

# ME CERTIFICATION LTD.

## MSC Public Certification Report (PCR)

For the

Mussel translocation in the Oosterchelde fishery

By members of the

Vereniging van Importeurs van Schelpdieren

FEBRUARY 2016

Authors: Jo Gascoigne  
Chrissie Sieben  
Ulf Löwenberg



ME Certification Ltd  
56 High Street, Lymington  
Hampshire, SO41 9AH  
United Kingdom  
Tel: 01590 613007  
Fax: 01590 671573  
E-mail: [info@me-cert.com](mailto:info@me-cert.com)  
Website: [www.me-cert.com](http://www.me-cert.com)

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## Glossary

Term / acronym	Definition
BB	Big Bag
EC	European Commission
EU	European Union
GiMaRIS	Gittenberger Marine Research Inventory and Strategy
MEC	ME Certification Ltd
MEP	MacAlister Elliott & Partners Ltd
MSC	Marine Stewardship Council
mtDNA	Mitochondrial DNA
PI	Performance Indicator
PO	Producer Organisation
PV	Productschap Vis
RBF	Risk Based Framework
SASI	Shellfish Dependency Species Index
SIMP	Shellfish Import Monitoring Protocol
SST	Sea Surface Temperature

# 1. Executive Summary

This report is the Public Certification Report (PCR) for the MSC assessment of the Mussel translocation in the Oosterchelde by members of the Vereniging van Importeurs van Schelpdieren by the Conformity Assessment Body (CAB), ME Certification Ltd (MEC). Note that this is an assessment of the translocation activity only; only selected PIs were therefore scored. It was agreed with MSC and stakeholders that the following PIs would be scored:

- 1.1.4 – Genetic outcome
- 2.6.1 – Translocation outcome
- 2.6.2 – Translocation management
- 2.6.3 – Translocation information
- 3.1.1 – Legal and customary framework (as it relates to translocation)
- 3.1.2 – Consultation, roles and responsibilities (relating to translocation)
- 3.2.2 – Decision-making processes (relating to translocation)
- 3.2.3 – Compliance and enforcement (relating to translocation)

The team for this assessment was Jo Gascoigne (team leader) and Chrissie Sieben. Jo was responsible for Principles 1 and 3 and Chrissie for Principle 2. The RBF was not used. Chrissie started maternity leave in June 2015, and Ulf Löwenberg was added to the assessment team in July 2015 for the remainder of the assessment process. Ulf will take on any further responsibilities for Principle 3 with Jo dealing with Principles 1 and 2. Ulf also reviewed all the scoring to ensure that the team remained agreed on all proposed assessment outcomes.

This assessment was started as a gap was identified in existing MSC mussel fisheries and it was agreed with the MSC that this certification take place specifically for the translocation process. A reduced assessment tree was agreed and authorised by the MSC. For further details on this, please see the following link: [https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215\\_ANMT\\_MUS492.pdf](https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215_ANMT_MUS492.pdf)  
For this assessment, a remote site visit was conducted on the 20<sup>th</sup> April 2015.

In general, the key strengths of the fishing operation are a strong regulatory framework, a good scientific base and data collection in use, which provided the assessment team with robust information upon which to base their assessment. There were not many weaknesses identified by the team, but there still appears to be residual confusion in the fishery from reallocation of responsibilities following closures of Dutch Fish Products Board.

The MEC assessment team have provisionally concluded that the fishery should be certified MSC, because no performance indicator (PI) scored less than 80 so no conditions are proposed. The overall scores for each principle were evaluated by taking the average of each PI scored in that principle: these were: P1 – 80; P2 – 98.3; P3 – 86.3. This determination has been subject to client and peer review, and now requires stakeholder review.

## **2. Authorship and Peer Reviewers**

### **2.1. Assessment team**

The team for this assessment was Dr Jo Gascoigne (team leader) and Miss Chrissie Sieben. Dr Gascoigne was responsible for Principles 1 and 3 and Ms Sieben for Principle 2. The RBF was not used.

Ms Sieben commenced maternity leave in June 2015. As a result Mr Ulf Löwenberg was added to the assessment team in July 2015 for the remainder of the assessment process. Mr Löwenberg would take on any further responsibilities for Principle 3 with Dr Gascoigne responding to any further queries in relation to Principle 1 or 2. A review of the scoring was completed by Dr Gascoigne and Mr Löwenberg to ensure that the team remained agreed on all proposed assessment outcomes.

### **2.2. Peer reviewer**

Only one peer reviewer was required for this assessment and this was completed by Mr Robert Blythe-Skyrme.

Rob started his career in 1996 in finfish mariculture, before switching to a focus on wild fisheries. Following his PhD, which focussed on fisheries management and the environmental effects of fishing, he moved to Eastern Sea Fisheries Joint Committee, the largest inshore fisheries management organization in England, where he became the Deputy Chief Fishery Officer. He then became a senior advisor to the UK Government on marine fisheries and environmental issues, leading a Natural England team dealing with fisheries policy, science and nationally significant fisheries and environmental casework. Rob now runs Ichthys Marine Ecological Consulting Ltd., a marine fisheries and environmental consultancy, based in the UK. Rob has undertaken all facets of MSC work as a Lead Assessor, expert team member and peer reviewer, across varied fisheries including those for Alaska pollock, Pacific cod, Atlantic cod, New Zealand hake, yellowtail flounder, Pacific salmon, albacore tuna, American lobster, Japanese scallop, sea scallop, Arctic surfclam and European mussel.

### 3. Description of the Fishery

#### 3.1. Unit of Certification and scope of certification sought

##### 3.1.1. What is this assessment for?

During the Year 2 surveillance audit of the Netherlands blue shell mussel and Netherlands suspended culture mussel fisheries (MEP, 2014), it was noted that the fisheries certificates for the mussel growers cover the mussels up to the point of harvest, while the members of the Vereniging van Importeurs van Schelpdieren have only a chain of custody certification. This means that there is a 'hole' in the fisheries certifications covering potential impacts of the activity of mussel relaying in the Oosterschelde on the ecosystem, as well as management of these impacts. This assessment is to fill this hole.

##### 3.1.2. Unit of Certification

The purpose of this assessment is to cover all translocation activities of mussels into the Oosterschelde by members of the Vereniging van Importeurs van Schelpdieren. These mussels come from MSC-certified fisheries elsewhere in NW Europe, and are placed in the Oosterschelde on holding plots for short periods of time for purposes of depuration/stockage.

The Units of Certification to be assessed is listed below:

<b>Species</b>	<i>Mytilus edulis</i>
<b>Geographical range</b>	NW Europe
<b>Method of capture</b>	Dredge
<b>Stock</b>	N/A
<b>Management Systems</b>	Dutch management system for control of impacts of translocation of mussels into the Oosterschelde
<b>Client group</b>	Members of the Vereniging van Importeurs van Schelpdieren
<b>Other eligible fishers</b>	None

##### 3.1.3. Conformance with scope criteria

The fishery under assessment is in conformity with Principle 3, Criterion A1 and Principle 3, Criterion B14 of the MSC Certification Requirements v1.3.

- Criterion A1: A fishery shall not be conducted under a controversial unilateral exemption to an international agreement.
- Criterion B14: Fishing operations shall not use destructive fishing practices such as fishing with poisons or explosives.

### **3.1.4. Scope of Assessment in Relation to Enhanced Fisheries**

The activity at issue is bivalve translocation, but the purpose of translocation is not on-growing over a long period, but depuration / stocking over a short period. Nevertheless, the enhanced bivalve fishery provisions relating to translocation apply here.

### **3.1.5. Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF)**

The fishery is not based on an introduced species. The risk of introducing species into the Oosterschelde is considered under the translocation provisions in Principle 2.

## **3.2. Overview of the fishery**

### **3.2.1. Activity under evaluation**

Yerseke, on the Oosterschelde, is the centre for mussel production in the Netherlands, and indeed in NW Europe. In total around 6000 hectares of mussel plots are found in the Netherlands, in the Oosterschelde and the Wadden Sea combined. For over a decade this production capacity has not been able to meet the mussel demand in the Netherlands, Belgium, France, Germany and southern Europe (who import Dutch mussels) and consequently large volumes of mussels are imported into the area to satisfy the high demand. These mussels are imported from the following MSC-certified fisheries:

- North Menai Strait mussels (Wales, UK)
- Exmouth mussels (Devon, UK)
- Irish bottom-grown mussels (Ireland)
- Northern Irish bottom-grown mussels (Northern Ireland, UK)
- Denmark blue-shell mussel dredge (Denmark)
- Isefjord and East Jutland blue-shell mussel (Denmark)
- Royal Frysk Jutland blue-shell mussel dredge (Denmark)
- Seafood Romo East Jutland and Isefjord blue-shell mussel dredge (Denmark)
- VMI East Jutland blue-shell mussel dredge (Denmark)
- Germany lower Saxony mussel dredge and culture

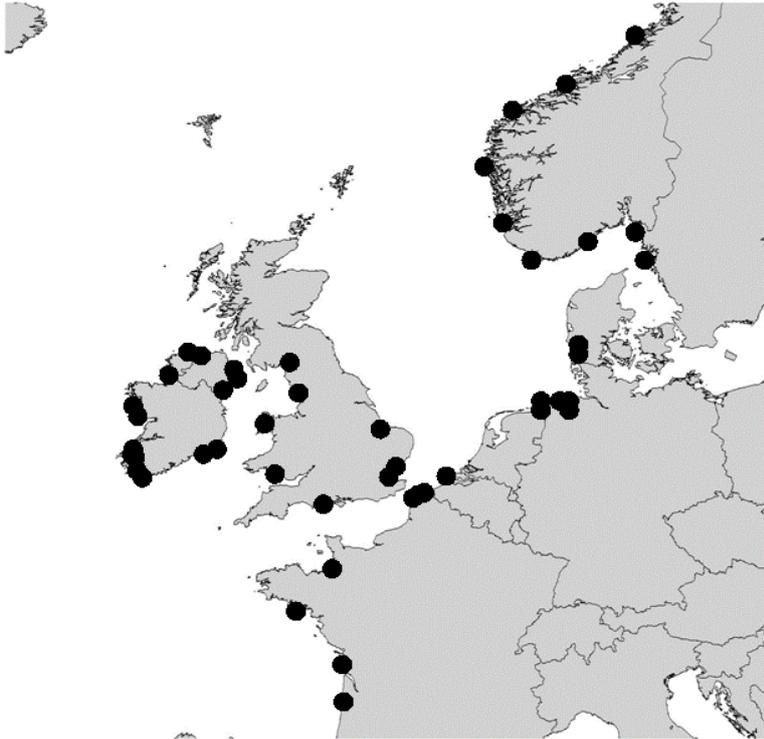
The mussels are imported into the Netherlands by members of the Vereniging van Importeurs van Schelpdieren (Association of Shellfish Importers), of which all the larger mussel processing companies in Yerseke are members.

The mussels are placed on plots in the Oosterschelde for short periods (a few days or weeks) for storage and/or depuration, before final harvesting and sale.

Because all of the source fisheries listed above, and the recipient fishery, already have MSC certification, this assessment is concerned only with the translocation activity itself.

### 3.2.2. History of translocation and management

The import of live mussels into the Oosterschelde has been happening since the 1960s, starting with mussels from the UK and Ireland. This soon expanded to other areas, particularly in the 1990s when Dutch mussel companies bought up their counterparts in Germany and Denmark. Over the years, mussels have been brought into the Oosterschelde from many different areas around NW Europe (Figure 1).



**Figure 1. Source locations for mussel imports to the Oosterschelde over the history of the activity (Wijsman and Smaal, 2006).**

For the first 30 years or so, the activity was not regulated at all, but concerns began to be raised about water quality – the Oosterschelde is Category A shellfish waters, and the UK and Ireland has a lot of Category B waters, raising concerns that toxic algae could be introduced along with the mussels. Eventually, in 2004, a licensing system was introduced. The Natura 2000 process raised the issue of introducing of non-native species into the Oosterschelde with the mussels, and in 2009, the licensing was extending so that each source area had to be separated licensed. The system by which this is done (described below) has been adjusted over the years further to various court cases brought by local environmental organisations; the most recent licensing protocol is from 2015. The licensing applies to all the areas under evaluation here except Germany – which is considered in Section 3.4.8.

### 3.3. Principle One: Target Species Background

For Principle 1, it has been agreed (see announcement<sup>1</sup>, 10 Feb. 2015) that the following PI is relevant:

- PI 1.1.4 – Genetic outcome

Background information is therefore provided here on mussel genetics only. For further details on mussel life history, population dynamics and stock management, the reader is directed to the Public Certification Reports for any of the fisheries listed above<sup>2</sup>.

#### 3.3.1. *Mytilus edulis*, *M. galloprovincialis*, *M. trossulus* and hybrids

Three species of *Mytilus* occur in western Europe – the common, blue, blue-shelled or European mussel *Mytilus edulis*, the Mediterranean mussel *M. galloprovincialis* (often considered to be a subspecies *M. edulis galloprovincialis* e.g. Gosling and Wilkins, 1981; commonly known as ‘gallo’ for obvious reasons) and the Baltic mussel *M. trossulus*. The general distribution of these three species is given in Figure 2.



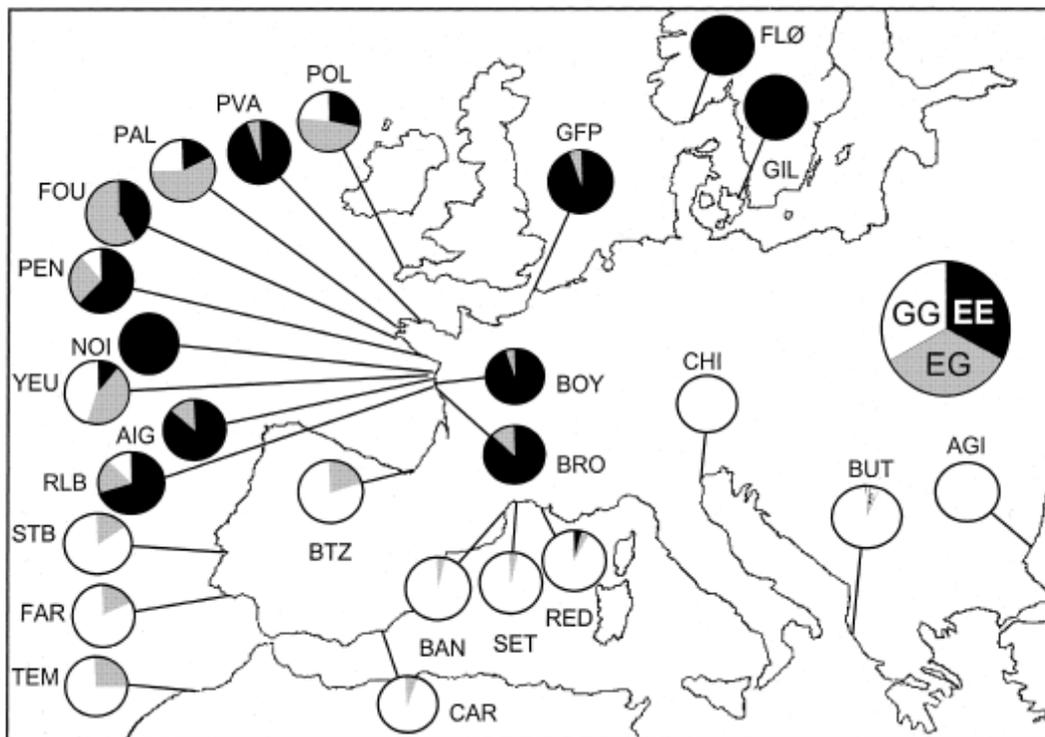
<sup>1</sup>[https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215\\_ANMT\\_MUS492.pdf](https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215_ANMT_MUS492.pdf)

<sup>2</sup> Available by following the links from <https://www.msc.org/track-a-fishery/fisheries-in-the-program/fisheries-by-species/fisheries-by-species#mussel>

**Figure 2. Distribution of *Mytilus* species in Europe (orange=gallo, purple=edulis, blue=trossulus), from Gosling, 1992.**

Edulis and gallo are both ecologically and physically similar, and very difficult to tell apart by eye, although gallo has a slightly sharper ‘shoulder’; they can also be distinguished genetically (coloration is no guide since it is very variable by age and area in both species). The centre of population of gallo is the Mediterranean and the Iberian Peninsula, while the centre of population of edulis is further north – around the North Sea and the British Islands. They co-occur in over a ~2000km zone extending from the Atlantic coast of France to southern Britain, and they readily hybridise in this zone. Populations occur mixed together, both as mosaics of mussels of each species as well as in the form of hybrid individuals.

