US Virginia eastern oyster – cages, dredges and tongs

Three-Year Evaluation Report

## FIP Information

|  |  |
| --- | --- |
| Target species scientific name(s) and common name(s)  | Eastern or Virginia oyster, *Crassostrea virginica* |
| Fishery location | Virginia, Chesapeake Bay and tributaries  |
| Gear type(s) | Tongs and patent tongs (UoAs 1 and 3), dredges and hand scrapes (UoAs 2 and 4), cage culture (UoA 5) |
| Estimated FIP Landings (weight in tons) | 2022: 243,362 bushels public, 428,841 bushels private. Total 672,203 bushels = 26,000 t approx. (Thanks to Tommy Kellum for working out the conversion factor.) |
| Vessel type(s) and size(s) | See description in vessel list form provided to FisheryProgress |
| Number of vessels | 800-1000 licensees across all gear types; see description in vessel list form |
| Management authority | Virginia Marine Resources Commission (VMRC) |
| Assessor name(s) | Jo Gascoigne |
| Assessor Organization/Affiliation | Strombus Ltd |
| Date of report completion | 24/4/24 |

## FIP Background

## When I was a graduate student at VIMS in the early 2000s, the sense was that the Virginia oyster and the associated traditional fishery was basically doomed, due to historical overfishing and the impact of two diseases (called colloquially dermo and MSX). I am so pleased to discover that this is no longer the case, due in part to the evolution of increased disease tolerance in the oysters, as well as competition between the two diseases in the oyster population leading to changes in pathology and virulance. (This is a complex and fascinating ecological and evolutionary story that has been extensively studied at VIMS – see for example Carnegie and Burreson 2011, Carnegie et al 2021.) There is now a viable commercial fishery again, with a management system which focuses on ensuring that sufficient biomass and size classes remain in situ such that variable spatfall and disease mortality can be managed in a precautionary and sustainable way.

## The gaps identified by the pre-assessment all relate to Principle 3 – the management system. In general, this relates to the ongoing move away from a more reactive management system towards a more strategic long-term approach, which, given the recent history of the stock and fishery as outlined above, makes perfect sense.

## Stakeholder Consultation & Meetings

|  |  |  |
| --- | --- | --- |
| Name | Affiliation | Date and Subjects Discussed |
| Tommy Kellum | Kellum Seafood, FIP lead | 12/3/24Key stakeholders and participants in the fishery, roles and responsibilities, management organisation and re-organisation, fishery objectives and decision-making, compliance and sanctions, oyster restoration / replenishment, apprenticeships and training, the role and achievements of the FIP |
| A.J. Erskine | Bevans Oysters, FIP lead |
| Bob Trumble | MRAG Americas, FIP consultant |
| Dr Jim Wesson | VMRC (retired) | 18/3/24History of the fishery since the 1990s, and improvements in stock and management; survey; replenishment / restoration; oyster ecology in the different river systems; disease dynamics; role of VMRC; management measures and decision-making; compliance issues |
| Jamie Green | Commissioner, VMRC | 28/3/24Recent history of oyster fishery and management; role and powers of VMRC; role and operation of SMAC; public vs private fishery; sustainable levels of harvest given variability in spat set; management measures including seasons, daily limits etc.; situation in different rivers; replenishment and restoration; latent effort, number of licences and interactions with other fisheries; short-term management vs long-term strategic planning; future plans of VMRC for the fishery; partnerships (US Army Corps, VIMS); economic as well as environmental sustainability; compliance; role of FIP |
| Adam Kenyon  | Chief, Shellfish Management Division, VMRC |
| Zachary Widgeon | Director of Communications and Public Information Officer, VMRC |
| Dr Roger Mann | VIMS | 28/3/24Oyster population dynamics and stock evaluation; disease dynamics and recent progress in understanding disease pathology, ecology and interations in oysters; recruitment and stability of recruitment; role and activities of FIP and FIP coordinators; management of shell substrate resource; future risks to fishery (economic, ecological); climate change; survey and work of VIMS, including public communication and transparency (<https://cmap22.vims.edu/VOSARA/>)  |

