

Comment	DNR Response	Change to Draft (Y/N)	Page of Draft OMP	Original Draft Text	New Revised Text
Action 2.4.2 (1) - Adaptive management can be used to improved project outcomes; however, the success criteria against which the project is assessed should be determined a priori and preferably in consultation with stakeholders and the academic community. (pg. 10)	The guidelines will provide the criteria for determining how the project is assessed, specifically, how the project meets their objectives. Language was added to specifically include stakeholders and the academic community.	Y	p.10. The final version p. 14.	Action 2.4.2. Utilize the following essential elements of adaptive management as a guideline to improve the success of oyster projects:	Added the following text to Action 2.4.2: Utilize the following essential elements of adaptive management as a guideline to improve the success of oyster projects in consultation with stakeholders and partners.
Adaptive management should not be used to avoid the solicitation of public comments and the rule-making process. Changes to the boundaries of fishery management areas (sanctuaries, harvest areas, etc.) should be implemented only as a result of a regulatory process that includes public comments. Adaptive management actions should utilize the best available science and DNR should provide the justification for the proposed change in approach or strategy. DNR should not make adaptive changes based solely on political pressure. DNR should consider establishing an external group of consulting scientists that can provide feedback on adaptive management actions similar to that of the blue crab industry.	Adaptive management actions relate to specific oyster projects. Any adaptive management necessary to change an approach (objectives, strategies and/or actions) in the OMP would need to go through an amendment process that includes stakeholder input and public review. It would also include input from our advisory commissions. As stated in the adaptive management introduction, it includes "a variety of strategies and techniques that can be refined or modified based on input from monitoring results, new scientific data and/or improved understanding from empirical observations."	N			
DNR needs greater public input for adaptive management	Added text to Action 2.4.2 " in consultation with stakeholders and the academic community."	Y	p.10. The final version p. 14.	Action 2.4.2. Utilize the following essential elements of adaptive management as a guideline to improve the success of oyster projects:	Added the following text to Action 2.4.2: essential elements of adaptive management as a guideline to improve the success of oyster projects in consultation with stakeholders and partners.
Section 2.4: Adaptive Management of any boundary changes to fishery management areas should be authorized only as a result of regulatory changes that allow for public comment and specify the scientific basis for the proposed rule change.	Any proposed regulatory changes resulting from an adaptive management approach would need to go through the regulatory and/or statutory changes that includes justifying the change and public review.	N			
Proper adaptive management should result in more successful restoration projects, more acres of healthy oysters, and an increased oyster harvest either from public and/or private grounds.	None needed.	N			
Page 9, Adaptive Management. The OMP should define, in advance, the feedback loops that will drive adjustments to management protocols. That is the essence of adaptive management.	The essence of adaptive management is stated in the essential elements: objectives and performance measures are defined, there is an ongoing review process of the project, monitoring is conducted and data collected, results are evaluated with input from partners and stakeholders, objectives and performance measures are reexamined with results in mind. Action 2.4.2.	Y	p.10. The final version p. 14.	Action 2.4.2. Utilize the following essential elements of adaptive management as a guideline to improve the success of oyster projects:	Added the following text to Action 2.4.2: Utilize the following essential elements of adaptive management as a guideline to improve the success of oyster projects in consultation with stakeholders and partners.
Adaptive management actions taken by the department should be scientifically justifiable and done so only after adequate peer- and public-review and comment opportunity (Page 10, Section 2.4.2). During the project design phase, the department should clearly identify target ecological metrics that can be used to measure progress towards success. By setting these targets at the onset of a project the department can scientifically justify the need to implement adaptive management actions. And for accuracy and to ensure that necessary actions are not excluded, these target metrics should be developed and reviewed by third-party scientists that can provide adequate feedback.	Added text to Action 2.4.2.	Y	p.10. The final version p. 14.	Action 2.4.2. Utilize the following essential elements of adaptive management as a guideline to improve the success of oyster projects:	Added the following text to Action 2.4.2: Utilize the following essential elements of adaptive management as a guideline to improve the success of oyster projects in consultation with stakeholders and partners.
For example, Arundel Rivers is pleased to see the DNR state that oyster "[p]rojects must specify an adequate monitoring protocol and include, if necessary, funding to implement the monitoring." Id. 10. We agree that monitoring the success of an oyster project, whether it be a sanctuary planting, aquaculture venture, or re-seeding of a public shellfish fishery area, is vital to clear understanding of population dynamics, and thus to effective adaptive management.	None needed.	N			
However, Arundel Rivers is concerned about the statements in the Adaptive Management section that "[r]estoration activities will be focused in areas that will maximize the possibility of success, while optimizing monitoring and funding resources" and "[s]patially explicit population dynamic models that include the major factors influencing mortality and recruitment rates across multiple salinity regimes, may help to develop appropriate management strategies." Id. Read together, these statements seem to indicate a willingness by the DNR to abandon restoration activities in areas that do not have robust recruitment rates and/or modify sanctuary areas based on low existing population numbers. Arundel Rivers cautions against abandoning investment in existing sanctuary areas or modifying boundaries of sanctuary areas without first attempting to restore populations in those areas.	Sanctuary objective #5 clearly supports restoration activities in tributaries throughout the Maryland portion of the Chesapeake Bay and Action 5.0.1 implements/maintains a network of oyster sanctuaries throughout the bay. With limitations on restoration efforts such as substrate, spat availability, environmental conditions, and funding, activities will need to be prioritized to maximize outcomes. Any considerations for removing a sanctuary or reducing the size of a sanctuary will be justified using the steps in Action 5.0.6.	N			
Mindful of the State's interest in realizing the best return on investment of taxpayer dollars, the DNR cannot expect areas of Bay bottom without any existing oyster population to spontaneously regenerate without some investment in restoration to counter the original causes of population decline. In other words, if the DNR has designated a sanctuary in an area with low total population and/or low natural recruitment, it should not abandon that area without first attempting to rebuild the population in that area. If the DNR's adaptive management strategy includes a good faith attempt to rebuild populations in existing sanctuaries coupled with sufficient time to allow the rebuilt population to become self-sustaining, only then should the DNR consider modifying sanctuary areas.	Adaptive management is a process based on monitoring results, science and empirical observations. Section 5.0 Sanctuaries - addresses concerns about actions on establishing, expanding or reducing the size/area of a sanctuary.	N			

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Appendix A, Harvest Reserves : The draft uses evaluative language such as "difficult" "critical" or "ineffective" to describe [output controls] but does not offer evaluative comments for Harvest Reserve Areas. Suggest the following revision: "..... Generally, stock enhancement investments are applied in these areas. One of the most difficult aspects of managing a harvest reserve is predicting environmental impacts including salinity and disease on stock enhancement investments."	Accepted suggestion.	Y	p. 85. The final version p. 89.	Harvest reserve areas are areas that are closed to harvest for a period of time and may be opened after certain biological criteria are considered. The criteria are often based on desired characteristics of the population. The purpose of these areas is maximize harvest while maintaining a sustainable and healthy population. Generally, stock enhancement practices are applied in these areas.	Harvest reserve areas are areas that are closed to harvest for a period of time and may be opened after certain biological criteria are considered. The criteria are often based on desired characteristics of the population. The purpose of these areas is maximize harvest while maintaining a sustainable and healthy population. Generally, stock enhancement practices are applied in these areas. One of the most difficult aspects of managing a harvest reserve is predicting environmental impacts including salinity and disease on stock enhancement investments.
Appendix A, Rotational Harvest Area : The draft uses evaluative language such as "difficult" "critical" or "ineffective" to describe [output controls] but does not offer evaluative comments for Rotational Harvest Area. Suggest the following revision: "..... in the hopes of rebounding the population quicker. One of the most challenging aspects of rotational harvest is mitigating the impacts of latent effort on active harvesters and the resource."	Accepted suggestion.	Y	p. 85. The final version p. 89.	Rotational Harvest involves closing an area to harvest for a set time period, then opening it to harvest for another set time period and then closing the area again for a set time period. The closure time generally depends on the capability of a species to rebound as the success of rotational harvest depends on growth and abundance increases during the closure period being greater than the levels of depletion during the harvest period. In conjunction with opening and closing areas to harvest, habitat and stock enhancement can be used in the hopes of rebounding the population quicker.	Rotational Harvest involves closing an area to harvest for a set time period, then opening it to harvest for another set time period and then closing the area again for a set time period. The closure time generally depends on the capability of a species to rebound as the success of rotational harvest depends on growth and abundance increases during the closure period being greater than the levels of depletion during the harvest period. In conjunction with opening and closing areas to harvest, habitat and stock enhancement can be used in the hopes of rebounding the population quicker. One of the most challenging aspects of rotational harvest is mitigating the impacts of latent effort on active harvesters and the resource
The only change that I hope you will consider would be on Page 45, in the second paragraph that discusses the Council. It would be helpful if there was more detail about the makeup of the Council. Basically, what parts of the industry each member would represent.	Fishery management plans generally provide background that is necessary to describe the resources and information used to develop strategies and actions. More detail can be found in statute. A citation was added so that those interested in learning more can easily do so.	Y	p. 45, 2nd paragraph. The final version p. 48.	The council includes members with a diverse range of experience and expertise.	The council includes members with a diverse range of experience and expertise (as described in Natural Resources Article, § 4-11A-3.2).