Figure 3 (from Daguin et al. 2001) shows the ‘hybrid’ zone and the extent of genetic as well as spatial mixing between the two species. As can be seen, hybrids (grey) occur from the Mediterranean to the North Sea, although the general tendency is for edulis individuals to dominate from France northwards.



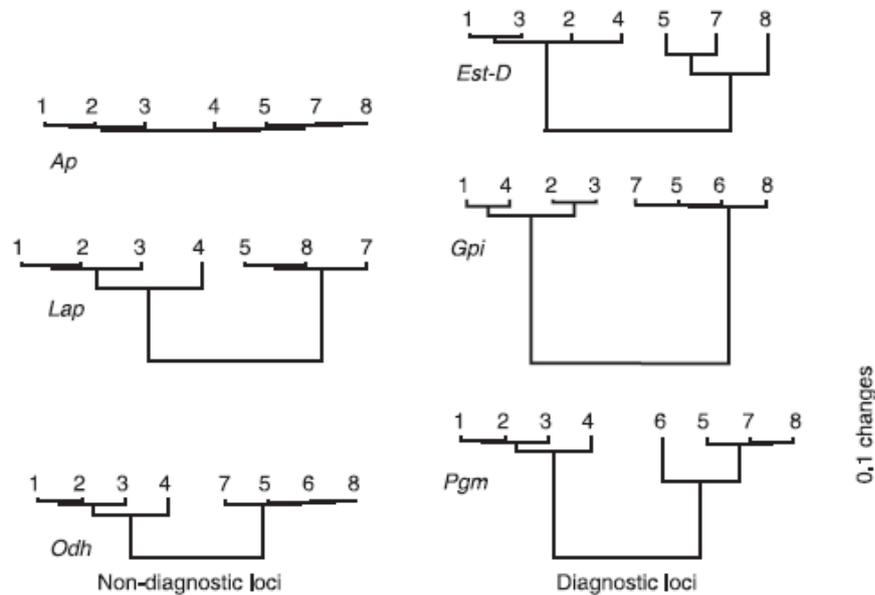
**Figure 3. Proportional genetic composition of mussels in samples from around Europe. GG=*M. galloprovincialis*, EE=*M. edulis*, EG=hybrid (Daguin et al. 2001).**

Trossulus is found (in NW Europe) only in the Baltic. It has thinner shells and is more susceptible to starfish predation (starfish being absent from the Baltic because they do not tolerate low salinity). As for edulis and gallo, there is a hybrid zone between edulis and gallo; in fact, Riginos and Cunningham (2005) argue that the entire Baltic is effectively a hybrid zone, because edulis mtDNA genes have introgressed into this trossulus population throughout its entire range.

The genetic dynamics of *edulis* and *trossulus* in Scandinavia is an extremely complex and interesting question – the reader is referred to Riginos and Cunningham (2005) for a review. What concerns us here is specifically the genetic identity of mussels taken from the source areas in Denmark. Allozyme surveys (allozymes are variant forms of enzymes coded for by different alleles of the same gene) identify North Sea and Skagerrak mussels as *edulis* and Baltic mussels as *trossulus*, with a cline in allozyme frequencies over about a 100 km zone through the Öresund and the Belt Sea. Figure 4 shows the sampling locations reviewed by Riginos and Cunningham, and Figure 5 shows the relationship maps based on various allozyme loci. Riginos and Cunningham note that sampling sites 1-3 are fully *edulis* and sites 6-8 fully *trossulus*. The main hybrid area seems to occur between sites 4 and 5, although mussels from site 4 (Niendorf, Germany) may have some *trossulus* alleles (see Lap, Odh and Pgm). The closest sampling site relevant to our source sites is site 3 (Velje, SE Jutland).



**Figure 4. Sampling locations (numbers) reviewed by Riginos and Cunningham (2005) in the *edulis*/*trossulus* transition zone in Scandinavia, with mussel source sites in Denmark added (blue dots – left to right Limfjord, East Jutland, Isefjord) (based on Figure 2 in Riginos and Cunningham, 2005).**



**Figure 5. Population relationships in the edulis-trossulus hybrid zone based on size allozyme loci. Non-diagnostic loci = no significant differences; diagnostic loci = significant differences (for details see Riginos and Cunningham, 2005) (Figure 2 in Riginos and Cunningham, 2005).**

### 3.3.2. Mussel species identity in the source sites

Irish Sea: According to Hilbish et al. (2002) Irish Sea mussels are edulis, with no evidence of gallo or hybrids present. Kijewski et al. (2009) found low rates of gallo alleles in samples from North Wales and Carlingford Lough, but no gallo individuals. Note that seed mussels are not brought for aquaculture from SW England (the gallo/hybrid zone) to the Irish Sea for culture, because of the risk of introducing slipper limpets (*Crepidula fornicata*), so there is a low risk of gallo becoming introduced to this area in mussel seed.

South and West Ireland: Gosling and Wilkins (1981) shows that while the east coast of Ireland was edulis only, the west coast populations were a mosaic of gallo and edulis, with gallo occurring mainly in exposed areas and edulis in sheltered areas – hybrid genotypes were also present (on this basis, they do not consider edulis and gallo to be separate species). Gosling and Wilkins note that gallo has also been found in extreme northwest Scotland, and speculate that wave exposure is a factor in determining this pattern, although they reject the hypothesis of selection as a causal factor. A detailed study of the hybrid zone in SW England, however (Hilbish et al. 2002) does not support the notion that gallo are favoured in exposed sites, and instead suggests that local patterns of circulation and larval retention may be response for mosaics of different genotypes in highly indented coastlines. (Conversely, Gosling and Wilkins suggest that the Irish Sea population is panmictic.)

It is not possible to map Gosling and Wilkins sampling sites on to the mussel source locations, particularly since the mussels at the source locations may have already been

moved from other sites as seed<sup>3</sup>. Hence it is not clear from this study whether mussels coming into the Oosterschelde from specific locations in western Ireland might be edulis or gallo or a mixture. Kijewski et al. (2009) sampled one location on in western Ireland (Castlemaine Harbour) and found it to be edulis, with some admixture of gallo alleles (as elsewhere) – this is not inconsistent with Gosling and Wilkins, however, since it is presumably a sheltered site. Smietanka et al. (2004), conversely, found a high proportion (>50% of gallo, most of the rest hybrids) at a site in Galway and also at the Giant's Causeway on the north coast of Ireland (the Giant's Causeway is exposed; the site at Galway unknown).

SW England: Hilbish et al. (2002) sampled mussels around the hybrid zone in SW England from SE Devon north Cornwall. SE Devon was evaluated as edulis, and north Cornwall as mainly gallo, with hybrids in between (i.e. around Lands End). In this study, Exmouth populations were evaluated as edulis, but Exmouth Mussels Ltd. considers that they are at least partially hybrids. There is evidence that the hybrid zone has been spreading into the Channel (reviewed below) so the conclusions of Hilbish et al. (2002) may well now be out of date. Kijewski et al. (2009) sampled mussels from Poole harbour in 2006 and found them to be 100% edulis, with no evidence of gallo introgression; again, this may now be out of date.

Denmark: Based on the review by Riginos and Cunningham (2005) it appears that mussels from the source areas in Denmark are edulis, although a low frequency of trossulus alleles cannot be ruled out.

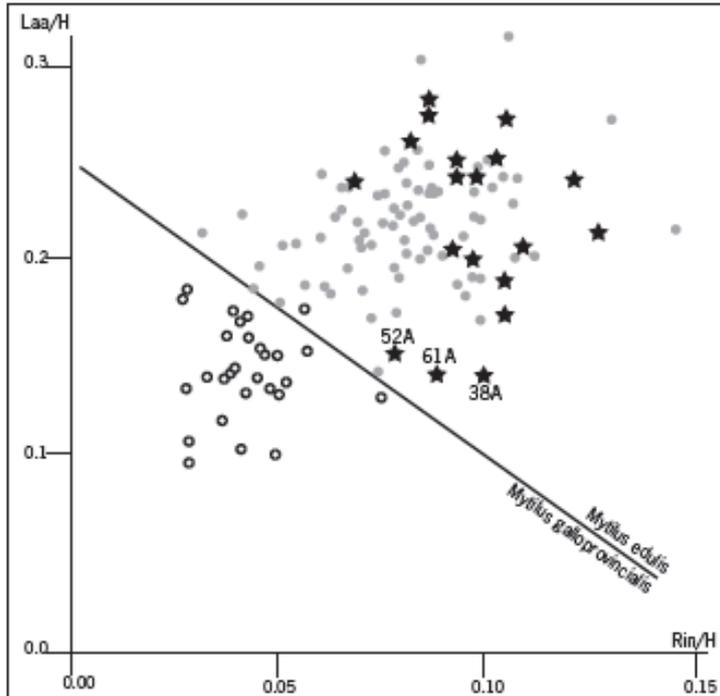
Germany: Steinert et al. (2012) looked at mussel genetics in the Lower Saxony Wadden Sea, with a sample size of 504. They found for the locus they evaluated that 499 individuals were homozygous for the edulis-type allele, and only 5 were heterozygous edulis/gallo – i.e. the samples were 99% pure edulis with a low rate of occurrence of gallo alleles.

### **3.3.3. Mussel species identity in the Oosterschelde and vicinity**

Groenenberg et al. (2011) looked at the genetics and morphology of mussels at different depths in the Oosterschelde. Based on both morphological (Figure 6) and genetic data, they concluded that all the mussels sampled should be classed as edulis – even the samples which were more morphologically similar to gallo, (labelled in Figure 6) were genetically classified as edulis.

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<sup>3</sup> Note that this activity will have been considered as part of the MSC assessments of the mussel fisheries at each of the source sites, and it is not part of this assessment.



**Figure 6. Morphological characteristics (length/width) of the mussels sampled from the Oosterschelde (stars) compared to those taken from a European-wide sampling programme (Verduin 1982, cited in Groenenberg et al. 2011). The line represents the morphological boundary between edulis and gallo, as defined by Verduin (1982) (Figure 5 in Groenenberg et al. 2011).**

Note, however, that the sample size for this study ( $n=229$ ) was small, and may not detect gallo or hybrid mussels if they are present at low frequency or in a spatial patchwork (e.g. in areas which were not sampled). A larger study is currently underway, which will evaluate ~2000 samples – a report is due in December 2015. A bigger study ( $n=1870$  for the Oosterschelde) found a mixture of mainly edulis (~99%) with some gallo alleles (~1%) and a very small number of trossulus alleles (Kijewski et al. 2009).

Another genetic study ( $n=504$ ) undertaken in the German Wadden Sea (Steinert et al. 2012) again shows that the population sampled is likely to be edulis. Steinert et al. note that their results are almost identical to those from similar studies in Dutch Wadden Sea and the Oosterschelde (Luttikhuisen et al. 2002, Kijewski et al. 2009). Looking in more detail at the population genetics, they found that the population at their sample site (the Lower Saxony Wadden Sea) was a single panmictic population with no genetic structure; this agrees with Gittenberger (2015) who concludes that there is high connectivity across the whole Dutch/German delta region. Steinert et al. contrast these results with the apparently invasive nature of the gallo genotype in SW England, and discuss whether there may be selection pressures against gallo types in the Wadden Sea. They conclude, however, that there is no particular evidence of this, and it is just more parsimonious to consider that gallo larvae or individuals arrive with such low frequency that there is no risk of any large-scale genetic change as a result. They conclude: '*the very low frequencies of the M. galloprovincialis allele would indicate that the threat of an introduction of non-indigenous Mytilus populations at the genetic level, whether by larval dispersal and/or anthropogenic influences, is negligible*' (p.398).

### 3.3.4. Comparative studies at the Oosterschelde and source sites

Kijewski et al. (2009) also looked at various sites around the UK (Figure 7), and concluded that the frequency of gallo alleles is similar or slightly greater at the Dutch sites than the UK sites (Figure 7). Smietanka et al. (2004) in a similar study, found more evidence of gallo in northern and western Ireland, and a surprisingly high proportion of trossulus hybrids in the Oosterschelde, although note that this was based on a small sample (n=50) from one site (Yerseke) (Figure 8).

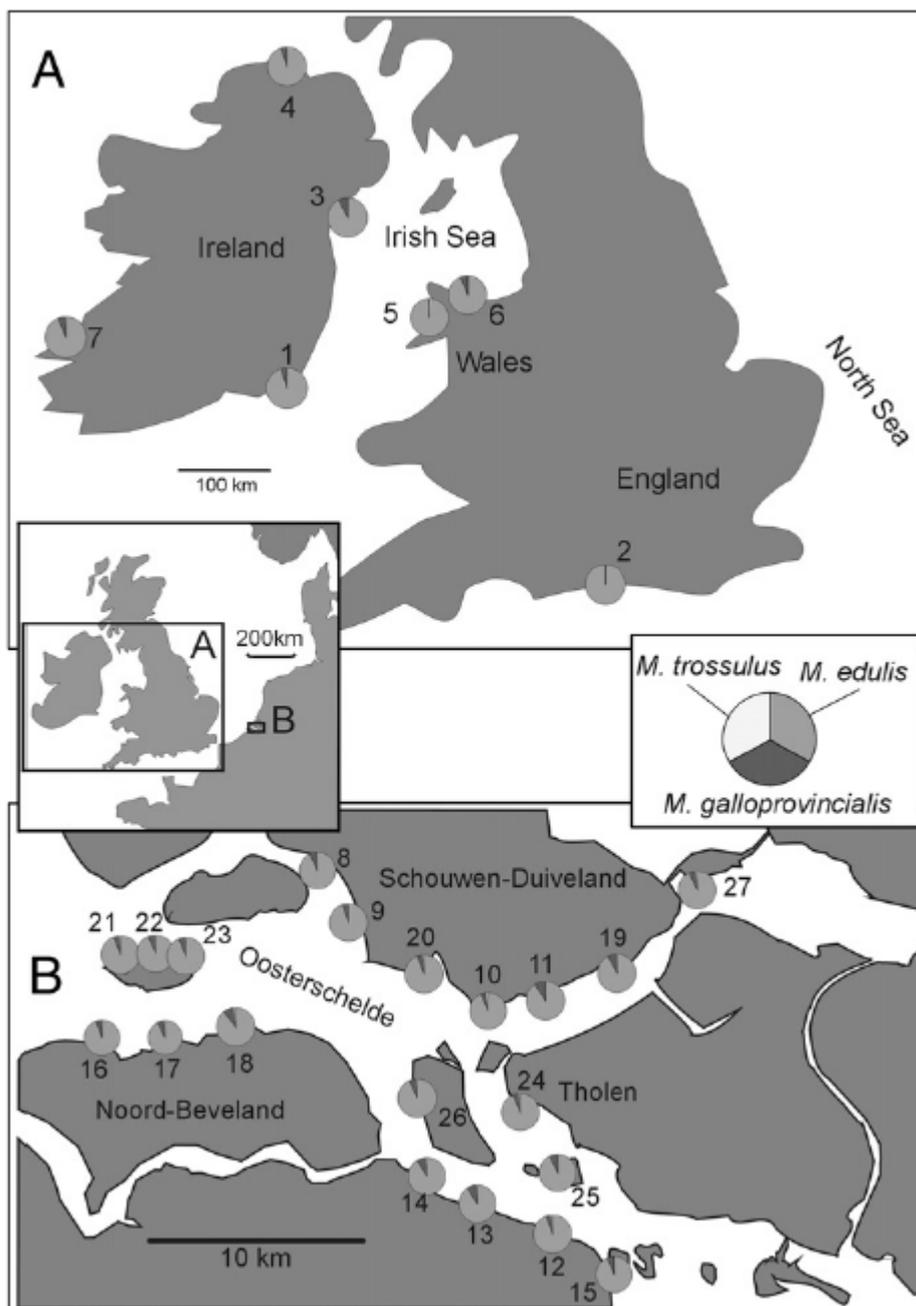


Figure 7. Sampling sites of Kijewski et al. (2009) with results in terms of allele frequency at three alleles (Glu, Efbis and M7).