## Summary of Findings and Recommendations

My impression from talking to stakeholders is that the FIP has been very successful at moving towards its objectives over the last three years. Although most of the actions have not yet been ticked off as complete, the hard work comes in supporting the creation of a culture where management is strategic and transparent, and where industry, managers, scientists and other stakeholders are all working together towards clearly-understood common goals. This framework then provides the basis for the various elements required by MSC (explicit objectives, management evaluation etc.). I have the impression that this framework is now largely in place, and that the FIP timetable for moving the fishery towards MSC certification (if desired) is realistic.

The participants are in a better position than me to understand what is required, and they also have MRAG for expert advice on MSC requirements, so I’m not sure that much by way of recommendation is needed. I did want to make one comment, however. When I talked to VMRC, they expressed some scepticism about the need for documents which set out objectives, targets and such blah blah blah, noting that they tend to go out of date quickly (which certainly can be true). When I started with this kind of work, I was inclined to agree that paperwork was best kept to a minimum. However, over the years I have become convinced that a clear statement of objectives, agreed by all participants in management, can actually be valuable, and I think here it might be. It need not take the form of a fat document requiring constant attention, but perhaps just a simple one-page statement of the various objectives that people have already listed to me (see below), which seem to be appropriate and generally accepted.

## Summary of MSC Performance Indicator Scores

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Principle | Component | Performance Indicator | Previous Score 2023 | Current Score 2024 | Rationale or Key Points  |
| 1 | Outcome | 1.1.1 | Stock status | n/a | n/a | P1 not scored. The fishery is likely to have a positive impact on the stock. I agree with this analysis. For the genetic PIs in P1 (1.1.3, 1.2.5 and 1.2.6), see below. |
| 1.1.2 | Stock rebuilding | n/a | n/a |
| Management | 1.2.1 | Harvest Strategy | n/a | n/a |
| 1.2.2 | Harvest control rules and tools | n/a | n/a |
| 1.2.3 | Information and monitoring | n/a | n/a |
| 1.2.4 | Assessment of stock status | n/a | n/a |
| 2 | Primary species | 2.1.1 | Outcome | >=80 | >=80 |  |
| 2.1.2 | Management strategy | >=80 | >=80 |  |
| 2.1.3 | Information | >=80 | >=80 |  |
| Secondary species | 2.2.1 | Outcome | >=80 | >=80 |  |
| 2.2.2 | Management strategy | >=80 | >=80 |  |
| 2.2.3 | Information | >=80 | >=80 |  |
| ETP species | 2.3.1 | Outcome | >=80 | >=80 |  |
| 2.3.2 | Management strategy | >=80 | >=80 |  |
| 2.3.3 | Information | >=80 | >=80 |  |
| Habitats | 2.4.1 | Outcome | >=80 | >=80 |  |
| 2.4.2 | Management strategy | >=80 | >=80 | (This is marked in the Indicators tab as scoring >=80 from Year 0, whereas the pre-assessment actually indicates some uncertainty about whether shell can be relaid on seagrass and if so what impact this might have (FIP Action 2), which would give a score of <80 – but since Action 2 has been closed out, the score is now increased anyway.) |
| 2.4.3 | Information | >=80 | >=80 |  |
| Ecosystem | 2.5.1 | Outcome | >=80 | >=80 |  |
| 2.5.2 | Management strategy | >=80 | >=80 |  |
| 2.5.3 | Information | >=80 | >=80 |  |
| 3 | Governance and Policy | 3.1.1 | Legal and customary framework | >=80 | >=80 | (Scored at 60-79 in pre-assessment but situation in relation to native American rights has been clarified – see FIP Action 3) |
| 3.1.2 | Consultation, roles and responsibilities | >=80 | >=80 |  |
| 3.1.3 | Long term objectives | 60-79 | 60-79 | In the course of my discussions with stakeholders, several clear, quantitative objectives were communicated (e.g. stable or increasing footprint, minimum 2-3 million bushels of biomass on the grounds, management precautionary enough to allow for 3 years of poor spat set etc.). These types of objective seem to be generally agreed among stakeholders, and provide the basis for management actions. I asked whether there was a management plan, or some other document where these objectives are set out clearly and explicitly, but it seems not. MSC allow for ‘informal and traditional approaches’ in scoring this PI (see GSA4.7) but their guidance is not very explicit, and I am not a P3 expert, so I can’t be confident that this would apply here. So, as far as MSC scoring for this PI is concerned, I am not going to disagree. |
