The Italian Ministry for Agricultural, Food, Tourism and Forestry Policies

DEPARTMENT OF COMPETITIVE POLICIES, FOOD, EQUINE AND FISH QUALITY

DIRECTORATE GENERAL FOR MARITIME FISHING AND AQUACULTURE

The National Management Plan for fishing with hydraulic dredges and boat-operated shell-rakes as identified in the classification of fishing equipment use by mechanical dredges including mechanised dredges (*HMD*) and boat dredges (*DRB*)

(drafted in compliance with Article 19 of EC regulation no. 1967/2006 as well as Articles 7, 9 and 10 of EU Regulations No. 1380/2013 concerning Common Fisheries Policy).

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Premise

This National Plan for the Management of Dredges replaces the plan adopted in compliance with the Decree dated September 23rd, 2014 and is implemented through a consolidated management system by the individual Consortia for the management of clams (COGEVO) created with Ministerial Decree no. 44 dated January 12th, 1995. This system is regulated by national law and the managerial decisions made by individual Consortia. The current management system is the result of lengthy legal debates involving the national administration, regional administrations and local operators.

The characteristics of this resource (benthic fossor molluscs), the fishing fleets concentration within a few maritime districts, the homogeneity of the productive organisations, are the elements that have permitted the application of management measures that are atypical when compared to those used by other sectors of the Italian fishing industry characterised by elevated multi-specificity, fragmentation and low production specialisation.

The success of the management system adopted can be linked to a rise in levels of responsibility acknowledged to the Consortia by delegating to these the provision of exploitation rules through the approval of management plans set out for Maritime Districts and Regions.

Consortia must respect national and EU law that provides the common reference framework.

Details of the management plan for hydraulic dredges are the following:

1. Resources caught by dredges are not mobile in the sense that once the planktonic larval phase is completed the molluscs remain linked to the area in which they sink to the seabed and do not move. This means that the quantities of molluscs of the species that is the object of fishing are established by the quantity of larvae that settle on the seabed as well as their survival and is restricted by the available suitable surface.

2. There are a fixed number of fishing vessels permitted to fish molluscs and are established on a historical basis by the ministry's Directorate General for Fishing for each Maritime District. The number of vessels with dredges, a parameter linked to the fishing effort, cannot be increased.

3. Mono-specific fishing: in each area the vessels may fish the species indicated by the Consortium (clams, cockles and razor shells) and the dredges used for each species differ technologically.

4. Continuous monitoring activities and the cultivation of the resource by Consortia that close and open to fishing certain areas of the sea on rotation, include operations involving the collection and redistribution (seeding) of young clams in significant numbers (hundreds of millions of clams), implementing a daily check of amounts fished, defining a priori daily catches allowed, depending on the availability of the resource and market demand, establishing no-fishing rules for lengthy periods and areas in which fishing is forbidden or only occasionally allowed as well as significantly influencing the natural cycle of the species fished.

5. Fishing takes place exclusively in Italian territorial waters and the resources are not in common with other countries. This does not consist of normal fishing of natural resources, but an activity that involves partial seeding on the basis of the characteristics of the territory in each Maritime District undertaken by those directly involved within the framework of current legislation.

To the extent that it is necessary, each Consortium has appointed a recognised scientific body that cooperates with the Consortium in planning and implementing intervention.

Breeding operations, no-fishing periods, collection areas and daily amounts to be fished are different and are decided autonomously by each Consortium and, alongside particular ecological conditions in each area, are fundamental elements for the management of bivalve molluscs.

There are differences not only between populations of bivalve molluscs in different Maritime Districts, but also within each District in which there are areas with a high density of recently settled clams, areas in which the product is increasing and areas with a product of commercial size ready to be fished. Small clams are returned to the sea both in fishing operations and measuring processes and are then followed as they grow in size and decrease in number due to the multiple factors that exist in natural mortality rates.

These situations influence normal indicators for fishing activities, the number of fishing vessels is fixed and they all fish the same quantity of produce every day as established by the Consortium. The daily catch does not reflect the abundance of the resource but is linked to price changes, the amount of commercial clams available and those that will become commercial in the coming months.

The yearly catch for individual Consortia can be linked to the management implemented and does not reflect the status of the resource if not in situations linked to abnormal ecological factors (blights due to various reasons) that differ among maritime districts.

The Management Plan presented takes into account the national situation with rules valid for the entire country and the application of the Management Plan in individual Districts taking into account the local environment's situation and the state of the resource.

The Regions are the administrations than manage the many interventions there are in the fishing and aquaculture sector, including some that involve the use of EU funds (FEP and FEAMP) and cooperate with the National Administration and individual Consortia regarding the implementation of the management plan.

1. Management Plan Objectives

The main objective of the Management Plan is to maintain and develop fishing activities and management of bivalve molluscs implemented by Management Consortia at district level.

Management activities also include preserving suitable environmental living and development conditions for bivalve molluscs by introducing supplementary measures aimed at protecting the different phases of the biological cycles of the species involved, such as the biological community and the environment as a whole.

It is in the interest of producers to preserve the ecological equilibrium established after decades of sampling activities carried out along the coastline. The ecological conditions of the environment are essential in preserving and increasing production of the single species. Safeguarding jobs in the sector is a second objective that, in the discouraging situation of the Italian fishing industry, where in recent years the fleet, the number of people employed and production have been substantially reduced, a downsizing that has only left unscathed the fleet of hydraulic dredges.

Job preservation does not only refer to the number of workers involved in these fishing activities, but also considers working conditions in terms of hours, number of days on board fishing vessels, type of work and remuneration. Nowadays fishing with hydraulic dredges is viewed as the form of Italian fishing that offers the best social conditions and a concrete role for workers in building their future.

The Consortia do not focus their attention only on production but carefully consider commercial aspects, so that they can avoid harvesting the largest possible quantities of product when the market is saturated and large quantities of products would cause prices to drop. These efforts to maintain or improve economic results mean that, coordinating their activities with Producer Organisations, the Consortia agree on defining additional resting periods to keep prices higher. As has already been the case with abrupt wedge shell fishing using hydraulic dredges, the commercial coordination implemented by working with Producer Organisations has made it possible to constantly adjust production to market demand and the launching of promotional activities to increase the quantities required. In short, the plan's objectives are focused on the environment, production, employment and workers' income and the aim is not just to preserve them but to increase them..

GENERAL OBJECTIVES	**SPECIFIC OBJECTIVES**
To maintain commercial stocks' self-renewal capacity	To ensure a level of management of the resource that can ensure lasting exploitation
To reduce annual fluctuations in abundance	To preserve a high biomass of reproducers in selected areas in each maritime district
To reduce the impact of harvesting on the communities and species caught	To designate nursery areas with periodic rotation of fishing zones
To improve the economic conditions of businesses	Operations to release specimens below the minimum conservation reference size
	Operations to reactivate the resource by seeding quasi-commercial sized specimens, closure of the sown areas and subsequent harvesting once legal size has been reached
	To improve dredge selectivity reducing the possibility of catching specimens under the minimum conservation reference size
	To reduce the impact of automated sorting operations on molluscs
	To reduce closed fishing periods caused by product shortages

2. Legal references

Community Provisions

- Reg. EC 1967/2006 art. 4 prohibits the use of hydraulic dredges above seagrass beds of *Posidonia oceanica* or other marine phanerogams, coralligenous habitats and *maërl*beds.
- Reg. CE 1967/2006 art. 13 prohibits the use of towed dredges and hydraulic dredges within 0.3 nautical miles of the coast. Since the distribution of clams (Venus gallina) and grooved razor shells reaches the coastline, this limit, de facto, significantly reduces the fishing grounds and establishes a large protected area that for some species like grooved razor shells, in terms of extension, exceeds 90% of the area of distribution of the species.
- Reg. CE 1967/2006 art. 19 requires Member States to adopt Management Plans for fisheries conducted by hydraulic dredges within their territorial waters.
- Reg. CE 1967/2006 Annex II establishes that the maximum breadth allowed for dredges is 3 m.
- Delegated Regulation (EU) 2016/2376 of the Commission of 13 October 2016, that establishes a Discard Plan for bivalve molluscs *Venus* spp. in the Italian territorial waters, in derogation of the minimum conservation reference size defined in Annex III of Regulation (EC) n. 1967/2006, has established that the minimum conservation reference size in the Italian territorial waters is set at a total length of 22 mm.
- Based on the characteristics of dredges and trawling methods, art. 2 of Community Regulation 1967/2006 recognises 4 basic types of dredges:
  - Dredges towed by vessels, that is equipment actively towed by the main engine of the fishing vessel (corresponding to the Italian definition "traino per Mollusci" in DM 26/07/1995);
  - Mechanized dredges, that are hauled by means of a motorised winch from an anchored fishing vessel (corresponding to the definition "boat-rakes" in DM 26/07/1995);
  - hydraulic dredges, that are instead equipped with hydraulic devices and are commonly known as suction dredgers;
  - manual dredges that are pulled by hand or by manual winch in shallow waters, without or without a boat.