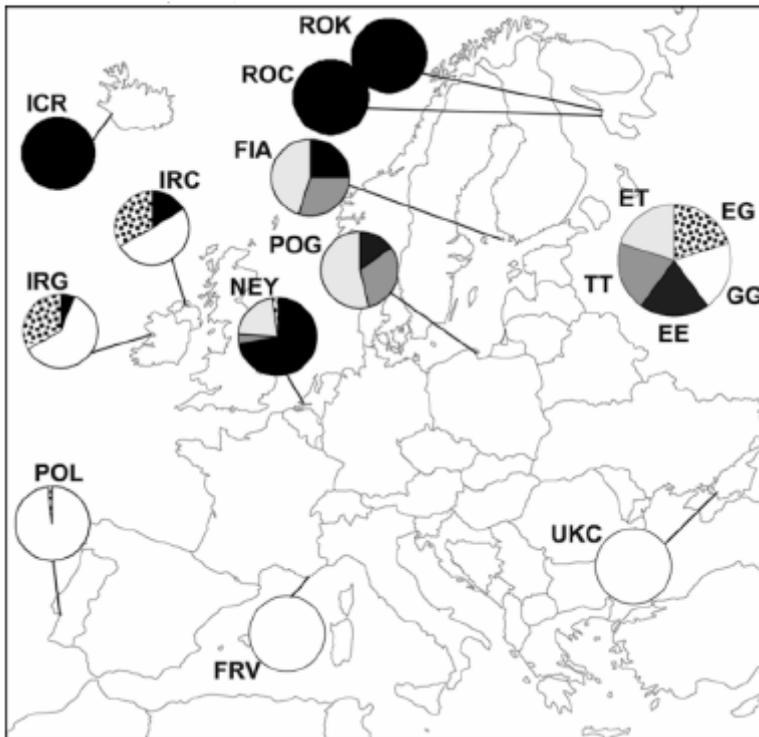
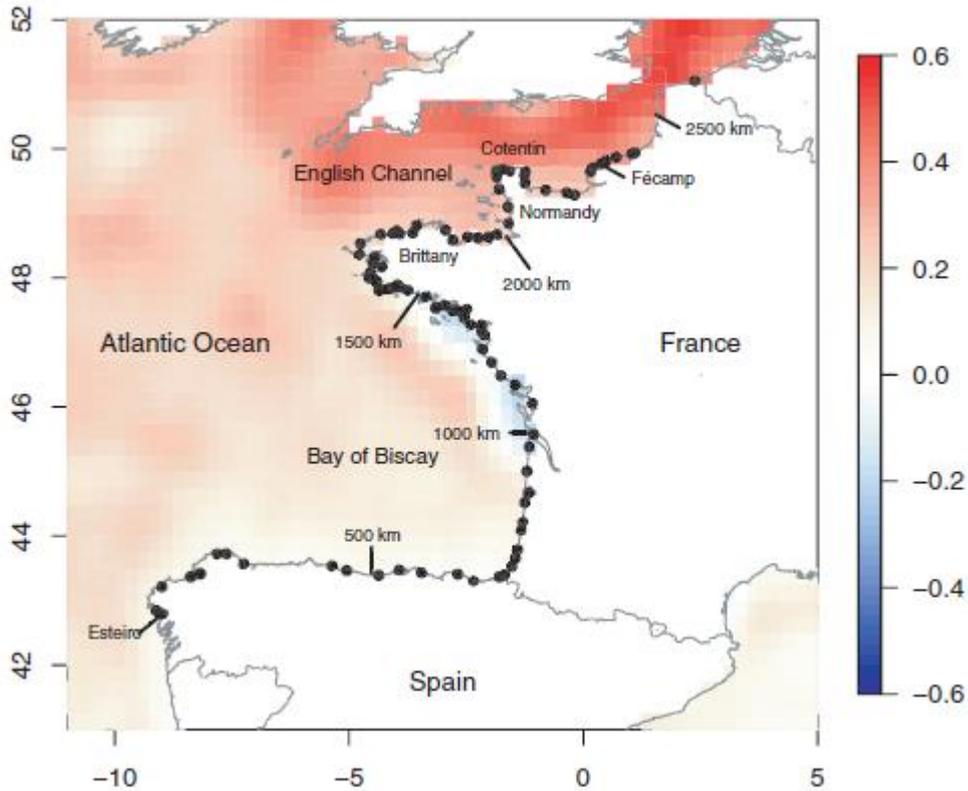


Figure 8. Sampling sites for Smietanka et al. (2004) and their classification of mussels (Figure taken from Wijsman and Smaal (2006)).

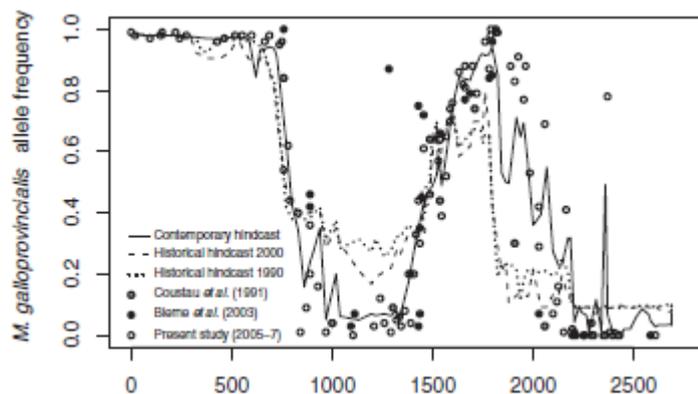
### 3.3.5. Climate-driven changes in *Mytilus* genetic distribution over time

Hilbish et al. 2012 compared the size and location of the mussel hybrids zones on the west and northwest coasts of France in 2005-7 with their location a decade earlier. They show that although the hybrid zones on the west coast of France have not moved, the hybrid zone in Brittany has expanded eastwards in a decade by about 110 km. They compare the location of different mussel taxa with environmental variables, and conclude that the most likely explanation is sea surface temperature (SST) warming, and specifically an increase in winter (February SST). On the French west coast, there is no evidence for warming of winter SST over the time period, while in the Channel and North Sea there has been very significant winter SST warming of  $\sim 0.5^\circ$  per decade (Figure 9).



**Figure 9. Sample locations and change in mean February SST from 1982-2010, in degrees Celsius (°C) per decade (Figure 1 in Hilbish et al. 2012).**

Figure 10 shows the results of genetic analysis to distinguish the two taxa, compared to historical studies. Comparing Figure 9 and Figure 10 (to convert km distance to location), Hilbish et al. are showing that whereas the gallo-hybrid zone on the French Channel coast ended in eastern Brittany (~km 1800) in 1990 and 2000, in 2007 ('present' in this study) it extended part way round the Cherbourg peninsula in Normandy (~km 2200). The authors note that several other species have shown a similar expansion into the Channel, such as three species of warm-water barnacle: *Chthamalus stellata* and *C. montagui* (which have expanded from the Atlantic as far as the Cherbourg Peninsula) and *Perforatus perforatus* (which has expanded from the Cherbourg Peninsula as far as Fécamp in the eastern Channel) (Hilbish et al. 2012).



**Figure 10. Proportion of gallo alleles (y-axis) vs. distance from Esteiro (Spain – see Figure 9), showing the Brittany hybrid zone (peak from 1400-2000 km) and how it has changed from 1990/2000 (dotted and dashed lines) to 2007 (solid line). Figure 3 in Hilbish et al. 2012.**

Hilbish et al. (2012) use these results to try and predict the situation in 2050. The forecasts predict that the edulis zone in the Bay of Biscay (kms 900-1400 above) will disappear, and that the gallo zone in the Channel will extend >500 km east of its present boundary in Normandy to '*at least as far as the Netherlands*'.

### **3.3.6. Likely genetic impact of source mussels on Oosterschelde mussels**

The source areas present a mixture of genotypes – those from the North Sea and Irish Sea are largely or completely edulis, while those from the Channel and the west coast of Ireland may include some gallo or hybrids. There is, however, for the moment, no evidence of gallo individuals in wild mussel population from the Oosterschelde or the Wadden Sea, despite the fact that mussels have been coming into the Oosterschelde from the UK and Ireland for several decades.

Several studies suggest, however, that in the Oosterschelde and the Wadden Sea there is a very low frequency of individuals (~1%) with some gallo alleles. Steinert et al. (2005) discuss the likely source of this genetic material, and consider that natural arrival of gallo-type mussels from gallo populations is not likely, since these natural populations are distant (although less distant now than they were then, according to Hilbish et al. 2012). They conclude that gallo genes have most likely arrived either with mussels brought by as shellfish imports, or as larvae brought in ballast water. One study also found some individuals with trossulus alleles (Kijewski et al. 2009), to which, presumably, the same logic applies. This study also suggests the presence of gallo alleles in edulis populations elsewhere at similar levels (e.g. the Irish Sea; Kijewski et al. 2009).

It is important to note that the imported mussels are only in the Oosterschelde for a brief period; most of them will therefore not spawn and hence not distribute their genes. This is not to say that none of them will spawn, however, and presumably a few are left behind when beds are cleared, giving them more opportunity.

Another possibility is that the environment of the Oosterschelde is not suitable (at present) for gallo-type mussels to establish, resulting in selection pressure against these alleles spreading through the population. Steinert et al. (2005) rule this out for lack of evidence, and although Gosling and Wilkins (1982) found that in western Ireland, edulis were present in sheltered areas and gallo in exposed areas, they likewise explicitly rule out natural selection as a cause – i.e. it is not a case of sheltered areas being 'unsuitable' for gallo or vice versa. Nevertheless, this possibility is supported by Hilbish et al. (2012) in relation to temperature. They hypothesise based on the correlation of gallo spread with winter SST that gallo is likely to expand or dominate where winter SST exceeds ~10°C. Winter SST in the Wadden Sea (and presumably also the Oosterschelde) are significantly lower than this - ~5°C<sup>4</sup> - it being a shallow area with some but limited tidal exchange with the open North Sea. If they are right, then gallo may spread in due course to coastal areas of the Netherlands exposed to open

<sup>4</sup>See <http://www.st.nmfs.noaa.gov/copepod/time-series/de-00101/>

sea water, but is not likely to persist in the delta region, where the water gets much colder – leading perhaps to a situation somewhat similar to that found currently in western Ireland.

Overall, the situation in terms of genetic mixing of European *Mytilus* populations is extremely complex. For the purposes of this assessment we conclude the following:

- Despite the likelihood that gallo mussels or edulis/gallo hybrids have been imported into the Oosterschelde many times over the last few decades, there is no evidence so far that gallo is present in 'native' Oosterschelde populations, although some gallo alleles are present in the population at low frequency; trossulus alleles may also be present although the evidence is less strong (only one study and sample site).
- The lack of gallo in the Oosterschelde may be for one or several of the following reasons: i) imported mussels do not spawn to any significant extent; ii) the import of gallo is too rare, imports too small and 'wild' populations too large, such that the imported gallo make no significant impact on the overall genetic make-up of the population; or iii) the Oosterschelde is not suitable for gallo-type mussels (perhaps because it is too cold in winter).
- The spatial distribution of gallo, edulis and hybrids is changing fast in NW Europe, because (most likely) of climate change. Hilbish et al. (2012) show that gallo moved ~110 km up the Channel in a decade, and the 'present' limit they give of the Cherbourg peninsula was now itself almost another decade ago (2006). If gallo mussels are found in or outside the Oosterschelde or the Wadden Sea by the current or future sampling, it will not, in the view of the team, be possible with 95% confidence to assign a cause (shellfish imports or other direct anthropogenic sources vs. climate-driven population change).

### 3.4. Principle Two: Ecosystem Background

For Principle 2, it has been agreed (see announcement<sup>5</sup>, 10 Feb. 2015) that the following PIs are relevant:

- PI 2.6.1 – Translocation outcome
- PI 2.6.2 – Translocation management
- PI 2.6.3 – Translocation information

Background information is therefore provided here on the process of translocation of mussels into the Oosterschelde and its management. For further details on the Oosterschelde ecosystem, bycatch when harvesting the mussel beds etc., the reader is directed to the Public Certification Report for the Netherlands blue-shelled mussel fishery (SGS, 2011).

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<sup>5</sup>[https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215\\_ANMT\\_MUS492.pdf](https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215_ANMT_MUS492.pdf)

### 3.4.1. Translocation process

Mussels are harvested from source areas by dredge (or by the method described in the relevant PCR) and loaded from the vessel into large bags ('Big Bags' – see below). They are transported to the Netherlands in refrigerated lorries. On arrival, after checks (see below) they are relayed on plots in the Oosterschelde set aside for this purpose by each of the mussel processing companies. They are generally present in the Oosterschelde for a few days or weeks for depuration or storage, before being re-harvested for sale.

### 3.4.2. Translocation risk assessment

In 2006, a risk-assessment of the translocation process was conducted by IMARES (Wijsman and Smaal, 2006) in relation to mussel imports from the UK and Ireland. Their conclusion is set out below:

*The risk that the transfer of mussels from the Irish and Celtic Sea to the Oosterschelde will lead to substantial ecological impact as a result of importing exotic non-indigenous species is small, but not totally absent. In Irish and UK marine waters, 74 exotic species are present, of which 22 are not found in the Oosterschelde. None of these 22 exotic non-indigenous species were either found on the mussel plots in Ireland and Wales, nor in the transport samples. This, however, does not completely exclude the possibility of their transport. From literature data and expert judgment we assessed that for 14 out of these 22 species there is a chance to survive transport, and establish populations in the Oosterschelde.*

*With respect to the effect, out of the 22 exotic non-indigenous species, the possible negative impact is considered high for three species. These are the algae Alexandrium tamarense and Gyrodinium cf. aureolum and the gastropod Urosalpinx cinerea (American oyster drill). The algae can lead to toxic blooms and the American oyster drill predated oyster spat and can have a devastating effect on oyster beds. The algae species already occur in and along the North Sea, and could be able to find their own way to the Oosterschelde. The American oyster drill has been found locally on the Essex and Kent coasts at the East coast of the UK, and precautions are taken to prevent dispersal to the mussel production areas.*

*This study showed that the chance of introducing exotic species by means of mussel transports is realistic for a number of species. The effects are considered limited, given the characteristics of the exotic species and the fact that mussel imports have been going on for over 30 years, and no observations on adverse effects have been reported.*

### 3.4.3. Translocation sampling protocol

The basis for the licensing of translocation from a given area is a system of sampling to ensure as far as possible that new species are not introduced to the Oosterschelde along with the mussels. The sampling protocol has been developed by GiMaRIS, an independent scientific organisation, who also carry out the sampling. The results of the sampling feed into a risk-based assessment process, which can stop imports or can increase (or reduce) the level of sampling in response to the perceived risk of undesirable introductions.

The basic idea of the sampling is to develop a species list for the exporting area and to compare this list with the list for the Oosterschelde, on an ongoing basis, to see whether there are species present in the exporting area which are not present in the Oosterschelde, and if so, whether they are likely to be imported with the mussels.

For each area, two species lists are established:

- List 1 – species present on the mussel beds in situ;
- List 2 – species present in the mussel cargo arriving in the Netherlands.

Clearly, these two lists are likely to be different, because many of the species present in situ are either not liable to be harvested along with the mussels, or will not survive the harvesting or transport.

In initial sampling for a new exporting area, GiMaRIS uses in situ sampling on the mussel beds in the exporting areas to establish List 1. For List 2 they take samples from the Big Bags (or other type of container, as applicable) on arrival in the Netherlands. Details of these two sampling methodologies are given in Table 1.

**Table 1. Sampling methodologies for mussel import source areas**

Species list	Type of sampling	Method	Protocol
List 1	Shellfish-dependent species inventory (SASI)	Samples taken by mussel dredge from the mussel beds; visible species are tracked in situ and sampling continues to the point where double the effort would result in <1 new species (in practice in the field, this means stop when you stop finding anything new). More cryptic species are identified in the lab.	Shellfish Import Monitoring Protocol (SIMP) – Gittenberger, 2014a
List 2	'Big Bag' species inventory (BB)	Samples taken from the Big Bags arriving in Yerseke. Big Bag is spread over a table and everything alive and non-mussel is collected and sent to the GiMaRIS lab for identification. To prove that it was done quickly, some live mussels must also be included.	

Once the species lists are established, they are compared with the existing species list for the Oosterschelde, developing using the SASI protocol by GiMaRIS and updated every year (see Gittenberger et al. 2011a for an example). A risk-based protocol then decides (on an ongoing basis) whether exporting should be allowed, and if so, which what level of ongoing sampling (Table 2).