| Fishery specific management system | 3.2.1 | Fishery specific objectives | 60-79 | 60-79 |
| 3.2.2 | Decision-making processes | 60-79 | 60-79 | This PI scored <80 on two SIs, relating to the precautionary approach and to transparency of the logic behind decisions (the latter because of insufficient information at the time). I note that summaries and minutes of meetings are available on the VMRC website and are very comprehensive[[1]](#footnote-1) so I have the impression that the issue around transparency can be concluded. The concern around the precautionary approach is the extent to which the interests of harvesters takes precedent over questions of sustainability. This was not the impression that I was given by stakeholder meetings, nor by reading the VMRC minutes (noting that several of the commissioners are watermen), nor by the results of recent biomass assessments. However, there is the issue, identified above, of having a clear, agreed statement of objectives to guide decision-making, including a statement around the precautionary approach to management. |
| 3.2.3 | Compliance and enforcement | 60-79 | 60-79 | It seems from my discussions with VMRC as well as from meeting minutes (e.g. 23 May 2023) that enforcement has increased and compliance has improved in recent years, but other stakeholders noted that there is still some non-compliance (small-scale fishing on closed grounds notably). With the mix of public and private areas in close proximity, a minimum level of trespass over boundaries is possibly inevitable. I agree with the pre-assessment that it is not clear whether this reaches the level of ‘systematic non-compliance’ or not (i.e. does it score < or >80), but I guess I would suggest the approach of considering whether it is likely to have any impact on the overall management or sustainability of the fishery.  |
| 3.2.4 | Management performance evaluation | <60 | 60-79 | Management has changed significantly for the better in recent years (see below), and progress on this action (Action 9) has been around putting the structures in place to provide a basis for management review, rather than conducting the review itself.Having said that, the management changes in recent years have in practice resulted in considerable internal review of key elements of the management system, including replenishment and restoration (increased role of SMAC), licensing system and number of licences, disease dynamics and interaction of the fishery with other elements of the ecosystem (VIMS studies), internal structure / staffing of VMRC in relation to shellfish etc. The new SAS will facilitate discussion of the management approach to all sustainability issues.SG60 for this PI requires occasional internal review of some parts of the management system, and I would say that this is now clearly met. SG80 requires evaluation of key parts of the management system (arguably met), via regular internal review (arguably met, or going to be met once SAS is up and running) and occasional external review, which seems to be the only element still missing. MSC do not provide a timeframe for ‘occasional’ except to note that it should be appropriate for the intensity of the UoA. Given the conclusion that the fishery is helping the stock rather than depleting it, I suppose that the timeframe for external reviews of management can be fairly long and still meet SG80. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Principle** | **Component** | **Performance Indicator** | **Previous Score****2023** | **Current Score****2024** | **Rationale or Key Points** |
| 1 | Outcome | 1.1.3 |  Genetics Outcome | 60-79 | >=80 | The PA analysis is a bit confusing, but it is clear from the scoping that these PIs were scored at 60-79, due to uncertainty around the nature and regulation of hatchery-produced oysters. They are addressed by Action 1 (not PI 1.1.1 as it says). A summary of the potential impacts of oyster hatchery production in this system was produced by McDowell and Reece (October 2021) and provides reassurance that impacts are not plausible, and the scores can be increased to >=80 as a result. (It is not clear when the score was increased, since the PIs are not included on the Indicators sheet, and the spreadsheet is not updated, but the associated Action 1 is marked as completed as of October last year, so I’ve marked the scores as increased from then. |
| Management | 1.2.5 |  Genetics Management | 60-79 | >=80 |
| 1.2.6 |  Genetics Information | 60-79 | >=80 |
| Enhancement | 1.3.1 |  Outcome |  |  |  |
| 1.3.2 |  Management |  |  |  |
| 1.3.3 |  Information |  |  |  |
| 2 | Translocations | 2.6.1 |  Outcome |  |  |  |
| 2.6.2 |  Management |  |  |  |
| 2.6.3 |  Information |  |  |  |