  - Regulation (EU) 1380/2013: Article 15 of Reg.(EU) 1380/2013, in force as of 1st January 2014, provides that all catches of species which are subject to limits[1] and in the Mediterranean also catches of species that are subject to minimum sizes as defined in Annex III of Regulation (EC) n. 1967/2006, are to be brought and retained on board fishing vessels, recorded, landed and counted against the quotas, where applicable, except when used a live bait. Hence the obligation for the Mediterranean Community countries starts from:

  a) no later than 1st January 2015 for:
  — small pelagic fisheries: European anchovy (Engraulis encrasicolus), Sardine (Sardina pilchardus) mackerel (Scomber spp), horse mackerel (Trachurus spp.), [to have a minimum size in Reg. 1967/06];
  - large pelagic fisheries: Red Tuna (Thunnus thynnus)[To be subject to catch limits– quota]
  b) no later than 1st January 2017 for the species which define the fisheries
  c) no later than 1st January 2019 for all other species in fisheries not covered by letter a) [that have a minimum size in Reg.1967/06]i.e.:
  Demersal species: European bass (Dicentrarchus labrax), Annular seabream (Diplodus annularis), Sharpsnout seabream (Diplodus puntazzo), White sea bream (Diplodus sargus), Two-banded sea bream (Diplodus vulgaris), Grouper (Epinephelus spp.), Striped sea bream (Lithognathus mormyrus), Hake (Merluccius merluccius), Red mullet (Mullus spp.), Axillary sea bream (Pagellus acarne), Blackspot sea bream (Pagellus

bogaraveo), Atlantic wreck fish (Polyprion americanus), Sole (Solea vulgaris), Sea bream (Sparus aurata), unless scientific evidence demonstrates high survival rates "taking into account the characteristics of the gear, of the fishing practices and of the ecosystem" (art. 15, paragraph 4, letter b);
Crustaceans: Prawn (Nephrops norvegicus), European lobster (Homarus gammarus), Spiny lobsters (Palinuridae), Mediterranean Pink shrimp (Parapenaeus longirostris), unless scientific evidence demonstrates high survival rates, "taking into account the characteristics of the gear, of the fishing practices and of the ecosystem" (art. 15, paragraph 4, letter b);
Bivalve molluscs: Mediterranean scallop (Pecten jacobaeus), Carpet shells (Venerupis spp.), Clams (Venus spp.),unless scientific evidence demonstrates high survival rates, "taking into account the characteristics of the gear, of the fishing practices and of the ecosystem" (art. 15, paragraph 4, letter b).
Paragraph 4 of article 15 sets out the cases to which the landing obligation does not apply:
a) species in respect of which fishing is prohibited and which are identified as such in a Union legal act adopted in the area of the CFP;
b) to species for which scientific evidence demonstrates high survival rates, taking into account the characteristics of the gear, of the fishing practices and of the ecosystem;
c) catches falling under the de minimis exemptions.
Recently, art. .9 of the Regulation (UE) 2015/812, so-called "Regulation omnibus", also introduced letter
d) fish damaged by predators.
Paragraph 5 provides that the details for implementation in the single States of the landing obligation are to be specified in appropriate multiannual plans, with reference in particular to different fisheries, to the species to which the landing obligation applies and to indications concerning the landing obligations for recognised high-survival species.
In relation to species subject to the landing obligation, catches under the minimum conservation reference size (indicated in Annex III of Reg. (EC) 1967/2006), may be used exclusively for purposes other than direct human consumption, and these uses include for example fishmeal, fish oil, animal feed, pharmaceuticals and cosmetics.
On the contrary, for species not subject to the landing obligation laid down in paragraph 1 (e.g. the ones that will be covered by this obligation as of 1st January 2019) catches of species of a size below the minimum conservation reference size, shall not be retained on board but must immediately be thrown back into the sea.
Lastly, to monitor landing obligation compliance, member States are required to guarantee detailed and accurate documentation on all fishing trips, as well as the appropriate capacities and means such as, for example, observers and closed circuit television systems (CCTV).

National Law

- The maximum daily quantity of clams that may be harvested by each vessel, set at 600 kg by DM 22/12/2000, has recently been brought down to 400 kg per vessel by DM 27/12/2016.
  The maximum daily amount of razor shells that can be fished by each vessel has instead been established at 100 kg in Adriatic Districts and 150 kg in the Tyrrhenian once by DM 2359 del 29/01/2018. As an experiment, however, the same decree allows fishing vessels in the Districts of Gaeta, Naples, Rome, Chioggia, Venice and Monfalcone the freedom to fish for razor shells also within the 0.3 nautical mile limit in the years 2017, 2018 and 2019.
- DM 22/12/2000 has specified the following characteristics for hydraulic dredges: *i)*a maximum cage width of 3 m; *ii)*a maximum pressure on the nozzles of 1.8 bar; *iii)*maximum weight of the gear 600 kg. Clam dredges are also subject to the following limitations: the distance between the metal rods in the bottom part of the cage must

be at least 12 mm. Instead of rods, square-mesh metal nets with a minimum mesh size of no less than 17 mm, or 12 x 25 mm rectangular mesh, or perforated sheet with round holes having a diameter of at least 21 mm and the full/empty ratio below ½. The product harvested by the dredge must be sorted using sieves with mesh having the same characteristics as the aforementioned cage.

- DM 22/12/2000 art. 6 prohibits the harvesting of abrupt wedge shells, venus clams and giant clams using hydraulic dredges
- DM 22/12/2000 art. provides that authorisation to fish bivalve molluscs is limited to the territorial waters of the district of registration of the vessel, unless otherwise indicated by specific provisions.
- DM 22/12/2000 envisages an obligation to stop fishing for razor shells from April 1st to May 30th for the Tyrrhenian Districts and from April 1st to September 30th for Adriatic Districts.
- DPR 1939/1968 indicates that the smallest size permitted for razor shells is 80 mm.

- The "*National Discard Management Plan for clams (Chamelea gallina)*" (GU N.8 11/1/2017), drawn up in compliance with articles 15 and 18 of the Regulation EU 1380/2013, adopting Regulation EU 2376/2016 of 13/10/2016, provides for the following*:*
    - has confirmed the number of vessels authorised to fish using hydraulic dredges until the end of December 2019 (DM 29/12/2014);
    - Has established a maximum of 4 fishing days a week;
    - has reduced the permitted amount of fish to 400 kg/vessel/day;
    - has made the system for monitoring the system for monitoring vessel position mandatory;
    - it has introduced for Management Consortia a system of certification of minimum conservation reference size(MCRS);
    - it has introduced the requirement to identity restocking areas to re-transfer products below the required size.
    - Renounced the 5% weight tolerance of the minimum reference size;
    - The harvesting of maximum 40 bags a day (400 Kg) per vessel, for the purpose of reducing production by 20%;
    - Application of the plan to all the clams sorted using sieves and retained on board;
    - the landing of all of each motorized fishing vessel's clams at landing sites where the molluscs consortia will have installed a sieve of the appropriate size;
    - operations involving a second selection, in optimal conditions on land, with the return to the motorised fishing vessels of all the clams above the new minimum conservation reference size (under the control of the Consorzi Gestione Clams, hereinafter CoGeVo), issuing to the fishing vessels a certificate confirming that the second selection has been performed;
    - collection by the CoGeVo of all clams below the new minimum reference size, present in the landed product, and re-transfer to areas of the sea chosen for restocking.

3. Consortia Management

The management measures included in this Management Plan define the reference framework within which the activities of the Consorzi di Gestione dei Molluschi will be carried out. The measures are proportional to the aims, the objectives and the planned schedules and take into account the following factors:

a) maintaining a high productivity of the single species or species;

b) the biological characteristics of the single species or species;

c) the characteristics of management and harvesting activities;

d) the economic impact of the measures.

The management of Chamelea gallina harvesting with hydraulic dredges is entrusted to the Consortia established pursuant to ministerial decrees no. 44/1995 and no. 515/1998 and recognised by the Ministry of Agriculture and Forestry; the operational procedures and the prerogatives of the Consortia are defined by the Ministerial Decree of 22 December 2000 that amends D.M. 21.7.1998, that regulates the fishing of bivalve molluscs. The principle that inspired this regulation, introduced in the 1990s by national policies, was to make it possible to adopt management systems that could make it possible to increase the added value for operators produced by the resource through management-related actions in relation to management of fishing zones entrusted directly to specific consortia, so as to ensure a balance between the fishing effort, stock dimensions and seeding as well as regulation of harvesting. Twenty years of experience with this management by the National Administration and the District Consortia and the excellent results achieved in terms of economic returns, make it possible to confirm the current management system for the hydraulic dredges sector for the coming years.

Rights-based management – RBM, in accordance with all that has been reported in the Commission's Communication, can improve the efficiency of fishing management, while facilitating achievement of the basic objectives pursued by the Community and the member States within the framework of the common fisheries policy (CFP), such as conservation of fish stock, preservation of the "relative stability" of fishing activities in member States and a competitive fishing industry. In the case of bivalve molluscs, management is effectively based on territorial fishing rights similar to those that exist in other Member States (in English TURF, Territorial Use Rights for Fishing). The introduction of territorial rights, that envisage the full transfer of responsibility to the holders of such rights, is appropriate in cases where the resources are sedentary; it is in this case only, in fact, that there is no competition between the parties who hold territorial rights and those who practice fishing outside the borders. The management of hydraulic dredges is very similar to this system, in which each fishing district operates and has fishing rights exclusively within its own territory (maritime district). However, there are in Italy innovative and highly successful situations, as is the case of OP Bivalvia Veneto and OP I Cockles, that are an example of joint management and supra-district cooperation that is unique on the entire Italian fishing scene and a source of pride, achieving social and economic sustainability that is constant over time and a reduction in product fluctuations in terms of both space and time, supporting profitable and long-lasting fishing activities.

There are currently 17 Management Consortia in Italy, listed as follows: *CoGeMo Monfalcone*, *CoGeVo Venezia*, *CoGeVo Chioggia*, *CoGeMo Ravenna*, *CoGeMo Rimini*, *CoGeVo Pesaro*, *CoGeVo Ancona*, *CoGeVo Civitanova Marche*, *CoVoPi San Benedetto del Tronto*, *CoGeVo Abruzzo*, *CoGeVo Frentano*, *CoGeVo Termoli*, *CoGeMo Manfredonia*, *CoGeMo Barletta*, *CoGeMo Napoli*, *CoGeMo Gaeta*, *CoGeMo Roma*).

Over the years the number of Consortia has increased with Barletta, Ortona and Gaeta among the most recent.

Almost the entire fleet is associated with the different consortia and this proves that members have a strong desire to belong to the Management Consortia. In particular, the slight difference between vessels authorised to harvest bivalve molluscs with hydraulic dredges and those that belong to the Consortia is due to the fact that, in the case of CoGeVo Abruzzo, 8 vessels do not belong to the Consortium. The other vessel not registered with the Consortium comes from Barletta, but it is not clear whether or not it is actually active. Special mention must be made of CoGeMo of Gaeta where in addition to the hydraulic dredgers, boat-operated clam rakes used for abrupt wedge clams harvesting also belong to the Consortium. Although all 4 authorised hydraulic dredgers belong to the Consortium, only 5 of the 11 boat-operated clam rakes belong to it, while the remaining 6 (the majority) do not operate under the Consortium's directives. Therefore, in actual fact, a number of vessels that is less than 75% of the ones authorised to harvest bivalve molluscs belong to the Consortium.

The current management system is the result of a lengthy development process that involved the central Administration and the Management Consortia, on the basis of the decree dated 22 December 2000. In some areas, for specific needs, ad hoc provisions have been introduced for a type of management better linked to local needs, as in the case of smooth clam fishing in the Veneto region.

The consortia are especially focused on managing and organising fisheries and seek, as far as possible, to safeguard fishing businesses while at the same time not reducing the natural product beds. The framework and the general rules are decided at the central level by the Directorate General for Fisheries and Aquaculture, while the Consortia can regulate activities in particular in the areas described below, naturally internally, adopting more restrictive measures within the boundaries set by national and community legislation.