**Table 2. Risk-based protocol for licence outcome, based on SASI and Big Bag sampling (taken from Gittenberger, 2014a). The different levels of sampling are defined below.**

Number of species of this type	Required action or mitigation measure			
	BasicBB	Repeated BB	SASI and BB	Stop imports
Problem species* not present in Oosterschelde,	0	0	N/A	>0

found dead or alive in all inventories				
Total cumulative number of species alive in all BB inventories	0-50	>50	>70	N/A
Number of species alive in the last BB	0-10	>10	>15	N/A
New species in last BB not present in previous inventories	0-2	>2	>5	N/A
Number of live exotic species in BBs, not established in Oosterschelde	0	>0	>2	N/A
Number of live NW European exotic species in BBs, not established in Oosterschelde	0-2	>2	>5	N/A
Total number of species from all inventories	0-50	>50	>70	N/A
Total number of exotic species, not established in Oosterschelde, from all inventories	0	>0	>5	N/A
Total number of NW European exotic species, not established in Oosterschelde, from all inventories	0-5	>5	>10	N/A

\* Defined as a species which based on the best available scientific information may be assumed to have a negative impact on a Natura 2000 area

In other words, a closure of the exporting area is only triggered by finding a problem species, as defined above. Additional sampling is triggered by the following risk factors:

- A high number of species found in Big Bags, even if already present in the Oosterschelde;
- New species appearing in samples that have not previously been found;
- Species appearing in the samples which are not known to be established in the Oosterschelde (with a lower risk threshold from species which are exotic to NW Europe)
- Species found in the Big Bag which were not found in the SASI (suggests new invasion event or sample from the wrong area) – triggers new SASI.

#### 3.4.4. Status of each area under evaluation

Table 3 shows the number of species on Lists 1 and 2, as well as problem species found in SASIs and living, exotic and problem species in Big Bags, to date, for each source site.

**Table 3. Details of the number of species on Lists 1 and 2, as well as problem species from the SASI and living, exotic and problem species from the Big Bag sampling. Sources: Gittenberger et al. 2014b, 2014c, 2014d, 2013a, 2013b, 2013c, 2011b, Seip-Markensteijn and Holstein 2014.**

Country	Area	# Spp. on List 1 (SASI)	# Problem species in latest SASI	# Spp. on List 2 (BB)	# Living spp. in latest Big Bag	# Exotic living spp. in Big Bag	# Problem spp. in Big Bag
Northern Ireland	Belfast Lough	80	0	12	2	0	0
	Carlingford Lough	128	0	26	3	0	0
UK	Menai Strait	104	0	19	3	0	0
	Exe estuary	58	0	None because no imports to date			

Ireland	Bantry Bay	83	0	3	1	0	0
	Castlemaine Harbour	106	0	20	3	0	0
	Dunmanus Bay	70	0	1	1	0	0
	Mulroy Bay	68	0	0	0	0	0
	Waterford	87	0	16	5	1	0
	Wexford Harbour	81	0	17	4	2	0
Denmark	Limfjord	49	0	9	4	1	0
	Isefjord	50	0	4	0	0	0
	NE Jutland	104	0	13	0	0	0
	SE Jutland	76	0	7	2	0	0

Each area is currently monitored at the 'high-risk' level (SASI every three years, 2-3 samples per region per import for the Big Bag) because the sampling system is new – but the rate of sampling may be reduced in the future for lower risk areas.

#### 3.4.5. Licensing system for translocation

Licences currently last 3 years; this is to be extended to 4 years to give enough time for the SASI cycle to be completed. In order to be awarded a licence initially, a SASI must be completed at the exporting area. This information is used as the basis for an 'appropriate assessment'. An appropriate assessment is an assessment required for certain activities taking place inside Natura 2000 areas (which includes the Oosterschelde). The licence application and appropriate assessments reviewed by the Ministry of Economic Affairs, and made available for stakeholder comment, and if there are no issues (e.g. problem species), the licence is normally granted by the Ministry of Economic Affairs.

#### 3.4.6. Monitoring of imports

Once exporting has begun, GiMaRIS continue ongoing sampling of the Big Bags. The basic level of sampling is currently one sample per area every 6 months, but this may be increased according to the risk factors set out in Table 2 above, to a maximum of 5 samples per area every 6 months. GiMaRIS provide a report to the Ministry every 6 months.

The monitoring protocol (Gittenberger, 2014a) is currently being reviewed and strengthened with the ultimate aim of setting it at a minimum percentage of samples per area (i.e. depending on the amount of loads that arrive in Yerseke; the percentage has not yet been determined). New rules are also being drafted for areas that have a license, but haven't been a recent source for shellfish (e.g. if closed for water quality reasons). If exports start again within a licence period, the current situation is that monitoring restarts as normal (i.e. one or more Big Bag samples every 6 months). Under the new proposals, four loads would have to be sampled after one year, and after two years, every load for the remainder of the licensing period would be sampled. The new protocol is expected to be finalised by September 2015, and licence conditions will be updated (Cora Seip-Markensteijn, pers. comm.).

### **3.4.7. Actions if problem species found**

If a problem species is found, dead or alive, in a Big Bag, all imports from that area must stop. The importing mussel company must also clean the plots where mussels from this area have been deposited and put the mussels in quarantine. They must also remove cultch (shell debris) from the plots and dispose of it on land. (Otherwise, they are allowed to dispose of it at sea in certain regulated areas.) This has, however, never occurred up till now. This contingency plan is set out in the Shellfish Imports Monitoring Protocol (Gittenberger, 2014a).

### **3.4.8. Translocation of mussels from Wadden Sea**

As well as the translocation of consumption-sized mussels, described above, there is translocation of mussel (consumption size and seed) from the Dutch and German Wadden Sea for on-growing in the Dutch delta. This translocation is not subject to the licensing process described above (although translocation from the Oosterschelde to the Wadden Sea is, strangely). An analysis of species distribution along the Dutch and German coast by GiMaRIS (Gittenberger, 2015) concludes that the Wadden Sea is effectively one connected ecosystem, but this may not be the case for the Oosterschelde, particularly given that the prevailing current is from SW to NE up the coast (i.e. connectivity is from Oosterschelde → Wadden Sea rather than vice versa). Nevertheless, the view of experts is that the risk of introducing undesirable species from the Wadden Sea into the Oosterschelde via shellfish transports is low (Arjan Gittenberger, pers. comm.), with a more likely risk scenario being transport on leisure craft, who can move freely between the two areas. The main reservoirs of non-native species in the Wadden Sea are harbours and other areas of hard substrata (walls, markers etc.), which have significantly higher quantities of non-natives associated with them than mussel beds.

It is important to note, however, that there are administrative requirements that ensure that the place of origin of each shipment is tracked, to avoid the possibility of other mussels being 'laundered' via the Wadden Sea. Mussel imports, quantity, source and date and time of arrival must be reported to the authorities. Live mussel imports into the Lower Saxony Wadden Sea from other areas are not permitted (MEP, 2015), so it is not possible that seed mussels from other sites are taken to Germany for on-growing and subsequently imported into the Oosterschelde without a licence.

### **3.4.9. Risk of introduction of diseases and pathogens**

The risk-based management and monitoring system described above considers translocations only of macroscopic animals and plants; however, under PIs 2.6.1, 2.6.2 and 2.6.3 we also need to consider 'diseases and pathogens' – i.e. microscopic organisms.

There is an EU framework for the monitoring and control of shellfish diseases, set out in the following EU legislation:

- Commission Decision 2009/177/EC implementing Council Directive 2006/88/EC – on the surveillance and eradication programmes and disease-free status of Member States, zones and compartments;
- Directive 2006/113/EC – on the quality required of shellfish waters.

Decision 2009/177 sets a framework for monitoring for fish and shellfish diseases, and a system of 'containment zones' to be put in place where diseases are detected. In relation to shellfish, the only disease concerned is *Bonamia ostreae*, which causes mortality in native oysters. Although mussels are not susceptible to *Bonamia* and are not a reservoir, there are strict limits on movement of any shellfish from inside to outside a *Bonamia* containment zone. In the case of this fishery, however, because *Bonamia* is present in the Oosterschelde, there are no restrictions resulting from this framework.

The Shellfish Waters Directive (2006/113) sets a framework for Europe-wide standardised testing of waters where shellfish are grown or fished for human consumption. It has happened that source areas have been closed because toxic algae were detected. The testing and closure is the responsibility of national authorities in the source area, and is enforced by national authorities in the source area (no fishing hence no exports). An EU-wide Rapid Response Alert (RASFF) system provides warnings about these area closures, although the companies must check with the authorities in the source areas before buying mussels from these areas – information is available online in all cases.

### 3.5. Principle Three: Management System Background

For Principle 3, it has been agreed (see announcement<sup>6</sup>, 10 Feb. 2015) that the following PIs are relevant:

- PI 3.1.1 – Legal and customary framework
- PI 3.1.2 – Consultation, roles and responsibilities
- PI 3.2.2 – Decision-making processes
- PI 3.2.3 – Monitoring, control and surveillance

Note that although fisheries from several countries are involved in this assessment, the legal and administrative framework for managing the translocation activity is exclusively Dutch. Other countries are only involved under the EU framework for monitoring and control of shellfish diseases and water quality (see above).

#### 3.5.1. Legal framework

The legal framework for the management of mussels fisheries in the Netherlands is described in detail in SGS (2011) (PCR for the Dutch blue-shelled mussel fishery), and is not described again here. From the point of view of translocation, the key piece of legislation is the Natuurbeschermingswet (Nature Conservation Act, 1998), which came into force in October, 2005. This law requires a permit system for activities ('plans or projects') in Natura

<sup>6</sup>[https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215\\_ANMT\\_MUS492.pdf](https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215_ANMT_MUS492.pdf)

2000 areas, with evaluation via an appropriate assessment. The licensing system for translocation based on the GiMaRIS risk assessments receives its legal basis from this law.

In 2011, a court case evaluated the robustness of this system<sup>7</sup>. The NGO 'Faunabescherming' (Protection of Fauna) requested an injunction to prevent mussel imports, on the basis that the GiMaRIS protocol (Gittenberger, 2014a) does not give an absolute guarantee against the introduction of new species with the mussels. The conclusions of the court were that the system is based on the best available scientific evidence, and is sufficiently robust to ensure that the activity does not cause damage to the Oosterschelde ecosystem; absolute certainty is not a requirement:

*De voorzitter is op grond van de stukken en het verhandelde ter zitting van oordeel dat de staatssecretaris zich op basis van de passende beoordelingen en het Schelpdierimport monitoringsprotocol van juli 2010 ervan heeft kunnen verzekeren dat het uitzaaien van mosselen afkomstig uit de genoemde herkomstgebieden geen schadelijke gevolgen heeft voor de natuurlijke kenmerken van de Oosterschelde - (Based on the documents and the hearing, the chair is of the opinion that on the basis of appropriate assessments and Shellfish Import monitoring protocol of July 2010, the Secretary of State has been able to ensure that the relaying of mussels taken from the areas of origin cited has no harmful effects the integrity of the Oosterschelde).*

### 3.5.2. Consultation, roles and responsibilities

Organised involved in the management system for mussel imports and their roles and responsibilities are set out in Table 4.

**Table 4. Organisations involved in management of mussel imports, their roles and responsibilities**

Organisation	Roles and responsibilities
Ministry of Economic Affairs	Ministry responsible for environmental matters in the Netherlands. Responsible for policy on mussel imports, and for approving / rejecting and issuing licenses. Also responsible for enforcement but this activity is delegated to ...
Dutch Food and Consumer Product Safety Authority	Responsible for monitoring for food safety. Enforcement responsibilities for mussel imports have also been delegated to this body by the Ministry of Economic Affairs.
Regional government of Zeeland Province	Responsible for licensing for cultch disposal, in authorised areas of the Oosterschelde
Vereniging van Importeurs van Schelpdieren	Shellfish Importers Association. Prepare licence applications and appropriate assessments on behalf of members
GiMaRIS	Consultancy who is contracted to develop monitoring protocols and carry out monitoring (SASIs and Big Bag)

The organisations involved in mussel fishery management in the Netherlands, and their roles and responsibilities, are set out in Section 4.3 of SGS 2011. Nothing has changed, except

<sup>7</sup> Details of the judgement given at [https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=59218&summary\\_only=&q=import](https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=59218&summary_only=&q=import)

that the Productschap Vis (PV) has been abolished. This has caused some problems with the management system – for example, PV used to manage much of the licensing process for the mussel companies, and the system for licensing the disposal of cultch, for example, is still a little unclear in their absence (see below). Likewise, since PV was abolished there is less monitoring of imports than was previously the case, although this is due to change (see below).

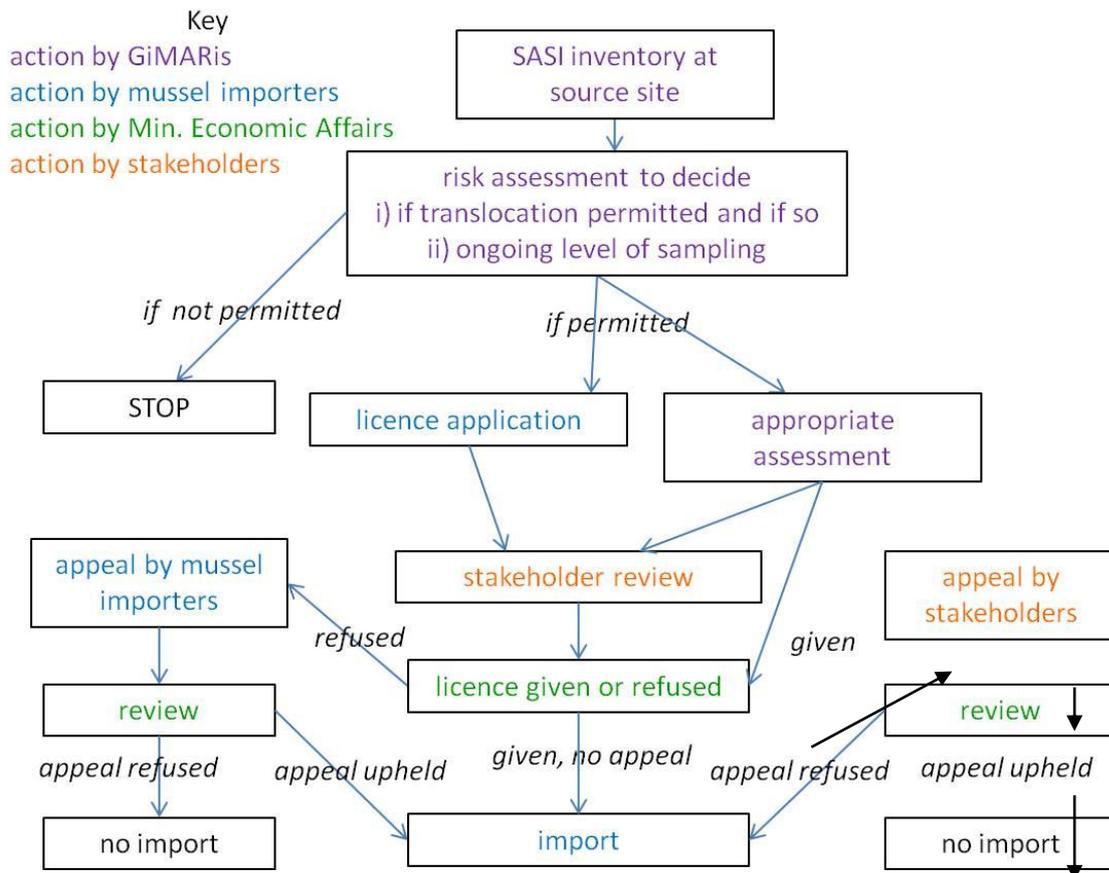
There are consultation processes, which apply to the licensing process for translocation. Each licence application is subject to a comment period, and registered stakeholders are sent a copy of the application and the appropriate assessment.

Under Article 1:2 of the Algemene wet bestuursrecht (General Administrative Law), a 'stakeholder' under Natura 2000 is defined as an organisation (or individual) 'whose interest is directly affected by an order'. An organisation's 'interests' are deemed to include '*the general and collective interests, which they particularly represent in accordance with their objects and as evidenced by their actual activities*'. This includes environmental NGOs; however, because of a history of court cases being brought against activities in Natura 2000 areas in the Netherlands (such as the one described above), some of which might be described as vexatious, the common law definition of how a stakeholder demonstrates an interest in a given subject or area is quite tight – an organisation that exists for the sole purpose of taking legal action, for example, would not be considered a 'stakeholder' in this process.