## Environmental Workplan Results

|  |  |  |  |
| --- | --- | --- | --- |
| Result | Related Action on FisheryProgress  | Related MSC Performance Indicator | Explanation |
| Oyster biomass and recruitment at an all-time high in the time series | No specific action | 1.1.1 (although not scored for this fishery) | See data provided in Southworth and Mann (2024). The increase in recruitment (spat set) is particularly striking, noting the logarithmic scale on the graphs.This huge improvement in stock status is not a result of the FIP per se, but a consequence of changes in disease dynamics plus management actions over two decades which have allowed the oyster population to take advantage of lower disease mortality (e.g. replenishment and restoration, strict limits on the fishery etc.). Nevertheless I note it here, because it is the huge result which makes all the rest worthwhile.The management has evolved and improved alongside the dynamics of the system, and the FIP is an element (and a driver) of this ongoing evolution. It is worth noting that the dynamics of oysters and disease in Chesapeake Bay are complex, and different in each river, so although overall trends are very encouraging, the task of managing this resource remains a very difficult one compared to other similar fisheries.  |
| Management system less reactive and more strategic  | Action 4, Action 5, Action 6 | 3.1.3, 3.2.1 | The Shellfish Management Advisory Committee (SMAC), chaired by VMRC, includes industry and NGOs, as well as VIMS experts as advisors. Its role is to set strategy both for the season ahead, as well as more long term. It is not a creation of the FIP, having existed for some 20 years, but according to stakeholders has become more dynamic since the start of the FIP. Prior to the FIP it met twice a year: in spring to plan restoration / replenishment actions; and in the pre-season to plan out the season (which areas should be opened when etc.). Currently, it meets 4-5 times per year, and the planning discussions are more detailed and data-based. In addition, a new Shellfish Advisory Subcommittee (SAS) has been created, with the aim of providing a forum explicitly for the discussion of sustainability issues – covering both environmental and social sustainability (memo from VMRC to Virginia Seafood Council, 1 April 2023). The Shellfish Management Division of VMRC has been reorganised and additional expertise brought in (new Director of Shellfish), with the aim of ensuring that management is coherent and strategic. VMRC seem fully on board with the direction of travel, noting the importance of making full use of SMAC and working to improve participation (e.g. through hybrid meetings). They commented that the FIP has helped with the development of a longer-term and more strategic approach to management. |
| Precautionary / sustainable decision-making | Action 6 | 3.2.2 | VMRC have the power to close areas in-season, and noted that when they have done this recently (twice, due to a high proportion of small oysters in the landings) it has been with the support of the industry. They have also trialled shorter seasons, to allow more responsive management. They try to consider strategically the range of areas which are open at any given time, to ensure that effort is not unduly concentrated in a few areas. (Dr Mann at VIMS likened this system of rotating openings and closures to medieval crop rotation, noting that it results in very productive fisheries.)Funding for replenishment (relaying of shell substrate on harvested areas) has doubled over recent years, and research is ongoing into the use of fossil shell as a supplement. The Fish Fund (which has just been approved in the state budget) is a mechanism to allow funding from various sources (donations, windfarm fees) to be channelled into management – in other words, a FIP-like structure drawing on multiple stakeholders to support the fishery. The FIP has encouraged a review of public oyster licence holders, because currently less than half are actively worked, so there is considerable latent effort in the system. It seems that is not legally possible to retract these licences, but as people retire, so the licences can be retired. There is also a new programme now in place, supported by VMRC and the FIP team, for apprenticeships, to bring young people into the industry while providing training, including in management and sustainability, as well as start-up support. Although this kind of initiative is not directly related to the MSC standard, it is so important in developing a long-term sustainable and well-managed fishery. |
| Objectives more clear and agreed by stakeholders | Action 4, Action 5 | 3.1.3, 3.2.1 | It was apparent when I talked to stakeholders that there were clear and quantitative objectives associated with the fishery. For example, VMRC stated that they aim for a public harvest of around 325-350 k bushels / year to leave 2-3 million bushels on the grounds and allow for 2-3 years of poor spat set (enough time to formulate a management response). Other stakeholders also underlined stability as a key objective, as well as the need to manage oyster substrate (shell footprint) just as much as oysters themselves such that there is no net loss of substrate. This is done via annual survey and replenishment plans. These objectives seem to be generally agreed, but are not explicitly set out anywhere that I could find. |
| Transparency  | Action 7 | 3.2.2 | The FIP team highlighted transparency and clarity in decision-making as a key result of the FIP, and indeed a review of recent minutes of VMRC meetings shows that the logic behind decisions is explained in detail – these are also, as noted above, publically available on the (excellent) VMRC website. The VIMS VOSARA website also allows exploration of the monitoring data, while the annual reports on the VIMS website set out survey results by river and across the full time series (e.g. Southworth and Mann 2024).  |
| Clarification of possible issues which were uncertain at pre-assessment | Actions 1, 2 and 3 | 1.1.3, 1.2.5, 1.2.6, 2.4.2, 3.1.1 | The FIP has acted efficiently to close out gaps identified at the pre-assessment which resulted from insufficient information. This includes a study commissioned from VIMS to evaluate the impact of relaying hatchery-reared oysters (McDowell and Reece 2021), ensuring that oyster shell is not relayed on seagrass (VMRC SAV guidance, Mann et al. 2019) and clarifying the situation in relation to Native American rights.  |
| Increase enforcement actions in the James River and elsewhere | Action 8 | 3.2.3 | As a result of the pre-assessment, the James River Oyster Task Force Committee was created, and direction given to law enforcement to prioritise the issue. The minutes of the VMRC meeting of 23 May 2023 shows that several people were prosecuted and had their licences revoked for some period (including in some areas not specifically identified in the pre-assessment). More generally, VMRC noted that they have tried to refocus compliance efforts more specifically toward the protection of the resource.  |