I think this statement more appropriately captures the department's intent to protect other living resources rather than the previous statement which was interpreted as excluding aquaculture entirely from areas with living resources.	Changed Action 7.2 to recommended text.	Y	p. 47. The final version p. 49.	Action 7.2. Identify areas suitable for submerged land and/or water column leases that do not have existing living resources.	Action 7.0.2. Identify areas suitable for submerged land and/or water column leases that do not create adverse impacts to existing living resources.
page 45. 7.0 Aquaculture: Expanding law enforcement for aquaculture is mentioned as a high priority at every aquaculture conference. In addition creative judicial circumstances might be developed that emphasize the importance of the activity on aquaculture businesses, such as a central court in Annapolis to handle these cases with judges and prosecutors familiar with the issues..	Changed Action 7.1 to recommended text.	Y	p. 46. The final version p. 49.	Action 7.1. Partner with other state and federal agencies, the University of Maryland and other state colleges and universities, non-governmental organizations, industry representatives and other stakeholders to further streamline state and federal permitting and to continue to implement and operate financing and education and training programs.	Action 7.0.1. Partner with other state and federal agencies, the University of Maryland and other state colleges and universities, non-governmental organizations, industry representatives and other stakeholders to further streamline state and federal permitting, to continue to implement and operate financing and education and training programs and to support the development of additional industry infrastructure.
To my knowledge the PRIVATE aquaculture fishery was not part of previous fishery management plans. To my knowledge the PRIVATE oyster aquaculture fishery was not part of previous oyster fishery management plans. The oyster aquaculture industry is not a wild or public fishery that needs direct management thought the new Maryland Oyster Management Plan as it is already very well defined under existing state law and already very well managed under the current system. My suggestion and request is that the section 7.0 be removed from the new Maryland Oyster Management Plan as this is inconsistent with Maryland's history and an inappropriate place to put the management authority.	Aquaculture considerations have been included in all Maryland's oyster management plans. Private industry is an important component of Maryland's management of the oyster population and has been included in the management plan.	N			
Action 7.2: The plan fails to address the process by which determinations will be formulated [areas suitable for... leases that do not have existing living resources]	Changed Action 7.2 .	Y	p. 47. The final version p. 49.	Action 7.2. Identify areas suitable for submerged land and/or water column leases that do not have existing living resources.	Action 7.0.2. Identify areas suitable for submerged land and/or water column leases that do not create adverse impacts to existing living resources.

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Suggest [the plan have] an objective process should be founded upon economic model for establishing valuations of habitat and living resources employing an analysis similar to the following: (1) First, establish a categorical listing of habitats of common wild fisheries and their associated ecosystems and definitions for each; (2) For each habitat identified in (1) above, apply the economic model to scenarios representation the habitat as it exists in the absence of aquaculture (the control) as well as the habitat that would result in the presence of aquaculture. The economic model should include components representing (a) the value of ecosystem services resulting from resources present in the scenario as well as (b) the value of the sustainable production of commercial species present in the scenario. To facilitate comparison between scenarios, valuation should be presented in terms of annualized dollars per acre. In making decisions regarding the appropriateness of aquaculture to specific habitats, a Matrix Economic Valuation would be applied to determine the economic effect of introducing forms of aquaculture into specific habitats.	Economic and environmental modeling are important tools in evaluating beneficial and adverse impacts. This idea will be brought to the Coordinating Council's attention to determine if and how it should be pursued. It may be possible to work with UMD to develop a grant proposal.	N			
NOAA supports the Continued Growth of Aquaculture.	None needed. We support continued growth of aquaculture as well.	N			
Recommend more to assist aquaculture adjacent to restoration as a means to add more oysters and indirectly protect the sanctuary reefs. This could also help struggling towns develop means of employment at oyster farms. Phillips Wharf aquaculture training project could be a model.	Addressed in the Aquaculture Strategy, Action 7.2.	N			
Specifically define "existing living resources"	Changed Action 7.2.	Y	p. 47, The final version p. 49.	Action 7.2. Identify areas suitable for submerged land and/or water column leases that do not have existing living resources.	Action 7.0.2. Identify areas suitable for submerged land and/or water column leases that do not create adverse impacts to existing living resources.
I also ask Maryland to continue to encourage off-bottom aquaculture that has proven to provide significant, consistent income to watermen while delivering high-quality product to us consumers.	Addressed in the Aquaculture Strategy 7.0, Action 7.0.2 (previously Action 7.2).	N			
At the behest of certain special interest groups, aquaculture leasing is permitted in sanctuaries. We find this troubling for several reasons. One main purported "benefit" is that aquaculture in sanctuaries may enhance natural recruitment. However, given that most aquaculture lease holders use sterile triploid oysters because they grow more quickly and are not affected by reproduction, we both challenge this assertion and contend that the other environmental benefits are limited given that these unnatural genetically altered oysters are pulled from the water more quickly since they grow to the legal market size more quickly; therefore, there is less overall ecological value (i. e., less time in the water filtering).	The department believes that aquaculture can be compatible to restoration by adding to localized water quality improvements, providing ecosystem functions through oyster shell habitat creation, and enhancing natural recruitment within the sanctuary when reproductive oysters are used: aquaculture operations are permitted in sanctuaries under certain conditions (Amendment I to the 2004 Chesapeake Bay Oyster Management Plan, 2010). The Aquaculture Coordinating Council or the Oyster Advisory Commission would be a good forum for further discussion.	N			
We question the constitutionality of a State law permitting a small group of private individuals to benefit (profit) from the investment of millions of taxpayer dollars while excluding the general public. This carve out for an elite subset of stakeholders is an affront to the Public Trust Doctrine.	The department has worked hard to ensure that all stakeholders have a role in oyster restoration within our Oyster Management Plan and that all stakeholders will receive the benefits of restoration activities.	N			
Aquaculture is an industry separate and apart from the public oyster fishery that is governed by its own statutes, regulations, and policies. Its inclusion in the oyster fishery management plan is inappropriate and should be removed.	Aquaculture considerations have been included in all Maryland's oyster management plans. Private industry is an important component of Maryland's management of the oyster population and has been included in the management plan.	N			
This section should include background information on the economic revenue, planting rates/standing stock, and observed harvest levels from oyster aquaculture. (pg. 44)	While the fishery management plan does not provide a comprehensive background on every aspect of oysters, background knowledge is important in understanding management of the oyster resource. Two additional source documents are referenced in Section 2.0. Most of the information you mention can be found in the Coordinating Council's Annual Report and recent harvest levels are included in the Aquaculture section of the OMP.	N			
Additionally, this section should include a discussion of the usual disposition of oysters from submerged land leases versus water column leases and the difference in price point associated with half-shell oysters and a shucked product. F (pg. 44)	While a fishery management plan does not provide a comprehensive background on every aspect of oysters, background knowledge is important in understanding management of the oyster resource. The type of information you mention would be included in an economic status report. Currently DNR is working with UMD to develop this type of report for the Maryland aquaculture industry.	N			
Finally, this section should include a brief history of leasing laws in Maryland, from the Yates survey to leasing moratoria to aquaculture as a tool in oyster recovery efforts. This provides important context to the current status of the industry and its role in growing the oyster resource. (pg. 44)	Shellfish aquaculture has had a long history and has been addressed in many forums. Since the main aquaculture objectives are to support policies and expand production, a history of leasing laws was not warranted in the OMP. The University of Maryland Extension provides an extensive background on oyster aquaculture in Maryland with specific attention to the role of leasing laws and the development of aquaculture policy (2008).	N			
Action 7.2 – As written, this action is untenable. The Plan fails to identify what is considered a living resource, what abundance level, if any, would be acceptable for aquaculture use, etc. Additionally, this action runs counter to the criteria put forth for sanctuary declassification for harvest use. Under section 5.0 of the Plan, oyster sanctuaries can be declassified for harvest if they would "contribute to the goal of increasing oyster production and/or provide economic and/or cultural benefits to another community." Yet this action would seemingly identify any area where any living resource exists as off limits to aquaculture, which would meet both criteria of increasing oyster production and providing economic benefits. Current regulatory classifications for aquaculture are sufficient to address the majority of use conflicts. Action 7.2 creates a dangerous and inconsistent precedent and should be removed. (pg. 46)	Changed Action 7.2 .	Y	p. 47, The final version p. 49.	Action 7.2. Identify areas suitable for submerged land and/or water column leases that do not have existing living resources.	Action 7.0.2. Identify areas suitable for submerged land and/or water column leases that do not create adverse impacts to existing living resources.