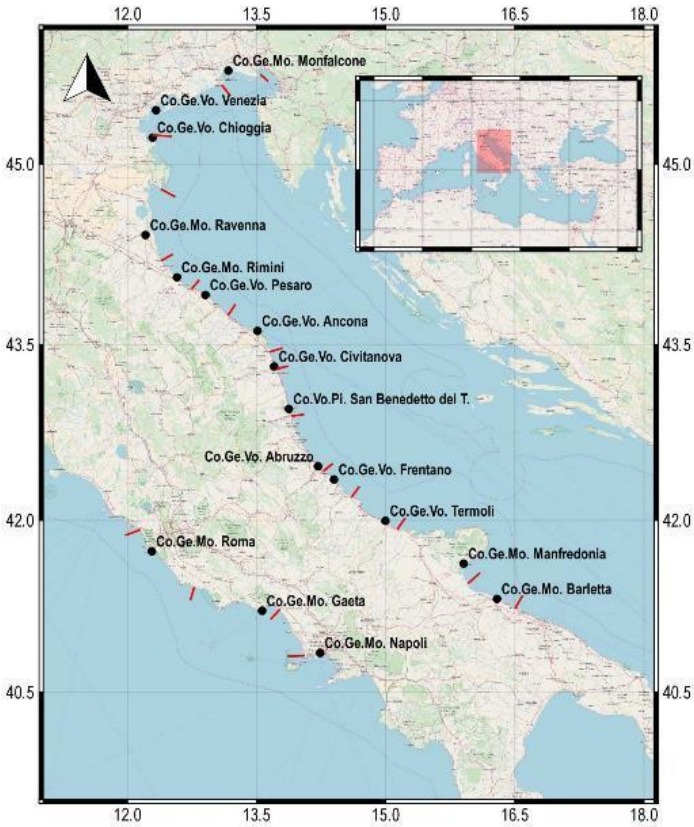

Figure 1. Graphic Map of the various bivalve molluscs fishery management Consortia and boundaries of the different reference Maritime districts (red bars).

Different Consortia have adopted diverse management measures to safeguard resources and maintain good social and economic sustainability. In addition to different bureaucratic activities (e.g. approval of financial statements, appointment of the Board, etc.) and actions to control and monitor members' activities, the Consortia have been involved, albeit in different ways, in defining different management measures:

- **- Maximum daily catch quantities allowed and fishing days**
- Maximum daily quantities are almost always lower than those established by the legislation in force: razor shell quantities, in particular, almost never exceed the limit. In some cases (e.g. North Adriatic Consortia) the quantities are set according to the size of the crew. Weekly fishing days are also established in connection with market demand and resource conditions.
- **Technical and voluntary resting periods**
  In addition to the two summer resting months established law, most Consortia generally have other months of voluntary no-fishing periods. In most cases, voluntary no-fishing periods are prompted by resource shortages resulting from natural fluctuations in stocks of the target species or, in more tragic cases, a high mortality rate.

Table 1. No-fishing periods (in months) in the various Consortia.

	Consortia								
Year	**Ancona**	**Civitanova**	**San Benedetto**	**Frentano**	**Chioggia**	**Venice**	**Ortona**	**Ravenna**	**Pesaro**
2006	2	4	2	1	2	2	-	-	7
2007	2	2	3	2.5	2	2	-	-	2
2008	2	2	2	4	2	2	-	-	2
2009	6	5	3	3	4	4	3	-	3
2010	3	2	2	2.5	4	4	2.5	-	2
2011	2	5	4	3	3	3	4	-	3
2012	4	2	2	3	2	2	2	-	5
2013	4	5	4	9	3	3	8	5	6
2014	4	3	4	5	4	4	5	7	5
2015	4	4	4	9	4	4	9	7	6
2016	4	3	4	12	3	3	12	2	2
2017	6	4	3	6	3	3	6	3	3
2018	5	3	3	2.5	3	3	2.5	7	3

- **Equipment Selectivity**
  Some Consortia of the middle-lower Adriatic, thanks to scientific support, have studied and introduced a number of changes to dredges to reduce their impact by changing the position of the nozzles and increase the flow of water inside the dredge so as to better expel the sand and juvenile specimens. This indicates that fishermen are careful about safeguarding the resource (especially the younger fraction) as well as the benthic habitat on which they live and grow. There are currently 15 projects underway for increasing the selectivity of dredges funded through FEAMP Measure 1.39 entitled "Innovation linked to the conservation of marine biological resources" of the EMFF 2014-2020.
- **Monitoring the resource**
  Constant and uninterrupted monitoring of the resource over the years, performed both on behalf of the Consortia members and in cooperation with research bodies (required by the National Management Plan for fishing using

hydraulic dredges and boat-operated rakes), is essential for obtaining a clear overview of both the resource's spatial distribution and its abundance, as well as the commercial and juvenile elements. Resource monitoring is preparatory to seeding, restocking, rotation and closure of fishing activities. The continued resource monitoring of resources marks a preparation for seeding, restocking, rotation and the closing of fishing activities.

Parallel to monitoring carried out by individual Consortia, monitoring of resources is also undertaken at a national level applying a standardized protocol.

The National Plan envisages that the Directorate General for Maritime Fishing, in cooperation with regional administrations, should supervise the correct implementation of the National Plan for the Management of Hydraulic Dredges, acting as the go-between for the European Commission's relevant offices. In order to achieve this, the Directorate General for Maritime Fishing receives all necessary information through Harbour Master Offices, the Regions, Scientific Institutions and recognised individual Management Consortia.

Monitoring takes place at two levels; district and national.

Monitoring at the Maritime District level is entrusted to a scientific centre approved by the Ministry for Agriculture, Food, and Forest Policies, chosen by the Management Consortium, which cooperates with the same consortium for all required technical and scientific aspects.

Every consortium, with its associates and with support provided by the chosen scientific institution, is responsible for continuously monitoring the state of resources in the area for which it is responsible. In order to be implemented, the consortium's management decisions, such as closing and re-opening areas, establishing the maximum amounts that may be fished, the periods of time during which fishing is permitted, the creation of restocking areas, seeding and moving activities, must be accompanied by the expert opinion of the appointed scientific institution.

The Consortia may divide up the territory they are responsible for into several areas for managerial reasons and establish their borders. On the basis of the results of their monitoring, the Consortium decides which areas can be closed or opened according to the reference points as set out in the Chapter entitled "Reference points".

By November 30th of every year, the Consortium for the Management and Protection of bivalve molluscs is obliged to send the Directorate General for Maritime Fishing a programme for management and protection activities it plans to implement for the following year, and also, for their information, to its regional authorities. By February 28th, each Consortium prepares a detailed report on management activities carried out by the Consortium itself during the previous year.

National monitoring will be carried out once a year, in one of the two months during which is it compulsory to suspend all fishing, following a protocol and standard methodology for all areas in which hydraulic dredges operate.

The same management plan can be revised by the Directorate General of Maritime Fishing on the basis of monitoring results or elements aimed at improving effectiveness.

- **Monitoring the fishing effort**

  Vessel position detection systems nowadays enable the Consortia to constantly monitor the fishing effort applied to the areas of reference. Each Consortium has adopted a position detection system most suited to its needs. Once it has been fully implemented, this tool will make it possible to plan harvesting activities, ensuring fishing-grounds rotation.

- **Seeding, restocking and rotation**

  These are the most important management measures to maintain both the resource stock and fishing activities. These actions are now undertaken by the majority of Consortia and supported by scientific advice. The best management practices for these activities have been identified in the northern Adriatic (Venetian Consortium): Thanks to breeding, restocking, closure and rotation of fishing activities, they have ensured a constant availability of the resource, reducing fluctuations and deaths. Significant redistribution of this resource also explains why traditional assessment methods are not applicable to clams.

- **Scientific support**

  Each consortium relies on technical-scientific advice from a reference research body. There are many cases involving productive and efficient cooperation both for stock maintenance and the adoption of more selective equipment having less impact. The results achieved by studies and monitoring carried out in cooperation with research institutions have resulted in increased interest and a positive stimulus among fishing vessel owners to implement activities increasingly managed and supported by scientific evidence, as proven by the Consortia's participation in various research projects aimed at training personnel, improving product quality and safeguarding the environment. Documentation clearly indicates that wherever fishing is carried out in close cooperation with a scientific institute, the state of the resource, and hence fishing activity, is better. The research institution contributes to the implementation of resource monitoring (at least once a year) in order to assess its biomass, abundance and distribution, as well as defining seeding, restocking, and rotation of fishing activities. The importance of scientific evidence is fundamental and indispensable for the management of fishing activities and the assessment of resources. It is no coincidence that wherever cooperation with research institutions is strong (for example Consortia in the North Adriatic) critical issues are successfully addressed and stock maintenance as well as socio-economic sustainability is guaranteed over time. Table 2 provides an overview of current cooperation between Consortia and scientific institutions.

Table 2: Overall picture Consortium by Consortium with organisational details, management measures implemented. Critical issues and eventual suggestions.