### **3.5.3. Decision-making processes**

#### *Mussel imports*

The decision-making process for allowing a translocation activity (mussel import) has been described above, and is summarised in Figure 11.



**Figure 11. A diagram of the decision-making process for the licensing of mussel translocations into the Oosterschelde.**

If an appropriate assessment is not approved by the Ministry, then the licence in question will not be awarded, and other licences will be revoked. This has in the past happened, when one part of the Limfjord was closed as a source of imports (because of the presence of the Japanese oyster drill (*Ocenebrellus inornata*) in samples). An overseas mussel producer can also be removed from the list of approved source companies, in which case mussels from this company (production area) are immediately closed for all the Dutch companies.

### *Cultch disposal*

It is permitted under certain circumstances to dump mussel cultch (empty shell material from harvesting / processing) in the Oosterschelde. Clearly this presents another source of risk of species translocation, albeit much smaller than the risk from the mussels themselves. This activity is also subject to licence, but not under the same systems as for the mussel imports, because the competent authority is Zeeland Province rather than the Ministry of Economic Affairs.

The Vereniging van Importeurs van Schelpdieren is working with the Zeeland Province to develop a new system for these licences, and the same appropriate assessments will be used as for the mussel imports.

### 3.5.4. Monitoring, control and surveillance

Monitoring and enforcement in this fishery does not fall under the same body as the one that conducts fisheries enforcement. Instead it is the role of the Ministry of Economic Affairs, and they have delegated their powers to the Dutch Food and Consumer Product Safety Authority (who also carry out hygiene testing, and have an office in Yerseke).

In relation to the monitoring all imports, the mussel companies are required to complete customs declarations for each shipment. They are not required to report imports directly to the Food and Consumer Product Safety Authority, but they must keep records, which can then be audited by the enforcement body at any time. Previously all shipments also had to be reported to the Productschap Vis, but since they were abolished this requirement has gone into abeyance. Reportedly, the next iteration of the Shellfish Imports Monitoring Protocol will include a requirement that all imports must be reported to the Vereniging van Importeurs van Schelpdieren, who reportedly will manage this via the auction at Yerseke, who have the traceability infrastructure in place to record the details of shipments (Cora Seip-Markensteijn, pers. comm.).

Up till recently, monitoring by the Food and Consumer Product Safety Authority was reported to be 'irregular', but a large-scale programme has recently started to screen all the mussel processing companies on a larger scale, to ensure that mussel imports are all properly licensed and reported.

Possible sanctions are:

1. A warning
2. A fine (under the Economic Offences Act).
3. Retract licence

The main constraint, however, as the mussel companies see it, is that infringements would risk putting the entire system into question – the Ministry could at any time choose not to licence further imports if it considered that the mussel companies were not in compliance with the requirements.

According to the Vereniging van Importeurs van Schelpdieren, there have been a few warnings given out recently because the licence for one area expired before the appropriate assessment was completed; companies who imported from this area during this period received a formal warning and if it happens again they will be fined. A representative of the Food and Consumer Product Safety Authority (Jacobine van den Boomgaard-Bom), however, did not express any concerns, noting that the issue was administrative rather than an intent to subvert the system.

## 4. Evaluation Procedure

### 4.1. Harmonised Fishery Assessment

P3 has been harmonised with the Dutch blue-shelled mussel fishery.

### 4.2. Previous assessments

There have been no previous assessments of this activity.

### 4.3. Assessment Methodologies

This fishery was assessed using the Certification Requirements version 1.3. MSC Full Assessment Reporting Template version 1.0 was used to produce the report.

The assessment tree used is the modification to the default tree for enhanced bivalve fisheries (Certification Requirements 1.3 Annex CK). Further to the fishery announcement<sup>8</sup>, published on the 10<sup>th</sup> February 2015, only the aspects of the tree relating to translocation and its management have been scored. Therefore PIs scored in this report were the following:

PI Number	PI
1.1.4	Genetic outcome
2.6.1	Translocation outcome
2.6.2	Translocation management
2.6.3	Translocation information
3.1.1	Legal and customary framework
3.1.2	Consultation, roles and responsibilities
3.2.2	Decision making processes
3.2.3	Compliance and enforcement

No stakeholder comments were received on modifying the default assessment tree for enhanced bivalve fisheries.

### 4.4. Evaluation Processes and Techniques

#### 4.4.1. Site Visits

A remote site visit was conducted (by Skype). Jo Gascoigne (team leader) was available for Skype meetings, and talked to Cora Seip-Markensteijn, the client representative. No

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<sup>8</sup> [https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215\\_ANMT\\_MUS492.pdf](https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-east-atlantic/mussel-translocation-into-the-oosterschelde/assessment-downloads-1/20150215_ANMT_MUS492.pdf)

stakeholders came forward to participate in the remote site visit or to request separate meetings.

Stakeholders were directly contacted by MEC on the 10<sup>th</sup> February 2015. The list of those contacted is provided below.

Stakeholder Organisation	Name of Contact
World Wide Fund for Nature (WWF)	Carel Drijver
Faunabescherming	Harm Nielsen
Zeeuwse Milieufederatie	Gijs van Zonneveld
Greenpeace Netherlands	Greenpeace Netherlands
World Wide Fund for Nature (WWF)	Karin Bilo
North Sea Foundation	North Sea Foundation
Stichting WAD	Lenze Stichting WAD
Vereniging Natuuronumenten	Wouter van Steenis
Vereniging Natuurmonumenten	Andre Hannewijk
Vogelbescherming	Manon ten Tij
Waddenvereniging	Paddy Walker

#### 4.4.2. Consultations

No stakeholders came forward to take part in consultations with the assessment team, either by phone or Skype or in writing.

#### 4.4.3. Evaluation Techniques

##### Public announcements

Two media outlets: Fishingneweu.com and the MSC website. Fishingneweu.com was selected to reach a wide range of stakeholders with varied interests in the catching, processing and aquaculture sectors in Europe; whilst the MSC press release targeted a wide range of stakeholders within the sustainable seafood industry. The combination of both ensured that key stakeholders were notified of this fishery's announcement.

##### Methodology

MEC is already the CAB for the Dutch blue-shelled mussel fishery, as well as the German Lower Saxony mussel fishery (Wadden Sea) and the two UK source fisheries (North Menai Strait mussels and Exmouth mussels). The MEC is therefore familiar with the operation of these fisheries, the translocation process and the site area. It was not therefore considered necessary to collect information via an on-site visit.

##### Scoring

Preliminary scores and rationales were put forward by the team leader and discussed and agreed or modified by the team via email.

The decision rule was as set out below:

The scores were decided as follows:

How many scoring issues met?	SG60	SG80	SG100
All	60	80	100
Half	FAIL	70	90
Less than half	FAIL	65	85
More than half	FAIL	75	95

Note that where there is only one scoring issue in the SG, the issue can be partially scored – in this case the team used their judgement to determine what proportion of it was met, e.g. at the 100 level, a small part met = 85, about half met = 90, nearly all met = 95.

### Decision rules for final outcome

The decision rule for MSC certification is as follows:

- No PIs scores below 60;
- The aggregate score for each Principle, rounded to the nearest whole number, is 80 or above.

Although only some PIs have been scored in this report, it is assumed that the same principles apply for determining pass or fail – i.e. that no individual score must be below 60 and the aggregate scores for each Principle must be 80 or above.

In the absence of a methodology for applying weighting, the individual PIs scored in each Principle have been weighted the same. The overall scores for each Principle are therefore determined as follows:

- Principle 1 – average of score of PIs 1.1.4
- Principle 2 – average of scores of PIs 2.6.1, 2.6.2 and 2.6.3
- Principle 3 – average of scores of PIs 3.1.1, 3.1.2, 3.2.2 and 3.2.3

### Scoring elements

Since PIs 1.1.1, 2.1, 2.2, 2.3 and 2.4 were not scored, there are no scoring elements to define.

## 5. Traceability

### 5.1. Eligibility date

The target eligibility date is set for the date of certification.

### 5.2. Traceability with the fishery

#### a) Description of the tracking, tracing and segregation systems within the fishery

Mussels are purchased from the MSC certified source fishery, for example Exmouth mussels in the UK (MEC-F-016). A trading company in Yerseke will buy mussels from the fisherman there on behalf of the client group (i.e. do not take ownership) and are considered part of this certificate. A list of these parties is included below in Table 5:

**Table 5. List of traders acting on behalf of the client group to be listed under the certificate**

Name of trader	Address
Aquamossel/Barbé groep	Korringaweg 53, Postbus 129, 4400 AC, Yerseke
Delta Mossel B.V.	Postbus 100, 4400 AC, Yerseke
Mosselhandel Prins&Dingemanse B.V.	Postbus 63, 4400 AB, Yerseke
Krijn Verwijs Yerseke B.V.	Postbus 67, 4400 AB, Yerseke
Triton Yerseke B.V.	Postbus 58, 4400 AB, Yerseke
Lenger Seafoods B.V.	Postbus 55, 4400 AB, Yerseke
Mosselhandel Vette & Verhaart B.V.	Postbus 22, 4400 AA, Yerseke
Roem van Yerseke B.V.	Groeninx van Zoelenstraat 35, 4401 KZ, Yerseke
Delisea B.V.	Postbus 18, 4400 AA, Yerseke
V.O.F. M&M Padmos	Meekrapstraat 13, 4311 EP, Bruinisse
Verspoor B.V.	Meekrapstraat 1, 4311 EP, Bruinisse
De Ronde B.V.	Mosselstraat 3, 4311 GJ, Bruinisse

The trading companies are required to adhere to restrictions and protocol set by the client group. They merely act as an intermediary agent for the fishery product. As mussels are live, there is a very short time between harvesting and transport of mussels onto the next stage, be that processing in a nearby facility or onward transport.

Once purchased from the source fishery, the mussels are harvested using the mussel dredge and transported onto a lorry for onward transport. The bill of lading accompanies the live mussels. This states the species, the gross tonnage and its source location.

A registration document for the mussels is provided to customs en route to Yerseke. Details on this document includes where the mussels are from, the amount in tonnes, date and time, and the MSC fishery certificate number. This arrives with the consignment and is then held by the auction at Yerseke, which acts as an administrator. The imported mussels do not go through the auction itself.

The client group also includes conditions in their import licences to aid further robustness to the management process of the imports into the fishery. This has been in place since 1<sup>st</sup> November 2015. 24 hours before a load is due at Yerseke, the buying company has to notify the Import Organisation (who has appointed the Dutch Mussel Auction as its proxy). In the notification, the company has to note:

- Name of the production area where the mussels are from (if possible with plot number and/or GPS-coordinates);
- Time of arrival in Yerseke at the company.

When the mussels arrive in Yerseke, they have to provide the Import Organisation (again through the auction, which serves as the administrator) with the bill of lading, registration documents, and any other relevant documents (like the MSC fishery certification number). This maintains the paper trail, allowing the tracing of the imports back to their respective sources. In order to notify the Import Organisation of the mussel imports, most companies use the registration form.

The client group members are also obliged to keep their own administration documentation, all of which the processing companies also have copies, these include:

- Point of origin: name of the production area where the mussels are from (if possible with plot number and/or GPS-coordinates);
- Amount of mussels in tonnage;
- Time and date of arrival in Yerseke;
- Time and date of the notification to the auction;
- Date of the mussels leaving the factory.

When the mussels are relayed on the plots in Yerseke, the following information is documented in addition to the list above:

- Plot number of the plot where the mussels have been relayed in the Oosterschelde;
- Date, vessel name, registration document number; and the amount of mussels fished from the plots;
- Date of the mussels leaving the factory.

The system above allows for full traceability to be maintained from arrival of the mussels to the point of harvest. Mussels are identifiable back to a certified source, through to a specific relocation plot and through to harvest.

All mussels that have been relayed and harvested will go to processing factories for packaging for onward sale to the final consumer, i.e. restaurants and supermarkets.

## **b) Possibility of vessels fishing outside the Unit of Certification**

There is no possibility of vessels fishing outside the Unit of Certification. Either the live mussels are imported into Yerseke via road, and are purified and processed directly; or the vessels are merely used to relay and subsequently harvest the mussels for entry into further chains of custody.

## **c) Risk of substitution of certified products with non-certified products**

The risk of substitution of certified products with non-certified products is minimal. The mussels being imported into Yerseke are accompanied with full paperwork, as described above in section a). Paperwork includes the certified source and other product details. If mussels are relayed, the exact plots the certified mussels are relayed on are documented and a registration document completed. This number is included on the invoice to the final customer.

Certified mussels remain segregated at all times by the fishery operators. All imports will either be from a certified fishery, or not. When they are imported, cargoes by lorry are from one fishery only. This means they arrive at the processing factory, they are from one source only. Processing factories have separate chain of custody certification, and will continue to segregate the mussels. Ownership has changed by this stage.

If the mussels are relayed, these are segregated by plot and which plot contains which source of mussels is documented. Mussels from different sources will not be relayed on the same plot, nor will more be added until that plot has been harvested completely; thus separation of mussels from different fisheries continues.

### **c) Transhipping**

All transshipment operations in EC waters are prohibited and may only take place in designated ports in EU Member States subject to authorisation from the relevant authorities. In any case, transshipment does not take place in the fishery. Mussels are purchased by the customer, before they are either processed by the factories or harvested from the relaying beds. The majority of the time, the mussels are purified and then processed directly from arriving in Yerseke. These factories have separate Chain of Custody (CoC). If not processed directly, they are placed on relaying plots of the trading companies ("wet warehouses") and harvested in due course.

### **d) Processing at sea**

Processing at sea does not occur within this fishery.

### **e) Points of landing**

There is only one point of landing for this certificate. Mussels arrive in Yerseke from the source fishery, with the relevant accompanying import paperwork. In some cases the mussels are relayed on the plots in Yerseke and then harvested, for passage into further chains of custody.

## **5.3. Eligibility to enter into further Chains of Custody**

Further Chain of Custody (CoC) will be required for all post-harvest mussels at the point of landing and following any change in ownership. Some harvesting companies also have processing factories, in addition to their vessels; these have separate CoC certification (awarded by a different CAB).

The client group appears to have a robust system to manage the import and onward sale of MSC certified mussels. Full traceability paperwork is kept, allowing full tracing of the fishery product being sold to customers, back to MSC fishery from which they originated.

#### 5.4. Eligibility of Inseparable or Practically Inseparable (IPI) stocks to enter further Chains of Custody

The target species under assessment is not considered as a IPI stock and is not discussed further.

## 6. Evaluation Results

### 6.1. Principle Level Scores

Note that the Principle level scores have been evaluated as the average of the scores received by each PI scored in each Principle, as described in Section 4.4.3 above.

**Table 6. Final Principle Scores**

Final Principle Scores	
Principle	Score
Principle 1 – Target Species	80
Principle 2 – Ecosystem	98.3
Principle 3 – Management System	83.8

### 6.2. Summary of Scores

Principle	Component	PI number	Performance Indicator	Score
1	Outcome	1.1.4	Genetic outcome	80
2	Translocation	2.6.1	Outcome	100
		2.6.2	Management	95
		2.6.3	Information	100
3	Governance and Policy	3.1.1	Legal and customary framework	85
		3.1.2	Consultation, roles and responsibilities	80
	Fishery-specific management system	3.2.2	Decision-making processes	85
		3.2.3	Compliance and enforcement	85

### **6.3. Summary of Conditions**

As each PI scored in this assessment scored 80 or above, no conditions are necessary for this fishery.

#### **6.3.1. Recommendations**

The Assessment Team does not wish to make any recommendations to the client.

### **6.4. Determination, Formal Conclusion and Agreement**

Following review of the draft Final Report, as well as all stakeholder comments submitted in relation to the Public Comment Draft Report, the Assessment Team was in unanimous agreement to grant MSC certification to this fishery, pending the outcome of the objections period.

The MEC Certification Decision Making entity was informed of the intention to certify the fishery on the 26th January 2016. The final certification decision was made on the 27th January 2016 with the Certification Decision Maker approving the decision to certify the fishery.