The department should clarify that it will continue to allow declassification of non-productive PSFAs and other harvest areas for aquaculture leasing according to current regulatory requirements. (pg. 46)	Existing regulations, COMAR, 08.02.04.17, provide for the PSFA declassification process.	N			

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Add new action: Action 7.4 Promote the development of industry infrastructure such as genetics programs, hatcheries, shucking houses, etc. through the use of new or existing programs.	Accepted suggestion. DNR included the development of industry infrastructure in Action 7.0.1 under the Aquaculture Strategy.	Y	p. 46. The final version p. 49.	Action 7.1. Partner with other state and federal agencies, the University of Maryland and other state colleges and universities, non-governmental organizations, industry representatives and other stakeholders to further streamline state and federal permitting and to continue to implement and operate financing and education and training programs.	Action 7.0.1. Partner with other state and federal agencies, the University of Maryland and other state colleges and universities, non-governmental organizations, industry representatives and other stakeholders to further streamline state and federal permitting, to continue to implement and operate financing and education and training programs and to develop additional industry infrastructure.
This plan would better serve all of the citizens of the state of Maryland and the Chesapeake Bay watershed if it promoted the following: The promotion of private aquaculture programs that would provide oysters for continued public consumption and jobs for displaced watermen and packing house workers.	The aquaculture section and aquaculture strategies clearly indicate that the state of Maryland will continue to support the development of shellfish aquaculture by locating new areas that are available for lease and providing incentives for investment into the industry.	N			
Proceed carefully with the term "existing living resources." As it stands it is exceedingly vague to the point of being arbitrary and may serve as pretense to extinguish the potential of vast areas for aquaculture leases. If Action 7.2 is to proceed to final rule this term needs to be refined in multiple characteristics, including but not limited to a basic definition, density of the resource, the viability as resource, and a measure of the potential positive or negative impact on the resource by aquaculture. All of these characteristics should be supported with references to meritorious scientific materials that justify the exclusion from identification as suitable area.	Changed Action 7.2.	Y	p. 47. The final version p. 49.	Action 7.2. Identify areas suitable for submerged land and/or water column leases that do not have existing living resources.	Action 7.0.2. Identify areas suitable for submerged land and/or water column leases that do not create adverse impacts to existing living resources.
Action 7.2 - "Existing living resources" is too broad to be used as a criterion, and, left undefined, could exclude nearly all of the Bay bottom since very few places have no living organisms either in or on the bottom. While it is reasonable to disallow leasing of existing productive oyster reefs, the language used in this section is far too broad.	Changed Action 7.2 .	Y	p. 47. The final version p. 49.	Action 7.2. Identify areas suitable for submerged land and/or water column leases that do not have existing living resources.	Action 7.0.2. Identify areas suitable for submerged land and/or water column leases that do not create adverse impacts to existing living resources.
Identification of suitable areas of aquaculture should occur in consultation with the industry as there are factors that inform oyster growers on site selection that are not based solely on biological criteria.	It is anticipated that the Aquaculture Coordinating Council and other industry stakeholders will be consulted on the implementation of this strategy	N			
Fully fund and support aquaculture programs to double current harvest by 2025	The aquaculture section and aquaculture strategies clearly indicate that the State of Maryland will continue to support the development of shellfish aquaculture by locating new areas that are available for lease, providing incentives for investment into the industry and support financing, education and training programs.	N			
Page 46. Aquaculture Strategies. Add an additional strategy to highlight and support the allowance of aquaculture operations to received nutrient reduction credits as a means to enhance the industry.	This is already addressed in Action 11.4.	N			
Aquaculture Action 7.2: "Do not have existing living resources," suggests bottom without oysters or any other life form are the only areas that would be made available to submerged land and/or water column leases; therefore, anywhere in the Bay is not suitable for submerged land and/or water column leases. For submerged land leases especially, it is imprudent for a potential lease applicant to apply for any area with substrate that does not currently exhibit some evidence of living resources. Suggest the following revision: Identify areas suitable for submerged land and/or water column leases without necessary density levels for successful oyster spawning within the Public Shellfish Fishery Area that can be restored with investment and allow for submerged land and/or water column leases outside of Public Shellfish Fishery Areas.	Changed Action 7.2 .	Y	p. 47. The final version p. 49.	Action 7.2. Identify areas suitable for submerged land and/or water column leases that do not have existing living resources.	Action 7.0.2. Identify areas suitable for submerged land and/or water column leases that do not create adverse impacts to existing living resources.
(Action 7.2, Page 46). This establishes a policy that leases should not occur where there are living resources however discussions at the recent MACC meeting and current legislation is contrary to that statement. This is no different than wild fishery areas being made available for leasing if the abundance of oysters is below a threshold level and various stakeholder groups approve. It is recommended that DNR change the language in Action 7.2 from 'no living resources' to something that allows for an evaluation with the intent to minimize significant adverse impacts to the ecosystem.	Changed Action 7.2.	Y	p. 47. The final version p. 49.	Action 7.2. Identify areas suitable for submerged land and/or water column leases that do not have existing living resources.	Action 7.0.2. Identify areas suitable for submerged land and/or water column leases that do not create adverse impacts to existing living resources.
NCBO strongly supports the work completed by the stock assessment and that development of overarching abundance targets for oyster recovery and the fishery is essential. Spatially explicit Biological Reference Points are a good starting point and could be stronger if developed as Ecological Reference Points where the targets and thresholds strive to maintain a certain level of ecosystem services not just oyster biomass or production. In addition, more emphasis on the fact that very little fully functioning oyster habitat exists in the Bay and that the fishery has adapted to habitat conditions that are not conducive to natural survival and reproduction of oysters. As a result, fishery enhancement and reef restoration must play a far more central role in developing a sustainable fishery if ecosystem and natural recruitment considerations are to be taken seriously.	Developing an ecological reference point would require more specific guidance defining ecological objectives. The stock assessment identified Maximum Sustainable Yield which is a critical starting point. Developing management objectives for things like ecological, economic and social outcomes, ideally through a stakeholder process, would be the next step for developing alternative reference points. Stock enhancement and reef restoration are listed as plan objectives under the public fishery and sanctuary sections respectively.	N			
Suggest having the Chesapeake Bay Stock Assessment committee of the Sustainable Fisheries Goal Implementation Team review and propose BRPs. What the plan suggests is a starting point from the stock assessment results but there may be ways to further enhance the BRPs with ecosystem models and data synthesis. For example, the BRPs could be developed to incorporate a specified level of ecosystem services not just biomass in setting the targets and thresholds (ie ecological reference points).	As above, to develop alternative BRPs, the CBSAC would need more specific guidance defining ecological objectives. Ideally these would be developed with stakeholders. Funding would likely be required and the expertise may not be present within the current membership of CBSAC to develop appropriate ecosystem models.	N			

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<p>Given the overall value of the oyster resource and fishery to the numerous and diverse stakeholders throughout the region, the exploitation rates should be determined that achieve a level of harvest bound by reference points developed with a focus of Optimum Yield instead of Maximum Sustainable Yield.</p>	<p>The 2018 stock assessment estimated maximum sustainable yield from available data which is a critical step in assessing the health of a population. Calculating optimal yield (OY) – which is generally reduced from MSY - requires that specific objectives for ecological, economic or social outcomes be defined - ideally with stakeholders. Under federal fisheries law (see below), OY is defined a mechanism for resolving federal management objectives, achieving the objectives of a Fishery Management Plan and balancing various interests. It should be noted that the value of MSY calculated for oysters does account for shell production as an essential factor for population growth and incorporates processes for shell production and loss. Title 50: Wildlife and Fisheries PART 600—MAGNUSON-STEVENSON ACT PROVISIONS Subpart D—National Standards §600.310 National Standard 1—Optimum Yield. (ii) OY. The determination of OY is a decisional mechanism for resolving the Magnuson-Stevens Act conservation and management objectives, achieving an FMPs objectives, and balancing the various interests that comprise the greatest overall benefits to the Nation. OY is based on MSY as reduced under paragraphs (e)(3)(iii)(A) and (B) of this section.</p>	N			