Consortium	District	No. of Associates	Scientific Institute	Target species	Consortium's strong points	Sector's criticalities
Co.Ge.Mo Monfalcone	Monfalcone – From the mouth of the Isonzo River (north) to Punta Tagliamento (south)	42 out of 42 (18 clam and razor clam fishing vessels + 24 hard clam vessels)	University of Trieste + Ente di Ricerca Agriteco, Venice	Cockles, razor clams, + Clams, peanut worms	Seeding, restocking and rotation activities; Supra-district coordination with the Co.Ge.Vo in Venice and Chioggia - OP Cockles; Constant monitoring of resources. Reduction of bivalve mollusc fishing through fishing peanut worms; Constant cooperation with scientific institution	The situation of natural banks of bivalve molluscs managed by the Co.Ge.Mo. in Monfalcone is experiencing an extremely delicate phase with very few clams and few razor clams present

Co.Ge.Vo Venezia	Venice - From Punta Tagliamento (north) to the northern breakwater of Chioggia Harbour (south)	86 out of 86 (63 clam fishing vessels + 23 smooth clam fishing vessels)	Ente di Ricerca Agriteco, Venice	Clams and cockles + razor clams, common cockles and murex snails	Excellent yield from bivalve stock. Stock management (clams and cockles) both in terms of production and at a socio-economic level; Seeding, restocking and rotation activities. Management measures addressing the impact of beach nourishment and the Mo.S.E; Supra-district coordination with the Chioggia and Monfalcone Co.Ge.Vo - OP Bivalvia Veneto and OP Cockles; Constant resource monitoring; Constant cooperation with scientific with scientific institution. Well-developed commercial policies.	Over the past 5 years the razor clam has almost vanished as a resource allowing no more fishing activities. Beach replenishment and port construction along the coast. Intense high-mortality rates in 2018
Co.Ge.Vo Chioggia	Chioggia – From the northern breakwater of the Chioggia Harbour (north) to the mouth of the Po River in Goro (south)	77 out of 77 (58 clam fishing vessels + 19 smooth clam fishing vessels)	Ente di Ricerca Agriteco	Clams and cockles + razor clams, peanut worms and common cockles	Management of bivalve stock (clams and cockles) with excellent yields both in terms of production and at a socio-economic level; Seeding, restocking and rotation activities; Managerial intervention addressing the impact of beach replenishment and the Mo.S.E; Sypra-district coordination with the Co.Ge.Vo in Venice and Monfalcone - OP Bivalvia Veneto e OP Cockles; Constant monitoring of resources ; Constant cooperation with scientific institution; Well developed commercial policies.	Over the past five years the razor clams have almost vanished to the point that no fishing is permitted. Beach replenishment and port-linked activities along the coastline. High mortality rates in 2018

Co.Ge.Mo Ravenna	Ravenna – From the lighthouse at Po di Goro (north) to the Canale Tagliata north of Cesenatico (south)	18 out of 18 (clam fishing vessels)	University of Bologna (Biology and Fishing Laboratories, Fano)	Clams	Seeding, restocking and rotation activities Creation of nursery areas; Constant resource monitoring; Cooperation with fisherman having small fishing activities .	Fishing restricted to the southern part of the district due to environmental restrictions and infrastructures such as the Military Firing Range etc.; illegal fishing of *Tapes philippinarum*; various high mortality events.
Co.Ge.Mo Rimini	Rimini – From the Canale Tagliata to Cesantico(north) to the port of Cattolica (south)	36 out of 36 (clam fishing vessels)	Cooperativa MARE, Cattolica	Clams	Rotation of fishing activities; constant monitoring of resources. Cooperation with scientific institutions. Commercial policies.	Significant presence of urban centres attracting many summer tourists. Presence of many mollusc farming centres. High-mortality rates and a fall in productive yields. Intense mortality in 2018
Co.Ge.Vo Pesaro	From Gabicce (north) to the Cesano River (south)	65 out of 65 (clam fishing vessels)	University of Bologna (Biology and Fishing Department in Fano)	Clams	Rotation of fishing activities; Two-yearly resource monitoring. Cooperation with scientific institutions.	Fluctuation of productive yields. Intense high mortality rates in 2018
Co.Ge.Vo Ancona	From the Cesano River (north) to the Potenza River (south)	74 put of 74 (clam fishing vessels)	CNR-IRBIM (ex ISMAR)	Clams	Rotation of fishing activities; Two-yearly resource monitoring. Cooperation with scientific institutions..	Fluctuation of productive yields. Intense high-mortality rates in 2018
Co.Ge.Vo Civitanova Marche	From the Potenza River (north) to the Chienti River (south)	25 out of 25 (clam fishing vessels)	CNR-IRBIM (ex ISMAR)	Clams	Rotation of fishing activities; Two-yearly resource monitoring. Cooperation with scientific institutions.	Fluctuation of productive yields. Intense high-mortality rates in 2018
Co.Vo.Pi S.Benedetto del Tronto	From the Chienti River (north) to the Tronto River (south)	56 out of 56 (clam fishing vessels)	CNR-IRBIM (ex ISMAR)	Clams	Rotation of fishing activities; Two-yearly resource monitoring. Cooperation with scientific institutions.	Fluctuation of productive yields. Intense high-mortality rates in 2018

Co.Ge.Vo Abruzzo	Pescara – From the mouth of the River Tronto (north) to themouth of the Alento River (south)	74 out of 82 (clam fishing vessels)	IZSAM (Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise Giuseppe Caporale, Teramo)	Clams	Seeding, restocking and rotation activities. Constant resource monitoring.; Adoption of more selective equipment; Scientific evidence; Sensitising fishermen regards to environmental protection.	Limited area of action following the creation of the AMP Torre del Cerrano; Excessive fishing in terms of the number of vessels. Fall in productive yields.
Co.Ge.Vo Frentano	Ortona – From Francavilla a Mare (north) to the mouth of the Trigno River (south)	21 out of 21 (clam fishing vessels)	CIRPSE (Centro Italiano Ricerche e Studi per la Pesca, Rome)	Clams	Management of clam stocks with good yields both in terms of productivity and at a socio-economic level. Seeding, restocking and rotation activities; Constant resource monitoring; Scientific evidence; Training for fishermen.	Clams restricted and limited as a resource in some areas. Occasional mortality events.
Co.Ge.Mo Il Colosso di Barletta	Barletta – From the Municipality of Zapponeta (north) to the Municipality of Bisceglie (south)	24 out of 25 (clam fishing vessels)	-	Clams, peanut worms	Seeding, restocking and rotation activities; Adoption of more selective equipment.	Limited fishing due to adverse sedimentological causes. Excessive number of vessels.
Co.Ge.Mo Napoli	Naples – From the mouth of the Garigliano River (north) to Mount Procida (south)	14 out of 14 (razor clam/clam fishing vessels)	-	Razor clams, wedge shells, Clams	-	-
Co.Ge.Mo Gaeta	Gaeta – From the mouth of the River Astura (north) to the mouth of the River Garigliano (south)	4 out of 4 (razor clam fishing vessel)	-	Razor clams, wedge shells	Stock management of razor clams with good yields both in productive and socio-economic terms. Constant data collection.	Reduced availability of fishing grounds . Classification of waters
Co.Ge.Mo Roma	Rome – From Fiumicino - Passoscuro to the mouth of the River Astura	20 out of 20 (clam and grooved razor shell fishing vessels)	-	Clams, razor clams, wedge shells	-	-

- **Commercial Policies**
  The commercial policies introduced by the Consortia are of vital importance because they can make it possible for fisheries to be profitable even when the resource is not abundant. Opening up new commercial avenues, new export destinations, "celebrating" the product locally through events and fairs are undoubtedly part of a strategy to be pursued as shown by some Adriatic Consortia.

- **Management beyond the Districts**
  This is exclusive to the Northern Adriatic Consortia and is at the forefront as one of the most interesting management methods in the entire Italian national fishing industry. The Chioggia CoGeVo and the Venice CoGeVo manage fishing in two different districts but in actual fact refer to a single Management Plan, unanimously shared by all the members of both Consortia, to which the 163 vessels of the Veneto Region belong. After an initial phase that presented organisational difficulties, for many years now an atmosphere of cooperation between the two Consortia has developed and has resulted in the establishment of two important producer organisations, OP Bivalve Veneto and OP I Cockles. The management of smooth clams harvesting represents the apex of beyond-border management, involving also the Monfalcone CoGeVo, for shared harvesting jointly managed by as many as 3 different Consortia belonging to two different regions.

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4. Critical issues

Several Consortia have raised different issues, some common to all and others that instead present some specificity limited only to some cases. The different problems, associated with both regulatory and management issues or environmental or anthropogenic factors (e.g. urbanization and infrastructures), are listed below:

Reduced fishing grounds due to Reg. (CE) 1697/2006

The critical issues that the bivalve molluscs fishing industry has faced following the coming into force of Reg. (EC) 1967/2006 (Mediterranean Regulation) and the resulting ban on the use of hydraulic dredges less than 0.3 nautical miles from the coast, have been found in all the maritime districts, although in varying degrees depending on the geological characteristics of the coastline involved and the target species.

The coming into force of the new limit in relation to distance from the coast for fishing activities performed using hydraulic dredges has, de facto, determined a significant reduction in usable fishing grounds. Above all in the Tyrrhenian area, where the Naples, Rome and Gaeta management Consortia operate and are mainly involved in razor shell fishing, implementation of the new regulation drastically reduces the fishing grounds because of the natural presence of this species in shallow coastal environments (1-3 m). Nationally, there has been an almost 50% reduction in fishing grounds, with peaks of over 90% in Apulia and the Tyrrhenian Sea (Latium and Campania). These decreases have caused operational and management problems for the Consortia, with repercussions on catches and profitability.

Table 3 quantifies the impact at a regional level of EC Regulation 1967/2006 on fishing areas for hydraulic dredges.

Table 3: Fishing areas that for Italian reasons are no longer available for fishing activities since EC Regulation 1967/2006 has come into force.

Region	Fishing ground (Km^2) before Reg 1967/2006	Fishing ground (Km^2) After Reg 1967/2006	% reduction of fishing ground
Friuli Venezia Giulia	88.0	56.4	35.9
Veneto	148.2	64.7	56.3
Emilia Romagna	127.2	57.8	54.6
Marche	252.2	163.1	35.3
Abruzzo	208.5	139.1	33.2
Molise	51.1	32.3	36.8
Apulia	102.5	10.2	90.0
Latium	78.2	2.5	96.8
Campania	52.1	0.2	99.6
Total	**1108.0**	**526.3**	**52.5**

Environmental Factors

The coming into force of the new limit in relation to distance from the coast for fishing activities performed using hydraulic dredges has, de facto, determined a significant reduction in usable fishing grounds. Above all in the Tyrrhenian area, where the Naples, Rome and Gaeta management Consortia operate and are mainly involved in razor shell fishing, implementation of the new regulation drastically reduces the fishing grounds because of the natural presence of this species in shallow coastal environments (1-3 m). Nationally, there has been an almost 50% reduction in fishing grounds, with peaks of over 90% in Apulia and the Tyrrhenian Sea (Latium and Campania). These decreases have caused operational and management problems for the Consortia, with repercussions on catches and profitability.

Furthermore, the absence of adequate quality control of the water that flows from rivers into the stretches of sea of all the coastal regions has in recent years caused restrictions on fishing grounds that could instead potentially be productive. The problem of water classification is typical of some Tyrrhenian areas, as is the case of the Salerno, Naples and Gaeta districts.

Other environmental factors affecting the state and distribution of the resource are linked to waters transported by rivers into the sea, as is the case of the Ravenna District, that can affect the biogeochemistry of sediments and the coastal seabed sediment characteristics (for instance muddy instead of strictly sandy sediments), making them less favourable for the survival of molluscs of commercial importance. By reducing the optimal habitats for their survival, these factors reduce the area of distribution of the target species.