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## Appendix 1 Scoring and Rationales

### Appendix 1.1 Performance Indicator Scores and Rationale

Evaluation table 1 - PI 1.1.4

PI 1.1.4		The fishery has negligible discernible impact on the genetic structure of the population		
Scoring Issue		SG 60	SG 80	SG 100
a	Guide-post	The fishery is unlikely to impact genetic structure of wild populations to a point where there would be serious or irreversible harm	The fishery is highly unlikely to impact genetic structure of wild populations to a point where there would be serious or irreversible harm	An independent peer-reviewed scientific assessment confirms with a high degree of uncertainty that there are no risks to the genetic structure of the wild population associated with the enhanced fishery
	Met?	Y	Y	N
	Justification	<p>1. Might the translocation activity change the genetic structure of 'wild' populations in the Oosterschelde?</p> <p>'Wild' mussel populations in the Oosterschelde are mainly mussels on culture plots, which are grown from seed collected on spat collectors or harvested locally or from the southern Wadden Sea. They are all, therefore, from the same broadly connected population (Gittenberger 2015) although not being 'wild' in the usual sense. In the most recent studies, these mussels have been determined to be ~99% pure edulis with ~1% having some gallo alleles, and possibly a lower level of trossulus alleles (Kijewski et al. 2009, Steinert et al. 2012 and references therein). The source of these gallo and trossulus genes is not known; mussel imports cannot be ruled out, although edulis populations elsewhere (e.g. the Irish Sea) show a similar low-level admixture of gallo and possibly trossulus alleles.</p>		

		<p>2. What constitutes 'serious or irreversible harm' in this context?</p> <p>The MSC provides no definition in this context, so the team considered what would be a suitable definition. The team concluded that irreversible change to the genetic structure of the population by itself does not constitute 'serious or irreversible harm'. Instead, the team considered that there are two possibilities which would be considered 'serious or irreversible harm':</p> <p>if the genetic change caused irreversible changes to ecological factors (e.g. the size of wild populations, or their dynamics (e.g. age and growth), or their role in the ecosystem, or their utility to dependent species (as prey or habitat), or fisheries);</p> <p>if there is loss of overall genetic diversity or the loss of some individual alleles, such that the ability of the population to adapt to future environmental change might be affected.</p> <p>3. Has the current presence of gallo alleles in the Oosterschelde caused serious or irreversible harm?</p> <p>It is clear that the presence of ~1% of heterozygous individuals in the population will have negligible population or ecological impacts. Likewise, there is no evidence of a loss of genetic diversity: conversely, some alleles are likely to have been added to the population, resulting in a (small) increase in genetic diversity. Therefore, according to the team's definition, there is no likelihood of 'serious or irreversible harm' at present, even assuming that shellfish imports are the source of these alleles.</p> <p>It is worth noting in this context that although gallo is spreading east on both sides of the Channel coast, the team could find no evidence that any ecological concerns have been raised, and mussel culture is thriving in both areas (e.g. Exmouth, Mont St. Michel Bay).</p>
		<p>4. What is the future risk of further change?</p> <p>There are two sources of evidence which suggest that the Oosterschelde / Wadden Sea is not particularly 'invasible' for gallo: i) although mussels have been brought into the Oosterschelde for several decades, including from areas (W. Ireland) where gallo is common, gallo alleles are still very rare; and ii) the spread of gallo in NW France is correlated with a winter SST of ~10°C (Hilbish et al. 2012) – considerably higher than the Oosterschelde. Conversely, it is clear that the distribution of gallo has been changing rapidly in other parts of Europe, and there is reason to suppose that with climate change it will sooner or later reach the southern North Sea. Overall, the team concluded that the risk of further genetic change from shellfish imports is most likely limited to maintaining some gallo alleles in the population at low frequency. The risk from climate change is probably considerably higher.</p> <p>5. Conclusion</p> <p>The team concluded that the import of mussels into the Oosterschelde is at worst 'highly unlikely' (probability of 20% or less) to change the existing genetic structure of the population to the point of serious or irreversible harm, as defined above; hence SG80 is met. While there has been considerable work on mussel genetic structure around NW Europe (some of which is reviewed in the main report), there is no particular study which has focused specifically on the likely impact of mussel imports into the Oosterschelde, therefore SG100 is not met.</p>
<b>References</b>		Gittenberger 2015, Steinert et al. 2012, Hilbish et al. 2012, Kijewski et al. 2009

<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>	<b>80</b>
<b>CONDITION NUMBER (if relevant):</b>	<b>N/A</b>

**Evaluation table 2 - PI 2.6.1**

<b>PI 2.6.1</b>		<b>The translocation activity has negligible discernible impact on the surrounding ecosystem</b>		
<b>Scoring Issue</b>		<b>SG 60</b>	<b>SG 80</b>	<b>SG 100</b>
<b>a</b>	<b>Guide-post</b>	The translocation activity is unlikely to introduce diseases, pests, pathogens, or non-native species (species not already established in the ecosystem) into the surrounding ecosystem	The translocation activity is highly unlikely to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem	There is evidence that the translocation activity is highly unlikely to introduce diseases, pests, pathogens, or non-native species into the surrounding ecosystem
	<b>Met?</b>	Y	Y	Y

<p><b>Justification</b></p>	<p>Note: In this context, the team considers 'non-native species' to mean 'non-native species not already present in the Oosterschelde'.</p> <p>The translocation activity is carefully monitored (via the SASI and Big Bag monitoring systems) and translocations are evaluated under a risk-analysis framework (Gittenberger, 2014a) to consider i) whether they should be permitted and ii) if so, subject to what level on ongoing monitoring. Species lists (Lists 1 and 2) for each area are maintained and updated by GiMaRIS, as is the Oosterschelde list (e.g. Gittenberger et al. 2011a).</p> <p>There has been one case where a 'problem species' has been encountered at a source site; when SASI monitoring revealed oyster drills (<i>Urosalpinx cinerea</i>) at a site in the Limfjord. The species disperses slowly on its own, but could be introduced to the Oosterschelde via mussel imports. This site has been closed as a source of imports, and there have been no subsequent licence applications for this area. This species was the main species of concern in the IMARES risk assessment (Wijsman and Smaal 2006), since the two other species cited as having possible negative impacts (algae species) already occur in the vicinity of the Oosterschelde. On this basis, the team considered that there is 'evidence' that the risks highlighted by the risk assessment have been addressed, and that the translocation activity is highly unlikely to introduce pests or non-native species (not already present in the Oosterschelde).</p> <p>In relation to diseases and pathogens, microscopic organisms are not covered by the translocation management system, but are covered by other national and EU regulations relating to shellfish toxicity and food health. Two examples can be given: the oyster pathogen <i>Bonamia</i> is present in some shellfish areas around Europe, and in order to avoid spreading it to other areas it is an EU requirement (Commission Decision 2009/177/EC implementing Council Directive 2006/88/EC) to have in place a monitoring system, with 'Bonamia containment zones' established where <i>Bonamia</i> is detected. Although mussels are not susceptible to <i>Bonamia</i> and do not act as reservoirs, all shellfish movement from inside to outside these containment zones is strongly restricted. The Oosterschelde is, however, inside a containment zone (<i>Bonamia</i> is present) so these restrictions do not apply – so, for example, when <i>Bonamia</i> was detected in a population of Chilean oysters in the Menai Strait (MEP 2011), mussel exports from that fishery to the Netherlands could still continue.</p> <p>In relation to water quality and toxic algae, there is of course a Europe-wide standardised testing programme for shellfish waters, under Directive 2006/113/EC (the Shellfish Waters Directive). It has happened that source areas have been closed because toxic algae were detected – e.g. in Castlemaine Harbour. The testing and closure is the responsibility of national authorities in the source area.</p> <p>Overall, the team considered that the translocation activity is highly unlikely to introduce diseases, pests, pathogens or non-native species (not already present) into the Oosterschelde, and that there is evidence that this is the case – not only because there has not so far been an introduction (although a contingency plan is in place should one be detected), but also because in cases where problem species or pathogens have been detected, the management systems in place have worked to ensure that there was no introduction.</p>	
<p><b>References</b></p>	<p>Gittenberger 2014a, Gittenberger et al. 2011a, MEP 2011, Commission Decision 2009/177/EC, Directives 2006/88/EC and 2006/113/EC</p>	
<p><b>OVERALL PERFORMANCE INDICATOR SCORE:</b></p>		<p><b>100</b></p>
<p><b>CONDITION NUMBER (if relevant):</b></p>		<p><b>N/A</b></p>

**Evaluation table 3 - PI 2.6.2**

PI 2.6.2		There is a strategy in place for managing translocations such that the fishery does not pose a risk of serious or irreversible harm to the surrounding ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guide-post</b>	There are measures in place which are expected to protect the surrounding ecosystem from the translocation activity at levels compatible with the SG80 Translocation Outcome level of performance (PI2.6.1)	There is a partial in place, if necessary, that is expected to protect the surrounding ecosystem from the translocation activity at levels compatible with the SG80 Translocation Outcome level of performance (PI2.6.1)	There is a strategy in place for managing the impacts of translocation on the surrounding ecosystem
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	The team considered that there is a strategy in place to manage the impacts of translocation, consisting of a risk-assessment system and ongoing monitoring which has successfully avoided any introduction of problem species to the Oosterschelde, as well as an EU-wide system of monitoring for shellfish diseases and toxic algae. The strategy has achieved a translocation outcome performance of >80. SG100 is met.		
b	<b>Guide-post</b>	The measures are considered likely to work based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species)	A valid documented risk assessment or equivalent environmental impact assessment demonstrates that the translocation activity is highly unlikely to introduce diseases, pests, pathogens or non-native species into the surrounding ecosystem	An independent peer-reviewed scientific assessment confirms with a high degree of certainty that there are no risks to the surrounding ecosystem associated with the translocation activity
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	There is a risk assessment (Wijsman and Smaal 2006); which was peer-reviewed (see Appendix C). The risk assessment concluded that risks to the ecosystem were small but not absent (see Section 3.4.2 of the main report). Each licence application must be accompanied by an appropriate assessment (e.g. Seip-Markensteijn and Holstein 2014), which is prepared on the basis of the SASI/Big Bag sampling carried out by GiMaRIS, and is subject to government and stakeholder review.  On this basis, the team considered that the risk assessment plus appropriate assessment process show that introductions are 'highly unlikely' (SG80 is met); but it cannot be said (and the risk assessment does not say) that there are no risks (SG100 is not met).		

<b>c</b>	<b>Guide-post</b>		Contingency measures have been agreed in the case of an accidental introduction of diseases, pests, pathogens or non-native species due to the translocation	A formalised contingency plan in the case of an accidental introduction of diseases, pests, pathogens or non-native species due to the translocation is documented and available
	<b>Met?</b>		Y	Y
	<b>Justification</b>	Contingency measures are agreed in the case that an accidental introduction of a problem species is detected – all licences are immediately suspended and any mussels from that site on plots must be cleared, all mussels placed in quarantine and all cultch disposed of in a same manner (i.e. not in the usual disposal sites in the Oosterschelde). This is part of the licence conditions. SG80 is met. The actions to be taken are set out in the Shellfish Import Monitoring Protocol (version 3; Gittenberger, 2014a), which is available to interested parties. The team considered that this document constituted a 'formalised contingency plan', hence SG100 is met.		
<b>References</b>		Gittenberger, 2014a, Wijsman and Smaal, 2006, Seip-Markensteijn and Holstein, 2014		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>95</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**Evaluation table 4 - PI 2.6.3**

<b>PI 2.6.3</b>		<b>Information on the impact of the translocation activity on the environment is adequate to determine the risk posed by the fishery</b>		
<b>Scoring Issue</b>		<b>SG 60</b>	<b>SG 80</b>	<b>SG 100</b>
<b>a</b>	<b>Guide-post</b>	Information is available on the presence or absence of diseases, pests, pathogens or non-native species at the source and destination of the translocated stock to guide the management strategy and reduce the risks associated with the translocation	Information is sufficient to adequately inform the risk and impact assessments required in the SG80 Translocation Management level of performance (PI2.6.2)	Information from frequent and comprehensive monitoring demonstrates no impact from introduced diseases, pests, pathogens or non-native species with a high degree of certainty
	<b>Met?</b>	Y	Y	Y

	<b>Justification</b>	<p>Information on pests and non-native species comes from the regular risk-based monitoring conducted by GiMaRIS at source sites and in the Oosterschelde; including species inventories in situ (SASI) and monitoring of species arriving in imports (Big Bags). In relation to introduction of pests and non-native species, the team considered that this programme constituted 'frequent and comprehensive monitoring'.</p> <p>In relation to diseases and pathogens, there is likewise a monitoring programme for shellfish waters and diseases in each EU member state, with EU-mandated requirements for frequency and type of monitoring (see details under PI 2.6.1). The team concluded that this likewise constitutes 'frequent and comprehensive monitoring'.</p> <p>The information is sufficient to inform the management system, as set out in PI2.6.2. SG80 is met. For Principle 2, 'high degree of certainty' can be defined quantitatively as an 80% probability (Certification Requirements paragraph CB3.2.3). The team considered that although the probability of impacts from accidental introduction is hard to quantify, the threshold of an 80% probability of no impact under the current management system is likely to be exceeded considerably. SG100 is therefore met.</p>
<b>References</b>	Gittenberger, 2014a, Gittenberger et al. 2011a, 2011b, 2013a, 2013b, 2013c, 2014a, 2014b, 2014c, Seip-Markensteijn and Holstein 2014	
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>		<b>100</b>
<b>CONDITION NUMBER (if relevant):</b>		<b>N/A</b>

Evaluation table 5 - PI 3.1.1

<b>PI 3.1.1</b>		<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> <li>• Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and</li> <li>• Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</li> <li>• Incorporates an appropriate dispute resolution framework.</li> </ul>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	There is an effective national legal system and <u>a framework for cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and <u>organised and effective cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and <u>binding procedures governing cooperation with other parties</u> which delivers management outcomes consistent with MSC Principles 1 and 2.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>The legal basis for the regulation of mussel imports is the EU Natura 2000 framework, as translated into Dutch law via the Nature Conservation Act (1998). The law sets out requirements for activities within a Natura 2000 area (the Oosterschelde), including appropriate assessment, which is implemented via the licensing system. The team considered that this framework is effective.</p> <p>Although the activity is international, the legal framework governing translocation of mussels into the Oosterschelde is 100% Dutch, so a framework for cooperation with other parties to manage this activity is not required. Other jurisdictions are involved tangentially – for example the EU legal framework for monitoring shellfish waters and diseases (described under PI 2.6.1 above) is implemented in each source jurisdiction. In this case, there is an EU-wide framework for reporting which ensures that shellfish from contaminated areas cannot be exported illegally. These requirements are binding.</p> <p>The legal framework has ensured good outcomes so far in relation to translocations (see under Principles 1 and 2). SG100 is met.</p>		
<b>b</b>	<b>Guidepost</b>	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.	The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.
	<b>Met?</b>	Y	Y	N

	<b>Justification</b>	<p>There has been at least one judicial challenge to the licensing system for shellfish imports, which is described in Section 3.5 of the main report – hence a legal mechanism for dispute resolution is present. There is also an administrative process of appeal (either by the mussel companies or by other stakeholders), after which a licensing decision will be reviewed. The mechanism is transparent – for example, judgments of court cases are available online.</p> <p>Because some stakeholders have been litigious to an extent viewed as unreasonable by the Dutch authorities, the definition of a 'stakeholder' has been tightened (via common law i.e. precedent) to ensure that, for example, an organisation cannot be created for the purpose of starting a court case.</p> <p>In general, the team concluded that the system has been tested and appears to be effective. Nevertheless, the peer reviewer commented that there is a risk that this tight definition of a stakeholder might exclude legitimate action against the fishery under some circumstances. The team therefore concluded based on this comment that while it was appropriate to conclude that the system is 'effective in dealing with most issues' (SG80 is met), it may not be 'proven to be effective' under all circumstances (SG100 is not met).</p>		
<b>c</b>	<b>Guided post</b>	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	The plots used by the mussel companies in the Oosterschelde are leased privately and are not open to fishing by others. Nevertheless, there is no shortage of mussels elsewhere in the Oosterschelde and surrounding areas which may be taken for personal consumption, at the individual's own risk. There are no commercial mussel fishers in the Oosterschelde who are not part of the UoC or who operate outside the culture areas; in any case if there were they would be subject to the usual Dutch law government commercial fisheries, and this activity would have no impact on them.		
<b>References</b>	<p>Commission Decision 2009/177/EC, Directives 2006/88/EC and 2006/113/EC</p> <p>Court judgment available at: <a href="https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=59218&amp;summary_only=&amp;q=import">https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=59218&amp;summary_only=&amp;q=import</a></p>			
<b>Harmonisation</b>	This scoring has been reviewed in relation to the overall MSC assessment for Dutch blue-shelled mussel (SGS 2011) and has been found to be consistent.			
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>85</b>