<p>Abundance threshold – According to the definition provided for the abundance threshold as “an abundance of oysters below which there is likely to be biological, social, ecological, or economic consequences” the abundance threshold set in the Plan is inappropriate. There have already been significant biological¹¹, social¹², ecological¹³, and economic¹⁴ consequences at recent oyster abundance levels, regardless of their ability to recover. Additionally, by setting the threshold at the lowest observed abundance in the time series, it is essentially ineffectual until the next stock assessment update. Many stakeholders and members of the Oyster Advisory Commission expressed concern over the level of the abundance threshold. This should be adjusted up. (pg. 17)</p>	<p>Given the available data, assigning the time series minimum is an objective way to assign a threshold consistently to each of the assessed areas. As stated in the stock assessment, the population has, in most cases, rebounded from the minimum but there is no evidence that a rebound could happen if the abundance went still lower. Adjusting the threshold upward and setting an abundance target could both be accomplished given the identification of management objectives for the population and fishery which ideally would be accomplished through a stakeholder process.</p>	N			
<p>Abundance Target – Though not required, the department can and should develop an abundance target. As part of the 2009 Programmatic Environmental Impact Statement an abundance target was defined as the abundance of oysters that would support harvest levels equivalent to those of 1920-1970. The department should also consider abundance targets that would achieve ecological goals, like increasing reproductive potential by 50%, increasing filtration capacity by 100%, achieving a positive shell budget, etc. The OysterFutures model and ecosystem modeling techniques (e.g. Ecopath with Ecosim) provide the tools necessary to set these types of abundance targets. The department should develop and implement an abundance target using modern techniques that can help restore oysters' ecological function. (pg. 18)</p>	<p>Action 4.1.3. As stated above, assigning the time series minimum is an objective way to assign a threshold consistently to each of the assessed areas. As stated in the stock assessment, the population has, in most cases, rebounded from the minimum but there is no evidence that a rebound could happen if the abundance went still lower. Adjusting the threshold upward and setting an abundance target could both be accomplished given the identification of management objectives for the population and fishery which ideally would be accomplished through a stakeholder process. These suggested objectives can be used in a future process.</p>	N			
<p>Oysters, as sessile broadcast spawners, are subject to Allee effects, meaning the overall abundance of oysters may not properly reflect their reproductive success. If oyster density is not increased, oysters will continue to experience limited reproductive success. Abundance targets and thresholds should include a spatial dimension such that relative oyster density can be determined. (pg. 18)</p>	<p>This was discussed in detail by the stock assessment team, but data are limited in this regard. There are research recommendations that address the effects of density on fertilization rates e.g. research on target levels of abundance including biological limits of abundance (e.g. necessary conditions for successful fertilization). Also note that the sanctuary “network” was tasked with achieving high densities and enhancing fertilization and reproductive success that would positively impact fishery areas. High densities are difficult to achieve in fishery areas because they are fishery areas. Holding them to a sanctuary standard for density is misapplied.</p>	N			
<p>Status of the oyster fishery – This section glosses over the fact that overfishing is occurring in more than half of Maryland’s NOAA codes. This is a significant characteristic of the current status of the fishery and should be stated outright, as is required by NR §4-215. It is evident that the current state of oyster management has not been successful in ‘preventing overfishing’. Descriptions of the current management scheme and patterns and extent of overfishing, not just in the terminal year, should be included in this discussion. (pg. 19)</p>	<p>Accepted suggestion. DNR added language in the beginning of the stock status section to directly state results for overfishing and overfished.</p>	Y	p. 16. In the final version p. 18.	<p>The department, in consultation with the University of Maryland Center for Environmental Science, conducted an oyster stock assessment and developed biological reference points based on the biological characteristics of the oyster population and other factors affecting the population. The results of the oyster stock assessment provide a basis for the department to work with stakeholders to determine management approaches (Maryland department of Natural Resources, 2018).</p>	<p>In 2018, the department, in consultation with the University of Maryland Center for Environmental Science, conducted the first oyster stock assessment and developed biological reference points based on the biological characteristics of the oyster population and other factors affecting the population. The results of the oyster stock assessment provide a basis for the department to work with stakeholders to determine management approaches (Maryland department of Natural Resources, 2018). In the final year of the stock assessment which was the 2017-2018 season, overfishing was occurring in at least 19 of the 36 areas assessed. The oyster population was not classified as overfished or depleted because the minimum abundance threshold was set equal to the lowest value in the assessment time series (Section 4.0)</p>
<p>Fishing mortality target – According to the Plan, the fishing mortality threshold (Umsy) would result in a ‘stable or increasing’ oyster population. However, maximum sustainable yield fails to account for oysters’ significant role in the ecosystem, negative impacts of harvesting on oyster habitat, and the desired outcome to rebuild oysters throughout the Bay, not to keep populations stable. Therefore, the fishing mortality target should be adjusted down to fulfill the department’s goal to implement a ‘risk-averse’ management strategy. Optimal sustainable yield, 75% of Umsy, or some other conservative target should be used in the place of maximum sustainable yield. (pg. 20)</p>	<p>Developing alternate fishing targets requires more specific guidance concerning management objectives. Rebuilding targets for abundance and timetables for rebuilding would ideally be identified with stakeholder input. It is important to note that the MSY fishing target calculated for oysters is unique in that it incorporates processes for shell accretion and loss, as well as a function for maximizing potential habitat. Shell dynamics are part of the fishing reference points. The elements in your comment are what the sanctuary program addresses. Sanctuaries protect the oysters’ significant role in the ecosystem and rebuild oyster habitat.</p>	N			

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Fishing mortality reference points – For each NOAA code, the Plan states that the appropriate BRP to use for that NOAA code depends primarily on the purpose for which oysters within that code are planted, yet then applies the adjusted values to all NOAA codes, regardless of whether the oysters planted there were for restoration or harvest. Instead of assuming all oysters were planted to harvest, which depresses the fishing mortality rate, the department should clearly delineate for each NOAA code, which BRP (with or without plantings) reflects oyster plantings in that area. Otherwise, overfishing could go undetected if significant restoration plantings are contributing to oyster populations within a NOAA code and fishing mortality rates are artificially depressed in harvested areas. Alternatively, the more conservative approach would be to use unadjusted values for all NOAA codes. (pg. 21)	The intention was not to 'apply' the adjusted estimate of fishing mortality and the department agrees this was unclear in the document. The text was adjusted to clarify and tables with both the adjusted and unadjusted values for U were added to the document. Objectives for plantings in particular areas should be determined in an open stakeholder process. Adjusting the harvest rate for plantings does not 'depress' the harvest rate, but rather incorporates plantings into the equation. This is important because oysters are unique in that harvest rate can be manipulated both through controls to the fishery and augmentation of the stock.	Y	p. 21. In the final version p. 23.	FIRST For the purposes of comparisons with the harvest fraction reference points in this report, all estimates of harvest fraction are adjusted for the number of planted oysters. SECOND In the terminal year of the 2018 assessment, which was the 2017-2018 harvest season, there was substantial variability among NOAA codes and regions in their status relative to the harvest fraction reference points. Nineteen NOAA codes had harvest fractions above the threshold reference point, three were between the target and threshold reference points and 14 were at or below the target reference point (Figure 12). In areas with targets and/or thresholds are 0 percent, oyster harvest is not sustainable without planting activities.	FIRST STRIKE ORIGINAL TEXT AND REPLACE WITH: The adjusted and unadjusted time series of harvest fraction for each NOAA code relative to the reference points are shown in Tables 3 and 4. SECOND In the terminal year of the 2018 assessment, which was the 2017-2018 harvest season, there was substantial variability among NOAA codes and regions in their status relative to the harvest fraction reference points. In the 2017-2018 harvest season, overfishing was occurring in 19 of the 36 areas assessed if harvest fraction is adjusted for spat plantings (Figure 12, Table 4). The number of areas where overfishing is occurring increases to 31 with unadjusted values of harvest fraction (Table 3). In areas with targets and/or thresholds are 0 percent, oyster harvest is not sustainable without planting activities.