## Supporting References

Carnegie, Ryan B. and Burreson Eugene M. 2011, Declining impact of an introduced pathogen: *Haplosporidium nelsoni* in the oyster *Crassostrea virginica* in Chesapeake Bay. Marine Ecology Progress Series 432, 1-15.

Carnegie, Ryan B.; Susan E. Ford, Rita K. Crockett, Peter R. Kingsley‑Smith, Lydia M. Bienlien, Lúcia S. L. Safi, Laura A. Whitefleet‑Smith and Eugene M. Burreson 2021. A rapid phenotype change in the pathogen *Perkinsus marinus* was associated with a historically significant marine disease emergence in the eastern oyster. Nature 11:12872.

Mann, Roger; Marcia Berman; James Wesson; Melissa Southworth; Tamia Rudnicky 2019. Expanding Virginia’s oyster industry while minimizing user conflict. Interim report (Year 2 of 3) submitted to Virginia Coastal Zone Management Program. VIMS.

McDowell, Jan R. and Reece, Kimberley S 2021. Understanding the impact of oyster hatchery production on the genetics of wild stocks. VIMS, 20 October 2021.

Southworth, M. and R. Mann. 2024. The status of Virginia’s public oyster resource, 2023.Molluscan Ecology Program, Virginia Institute of Marine Science, Gloucester Point, Virginia. 53 pp. <https://www.doi.org/10.25773/baw2-1j52>

1. e.g. <https://www.mrc.virginia.gov/Commission_Minutes/VMRC_FINAL_minutes_02-27-2024.pdf> [↑](#footnote-ref-1)