**CONDITION NUMBER (if relevant):**

**N/A**

**Evaluation table 6 - PI 3.1.2**

<b>PI 3.1.2</b>		<b>The management system has effective consultation processes that are open to interested and affected parties.</b>		
		<b>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>The organisations involved in the management of mussel imports and their roles/responsibilities are set out in Table 4 of the main report.</p> <p>The MSC assessment of the Dutch blue-shelled mussel fishery (SGS 2011) considered that all organisations and individuals involved in management are identified and their functions, roles and responsibilities explicitly defined in all areas. Since the organisations and responsibilities involved in the translocation activity are a subset of those involved in the wider management of the Dutch mussel fishery, then the team concluded that the scoring of this PI here should be harmonised with SGS 2011. However, in the specific case of licences for the disposal of cultch (a regional competency) the situation has changed since the fishery assessment because of the abolition of the Productschap Vis. It is reported that the responsibilities in relation to this licensing process specifically remain a little unclear. This is not considered a 'key' area of responsibility, so SG80 is met, but SG100 is not met.</p> <p>The peer reviewer expressed some concern about lack of clarity in the cultch disposal licensing, and considered that it might a 'key area of responsibility'. The team, however, did not agree that disposal of cultch is a 'key area of responsibility'. It is important to note that this problem does not apply to disposal of cultch in cases where, for example, problem species have been identified – in these cases, the responsibilities of those concerned are very clear (see Section 3.4.7 of the report and scoring for 2.6.2). This situation pertains only to disposal of cultch as a routine activity, for which locations and procedures are well-established, even if the licencing system is not completely clear. The team therefore decided not to change the scoring.</p>		

<b>b</b>	<b>Guided post</b>	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	Consultations processes are set out in Section 3.5.2 of the main report. There is a formalised consultation process for licensing, with an appeals process for both applicants and stakeholders. The management system has been continually adapted (strengthened), partly as a response to input from stakeholders (e.g. eNGOs). SG80 is met. It is not, however, clear that the management system would automatically explain how information is used or not used – except, for example, as part of an appeals process. SG100 is not met. (This was also the judgment of SGS 2011).		
<b>c</b>	<b>Guided post</b>		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	<b>Met?</b>		Y	N
	<b>Justification</b>	As noted above, the consultation process provides the opportunity for any designated stakeholder to be involved. SG80 is met. The team considered that SG100 is not met, because the definition of a 'stakeholder' is quite tight. This has been to avoid unnecessary or vexatious litigation, but may also have the effect of not providing 'encouragement' for organisations to get involved in consultation (although the team did consider that the process facilitates the effective engagement of legitimate stakeholders under the formal definition, since they are directly informed of licence applications and sent the appropriate assessments).		
<b>References</b>		SGS 2011 Court judgment available at: <a href="https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=59218&amp;summary_only=&amp;q=import">https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=59218&amp;summary_only=&amp;q=import</a>		
<b>Harmonisation</b>		This scoring has been reviewed in relation to the overall MSC assessment for Dutch blue-shelled mussel (SGS 2011) and has been found to be consistent.		
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>80</b>

CONDITION NUMBER (if relevant):	N/A
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Evaluation table 7 - PI 3.2.2

<b>PI 3.2.2</b>		<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Guidepost</b>	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	<b>Met?</b>	Y	Y	
	<b>Justification</b>	The established decision-making process is summarised in Figure 11 of the main report. It has resulted in a strategy which achieves the fishery-specific objectives (minimises the risks of importing mussels into the Oosterschelde to a level which meets the requirements of the management framework for Natura 2000).		
<b>b</b>	<b>Guidepost</b>	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	The only 'serious and important' issue in relation to mussel imports is the risk of translocation of unwanted species into the Oosterschelde and its possible impact on the ecosystem (or on 'good ecological status' of the Natura 2000 area) – as identified by the risk assessment (Wijsman and Smaal 2006). The decision-making process clearly responds to this issue, via monitoring, appropriate assessments and licensing. SG80 is met.  The team considered whether genetic issues (as evaluated under Principle 1) should be considered a 'serious or important issue' (i.e. under SG80) and concluded that the scientific evidence suggests that it is not (see main report 'Principle 1'). This issue was included in		

		<p>the risk assessment, so has in that sense been considered by the decision-making process, but is not now incorporated in it, on the basis that it is not likely to be significant. Nevertheless, because 'all issues' are not included in the decision-making for licensing, the first part of SG100 is not met, although the team notes that monitoring work is ongoing on genetics, and there is scope for it to be included in the management system depending on the outcome of the monitoring.</p> <p>The team considered that the decision-making process is transparent, timely and adaptive. The appropriate assessments are available for stakeholder consultation and comment, but under a fixed timetable. The decision-making process has been shown to be adaptive, in that it has clearly been strengthened over the years to take account of concerns – e.g. under the Natura 2000 framework. The wider implication of decisions (i.e. on the ecosystem of the Wadden Sea) are at the core of decision-making. SG80 is met.</p>		
c	<b>Guided post</b>		Decision-making processes use the precautionary approach and are based on best available information.	
	<b>Met?</b>		Y	
	<b>Justification</b>	Decision-making (licensing of mussel imports) is based on a risk-based monitoring protocol and appropriate assessments. No new area can be licensed without a SASI. The team considered that this constituted a precautionary approach and use of the best available information.		
d	<b>Guided post</b>	Some information on fishery performance and management action is generally available on request to stakeholders.	Information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>Stakeholders are proactively informed of licence applications and appropriate assessments, as well as the outcome of the licence decision, as part of the consultation process. In relation to the monitoring of imports, the mussel companies are required to complete customs declarations for each shipment. They are not required to report imports directly to the Food and Consumer Product Safety Authority, but they must keep records, which can then be audited by the enforcement body at any time – i.e. they are available on request to the relevant authorities, and from there to other stakeholders. Licence and other legal decisions (e.g. ref court case summary) explain why actions were taken or not taken. SG80 is met.</p> <p>In relation to SG100, because the current gap in reporting requirements for shellfish imports (i.e. aside from customs declarations there</p>		

		is no current requirement for companies to report quantities and source to a third party, although they can be audited by the enforcement agency), the team concluded that SG100 is not met. Reportedly, the next iteration of the Shellfish Imports Monitoring Protocol will include a requirement that all imports must be reported to the Vereniging van Importeurs van Schelpdieren, who reportedly will manage this via the auction at Yerseke, who have the traceability infrastructure in place to record the details of shipments (Cora Seip-Markensteijn, pers. comm.).		
e	<b>Guided post</b>	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	In the past, the management of mussel imports has been characterised by legal disputes. The most recent legal challenge found that the management system is appropriate and precautionary. The management system has tried to avoid legal disputes by having a strong stakeholder consultation framework, with a formal appeals process, as well as by reviewing the definition of who is a legitimate stakeholder. SG100 is met.		
<b>References</b>	Wijsman and Smaal, 2006, Gittenberger, 2014a Court judgment available at: <a href="https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=59218&amp;summary_only=&amp;q=import">https://www.raadvanstate.nl/uitspraken/zoeken-in-uitspraken/tekst-uitspraak.html?id=59218&amp;summary_only=&amp;q=import</a>			
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

**Evaluation table 8 - PI 3.2.3**

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Guidepost</b>	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	<p>Monitoring and enforcement in this fishery does not fall under the same body as the one that conducts fisheries enforcement. Instead it is the role of the Ministry of Economic Affairs, and they have delegated their powers to the Dutch Food and Consumer Product Safety Authority (who also carry out hygiene testing, and have an office in Yerseke).</p> <p>In relation to the monitoring all imports, the mussel companies are required to complete customs declarations for each shipment. They are not required to report imports directly to the Food and Consumer Product Safety Authority, but they must keep records, which can then be audited by the enforcement body at any time. Previously all shipments also had to be reported to the Productschap Vis, but since they were abolished this requirement has gone into abeyance. Reportedly, the next iteration of the Shellfish Imports Monitoring Protocol will include a requirement that all imports must be reported to the Vereniging van Importeurs van Schelpdieren, who reportedly will manage this via the auction at Yerseke, who have the traceability infrastructure in place to record the details of shipments (Cora Seip-Markensteijn, pers. comm.).</p> <p>Up until recently, monitoring by the Food and Consumer Product Safety Authority was reported to be 'irregular', but a large-scale programme has recently started to screen all the mussel companies on a larger scale, to ensure that mussel imports are all properly licensed and reported.</p> <p>A monitoring, control and surveillance system is therefore implemented. Since there have not been any introductions of undesirable species into the Oosterschelde as a result of this industry, as far as is known, then the system can be argument to be effective. No infringements of the rules have been reported either by the Vereniging van Importeurs van Schelpdieren, or the Food and Consumer</p>		

		Product Safety Authority. SG80 is met. Because of the various limitation of the system outlined above (to be addressed in the new monitoring protocol), SG100 is not met.		
<b>b</b>	<b>Guidepost</b>	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	<b>Met?</b>	Y	Y	Y
	<b>Justification</b>	<p>Possible sanctions are:</p> <ol style="list-style-type: none"> <li>1. a warning</li> <li>2. a fine (under the Nature Conservation Act).</li> </ol> <p>The main constraint, however, as the mussel companies see it, is that infringements would risk putting the entire system into question – the Ministry could at any time choose not to licence further imports if it considered that the mussel companies were not in compliance with the requirements.</p> <p>Sanctions exist. Since, reportedly, no infringements have been detected to date, they demonstrably provide effective deterrence. With no infringements, there has been no basis for deciding if they are consistently applied or not – however, the fishery as a whole scored 100 for this scoring issue (SGS 2011) and the team considered that there was no reason to support that sanctions would be applied differently in this case. SG100 is met.</p>		
<b>c</b>	<b>Guidepost</b>	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	<b>Met?</b>	Y	Y	N
	<b>Justification</b>	As noted above, there is no evidence of any non-compliance, particularly since compliance is strongly in the fisher's interest. The monitoring system is enforced as a condition of licensing, and key information for the management system (such as Big Bag samples) are provided as required (A. Gittenberger pers. comm.). SG80 is met. SG100 is not met, because of the hiatus that currently exists in the reporting of imports due to the abolition of the Productschap Vis (as described under scoring issue a)		
<b>d</b>	<b>Guidepost</b>		There is no evidence of systematic non-compliance.	

	<b>Met?</b>		Y	
	<b>Justification</b>	No infringements of the rules have been reported either by the Vereniging van Importeurs van Schelpdieren, or the Food and Consumer Product Safety Authority.		
<b>References</b>				
<b>OVERALL PERFORMANCE INDICATOR SCORE:</b>				<b>85</b>
<b>CONDITION NUMBER (if relevant):</b>				<b>N/A</b>

## Appendix 2. Peer Review Reports

### Summary of Peer Reviewer Opinion

<b>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</b>	Yes	<b>CAB Response</b>
<u>Justification:</u> Yes, subject to comments provided against specific PIs in the peer review tables, below.		See response to detailed comments below

<b>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]</b>	N/A	<b>CAB Response</b>
<u>Justification:</u> No conditions were raised.		N/A

If included:

<b>Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]</b>	N/A	<b>CAB Response</b>
<u>Justification:</u> No conditions were raised.		N/A

<b>Performance Indicator</b>	<b>Has all available relevant information been used to score this Indicator? (Yes/No)</b>	<b>Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)</b>	<b>Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)</b>	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
1.1.4	Yes to the extent practicable	Yes	N/A	I have indicated 'Yes to the extent practicable' because there are more genetic studies available(i.e., the team has not used ' <b>all</b> available relevant information'), but relevant studies have been considered and used to score the fishery appropriately, and other references (e.g., Zbawicka et al. (2012) – full citation in 'general Comments', below) support the findings.	On the basis of this assurance, no further information has been added.
2.6.1	Yes	Yes	N/A	No comments	N/A
2.6.2	Yes	Yes	N/A	No comments	N/A
2.6.3	Yes	Yes	N/A	No comments	N/A
3.1.1	Yes	Yes, subject to clarification	N/A	The report raises an interesting point in that Dutch law apparently limits the potential for litiagtion from some people who presumably consider themselves to be stakeholders in the fishery. Although	As we understand it, the law does not prevent concerned citizens from bringing litigation, but prevents organisations being established for the sole purpose of supporting continuing litigation (e.g.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
				<p>vexatious litigation is certainly unhelpful, it is not clear that the Dutch law does not prevent valid cases being brought by 'concerned citizens' who do not necessarily have an active/ongoing role in environmental matters. Some clarification on this would support the SIb score of 100.</p> <p>With regard to the comment above, it is noted that SIc of PI 3.1.2 is not scored at 100 because "the definition of a 'stakeholder' is quite tight .... but may also have the effect of not providing 'encouragement' for organisations to get involved in consultation"</p>	<p>against every licence application). Informally, it is the observer of the team that NGOs in the Netherlands are fond of interacting with fisheries via law suits, and that overall it is not particularly productive.</p> <p>Nevertheless, to be precautionary and to be more consistent with 3.1.2, the scoring for this scoring issue has been reduced to 80 (overall score for this PI reduced from 95 to 85).</p>
3.1.2	Yes	No.	N/A	I have indicated 'No', because the report notes that the Productschap Vis (PV) has been abolished, that this organisation previously managed the licensing process for mussel companies,	The team did not agree that disposal of cultch is a 'key area of responsibility'. Note that this does not apply to disposal of cultch in cases where, for example, problem species have been identified –

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
				<p>and that there is less monitoring of imports (and cultch disposal licensing is 'a little unclear') as a result. Although there appear to be other processes in place which could pick up important issues while waiting for the licensing process to be clarified, I would argue that this is clearly a 'key areas of responsibility'.</p>	<p>in these cases, the responsibilities of those concerned are very clear (see Section 2.4.7 of the report). This situation pertains only to disposal of cultch as a routine activity, for which locations and procedures are well-established, even if the licencing system is not completely clear.</p>
3.2.2	Yes	No, subject to clarification		<p>I have indicated 'No subject to clarification' on the basis that SId states: "<a href="#">Mussel companies must report to the Ministry of Economy all imports and their quantities.</a>", but also "<a href="#">Aside from customs declarations there is no current requirement for companies to report quantities and source to a third party,</a>" Which is right?</p> <p>Also, the reason for scoring the fishery down from SG100 for SId is stated as</p>	<p>The reviewer is right – the rationale for this scoring issue was very unclear. The situation is correctly set out in Section 2.5.4 of the report (and now in the rationale for this scoring issue).</p> <p>The situation is that the mussel importers complete a customs declaration, but do not report their imports directly to the Food Product Safety Authority – however, they are available for audit and hence would be</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	<b>Justification</b> Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	<b>CAB Response</b>
				<p>being the current gap in reporting requirements for shellfish imports. I don't think reporting internal to the management system is the issue in question, though – I would score this SI on the basis of process undertaken by managers to report to external stakeholders. And, on that basis, the fishery may warrant a higher score.</p> <p>Finally, one of the justifications for scoring Sle at 100 is 'reviewing the definition of who is a legitimate stakeholder'. While I agree with the SG100 score for the other reasons provided, I am not convinced that limiting who can mount a legal challenge is what the MSC had in mind in terms of the management system acting proactively to avoid legal disputes!</p>	<p>available to stakeholders (via the Food Product Safety Authority) if required. We agree that this situation is not wholly satisfactory, but it does seem to meet the requirements of SG80. A new reporting system is in the process of being implemented as part of the strengthened monitoring regime, however – a note has been added to the rationale, although the score was not adjusted on this basis since it is not yet implemented.</p> <p>See response to comment on 3.1.1 above – the situation is not quite as the reviewer characterises it. The management system in this case has had difficulty with vexatious legal actions, even though it has been found (through the courts) to be appropriate, so in this circumstance, the action was most likely appropriate.</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.  Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					The scoring was reduced in 3.1.1 above to take account of concerns around this issue, and it was not changed here.
3.2.3	Yes	Yes	N/A	No comments	

<p><b><i>Does the report clearly evaluate any additional impacts that might arise from enhancement activities?</i></b></p> <p>Note: Justification to support your answers is only required where answers given are 'No'.</p>	<p><b>No</b></p>	<p><b>CAB Response:</b></p>
<p><u>Justification:</u></p> <p>The report is comprehensive for the PIs scored, and there are no additional impacts that appear likely to arise from the enhancement activities described. Therefore, the response to the question is 'no', but this does not reflect a deficiency.</p>		<p>N/A</p>

**Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary) can be added below and on additional pages**

The report appropriately describes the fishery and is generally clear and concise. Some minor typographic errors have been noted and provided back to the assessment team.