Action 4.1.2. – (1) The development of regional scales for managing oysters must be accompanied by changes in harvest reporting and enforcement to account for this shift. (pg. 22)	Harvest reporting has been at the bar level since 2010.	N			
Action 4.1.2 – (2) NR §4-215 states that fishery management plans shall include indicators that would trigger tightening or loosening of harvest restrictions. In this section, the department should outline what indicators will trigger tightening or loosening of harvest restrictions. (pg. 22)	Accepted suggestion. This was the intention of item 2 under action 4.1.2. DNR changed the word 'guidelines' to 'triggers'.	Y	p. 22. The final version p. 24.	Action 4.1.2. 2) Develop guidelines for implementing management measures when targets and thresholds are not met or exceeded.	Action 4.1.2. 2) Develop triggers for implementing management measures when targets and thresholds are not met or exceeded.
Action 4.1.2. – Given the chosen target fishing mortality rate is expected to result, minimally, in stable oyster populations, the Plan should explicitly state that the department's management actions will be designed to achieve the target fishing mortality rate. Anything less places the future of the oyster population at risk. (pg. 22)	Accepted suggestion.	Y	p. 22. The final version p. 24.	Action 4.1.2 Develop risk-averse harvest management strategies based on the status of oysters using the targets and thresholds for fishing mortality and the threshold for abundance.	Action 4.1.2 Develop risk-averse harvest management strategies based on the biological reference points to achieve the target harvest fraction.
Additional Actions - NR §4-215 states that if a stock is determined to be overfished, the FMP should include a species-specific time period for ending overfishing and rebuilding the stock to a sustainable level. FMPs, as an objective, must also prevent overfishing, which is not listed as an action in this plan. Therefore, the Plan should include the following as additional actions:	The question of time period when fishing is reduced to the target level is open for discussion with stakeholders.	N			
Add: End overfishing in all areas and regions of the Bay experiencing overfishing as determined by the most recent stock assessment within 8 years, the equivalent of one generation time of oysters in recent history.	The question of time period when fishing is reduced to the target level is open for discussion with stakeholders. Additionally, the metrics used to determine "overfishing" are being reviewed by UMCES and DNR since some areas that were designated with "overfishing" may not be accurate.	N			
Add: Rebuild oyster populations to levels that exceed the maximum abundance observed in the most recent stock assessment within 8 years.	A rebuilding target will be developed with stakeholder input. It should be noted that setting a time period to achieve an abundance goal for oysters would be highly uncertain. Even if harvest rates persisted well below the target level for a number of years, there is no guarantee the abundance will respond on a time scale of less than a decade.	N			
Add: Prevent overfishing through conservative, science-based management strategies that have a high probability of achieving abundance and fishing mortality targets. (Given the failure of existing management actions to prevent overfishing, the department should include additional actions or explain how such actions will be implemented differently to achieve the goals of ending and preventing overfishing and rebuilding oyster stocks.) (pg. 23)	This is the intent of action 4.1.2: to develop risk averse harvest management strategies.	N			
page 20: 4.1 Biological Reference Points: The consideration of Maximum Sustainable Yield does not consider the ecological value of oysters and thus should be replaced with the target of Optimal Sustainable Yield.	The 2018 stock assessment estimated maximum sustainable yield from available data, a critical step in assessing the health of a population. Calculating optimal yield (OY) – which is generally reduced from MSY- requires that specific objectives for ecological, economic or social outcomes be defined - ideally through stakeholder input. Under federal fisheries law (see below), OY is defined as a mechanism for resolving federal management objectives, achieving the objectives of a Fishery Management Plan and balancing various interests. It should be noted that the value of MSY calculated for oysters does account for shell production as an essential factor for population growth and incorporates processes for shell production and loss. Title 50: Wildlife and Fisheries PART 600—MAGNUSON-STEVENSON ACT PROVISIONS Subpart D—National Standards §600.310 National Standard 1—Optimum Yield. (ii) OY. The determination of OY is a decisional mechanism for resolving the Magnuson-Stevens Act conservation and management objectives, achieving an FMPs objectives, and balancing the various interests that comprise the greatest overall benefits to the Nation. OY is based on MSY as reduced under paragraphs (e)(3)(iii)(A) and (B) of this section.	N			

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The status of the stock relative to biological reference points should be determined every 2 years, with a full stock assessment every 6 years. Data collection, stock assessment, and stock status determination should be conducted at a spatial scale appropriate to determining the effectiveness of replenishment shell/seed plantings and sanctuary restoration activities.	Action 4.2 was changed and the time frame was adjusted from 3-5 years to 2-5 years.	Y	p. 17. The final version p. 19.	Action 4.2 Conduct a Maryland Chesapeake Bay stock assessment at least once every three to five years to provide information on the status of oysters, re-examine stock assessment methods and parameters and make any necessary adjustments to the biological reference points.	Action 4.0.2. Conduct a Maryland Chesapeake Bay stock assessment at least once every two to five years to provide information on the status of oysters, re-examine stock assessment methods and parameters and make any necessary adjustments to the biological reference points.
The target fishing level identified in the stock assessment is designed to maximize harvest while keeping stock levels stable at their current level. This is insufficient to achieve the objective of growing the oyster population overall. Target fishing levels should be set at a lower level that takes into account the oysters' role as habitat for both other oysters and other organisms in the ecosystem.	Offsetting the target to achieve ecological, economic or other social goals requires an open stakeholder process to determine management objectives. Setting an abundance target could be accomplished given the identification of management objectives for the population and fishery, which ideally would be accomplished with stakeholder input.	N			
An abundance target should be set that achieves the oysters' full ecological potential in the Bay. This could, perhaps, be based on oyster carrying capacity.	Setting an abundance target could be accomplished given the identification of management goals for the population and fishery which ideally would be accomplished with stakeholder input.	N			
Page 17, Biological Reference Points. The goal is to have more oysters in the Bay. The current oyster abundance as determined by the stock assessment should be the threshold abundance reference point. We do not want to go backwards. If the mind-set of using the lowest observed level during the stock assessment is used, it will create the mind-set to continually lower the population goals moving forward.	Assigning the time series minimum is an objective way to assign a threshold consistently to each of the assessed areas. As stated in the stock assessment, the population has, in most cases, rebounded from the minimum but there is no evidence that a rebound could happen if the abundance went still lower. The minimum abundance approach is a clear objective and has been used successfully in other fisheries including blue crab. The peer review endorsed this method, given the lack of available data to calculate biologically-based abundance reference points.	N			
Page 20, Biological Reference Points. The concept of "Maximum Sustained Yield" does not incorporate the ecological value of oysters. This is inconsistent with the state goals for the OMP. The target should be the "Optimal Sustainable Yield," which would be calculated taking into consideration the ecological value of oysters.	The 2018 stock assessment estimated maximum sustainable yield from available data which is a critical step in assessing the health of a population. Calculating optimal yield (OY) – which is generally reduced from MSY- requires that specific objectives for ecological, economic or social outcomes are defined - ideally through stakeholder input.	N			
The department needs to develop target fishing levels and target abundance levels. The target fishing levels currently identified in the stock assessment do not adequately promote the growth of the oyster population as they are designed to maximize harvest and keep population levels stable. This is problematic because the stock assessment identified that overfishing is already occurring in certain areas and the current oyster population is not at a level that we should want to maintain. The target fishing levels need to be set lower in order to actually have a growing oyster population over time. Furthermore, target abundance levels need to be identified with consideration for the value that intact three-dimensional reefs have to other functions in the bay, like nitrogen removal and habitat for other species, to name a few.	Offsetting the target to achieve ecological, economic or other social goals requires an open stakeholder process to determine management objectives. Setting an abundance target could be accomplished given the identification of management objectives for the population and fishery, which ideally would be accomplished with stakeholder input.	N			