High mortality and stock fluctuations

In recent years there have been local cases of high and even massive mortality, in some cases chronic and in others of a seasonal nature. These conditions of inactivity are the main threat in some Districts. The most extreme cases have affected the Ravenna, Rimini, Ortona Districts and the Apulia region as regards clams, a species that in recent years has seen a drastic drop in abundance also in the Monfalcone District. As regards razor shells, the resource has now been below the fishing threshold for many years in the Chioggia and Venice Districts. In this connection, actions to reactivate the resources are being undertaken.

Mortality phenomena are generally caused by sudden changes in the coastal environment (anoxia, intake from river water, storms at sea, pollution etc.). It has, however, been noted how clams have a significant ability to recover following stressful conditions and just like their reproductive biology they seem naturally prone to compensate for high mortality through intense recruitment.

The most recent high mortality event was seen in September 2018. The owners of hydraulic dredges reported widespread mortality of clams in the central-northern Adriatic, more or less from the Veneto to the Abruzzi Districts. In order to try and understand the reasons for this mortality and assess its intensity, random sampling was organised in the central Adriatic. An investigation of chemical and physical parameters was carried out in the same waters in which mortality occurred, in particular the levels of oxygen the temperature and levels of salt, to try and understand at least to a certain extent what the reasons had been, The presence of clams s significantly linked not only to the granulometry of the surface sediments and the environment conditions of the water near the seabed and in particular to oxygen levels. This pilot study emphasised how mortality had affected about 20-30% of the clams present in the area analysed (with peaks even above 40%). Physical data of the column of water near the area object of sampling and subject to clam mortality, are the object of monitoring by the CNR-IRBIM using a weather-marine station situated on a Meda platform off the coast of Senigallia (website rmm.an.ismar.cnr.it). The weather-marine station is able to register physical parameters such as wind, humidity, surface temperature, salinity, currents, temperature, dissolved oxygen, chlorophylla, wave height etc. Analysis of the data collected has allowed verification of the fact that at the moment in which mortality occurred there had been no sudden changes in physical parameters. However, in studying data for the previous period, it was possible to observe that an abnormal event has occurred on about August 28th , 2018. During that period that had been a large storm as shown by wind and wave measurements. During this event (sea storm) temperatures dropped suddenly (about 2 °C in 2 hours) and, even more importantly, slat levels too had fallen abruptly, a clear signal for a strong flow of sweet water also on the seabed. This flow was confirmed by measuring currents within the column of water, which show current intensity at about 50 centimetres per second (about 1 knot) in an East-South Easterly direction and thus coming from West-North-West (parallel to the Marche coastline). This intense flow of eater lasted for about two days from August 26th to August 28th.

As of August 28th one can observe a progressive rise in CDOM, dissolved organic matter, a clear sign of metabolic events on the seabed.

As a reaction to these events, one observed a brief hypoxia event on the seabed. Although brief, such an event may have been responsible for a situation involving significant environmental stress on the seabed. Clams have little movement and in hypoxia conditions may have reacted with massive mortality rates.

However, the fact that this mortality was rather selective and mainly involved clams, leaves open the hypothesis of a microbiological phenomenon. The outcome of possible health analysis carried out is, however, unknown.

In order to try and explain the biological dynamics of clams one should proceed by monitoring the chemical-physical parameters of the column of water and the granulometry of the seabed, so as to observe seasonal

variations in relation to the development of clams. This would allow the identification of anomalous changes in these parameters and the determination with far more probability of possible causes of frequent mortality events seen among clams in recent years.

Important high mortality events have taken place in 1991, 1993, 1996, 1998, 2000, 2004, 2008 and 2018.

Research carried out, however, has not managed to identify the causes of these mortality events and the outcome has been inconclusive (Froglia, 2000). Specific research on the presence of pathogen agents carried out during significant mortality events has, however, proved that over 90% of clams were, albeit slightly positive to the presence of parasites (*Perkinsus* spp, *Nematopsis* spp) which may have weakened the clams making them more vulnerable to stressful environmental conditions (hypo-anoxic phenomena, sudden changes in temperature and salinity etc.).

Man-made infrastructure and beach replenishments

In this regard the problems that hinder fishing are to be attributed mainly to the strong presence of urban centres, as is the case of districts with a strong seaside tourism industry (e.g. the Rimini district), and to the different man-made infrastructures that exist along the coastline. At times the fishing grounds are further reduced by the presence of other specificities as in the case of the Ravenna district where one area has been allocated for military use (Military Firing Range of the Military Command of the Defence Ministry) and in the Pescara District where the Torre del Cerrano protected area has recently been established. Added to that, the coastal area is a fishing ground to be shared also with small-scale fishing (drift nets, pots, etc.) and with mollusc farming facilities (e.g. mussels), that further limit the range of activity of hydraulic dredges during some seasons of the year.

Along the Veneto coastline instead there are periodic beach replenishments and other port engineering activities (e.g. creation of underwater dams at Lido of Venezia and Pellestrina, Mo.S.E project, etc.) that over time permanently and constantly reduce areas that were traditionally used as fishing grounds.

5. Measures envisaged by the New Management Plan for the species *Chamelea gallina*

Measures envisaged by the previous Management Plan produced good results. Such measures should therefore been confirmed and improved in cases in which they were insufficient.

5.1 Amounts unloaded and fishing days

Maximum daily quantities are those imposed by the regulations in force; the maximum daily catch limit is set at 600 kg / vessel, reducing the maximum daily catch to 400 kg/day with the current National Plan for Discards. Fishing days allowed amount to 5 a week with a reduction to 4 days a week in the current National Plan for Discards.

5.2 Fishing grounds

Vessels are authorised to fish exclusively in the waters of the district the vessel is registered unless there are specific exemptions.

5.3 Monitoring vessel activity

Boats must be equipped with a system for monitoring their position; the catch monitoring system will be used not only for control purposes, but also to initiate management activities based on systems for rotating fishing areas. Once the resource is exploited below the attention limits established by the reference points, the vessels will have to migrate to other fishing areas leaving the previous areas to rest for at least 3 months. Systems for detecting the position of vessels now allow the Consortia to constantly monitor the fishing effort applied to the reference areas. Therefore, once fully operational, this equipment will allow planning of fishing activities allowing a rotation of fishing areas.

5.4 Certification system

The Consortia maintain a certification system of the minimum reference size for conservation purposes (MCRS, 22 mm for clams);

5.5 Restocking

Restocking areas are kept to relocate the undersized product and maintain a breeding stock share.

5.6 Landing sites

The Plan is applied to all clams selected using sieves and kept on board; clams caught by each motor fishing boat are landed only at landing sites, where the shellfish consortia will have installed a sieve of adequate size used for measuring operations.

5.7 Assessment Operations

Secondary sieving operations are carried out at sea or on land, with all clams above the new minimum size of reference for conservation being returned to the boat (under the control of the Clam Management Consortia, hereinafter referred to as CoGeVo); after sieving operations, the motor fishing vessel will receive a certificate of second sieving. After sieving, all undersized clams will be collected by CoGeVo and transferred back to the sea areas intended for restocking (in the first two years of implementation of the Plan, minimum quantities of clams with a size of less than 22 mm were found).

5.8 Equipment selectivity

Initiatives are encouraged to increase the selectivity of the catch and sieving systems and increase the chances of survival (MIPAAFT has already evaluated and activated 15 projects). .

5.9 Fishing closure

The law obliges the respect of a two month no-fishing period (from April to October). Voluntary no-fishing periods are linked to high-mortality events or commercial problems caused by an excess of production or are autonomously decided by Management Consortia.

5.10 Seeding, restocking and rotation

These are the most important management measures to maintain both the resource stock and fishing activities. These actions are now undertaken by the majority of Consortia and supported by scientific advice. The best management practices for these activities have been identified in the northern Adriatic (Venetian Consortia). Thanks to breeding, restocking, closure and rotation of fishing activities, they have ensured a constant availability of the resource, reducing fluctuations and deaths.

5.11 Statistical data

Every vessel authorised to fish for *C. gallina* is obliged to register the fishing grounds used, the species and quantities of the daily catch in a fishing journal to be sent on a monthly basis through the Maritime District's Management Consortium to its reference research institution.

5.12 Scientific evidence

Each consortium relies on the technical-scientific advice of a research body of reference for the constant monitoring of the resource, for the definition of rotating fishing areas, for the operations of re-breeding or reactivation of the resource. The Consortia and the reference scientific bodies shall interact with the appropriate national scientific institutions, in the event scientific information is needed.

5.13 Monitoring

The National Plan envisages that the Directorate General for Maritime Fishing, in cooperation with regional administrations, should supervise the correct implementation of the National Plan for the Management of Hydraulic Dredges, acting as the go-between for the European Commission's relevant offices. In order to achieve this, the Directorate General for Maritime Fishing receives all necessary information through Harbour Master Offices, the Regions, Scientific Institutions and recognised individual Management Consortia.

Monitoring takes place at two levels; District and National .

District Monitoring

Continuous monitoring of fishing activities at a Maritime District level is entrusted to a scientific body, chosen by the Management Consortium, which cooperates with the same consortium for all required technical and scientific aspects. The Consortium's reference body's task is to monitor the resource status and outline eventual situations that could compromise these resources and fishing activities. Every consortium, with its associates and with support provided by the chosen scientific institution, is responsible for continuously monitoring the state of resources in the area for which it is responsible. In order to be implemented, the consortium's management decisions, such as closing and re-opening areas, establishing the maximum amounts that may be

fished, the periods of time during which fishing is permitted, the creation of restocking areas, seeding and moving activities, must be accompanied by the expert opinion of the appointed scientific institution.

The Consortia may divide up the territory they are responsible for into several areas for managerial reasons and establish their borders. On the basis of the results of their monitoring, the Consortium decides which areas can be closed or opened according to the reference points as set out in the Chapter entitled "Reference points". Management decisions proposed by each management consortium, such as maximum amounts of fishing permitted, period of time during which fishing is allowed, the creation of restocking areas, etc. must be accompanied by the expert opinion of the reference scientific institution in order to be adopted.

By November 30th of every year, the Consortium for the Management and Protection of bivalve molluscs is obliged to send the programme for management and protection activities it plans to implement for the following year to the Directorate General for Maritime Fishing, and also for their information to its regional authorities. By February 28th, each Consortium prepares a detailed report on management activities carried out by the Consortium itself during the previous year.

National Monitoring

National monitoring will be carried out once a year, in one of the two months during which is it compulsory to suspend all fishing, following a protocol and standard methodology for all areas in which hydraulic dredges operate.