## Appendix 3. Stakeholder submissions

Email from Arjan Gittenberger, 19 August 2015, in response to questions from the team (in supplement to discussions by phone):

Concerning your questions about the big-bag monitoring/simp:

1. The report says: "Once exporting has begun, GiMaRIS continue ongoing sampling of the Big Bags. The basic level of sampling is currently one sample per area every 6 months." Could you explain why such a low sample level is sufficient to avoid the import of any non-indigenous species?

\*\*\* The aim of the big-bag sampling is not to score ~all species present in the big-bags and stop the transports. To do a more or less complete species assessment of the species in the big-bags would cost a lot of time, and it would simply not be feasible to stop the processing of the shellfish until all species in the samples have been identified. In general two samples per area are taken from big-bags every 6 months, but that is indeed still insufficient to avoid the import of any non-indigenous species. For assessing the species that live among the mussels in the export area, the repeated "Shellfish Associated Species Assessment (SASI)" is included in the SIMP (Shellfish Import Monitoring Protocol). Depending on the species diversity and homology in an area one usually has to take 60-120 samples to reach the obliged (by SIMP) monitoring effort, indicated as "one has to take additional samples until one expects (statistically calculated) that less than one new species for the area would be found in double the number of samples". If the species communities/diversity found in different samples differs much, this rule will automatically imply that more samples have to be taken.

The SIMP is mostly based on keeping two species lists up to date for each of the areas: List 1 and List 2. List 1 includes all species that have been found living among the shellfish in the export area (the focus of the SASI) and list 2 includes all species that have been found alive among the mussels upon arrival in The Netherlands (the focus of the big-bag monitoring). These two lists are linked in the SIMP directly to the obliged monitoring intensity and potential mitigation actions. These links are made on the basis of nine parameters, which may indicate risk. Among these parameters are for example aspects like "How many "new" species (native and non-native) for the area have been found during the last big-bag inventory or during the last SASI? ". If relatively many "new" species (regardless of whether they are native or non-native) are found, this indicates that apparently the species diversity in the export area is not well known yet. Therefore the monitoring intensity is intensified. Other parameters include the number of exotic species (from outside of Europe) are found and how many non-indigenous (NW European) species are found. For all of these species a risk-assessment has to be made to decide whether or not they concern a nuisance species. A nuisance species is a (probably non-native, but it may also be native) species that is expected to have a significant negative impact on the Natura 2000 values of the import area, because of the transport of mussels. If a nuisance species is found during any of the monitoring, the shellfish import monitoring protocol cannot be used anymore to minimize the risk of invasive species, and one has to quarantine any shellfish imports from that region. In

addition, if any shellfish were imported in the season that this nuisance species was first recorded, one asap has to fish clean any area where these shellfish were imported to. It is unlikely that this will happen, but as the SIMP minimizes that chance that that a nuisance species is imported, and can't guarantee a 0.00 % risk, the "fishing clean" obligation was added to the protocol.

To summarise:

The SIMP is based on the assumption that if one wants to minimize the chance that nuisance species are imported with shellfish transports into the Netherlands, one should take into account which species live among the shellfish in the export area and which species survive the fishing activity and the transport to The Netherlands. Finally one has to do a risk assessment for each species to decide on whether or not any of these species concerns a nuisance species as described above. On the basis of how well the species diversity in the export area is known and how many non-indigenous species are present, the obliged monitoring intensity has to be decided. Before one is allowed to start any imports from an area a SASI has to be done there, including risk assessments of all species present to conclude on whether or not they concern nuisance species. These SASI's are in general repeated every three year, but in some cases if the monitoring data indicates this may be necessary (e.g. for the Oosterschelde as an export region, because it is relatively very large and diverse) they are repeated on a yearly basis.

2. The report says: "Samples taken from the Big Bags arriving in Yerseke. Big Bag is spread over a table and everything alive and non-mussel is collected and sent to the GiMaRIS lab for identification. To prove that it was done quickly, some live mussels must also be included." Who is doing the sampling, are this biologists or fishermen? Can it be guaranteed that all non-mussel specimens are found and sent to GiMaRis? Can tiny larvae or young animals/plants really be seen? What's about eggs and larvae in the residual water in the Big Bag? They won't be found on the sample table because the water is running off, but they are surely introduced in the water of the receiving area when the Big Bag is emptied into the water.

\*\*\* As indicated above the potential presence of nuisance species in the export area is (within SIMP) mostly based on the SASI monitoring (the basis for list 1 of the SIMP). If any nuisance species is found, imports are not allowed following the SIMP. The Big-Bag monitoring results in much less species (on list 2 of the SIMP) than the SASI and will probably not be complete, but does gives a good general idea of what species survive the fishing activity and transport to The Netherlands. This can vary between areas and is used in the SIMP to set the obliged monitoring intensity; if for some reason the export area is drastically changed this may also become clear in this big-bag monitoring and one can get an indication on the basis of this monitoring that the shellfish that are imported are indeed from the same area where the SASI has been done. The samples for the big-bag monitoring are in general taken by the employees of the mussel auction house (Yerseke). They do not have to identify the species. They only have to collect all species that are not mussels, something that they do on a virtually daily basis anyways (when checking the % of tarra in a batch of mussels). Concerning the water and larvae in the water... In general the SIMP does not take into account species of which the larvae are in the water. Even if we would take a look at the zooplankton in the water, most of the species probably cannot be identified as

many species in the zooplankton tend to look the same or very similar in these early larval stages. Techniques like DNA barcoding are sometimes mentioned as an option, but they cannot distinguish between dead or alive larvae and will even pick up DNA traces in the water (brought in with the tides /currents) of specimens that may have died more than a month ago, hundreds of kilometres away. In general we assume that most of the species of which the larvae are in the water, will also have settled among the mussels in the export region and would have been found during the SASI there. The chance that the larvae of other species (that are not found in the export area among the mussels), are fished up in the export area, survive the transport in the residual water in the big-bag, are introduced in the Dutch waters with the big-bags, and are able to settle there, expand and significantly impact the Natura2000 values of the import region in The Netherlands is assumed to be extremely small.

During the stakeholder consultation period, the MEC team received Technical Oversight (TOs) from the MSC. These are provided below and the CAB's response.



**Marine House,**  
1 Snow Hill,  
London, EC1A 2DH,  
United Kingdom,  
Tel: +44(0)20 7246 8900  
Fax: +44(0)2- 7246 8901

Date 10/11/2015

**SUBJECT: MSC Review and Report on Compliance with the scheme requirements** Dear Jo Gascoigne

Please find below the results of our partial review of compliance with scheme requirements.

<b>CAB</b>	ME Certification Limited (MEC)
<b>Lead Auditor</b>	Jo Gascoigne
<b>Fishery Name</b>	Mussel translocation by members of the Vereniging van Importeurs van Schelpdieren into the Oosters
<b>Document Reviewed</b>	Public Comment Draft Report

Ref	Type	Page	Requirement	Reference	Details	PI	CAB response
18387	Minor	30	CR 27.12 v1.3		The report gives no information on the traceability as per section 27.12 of the CR. In this case, at a minimum it would state that the parties are only eligible to sell product as certified if they have valid CoC certification. The list of these companies should then be included.	N/A	Traceability within the fishery was re-evaluated and now adhere to the requirements as stated in 27.12 of v1.3 of the MSC Certification Requirements
18389	Guidance	30	CR-27.12.2.1 v.1.3	27.12.2 If the CAB determines the systems are sufficient, fish and fish products from the fishery may enter into further certified chains of custody and be eligible to carry the MSC ecolabel. The CAB shall determine:27.12.2.1 The scope of the fishery certificate, including the parties and categories of parties eligible to use the certificate and the point (s) at which chain of custody is needed. a. Chain of custody certification shall always be required following a change of ownership of the product to any party not covered by	<p>The report states that "all mussel companies have Chain of Custody certification for the source fisheries involved." However, it does not name these companies nor provide details of their certification (i.e. MSC CoC codes).</p> <p>Are all operations covered by CoC certificates? If not details would needed on is certified and non-certified product handled at the same time and if so, what are the systems in place to ensure traceability? Is product sufficiently segregated and identifiable? Who has ownership of the product from when it enters the Oosterschelde until it leaves?</p>	N/A	<p>Traceability within the fishery was re-evaluated and now adhere to the requirements as stated in 27.12 of v1.3 of the MSC Certification Requirements.</p> <p>A full list of traders authorised by the client group to purchase from MSC-certified mussel fisheries on their behalf is now included in the Final Report under 5.2.</p>

				<p>the fishery certificate. b. Chain of custody certification may be required at an earlier stage than change of ownership if the team determines that the systems within the fishery are not sufficient to make sure all fish and fish products identified as such by the fishery originate from the certified fishery. c. If the point where chain of custody certification is required is covered by the fishery certificate, the team shall determine the parties or category of parties covered by the fishery certificate that require chain of custody certification.</p>			
18390	Guidance	30	CR 27.12.1.7 v.1.3	<p>27.1.2.1 The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified</p>	<p>The report states, "Reportedly, the next iteration of the Shellfish Imports Monitoring Protocol will include a requirement that all imports must be reported to the Vereniging van Importeurs van Schepdieren who reportedly will manage this via the auction at Yerseke, who have the</p>	N/A	<p>This is now elaborated upon in section 5.2. The association takes ownership of the product, but is purchased through the traders listed, which act as sub-contractors for the client group.</p>

				<p>fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: 27.12.1.7. The robustness of the management systems</p>	<p>traceability infrastructure in place to record the details of shipments”.</p> <p>The report is not clear what role Vereniging van Importeurs van Schepdieren has at this time in managing the traceability of product received from the different fisheries. Does the association take ownership of product? Are they responsible for segregation and identification of product? Please explain the role of the association in regards to CoC and traceability.</p>		
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This report is provided for action by the CAB and ASI in order to improve consistency with the MSC scheme requirements; MSC does not review all work products submitted by Conformity Assessment Bodies and this review should not be considered a checking service. If any clarification is required, please contact Sergio Cansado on +34626124135] for more information.

Best regards,  
 Fisheries Oversight Director  
 Dan Hoggarth

Marine Stewardship Council



cc: Accreditation Services International

**MSC – the best environmental choice In seafood**

Company Reg. 3322023 Limited by guarantee. Registered Office: 1 Snow Hill London EC1A 2DH Registered Charity No. 1066806



Marine House  
1 Snow Hill  
London EC1A 2DH  
United Kingdom  
Tel: +44 (0)20 7246 8900  
Fax: +44 (0)20 7246 8901

Date: 08/01/2016

**SUBJECT: MSC Review and Report on Compliance with the scheme requirements**

Dear Jo Gascoigne

Please find below the results of our partial review of compliance with scheme requirements.

<b>CAB</b>	ME Certification Limited
<b>Lead Auditor</b>	Jo Gascoigne
<b>Fishery Name</b>	Mussel translocation by members of the Vereniging van Importeurs van Schelpdieren into the Oosters
<b>Document Reviewed</b>	Final Report Submitted

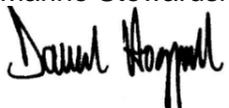
Ref	Type	Page	Requirement	Reference	Details	PI	CAB Response
18445	Minor	34-37	CR – 27.12.2.1 v1.3	27.12.2 If the CAB determines the systems are sufficient, fish and fish products from the fishery may enter into further certified chains of custody and be eligible to carry the MSC ecolabel. The CAB shall determine: 27.12.2.1 The scope of the fishery certificate, including the parties and categories of parties eligible to use the certificate and the point (s) at which chain of custody is needed. a. Chain of custody certification shall	The final report provides much more information regarding CoC and traceability on pgs 34-37, including naming the companies with CoC involved. However, the PCDR stated that "all mussel companies have Chain of Custody certification for the source fisheries involved." It		This has been further described in the traceability section of this report (Section 5)

				<p>always be required following a change of ownership of the product to any party not covered by the fishery certificate. b. Chain of custody certification may be required at an earlier stage than change of ownership if the team determines that the systems within the fishery are not sufficient to make sure all fish and fish products identified as such by the fishery originate from the certified fishery. c. If the point where chain of custody certification is required is covered by the fishery certificate, the team shall determine the parties or category of parties covered by the fishery certificate that require chain of custody certification.</p>	<p>appears that some of the companies now listed in the final report are trading companies who do not all have CoC. Can this point be clarified - by either explaining how these companies are covered by CoC certification, or how they have been assessed as part of the fishery certificate to confirm that the systems in place ensure any risks to traceability are addressed?</p>		
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Given this finding we would strongly suggest resolving these issues, i.e. by making changes to the traceability section in the public certification report (as this section does not have a bearing on the outcome of the assessment). MEC shall be responsible for any future lack of compliance and/or complaints that arise subsequent to publication.

This report is provided for action by the CAB and ASI in order to improve consistency with the MSC scheme requirements; MSC does not review all work products submitted by Conformity Assessment Bodies and this review should not be considered a checking service. If any clarification is required, please contact Sergio Cansado on +34626124135 for more information.

Best regards,  
 Fisheries Oversight Director  
 Dan Hoggarth  
 Marine Stewardship Council



cc: Accreditation Services International

## Appendix 4. Surveillance Frequency

Version 1.3 of the MSC Certification Requirements states that CABs shall calculate a surveillance score from which the level of surveillance frequency shall then be determined. The criteria in relation to this scoring are set out below.

**Table C3. Criteria to determine surveillance score**

Criteria	Surveillance Score
<b>Default Assessment Tree Used?</b>	
Yes	0 – modified as Enhanced Bivalve Fishery (Annex CK)
No	2
<b>Number of Open Conditions</b>	
Zero conditions	0
Between 1-5 conditions	1
More than 5 conditions	2
<b>Principle Level Scores?</b>	
Greater or equal to 85	0
Less than 85	2
<b>Condition on Outcome PIs?</b>	
Yes	2
No	0
<b>TOTAL SCORE</b>	<b>2</b>

**Table C4: Fishery Surveillance Plan**

Score from CRTable C3	Surveillance Category	Year 1	Year 2	Year 3	Year 4
2	Normal Surveillance]	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit & re-certification site visit

**PLEASE NOTE:** MEC will complete the Year 1 surveillance audit in line with the procedural requirements of Version 2.0 of the MSC Certification Requirements. Should this require any changes to be made to the surveillance plan, it will be considered at this time.

## Appendix 5. Client Agreement

**From:** Cora Seip <coraseip@gmail.com>

**Subject: Re: 2881 (Client) - Public Certification Report and finalising Certification**

**Date:** 9 February 2016 at 08:56:39 GMT

**To:** Kat Collinson <kat.collinson@macalister-elliott.com>

**Cc:** Gavin Fitzgerald <gavin.fitzgerald@me-cert.com>, Chrissie Sieben <chrissie.sieben@me-cert.com>

Hi Kat,

Thank you. I did a quick scan of the document and see nothing problematic. Please proceed!

Kind regards,  
Cora

On Mon, Feb 8, 2016 at 3:04 PM, Kat Collinson wrote:

Dear Cora,

I hope this email finds you well. The stakeholder objection period on this certification has now closed. No objections to certification were received. As a result, we have now completed the Public Certification Report (PCR) for publication on the MSC website this week. The document is ready apart from one small thing (Appendix 5).

To complete this we require (as per MSC requirements) final written approval that the client accepts the PCR. Once this is received the report is ready to be sent to the MSC. To do this I have attached the PCR (in PDF as the word file is so big) for you should you wish to review it in detail. In essence though you have already seen the report and we have only added the official certification decision (page 38 of the report). We look forward to your confirmation that you are happy for us to proceed.

Kind regards,

Kat and the MEC Fisheries Team

ME Certification Ltd (MEC)  
56 High Street  
Lymington  
Hampshire  
SO41 9AH  
UK  
[+44\(0\)1590 613007](tel:+44(0)1590613007)