The SA refers to these sections as "NOAA Codes". Further, the Stock Assessment found that "[i]n the most recent fishing season (2017-2018), 19 NOAA codes had exploitation rates above the limit reference point" (emphasis supplied). In the 2016-2017 fishing season, 23 NOAA Codes were overfished. In 2015-2016, 21 NOAA Codes were overfished. In light of the findings by DNR and UMCES that over half of the oyster fishing zones in the State's portion of the Bay are consistently being over-harvested, Arundel Rivers Federation notes as an overarching matter that pursuant to Md Code Ann., Nat. Res. 4-215, the FMP must include, among other things, A species-specific time period for: A. Ending or appropriately addressing overfishing; and B. Rebuilding the stock of the species to a sustainable level; and 2. A description of: A. Management strategies that have a high probability of reducing fishing to a target level within a target time period, as determined by the department; and B. The appropriate assignment or allocation of fishing privileges in accordance with subsection (d) (2) of this section.	Natural Resources Article 4-215 states that: conservation and management measures adopted under a FMP, to the extent possible: (i) shall prevent overfishing while attempting to achieve the best most efficient utilization of the State's fishery resources. The completion of the stock assessment provides the information needed to identify and address overfishing, hence the development of a new FMP and the inclusion of stock status and results of the stock assessment. The section of statute cited in this comment states that time periods for ending overfishing, rebuilding the stock, etc. are triggered if the population is determined to be overfished, which means abundance is below the assigned threshold. The oyster population was not classified as overfished or depleted (Maryland department of Natural Resources 2018), although overfishing was occurring in 19 of the 36 areas assessed (2017-2018 season). Identifying and adjusting harvest rates is the first step in changing oyster stock status. Rebuilding (abundance) targets can be set but will require an open stakeholder process to determine management objectives.	N			
Arundel Rivers recommends adjusting the threshold abundance reference point to build in a margin of safety for the 36 NOAA codes that is better equipped to absorb impacts from low recruitment or extreme natural mortality events.	Adjusting the threshold upward and setting an abundance target could both be accomplished given the identification of management goals for the population and fishery which ideally would be accomplished with stakeholder input.	N			
Arundel Rivers is concerned that the delta between the threshold value and the target value may be artificially shrunk based on the input from fishery industry stakeholders, who have clearly been more comfortable with the risk of population decline than other stakeholders who wish to see resurgence in the population in order to realize the ecosystem services of the oyster above its economic value.	Assuming you mean the difference between the target and threshold values for harvest rate, these were set using objective means within the stock assessment and supported by peer review. Setting a target that includes management objectives developed in consultation with stakeholders would be an additional step.	N			
Action 4.1.2 and 4.1.3- When/how will these actions be undertaken/implemented?	The process to accomplish these actions will be developed over the coming months.	N			
(Section 4.1, Page 18, 3rd paragraph). As stated "it was not possible to generate a suitable method for calculating an abundance target," however, we believe an abundance target was established for the PEIS between DNR, VMRC, PRFC, NOAA and ACDE in that they agreed that a desirable abundance target was a level of abundance that would support sustainable harvests comparable to harvest levels during the period 1920-70.	The department appreciates this input on an abundance target. It will need further discussion and input.	N			
See this paper by Amy Freitag, Bruce Vogt, and Troy Hartley on Ecosystem Indicators for oysters https://www.researchgate.net/publication/324502862_Ecosystem-Based_Fisheries_Management_in_the_Chesapeake_Developing_Functional_Indicators	Although the authors lay out an ecosystem-based fishery management approach for oysters, 4 of the 8 ecosystem services they suggest for indicators have limited or no data available. It would also be a complex process involving a number of agencies and would require a major policy shift and needs more consideration than can be provided in this document at this time.	N			
Ecosystem considerations strategies and actions should consider more than oysters' water filtration and nitrogen removal benefits. Benthic structural habitat, biodiversity enhancement, fish production, seagrass facilitation, shoreline stabilization, carbon sequestration, and sediment deposition should all be considered. Monitoring programs should be developed that can quantify these types of ecosystem services. (pg. 54)	The current monitoring program takes into consideration physical environmental factors, habitat, and epibenthic biodiversity. The suggestion to develop more complex ecosystem monitoring programs is noted and will be considered.	N			

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The list of factors looks complete but suggest stronger connection of these factors to the fishery management objectives. One way to do this could be development of ecological reference points or ecosystem indicators.	Developing ecological reference points would require more specific guidance defining ecological objectives and would need to be developed through the stock assessment process. Developing ecosystem indicators would be best from a baywide perspective and maybe something to discuss under the CBP oyster outcome.	N			
The development of nutrient trading programs should ensure that actions are quantifiable, verifiable, and properly accounted for, including the use of third-party verifiers. Only actions that are considered additional should qualify for nutrient credits. (pg. 55)	Since the use of oysters as BMPs is still being developed, keeping Action 11.4, 11.5, and 11.6 more general for now seems appropriate. The department will only be able to utilize oysters as BMPs as approved by EPA.	N			
DNR should consider more than just nutrient removal in decision-making.	DNR considers all aspects of oysters as stated in the Goal.	N			
Explicitly state that oysters are a keystone species because of the role they play in shaping the ecosystem. Suggest adding text that communicates how the functioning of the Bay ecosystem has been fundamentally changed with the extensive and broad reduction of oysters in the Chesapeake.	Accepted suggestion.	Y	p 53, para 1, sent 1; p53, para1, last sent added. In the final version p. 57.	1st sentence: Oysters are considered a keystone species because of their ecological benefits. Last sentence: The decline in the oyster populations and consequent reduction in ecological benefits may have fundamentally altered the functioning of the Bay ecosystem.	...keystone species because of the role they play in shaping the ecosystem.
p 53: This section discussed impacts to oysters from predation and climate change. It would also be appropriate to mention the impact that harvesting has on reducing ecosystem benefits. The unique 3D structure of oyster reefs is damaged or removed by harvests, which greatly reduces their ability to be self-sustaining and the ecosystem benefits reefs provide.	Accepted suggestion.	Y	p 53, para 4, new para. In the final version p. 57.	n/a	Oyster reefs contribute structure and substrate that sustain the rich community of organisms associated with them. The shell that constitutes the reef adds structure and firm substrate to the estuary, contributing habitat that is in stark contrast to the otherwise soft bottom environment of the bay. Under natural conditions, shell degradation is due to a combination of taphonomic factors, where shell is lost through chemical (e.g., dissolution), physical (e.g., sedimentation, subsidence, breakage, dislodgement from the bar), and biological (e.g., shells riddled by boring sponges, polychaete worms, etc.) processes. For reefs to build, the rate of shell accretion must exceed the rate of shell loss, which under natural conditions occurs by some small amount. The extraordinary outbreaks of disease epizootics in recent decades and two centuries of harvesting have disrupted this balance. The decline of the Chesapeake oyster over the past three decades has resulted in the reduction of a critical functional component of the ecosystem and the gradual disappearance of a significant structural element as well.
p 54., 1st paragraph (RE: sea nettle/ctenophores): This does not appear to be a completely accurate depiction of Breitburg and Fulford's work. Their work concluded that the relationship was related to oyster abundance as opposed to climate - "sea nettles declined in the mid-1980s when overfishing and increased disease mortality led to a sharp decrease in oyster landings and abundance. Climate trends, previously associated with interannual variation in sea nettle abundances, do not explain the sharp decline." Revise text to additionally recognize the role that low numbers of oysters and decreased oyster reef habitat has played in the past with respect to oysters – sea nettle – ctenophore dynamics. The result is that increasing oyster populations could benefit sea nettles, reduce ctenophores, and subsequently reduce predation on oyster larvae.	Accepted suggestion.	Y	p. 54, para1. In the final version p. 58, para 3.	Insert new text after: ...more ctenophores would mean fewer oyster larvae.	Low numbers of oysters and decreased oyster reef habitat may have altered the oysters – sea nettle – ctenophore dynamics, the net result being an increase in ctenophores in the Bay. Increasing oyster populations could benefit sea nettles, reduce ctenophores, and subsequently reduce predation on oyster larvae (Breitburg and Fulford, 2006).
p. 54 – 2nd paragraph, last sentence :Text states 'important in nutrient and energy cycling'. Revise text to also include sediment processes.	Accepted suggestion.	Y	p 54, para 2, last sent.	"...important in nutrient and energy cycling."	"...important in nutrient and energy cycling, transferring nutrients from the water column to the sediment."