A working group for fishing with hydraulic dredges is set up at the Directorate General, the members of which are chosen among mollusc fishing, biology and environmental experts. The working group sets out the sampling procedures for the annual national monitoring programme, analyses the results and cooperates with the Directorate General in the preparing of the yearly report on the state of bivalve mollusc resources in Italy, a report that will then be sent to the European Commission.

National monitoring will be carried out by one or more approved scientific institutions identified by the Directorate General for Maritime Fishing and operating on the territory in cooperation with the consortia.

Monitoring results concerning individual districts will be reported to the individual consortia by the Directorate General, indicating possible measures to be adopted on the basis of density figures found and compared to reference point figures as set out in the chapter entitled "Reference points". .

Should individual consortia reveal inadequacies or malfunctions in managing activities, the Directorate General will adopt appropriate provisions aimed at avoiding such shortcomings to the extent of revoking the appointment.

Bivalve mollusc fishing will be regulated directly by the Ministry in maritime districts where Management Consortia have not yet been established or have not obtained results or whose ministerial approval has been withdrawn.

. The Management Plan will be reviewed every three years, on the basis of annual management reports for individual districts and on the basis of the situation concerning the state of resources found in annual monitoring carried out using a uniform methodology as requested by the Italian Fishing Administration. Since within the Directorate General for Fishing there is a working group cooperating in the preparation of the yearly report on the state of bivalve mollusc resources, it will be the responsibility of this Directorate General for Fishing to send this paper as an intermediary report to the offices of the European Commission.

The Management Plan itself may be reviewed by the Directorate General for Maritime Fishing on the basis of results arising from monitoring or should elements arise to improve its efficiency.

National Monitoring controls two aspects considered fundamental for programming fishing activities and they are:

1) The commercial size quantity of clams present with the quantity of clams that will grow to commercial size during the three months that follow the sampling period. This result will be used for managerial reasons by the CoGeMo since, with knowledge of the quantity and location of commercial resources, the fishing areas to be used can be managed, as can the daily fishable amounts and the number of fishing days allowed, obviously paying attention to commercial aspects (overall quantity of the product placed on the market by other Management Consortia). The quantity of clams that will be marketable over the three following months and their distribution over the territory is a figure used to programme fishing, not immediately but with the perspective of a few months. This monitoring envisages the use of sample collecting sieves all over the District with equidistant areas and about 4 samples taken at different distances in every area. The product caught using normal dredges is assessed using a sieve with 19 mm holes so as to separate all clams measuring more than 25 mm and clams between 22 mm and 25 mm. When monitoring was started clams had a commercial size of 25 mm.

2) The second type of monitoring, carried out simultaneously, concerns the composition by size and abundance of each category of size of clams populating the seabed, without the influence of the selectivity of the dredges or sampling. From a biological perspective and that of population dynamics it is important to have knowledge of the composition of the population based on size, the level of induction and the biomass of reproducers. To achieve this, the monitoring programme for clam population has been developed, adding a small link sieve with 12 mm openings both on entering the dredge and immediately behind the blade. This is done so as to collect a sample of the population before it enters the dredge, determining the quantity of clams/m² and their composition by size.

5.14 Reference points

In establishing the reference points for sampling activities to be considered valid for all areas in which hydraulic dredges are used for fishing, what are mainly considered are a number of biological aspects of a species with elevated fecundity levels and a spatial distribution linked to the planktonic larvae phase and with a need for free spaces where they can settle considering their lack of mobility once they have descended to the seabed. These biological aspects, added to the lengthy reproductive period, elevated predation, determine a non-homogenous distribution of clams, by density, by size and set in time. Even within one same Maritime District there are very different conditions that are not constant over time. The biological and ecological aspects are shared with other bivalve molluscs that are cultivated, (for example Filipino Clams) and some of the rules for correct management used in the cultivation of Filipino clams are applicable also to clams, razor clams and cockles. For each of these species, the existence of a number of areas with the presence of reproducers seem sufficient for producing enormous numbers of larvae that can populate the species' distribution area. The larvae's descent to the seabed is conditioned by oceanographic factors and the presence of areas without, or almost without, adults and predators. The cleanliness of the area before the larvae descend to the seabed determines strong recruitment just like the preparation of agricultural land facilitates seeds taking root.

One must bear in mind that in every Maritime District there are vast areas in which fishing is not permitted for a variety of reasons, in particular areas within 0.3 nautical miles, as well as areas not considered suitable for health reasons and those with other restrictions (protected marine areas, areas under environmental protection, military zones, concessions for aquaculture, etc.). These areas in which fishing is forbidden are reproduction areas and cover between 30% and 60% of the entire clam distribution areas. The planktonic larvae are also transported all over the remaining distribution area. According to observations repeated in various periods and different areas, commercial clams have already been reproducing for at least a year..

In all fishing areas there are zones with very many small sized (less than 10 mm) clams with a density often over 1,000 Clams/m^2 right next to areas with only a few dozen that, in this case, are larger, over 18-20 mm, which are clams that survived for more than a year after descending to the seabed when fishing had not yet started. This situation involving great diversity in the presence of clams appears in all individual samples as reported in the part involving the application of the Plan to different regional realities.

Such conditions evolve continuously since it takes clams about two years to reach commercial size. Clam growth amounts to 1-2 mm a month, as size-distribution in one area is known as is the period required to reach commercial size for most clams.

Management of this type of resource is similar to that of many vegetal organisms of which the number of plants and the distribution is known and collection is managed on the basis of desired growth and survival achieved.

In order to manage the clam population it is necessary to establish objective indicators so as to compare the resource's status over time. The size of daily catches does not reflect the abundance of this resource, but is linked to price dynamics and the amount of commercial clams available as well as quantities that will be available on the market in following months. Linking biological aspects to socio-economic ones makes it possible to determine average clam density both as figures below which fishing should not be permitted and an optimal figure to be aimed for to obtain optimal fishing yields.

The reference points considered in this plan refer to the biomass of commercial size organisms. This is a valid approach for each of the three species: clams, razor shells and cockles as in the previous Management Plan.

Clam distribution within each Maritime District presents a significant spatial variability and one can find areas with very low commercial clam presence as well as other areas with a more elevated density in all Maritime Districts.

The amount of clams present is linked to the manner in which clams sink to the seabed at the end of their planktonic phase. If clams or other organisms have already settled on the sediment, the number of new clams settling there is very low; if instead the area has few filter-feeding organisms since it has recently been dredged, then the number of clams that settle on the seabed will be more significant. The descent of clams to the seabed takes place over a long period of at least 6 months (from April to September) determining variable distribution.

The biological factor in the distribution of clams in the area, linked to the growth of individual clams, determines the value of the biomass per surface unit, which is the most important biological parameter in terms of management.

As far as the involvement of Consortia in the management the resource is concerned, it is necessary to use as management references points a parameter that is easily understood by individual fishermen and that does not involve theoretical models but easily identifiable situations. This determines the choice of an indicator that is not referred to the entire clam population, but only to the fraction visible to fishermen, hence the biomass of clams that are larger than those fished and therefore commercial size clams.

One should bear in mind that it is first of all the District Management Consortia that determine fishing pressure (fishing days and daily catch allowed) and the areas in which fishing is permitted, closing and opening them to fishing when necessary. This management system must be equipped with information regarding distribution based on size and the biomass of clams for each district and it is also in order to achieve this that the CoGeMo are assisted by a scientific institution responsible for monitoring.

For each species and for each GSA where there are non-uniform environmental conditions, commercial product density values are defined as reference points. Below threshold quantities cause the area or sub-area to be closed to fishing. Values slightly above this figure may be compatible with fishing but determine a state of attention that requires more frequent controls. Density values above the upper threshold indicate that the resource is managed correctly.

Average density per surface unit has been identified as an abundance index. This indicator is independent from fishing and is based on standard samplings, aimed at determining the average density of the resource on samples taken on transepts and equidistant stations. Knowledge of the size of the dredge, the length of areas dredged and therefore the area explored, allows one to obtain average values of density and biomass per surface unit as well as size distribution. Since this species (like other bivalve species that are the object of fishing) once it has sunk to the seabed following the larval stage, does not move except for extremely small distances, it becomes possible to follow mortality rates for the various sizes over time and in space. Clam density affects the fishing time needed to reach the predetermined daily quantity. In the management of fishing, in particular the length of periods when fishing is forbidden, one must consider the simultaneous presence of different sizes that, once the time required has passed, will gradually increase the average density of the commercial product.

As known, monitoring is also needed to determine the size of the areas in which bivalve molluscs are present and therefore sampling is continued as far off shore as clams are found.

The minimum presence of clams required for commercial fishing has been set out in the National Management Plan for Fishing with Hydraulic Dredges (DM 24/7/2015) as at least 1 ind m^{-2} of commercial size, corresponding to about 5 gm/m^{-2}. This index based on biological aspects allows the determination of areas managed in an efficient manner and those that are instead experiencing issues and need management intervention. There are various figures (*Reference points*) to be taken into account. Quantities below the lowest limit should suggest closing the area to all fishing activities. Figures slightly higher are compatible with fishing activities but do demand a degree of attention with more frequent monitoring and, as a precaution, continuation of fishing could eventually involve changes made to the daily quota or halting all fishing should the biomass fall below such levels. Density figures superior to the upper limit indicate instead that the resource has been correctly managed. Furthermore, studies in the distribution of the frequency of lengths allow the determination of which areas are characterised by clams of a size that permit one to envisage that the commercial size will be exceeded in the coming three months or more. Once the areas characterised by the presence of young clams are known, it is possible to plan fishing and seeding of the product in low density areas.

The vibrating screens currently used on professional fishing vessels retain almost exclusively samples that measure more than 22 mm, releasing back into the sea all smaller ones with very high survival rates. Fishing activities therefore seem to essentially involve clams that are over a year old, while natural mortality rates appear to mainly affect smaller sized clams. In particular, sudden high-mortality seems to be sparked by a high density of clams per surface unit.

At the moment, *reference points* for razor clams and smooth clams in Italian waters, defined by the National Management Plan For Fishing with Hydraulic Dredges (DM 24/7/2015), are those set out in Table 4. The reference limit for a density of 10 gr/m² of commercial clams as the indicator of correct management, corresponds to about 100 kg of clams per hour of fishing, so that every fishing vessel operating in a sub-area can catch the maximum daily quantity allowed in about 4 hours of work.

Table 4. Reference figure on clam density in the various GSAs (Geographical Sub Areas, FAO; source Rules 1967/2006).