The Plan, like past plans, continues to place emphasis on restocking, shell budgets, and maximizing harvest of wild oysters. While the Plan does mention the ecosystem services having great value, no where in the Plan are ecosystem services considered alongside the harvest protocols.	The section on sanctuaries considers ecosystem benefits while excluding harvesting of the wild stock. Sanctuaries currently account for about 24% of natural oyster bars, not an insubstantial amount.	N			
Increase focus and scope of ecosystem functions.	Additional information was added to Section 11.0: ecosystem considerations. See specific responses to comments 74-77.	N			
The foundations of this plan are based on oyster growth and reproduction rates that were germane decades ago in a time when the population had not been devastated by Dermo and MS; when the influx of freshwater during storm events was not as severe; when there were not prevalent dead zones with large areas of oxygen depletion; and probably most importantly, when climate change considerations were not a significant consequence when developing a comprehensive, long-term plan.	The first FMP was developed after devastating disease epizootics and dead zones. Freshets have been a problem since the inception of the fishery. The stock assessment was conducted with data from 1999 through 2017. The time frame was chosen because of consistent data reporting methods and not because of biological or environmental factors. However, it does capture a time frame under current conditions.	N			
Enforcement:In addition to the actions listed, the Plan should include the following: a) Management areas, to the extent possible, should utilize straight-line boundaries for the facilitation of the use of the MLEIN system. Where possible, management area boundaries should use conspicuous landmarks to facilitate enforcement and compliance.	Management lines are drawn in consultation with various stakeholder groups to achieve a variety of management objectives. To the extent practicable, lines are drawn in a way that facilitates compliance with the rules while balancing harvest opportunities with restoration efforts.	N			

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b) Management areas and gear lines should not cut across oyster bars. Open/closed areas should not split oyster bars and open/closed areas should not be contiguous.	Management lines are drawn in consultation with various stakeholder groups to achieve a variety of management objectives. To the extent practicable, lines are drawn in a way that facilitates compliance with the rules while balancing harvest opportunities with restoration efforts.	N			
c) When possible, oyster sanctuary boundaries should include a buffer of 200 feet or more such that oyster bars within the sanctuary are situated more than 200 feet within the sanctuary boundary to facilitate enforcement.	The egregiousness of sanctuary violations by distance are addressed in current regulation, essentially creating buffers.	N			
d) Closure areas listed in the Shellfish Closure Book, including aquaculture lease areas, should be made available online, via GIS application, and in a format that can be downloaded for use on standard marine navigation equipment. Any changes to management areas, open/closed areas, MDE restricted areas, etc. should be made available online.	DNR is currently in the process of developing an on-line version of Shellfish Closure Book. This is implicit in the Fishery Management Areas Strategy 6.1: Identify and maintain the designation of productive oyster habitat and explicit in the management areas Actions 6.2.1.1 and 6.3.1.4.	N			
e) Modern electronic reporting systems should be used (e.g. e-FACTS, hail in/hail out, vessel monitoring systems) to ease enforcement and improve harvest reporting.	Addressed in Action 6.3 and 6.4.	N			
f) The department should continue to maintain strict penalties for oyster poaching to serve as a deterrent to bad behavior. The department should also consider additional actions identified by the Aquaculture Theft Prevention Workgroup, including seizure of vessels and gear, a centralized court for natural resources violations, improved education for county attorneys, promotion of the Wildlife CrimeStoppers program, and others, for use in the public fishery.	DNR addresses poaching in Section 10.0 of the plan and list methods to implement appropriate enforcement measures including continuing to provide education to states attorneys and judges in Action 10.1. The department will contact the Aquaculture Theft Prevention Workgroup regarding their actions.	N			
g) Landing of oysters should be conducted at centralized locations throughout the state to facilitate law enforcement inspections of vessels and harvests at the point of sale. (pg. 51)	DNR could also facilitate law enforcement through a hail in/hail out system under existing reporting systems. Additionally, harvested oysters can only be sold to certified buyers at certified locations as per current law.	N			
There also needs to be a focus on the enforcement of illegal fishing and poaching	Enforcement is addressed in Section 10.0 of the OMP.	N			
Enforcement. More Marine Police are needed. Electronic devices might also be helpful.	Enforcement is addressed in Section 10.0 of the OMP.	N			
This plan would better serve all of the citizens of the state of Maryland and the Chesapeake Bay watershed if it promoted the following: A continued movement to create and enforce environmental regulations that would improve the overall health of the Chesapeake (limiting freshwater runoff, wastewater, sediments, etc).	MDE is responsible for enforcing environmental regulations. The Chesapeake Bay Program also addresses these issues in the 2014 Watershed Agreement and subsequent work plans.	N			
Enforcement should continue to be a top priority in the development of fishery management actions, boundaries of fishery management areas, and in the development of penalty structures.	Enforcement is addressed in Section 10.0 of the OMP.	N			
DNR should consider requiring landing of product at specified locations to facilitate enforcement at the time of sale. In addition, straight line boundaries should continue to be used to facilitate the use of the MLEIN system. DNR should provide downloadable, electronic maps of Shellfish Closure Book maps that can be used in onboard navigation systems.	Harvested oysters can only be sold to certified buyers at certified locations as per current law. DNR is in the process of developing an on-line version of the Shellfish Closure Book for gear lines.	N			
Full funding and staffing of DNR Police should be a priority	Enforcement is addressed in Section 10.0 of the OMP.	N			
No plan can be successful without strict adherence to regulations designed to accomplish the goals for a restoration site. Enforcement must be swift, severe, and applied across the board in order to be effective. Every effort should be made to incorporate the public fishermen in this effort. Recent reductions in enforcement staff has been used as an excuse for the lack of enforcement. Lack of compliance for whatever reason dooms restoration efforts. A special committee should be formed with the objective of developing regulations severe enough to curtail unauthorized harvests.	Enforcement is addressed in Section 10.0 of the OMP.	N			
Page 51, Enforcement. Add a recommendation to make closed area boundaries easy to enforce and to be understood.	DNR is working on online mapping.	N			
Action 10.2 – Strengthen enforcement. What can be done to accomplish this?	This will need to be a coordinated effort between DNR and MDE to ensure that the NSSP Model Ordinance is properly enforced by NRP officers. A list of enforcement measures can be found in Action 10.1.	N			
Action 10.1: With respect to repeat offenders - What else can be done? From reported information, it appears that there is still extensive repeat offenses.	The current system handles repeat offenders, especially now that the department has chronologically caught up with the penalty systems implemented in 2010 and 2011.	N			
(Page 51). The overview section on enforcement focuses on the importance of enforcing closed areas. This should be expanded to include areas open to the wild fishery, and also specifically mention enforcement of aquaculture. Significant investments occur in these areas and need to be protected.	Accepted suggestion.	Y	p. 55 in the final version.	Enforcement Strategy 10.0. Continue to strengthen the enforcement of oyster closures and harvest regulations.	Enforcement Strategy 10.0. Continue to strengthen the enforcement of oyster management measures in established in statute and regulations, and by public notice.
Page 29, Fisheries Management. The goal should be to increase the oyster population and achieve an optimal harvest in the public fishery considering the ecological services provided by the oyster population.	These topics are addressed in the overall OMP goal and objectives.	N			
Page 30, Action 6.0. What is meant by "optimal population growth" and how specifically is it defined?	Optimal is a subjective term and Action 6 was somewhat vague and redundant to Actions 4.1.1 and 4.1.2. The department changed the strategy to clarify.	Y	p. 30. In the final version p. 33.	Fishery Management Strategy 6.0 Manage the public fishery to achieve maximum sustainable harvest while keeping the oyster stock at a level that produces optimal population growth. Action 6.1 Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.	Removed the language under strategy 6.0 and replaced it with the language from Action 6.1. The Fishery Management Strategy 6.0 is now: Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.

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Page 30, Action 6.7. Latent effort is clearly an important threat to any sustainability effort for the public fishery. The goal should be to work with the industry and other stakeholders to implement strategies to reduce latent effort.	Accepted suggestion.	Y	p. 30. The final version p. 33.		Action 6.0.6. Continue to monitor latent effort and work with the commercial industry and other stakeholders to identify potential strategies to control or decrease effort if necessary.
Page 33 and 34, Harvest Reserve Areas and Rotational Harvest Areas. There does not seem to be any substantive difference between these types of areas. Both are open to periodic harvest. The fewer categories the better, so we would suggest combining.	Harvest Reserves are opened to harvest based on biological criteria only. Rotational harvest areas are opened based on individual area rotational plans developed prior to creating the area.	N			
The paradigm of increasing harvest in any year there is an increase in population is unlikely to result in any increase in overall population in the fishery, and thus should trigger the DNRs "appropriate assignment or allocation of fishing privileges in accordance with subsection (d)(2)" of §4-215. Arundel Rivers recommends reducing commercial oyster licenses and "umbrella" licenses to a set amount that is low enough to enable natural populations to retain population increases and remain stable through harvest seasons.	Addressed in Action 6.7 (in the final version Action 6.0.6).	N			
The DNR fishery management strategy 6.0 is to "[m]anage the public fishery to achieve maximum sustainable harvest while keeping the oyster stock at a level that produces optimal population growth." Id 30. Respectfully, this statement seems internally inconsistent—it is unclear how it is possible to realize "maximum sustainable harvest" while simultaneously "keeping the oyster stock at a level" that also "produces optimal growth". If the DNR is serious about producing optimal growth in an area, it will not be keeping the stock at a certain level, but will be consistently raising this level, i.e. -encouraging growth. Moreover, if DNR wishes to realize optimal growth, that is fundamentally inconsistent with achieving maximum sustainable harvest.	Optimal is a subjective term and Action 6 was somewhat vague and redundant to Actions 4.1.1 and 4.1.2. The department changed the strategy to clarify.	Y	p. 30. In the final version p. 33.	Fishery Management Strategy 6.0 Manage the public fishery to achieve maximum sustainable harvest while keeping the oyster stock at a level that produces optimal population growth. Action 6.1 Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.	Removed the language under strategy 6.0 and replaced it with the language under Action 6.1. The Fishery Management Strategy 6.0 is now: Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.