Density referred to the commercial biomass of *Chamelea gallina*			
	Good management	*Attention interval*	*Fishing forbidden*
GSA17	> 10 g/m^2	5 - 7.5 g/m^2	< 5 g/m^2
GSA18	> 8 g/m^2	4 - 6 g/m^2	< 4 g/m^2
GSA9-10	> 8 g/m^2	4 - 6 g/m^2	< 4 g/m^2

The Consortia establish lower daily quantities to avoid an excess of product on the market so that the established daily quota can be fished in 3-4 hours.

Furthermore, as a precaution, it was considered appropriate to also add a limit described as one of "attention" involving periodical monitoring (every two months) of the state of the resource, which depending on the outcome can result in continuing fishing activities, making possible changes to the daily quota permitted or closing the area if the biomass has fallen below the aforementioned levels (4/5 grams per square metre).

For all three species fished using hydraulic dredges, the current commercial size is significantly larger than the size reached on sexual maturity; hence the biomasses of specimens considered concerns specimens that have already reproduced. As far as the individual regional areas are concerned, situations that existed during the most recent sampling are reported. Procedures for closing or opening areas and sub-areas are the following:

Each Consortium determines the limits of eventual managed sub-areas within the framework of the territory on which it operates.

Two kinds of monitoring are carried out in each sub-area

- Coordinated yearly monitoring following a standardised methodology, identical for all districts, carried out by an authorised scientific institution chosen by the MiPAAF's General Directorate for Fishing, during the months in which it is compulsory to stop fishing;
- Continuous monitoring carried out by individual Consortia with the objective of programming normal fishing activities with support provided by a scientific institution chosen by the Consortium using methodologies considered to be the most appropriate.

Should the continuous monitoring carried out by individual Consortia in sub-areas in which the average density of the commercial product appears to be under the established limit, within 15 days the Consortium must rule to close this sub-area to fishing and report this decision to the Maritime Authorities.

Should the biomass be found to be in the range of the 'attention' period, the Management Consortium must inform the Maritime Authorities and within two months of the previous monitoring session carry out another together with its reference scientific institution. Two-monthly monitoring must continue until the size of the biomass remains within the "attention" range.

The results of monitoring carried out by Consortia during the 'attention' period showing that possible closure of the area may apply, are to sent through the Maritime Authorities to the Directorate General for Maritime Fishing.

Areas or sub-areas closed to all fishing remain closed until later monitoring indicates that the reference figure for closing has been overcome. Should figures remain within the 'attention' range then fishing may be allowed with two-monthly monitoring.

The closing and opening of fishing areas is currently managed by Consortia using their own reference parameters that are very similar to those envisaged in this Management Plan.

The Management Plan concerns clams, razor clams and cockles fished using hydraulic dredges all over the Italian territory. For each species and for each GSA where there are non-uniform environmental conditions, commercial product density values are defined as reference points..

The management of fishing is organised on the basis of maritime districts and sub-areas when identified within each District. This indicates than managerial rules are applied separately for each Maritime District according to the status of the resource. Management measures are modulated according to the status of the resource and can range from total

closure of part of a district to closing the entire district. Furthermore, temporal restrictions are also envisaged (number of fishing days per week) as are quantitative ones (reduction of the maximum quantity of catch allowed).

Management rules have all the required flexibility to adapt sampling to the local status of resources. Precaution measures take into account the possibility of also regulating amounts permitted to be fished and the duration of individual measures applied.

Experience in the use of these reference figures has indicated a number of situations and there is ongoing analysis so as to adapt the references points.

Critical issues found are the following:

- Density figures below the reference figure can be found only in some rather small areas and not as average figures for the entire district or managed sub-areas created by the CoGeMo. This involves partial closings.
- Variation of the reference commercial size, which until 2016 was 25 mm and is currently 22 mm. Since the importance of size categories of 22-23 and 24 mm is always superior to the number of 25 mm clams, there is a significant difference in the calculation of the commercial biomass using two figures. This aspect can be overcome by calculating the biomass for each size category.
- The recovery of clams fished in areas in which sand is taken for beach replenishment along the coast is used to repopulate areas where there are few clams and thereby returning some areas to a density with figures higher than the reference range.
- Scientific monitoring carried out by research institutes can take into account areas that differ in size on different years due to the variation of the clams' areas of distribution. When the area is increased, the average figure for clam density also increases for the entire district.
- The role played by clam density in areas that for various reasons are excluded from fishing, but that also have a great importance in the renewal of the population.
- Little knowledge of the role played by clam density in spawning processes regards to the minimum density of reproducers, mechanisms for synchronising the emissions of gametes in the water and the time needed to ensure spawning. This aspect is important but must be integrated by knowledge of the quantity of clams capable of reproduction with a size smaller than the commercial one. On the basis of monitoring, for each clam measuring 25 mm per m² there are always at least another 25 clams larger than 16 mm, hence capable of spawning.
- Seeding operations are carried out by the CoGeMo, collecting clams from high density areas and seeding them in other low density areas within their own districts. This reduces the time needed to reactivate collection in areas with low density. All the CoGeMo have undertaken seeding activities when necessary, moving on every occasion hundreds of millions of clams. Seeded areas are monitored in order to verify when collection activities can be resumed. Very significant seeding activities were undertaken in 2018 in the Monfalcone District using clams collected in the districts of Chioggia and Venice.

So as to overcome critical issues, a scientific study group is active supporting the so-called Mollusc Table at the Directorate General for Maritime Fishing in order to verify ways of standardising reference values and calculation modalities as well as providing CoGeMo with objective criteria for safeguarding resources.

It must be emphasised that fishing clams and other bivalve molluscs (razor clams and cockles) operating on resources with little mobility and with a very elevated degree of managerial involvement by fishermen, requires managerial modalities, that within the limits of safety and state control are applicable by those directly involved, involving them and allowing all attention to be aimed at the resource, the management of which is becoming that of a home-bred resource involving operators.

Current reference points have been used as a precautionary approach because they have been implemented since the end of the 1970s; therefore the limit of 5 g/m^2 can be used as the Limit Reference Point (LRP) and the one over 10 g/m^2 as the Target Reference Point (TRP). When clam density falls below 10 g/m^2, Management Consortia activate measures aimed at reducing fishing in areas identified as experiencing problems. Hence over the past 40 years, these reference points have been applied and have guaranteed the presence of the fishing fleet (about 588 fishing vessels in the Adriatic Sea), of fishermen and economic performance. Having reached these limits, the Consortia react by closing fishing activities until clam density rises above these RP. Table 5 indicates fishing closure decided on over the past 12 months on the basis of the status of resources according to the reference points. It is possible to observe that on the basis of the status of resources, the different Consortia have also decided to close fishing areas for long periods of time in order to return to clam density. A long period closed to fishing may also be caused by sudden massive natural mortality rates caused by environmental factors.

Table 5. Number of months during which fishing is stopped established by the individual Consortia.

	Consortia								
Year	**Ancona**	**Civitanova**	**San Benedetto**	**Frentano**	**Chioggia**	**Venice**	**Ortona**	**Ravenna**	**Pesaro**
2006	2	4	2	1	2	2	-	-	7
2007	2	2	3	2.5	2	2	-	-	2
2008	2	2	2	4	2	2	-	-	2
2009	6	5	3	3	4	4	3	-	3
2010	3	2	2	2.5	4	4	2.5	-	2
2011	2	5	4	3	3	3	4	-	3
2012	4	2	2	3	2	2	2	-	5
2013	4	5	4	9	3	3	8	5	6
2014	4	3	4	5	4	4	5	7	5
2015	4	4	4	9	4	4	9	7	6
2016	4	3	4	12	3	3	12	2	2
2017	6	4	3	6	3	3	6	3	3
2018	5	3	3	2.5	3	3	2.5	7	3

6. Rules envisaged by the New Management Plan for *razor clams*

The following are the management rules for the fishing of razor clams

6.1 Authorisation to fish and number of fishing vessels

In recent years, razor clam fishing has been carried out with a limited number of fishing boats, as it is subject to derogation for experimental purposes in the Maritime Compartments of Monfalcone, Venice, Chioggia, Rome, Gaeta and Naples, to collect technical and scientific elements useful for managing a resource that populates the seabed at the turn of 0.3 nautical miles.

The experimental fishing campaigns will end on December 31st 2019 and, following the analysis of the technical-scientific results, the present Management Plan for the razor clam resource will be updated, possibly extending the measures to all the National Maritime Compartments, considering the geo-morphology optimal habitats in the presence of razor clams and considering the contents of Article 7 of Reg. (EC) 1224/2009 and of Reg. (EC) 1967/2006.

6.2 Amounts unloaded

Maximum amounts allowed to be fished by each fishing vessel on a daily basis are:

- 300 kg in the Adriatic Districts
- 300 kg In Tyrrhenian Districts;

Management Consortia are permitted to establish maximum amounts to be fished on a daily basis, the number of days on which fishing is permitted, fishing areas and the time at which vessels may leave harbours. Such rules are decided in cooperation with the reference research institution.

In the context of experimental fishing regulated, most recently, with the Ministerial Decree 29.1.2018, the maximum catch limits for each authorized vessel are the following:

- 100 kg in the Maritime Compartments of Monfalcone, Venice and Chioggia;
- 150 kg in the Maritime Compartments of Rome, Gaeta and Naples. As part of the agreement stipulated with the C.N.R. of Ancona an experimentation activity was carried out within the maritime compartment of Salerno aimed at knowing the distribution and the entity of the razor clam resource historically taken in this area.

6.3 Fishing period and fishing days

In the Tyrrhenian Sea (GSA10) fishing is permitted for 8 months, for a maximum of 4 days a week (fishing is stopped on a compulsory basis from April 1st to May 21st in the Tyrrhenian Sea);

In the Adriatic Sea (GSA17 and GSA18) the fishing period for razor clams goes from October to March, with a maximum of 5 days a week permitted. Consequently, fishing is stopped every year from April to September.

The reduction of the fishing period also reduces the impact of dredges on other macro-invertebrate species, which with their presence guarantee the system's optimal functioning. In the six months during which there is no fishing the only physical impact that might affect the community would be the natural one of the waves and coastal currents, to which such communities are accustomed and that would not be emphasised or made more extreme by fishing activities. From an economic perspective, a slight rise in prices (trying to always remain below the maximum allowed) would help those who work in the razor clam fishing sector to recover the losses they suffer during the no-fishing period. Additional earnings could come from reconversion during the no-fishing period aimed at other target species (Clams, peanut worms, wedge shells) that would provide an additional source of income.

6.4 Fishing grounds

Incentivising a strategy of divisions into exploitable sub-areas on a rotation basis and identifying different areas within each individual District, to be closed to fishing in order to allow the resource to “rest” encouraging normal spawning and the completion of an entire cycle of growth for the species.

6.5 Statistical data

Every fishing vessel authorised to fish for *C. gallina* is obliged to register fishing areas, specific hours spent fishing and daily catch in a special daily fishing journal to be sent every month through the Maritime District Management Consortium it belongs to its reference research institution

6.6 Scientific evidence

Each consortium relies on the technical-scientific advice of a research body of reference for the constant monitoring of the resource, for the definition of rotating fishing areas, for the operations of re-breeding or reactivation of the resource. The Consortium and the reference scientific bodies shall interact with the appropriate national scientific institutions, in the event scientific information is needed.

6.7 Monitoring

The Management Plan for razor clam fishing envisages that the Directorate General for Maritime Fishing, in cooperation with regional administrations, should supervise the correct implementation of the National Plan for the Management of Hydraulic Dredges, acting as the go-between for the European Commission’s relevant offices. In order to achieve this, the Directorate General for Maritime Fishing receives all necessary information through Harbour Master Offices, the Regions, Scientific Institutions and recognised individual Management Consortia.

Monitoring is carried out at two levels: District and national.

District Monitoring

The continuous monitoring of fishing activities at the level of the Maritime Department is entrusted to a scientific institute, chosen by the Management Consortium, which collaborates with this latter on technical and scientific aspects. The Consortium's reference Institute shall monitor the state of the resource and highlight any conditions that could compromise the resources and fishing activities. Each Consortium, with its members and with the support of the scientific institute, shall continuously monitor the state of resources within its own area. Any management decision made by the Consortium, such as the closure and reopening of the areas, the maximum quantities that can be fished, the time periods for the performance of the activity, the establishment of areas for the product restocking, breeding and moving, shall be accompanied by an informed opinion issued by the Scientific Institute.

Consortia may subdivide their territory into several management areas, indicating their boundaries. On the basis of monitoring results, the Consortium closes and opens the areas in accordance with the reference points set out in the Chapter "Reference points". The management measures proposed by each Consortium, such as the maximum quantities that can be fished, the time periods during which the activity can be carried out, the establishment of re-stocking areas, etc., shall be accompanied by an informed opinion issued by the scientific institute prior to their adoption.

End of fishing season monitoring (pre fishing suspension) by the research body can provide indications concerning the amount of resources in the sea before commercial exploitation (or, from a different perspective how much as remained since the last catch). The data collected by fishermen (monthly logbooks) will indicate the real amount of the resource that has been fished. The result obtained will provide management indications to the Consortium for the next season.

By November 30 of each year, each Consortium for the management and protection of bivalve molluscs shall send to the Directorate General for Maritime Fisheries and to the Region the management and protection plan it intends to implement in the following year. By 28 February, each Consortium shall prepare a detailed report on the management activities carried out during the previous year.

National Monitoring

The national monitoring will be performed once a year, in one of the two compulsory months of fishing closure, according to a standardized protocol and methodology in all areas where hydraulic dredgers operate.

A working group on hydraulic dredging is set up at the Directorate-General for Fisheries. Its members are chosen by the Directorate-General among fishery experts, biologists and shellfish ecologists. The working group prepares the sampling protocol for the annual national monitoring, examines its results and collaborates with the Directorate General in preparing the annual report on the state of bivalve mollusc resources in Italy. Such report will be sent to the European Commission.

The national monitoring will be performed by one or more recognized scientific institutes. These latter will be identified by the Directorate General for Maritime Fisheries with the collaboration of Consortia among those that operate locally.

The Directorate-General shall communicate the monitoring results for the individual districts to the relevant Consortia, indicating any measures to be taken on the basis of the measured density values compared with the reference points indicated in the chapter "Reference points".

In the event of deficiencies or malfunctions in the management of the activity by the individual Consortia, the Directorate-General will take the necessary measures to remedy these deficiencies until the assignment is revoked.

In maritime districts where Management Consortia have not been established or have not obtained or have been revoked their ministerial accreditation, the fishing of bivalve molluscs is regulated directly by the Ministry.

The Management Plan will be reviewed every three years, on the basis of the annual management reports drawn up for each district and the state of the resource as resulting from the annual monitoring conducted on behalf of the Italian Fisheries Administration. Since a working group has been set up at the Directorate-General for Fisheries to collaborate in the preparation of the annual report on the state of bivalve mollusc resources, it will be the responsibility of the Directorate-General for Fisheries to forward it, as an interim report, to the appropriate offices of the European Commission.

The same management plan may be revised by the Directorate-General for Maritime Fisheries on the basis of the monitoring results or when efficiency can be improved.

6.8 Reference points

Reference points, hence objective indicators of optimal density of species that are the object of fishing, are currently regulated by DM 24/07/2015 (National Management Plan for Fishing Activities using Hydraulic Dredges and Boat-operated Shell-rakes).The figures set out in the DM for razor clams are reported in Table 6.

Table 6: Reference figures for razor clam density in the different GSA (Geographical sub Areas, FAO) set out in DM 24/07/2015.

Density referred to the commercial biomass of *Ensis minor*			
	Good management	*Attention period*	*Fishing prohibited*
GSA17	>20 g/m^2	10 - 15 g/m^2	< 10 g/m^2
GSA18	>15 g/m^2	8 - 10 g/m^2	< 8 g/m^2
GSA9-10	>15 g/m^2	8 - 10 g/m^2	< 8 g/m^2

In addition to the limits below which fishing is stopped and the optimal figures to aim for, it has been considered appropriate to add as a precaution an additional intermediate “attention” range, which involves periodical monitoring of the status of the resource and that can envisage continued fishing activities with possible changes made to the daily quota that can be fished, or alternatively, closing the area if the biomass continues to fall in spite of the changes made.

If the monitoring carried out by the Consortium identifies sub-areas in which resource density is below the established limit, within 15 days the Consortium must close the sub-area to fishing while also reporting closure to the Maritime Authorities. Should the size of the commercial biomass fall within the “attention” range, the Consortium informs the Maritime Authorities and within two months of the monitoring must carry out another monitoring with its reference scientific institution. Two-monthly monitoring must continue until the size of the biomass remains within the attention range. In any case, all monitoring results are sent to the Directorate General of Maritime Fishing. Obviously, areas closed to fishing remain closed until further monitoring indicates that the limit involving closing the area has been overcome. Should density return to within the attention range, fishing may take place with two-monthly monitoring.

7. Measures established by the New Management Plan for cockles (*Callista chione*)

Management measures for the fishing of cockles are summarised below.

7.1 Fishing permits and number of vessels

Each vessel is provided with a specific fishing authorisation in compliance with Art. 7 Reg. 1224/2009;

The number of vessels authorised to fish for cockles in the districts of Monfalcone, Venice and Chioggia is determined every three years by the Directorate General for Maritime Fishing following a request motivated by the three Consortia for the Management of Molluscs, within the framework of the number of authorised hydraulic dredges;

7.2 Amounts unloaded

The maximum weekly catch per vessel is established at kg 1500, the number of fishing days per week and maximum catch will be established by the CoGeMo in Monfalcone, Venice and Chioggia while respecting the maximum weekly quota;

7.3 No-fishing periods

Two-month long compulsory no-fishing periods are established by the Consortia for each individual business;

7.4 Statistical data

Every fishing vessel authorised to fish for *C. chione* is obliged to register in a special fishing journal its fishing areas, fishing hours, the species and quantities fished each day as well as sending a monthly report to its reference research institution through the Maritime District Management Consortium it belongs to.

7.5 Scientific evidence

Each Consortium relies on the technical-scientific opinion of a reference research institution for the constant monitoring of resources, to determine rotation fishing areas, for seeding operations or for the reactivation of the resource. The Consortia and the scientific bodies of reference interact with national scientific operators of references in the case scientific information should become necessary.

7.6 Monitoring

The distribution of sandbanks on which cockle fishing takes place is very broad and the banks are small albeit very numerous. This requires close cooperation between the CoGeMo, the fishermen and the scientific institution in order to verify the situation of the population in the different areas through rotation.

The Management Plan for cockle fishing envisages that the Directorate General for Maritime Fishing, in cooperation with regional administrations, should supervise the correct implementation of the National Plan for the Management of Hydraulic Dredges, acting as the go-between for the European Commission's relevant offices. In order to achieve this, the Directorate General for Maritime Fishing receives all necessary information through Harbour Master Offices, the Regions, Scientific Institutions and recognised individual Management Consortia.

Monitoring is carried out at an inter-district level (Maritime Districts of Monfalcone, Venice and Chioggia).

The continuous monitoring of fishing activities at the level of the Upper Adriatic Sea Maritime Department is entrusted to a scientific institute, chosen by the Management Consortium, which cooperates with this latter on technical and scientific aspects. The Consortium's reference Institute shall monitor the state of the resource and highlight any conditions that could compromise the resources and fishing activities. Each Consortium, with its members and with the support of the scientific institute, shall continuously monitor the state of resources within its own area. Any management decision made by the Consortium, such as the closure and reopening of the areas, the maximum quantities that can be fished, the time periods for the performance of the activity, the establishment of areas for the product restocking, breeding and moving, shall be accompanied by an informed opinion issued by the Scientific Institute.

Winter monitoring by the research organization can provide an indication of how much of the resource is at sea before commercial exploitation (or, to see it the other way around, how much is left since the last fishing). Data collected by fishermen (monthly logbook) will indicate the actual amount of resource taken. At the end of the fishing season, it will be possible to estimate how much of the resource remains at sea and can reproduce for the following season.

By November 30th of every year, the Consortium for the Management and Protection of bivalve molluscs is obliged to send the programme for management and protection activities it plans to implement for the following year to the Directorate General for Maritime Fishing, and also for their information to its regional authorities. By February 28th, each Consortium prepares a detailed report on management activities carried out by the Consortium itself during the previous year.

7.7 Reference Points

Reference points, hence objective indicators of density of the species that is the object of fishing, are currently regulated by DM 24/07/2015 (National Management Plan for Fishing Activities using Hydraulic Dredges and Boat operated Shell-rakes). The figures for cockles set out in the Ministerial Decree are shown in Table 7.

Table 7: Reference figures for razor clam density in the different GSA (Geographical sub Areas, FAO) as set out in DM 24/07/2015.

Density referred to commercial biomass of *Callista chione*			
	Good management	*Attention Interval*	*Fishing forbidden*
GSA17	> 40 g/m^2	15 - 25 g/m^2	< 15 g/m^2

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