Arundel Rivers applauds the DNR's proposed Action 6.1.1 to "Conduct a new bay bottom survey in Maryland's Chesapeake Bay and delineate the boundaries of oyster bars." Arundel Rivers further supports any increased funding required by the DNR to accomplish the objective of improved scientific understanding of the oyster population in the Bay.	None needed.	N			
Action 6.1.2 appears to carve out an option to modify charted boundaries of oyster bars based on "other quantitative data" (i.e., something other than scientific survey boundaries) and this carve-out is concerning. We recommend striking Action 6.1.2.	Oyster populations are dynamic and changing. This action allows the bar boundaries to evolve as populations expand and shrink in different areas	N			
Action 6.2 – Evaluate the potential management tools... How will this be accomplished?	6.0 Fishery Management section discusses the use of target levels of harvest identified from the stock assessment and the last paragraph states that strategies for controlling harvest or effort will require input from TFAC, SFAC, OAC, County Committees and the public and may require changes in regulations. Any regulatory changes would go through the regulatory process. Added additional language to clarify.	Y	p 29-30. In the final version p. 33.	Action 6.2. Evaluate the potential use of management tools including those referenced in Appendix A, either separately or in conjunction with each other and implement them to manage the oyster resource.	Action 6.0.1. Evaluate the potential use of management tools including those referenced in Appendix A, either separately or in conjunction with each other and implement them to manage the oyster resource consistent with the fishery management strategy.
Section 6.1- Text states 'it will be necessary to formally decide how to allocate the limited resources among the areas'. How will this be accomplished?	The text in Section 6.1 Fishery Management Areas now includes a reference to Action 3.1 which states the following: Develop a decision-making process on how to equitably utilize limited natural shell and alternative substrates for sanctuary restoration, fishery enhancement and aquaculture and make decisions according to the process. Section 6.4 Seed Areas addresses planting shell and seed.	Y	p.34 In the final version.		Added reference (see Action 3.1) to the end of the first paragraph.
Section 6.2 – Develop guidelines for managing harvest and monitoring in harvest reserves. How/when will this be accomplished?	The department is working with the OAC and partners. This is part of an ongoing work effort.	N			
Action 6.3.2 – What is the process/decision criteria for modifying rotational harvest areas?	The department is working with the OAC and partners. This is part of an ongoing work effort.	N			
1st sentence, 2nd paragraph: Text states 'estimates of the maximum level of harvest...'. Is this Umsy? If so, add that reference in parentheses.	The use of the technological notation Umsy was used throughout the stock assessment section of the plan. Since this document has a broad audience the department chose to use the descriptive words "estimates of the maximum level of harvest" in the fishery management section.	N			
Action 6.1.1: Bullet #2 – With regards to new charted boundaries - Would other regulatory decisions be based on the new designations? I'm thinking about current limits on dredging and other activities within 500 yds of existing NOBs. Would those now be tied to the new charted boundaries rather than old NOB boundaries?	Fishing restrictions around oyster bar boundaries would continue to be maintained based on the new charted boundaries. Language was added to the text (last paragraph in Section 6.1. Fishery Management Section to clarify.	Y	p. 33. In the final version p. 36.	Given the change in oyster habitat since 1906 and the discrepancies of the boundaries between these four areas (Yates Bars, Non-Yates Bars, NOBs and PSFAs), oyster habitat should be re-delineated so that charted oyster bars more accurately reflect areas of productive oyster habitat. By re-delineating productive oyster habitat, the department could improve its management of oyster resources and maximize the benefits of bay bottom usage for the public (e. g. oystermen, clammers, aquaculture, crabbers, finfish fisheries).	Given the change in oyster habitat since 1906 and the discrepancies of the boundaries between these four areas (Yates Bars, Non-Yates Bars, NOBs and PSFAs), oyster habitat should be re-delineated so that charted oyster bars more accurately reflect areas of productive oyster habitat. By re-delineating productive oyster habitat, the department could improve its management of oyster resources and maximize the benefits of bay bottom usage for the public (e.g. oystermen, clammers, aquaculture, crabbers, finfish fisheries). Non-fishing buffers around bar boundaries (e.g. no soft clam harvest using hydraulic dredges can occur with 150 feet of an oyster bar) will continue to be maintained.

Comment	DNR Response	Change to Draft (Y/N)	Page of Draft OMP	Original Draft Text	New Revised Text
Section 6.2 – Harvest Reserve Areas – 2nd paragraph: Text refers to currently having 2 oyster bars designated as Harvest Reserve Areas. Suggest identifying them by name.	Accepted suggestion.	Y	p. 33. In the final version p. 36.	To date, Maryland has designated two oyster bars as Harvest Reserve Areas.	To date, Maryland has designated two oyster bars as Harvest Reserve Areas (Bramleigh Reserve in Wicomico River West and Evans Reserve in Tangier Sound).
Section 6.2 – Harvest Reserve Areas – Action 6.2.1 #3: Similarly, how will harvest be monitored to ensure that only what is supposed to be harvested is actually what is taken? For example, if a larger size limit is established for harvest in a reserve, how will that be enforced/monitored?	Natural Resources Police currently handle enforcement related to harvest reserve areas. They have a number of tools that allow for improved enforcement monitoring including the MLEIN system.	N			
Section 5.5 [should be 6.6] – Replenishment Plantings – 4th paragraph: Text states the number of bushels for planting that corresponds to the average annual revenue. Is this number representative of what is actually planted? Or, are shells limited to meet that number? For context, approximately how many bushels are planted annually over the last few years? Is there enough available for the funding available or are shells limited?	That sentence was meant to provide context so that the reader can equate revenue to replenishment generally. It is not what is planted annually. The substrate section already addresses shell quantity limitations. Table 7 was added to provide information on additional years, plantings and cost. The text was changed to include this change.	Y	p. 38. In the final version p. 41-42.	Replenishment plantings are currently funded by a grant from the Maryland department of Transportation, revenue from the oyster bushel tax and revenue from the purchase of an oyster surcharge from commercially licensed fishers. The oyster bushel tax has been set at \$1 and the export tax at \$0.30 since 1991. Currently the cost to buy and plant a bushel of shells is around \$5. The average annual revenue generated from the bushel tax since 1991 is \$208,740 (excludes export tax). The oyster surcharge is currently set at \$300 and the average revenue from surcharges is \$241,062. Average annual revenue from the bushel tax and oyster surcharges equates to planting approximately 80,000 bushels of shell annually. For the future, additional funding or public-private partnership opportunities should be sought.	Replenishment plantings are currently funded by a grant from the Maryland department of Transportation, revenue from the oyster bushel tax and revenue from the purchase of an oyster surcharge from commercially licensed fishers. The oyster bushel tax has been set at \$1 and the export tax at \$0.30 since 1991. The average annual revenue generated from the bushel tax since 1991 is \$208,740 (excludes export tax). The oyster surcharge is currently set at \$300 and the average revenue from surcharges is \$241,062. Table 7 indicates that these two sources of revenue are not enough to fully fund repletion efforts, or even just the shell planting component. In the future, additional funding or public-private partnership opportunities should be sought.
(Page 29). It is stated in Strategy 6.0 that DNR will manage at MSY for optimal population growth. Clarification should be provided to explain what is meant by 'optimal population growth'.	Optimal is a subjective term and Action 6 was somewhat vague and redundant to Actions 4.1.1 and 4.1.2. The department changed the strategy to clarify.	Y	p.30. In the final version p. 33.	Fishery Management Strategy 6.0 Manage the public fishery to achieve maximum sustainable harvest while keeping the oyster stock at a level that produces optimal population growth. Action 6.1 Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.	Removed the language under strategy 6.0 and replaced it with the language under Action 6.1 Fishery Management Strategy 6.0 is now: Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.
(Page 35). Suggest including an action that would allow DNR to create a new / hybrid management system (with supporting regulations) whereby harvest would be limited to those that agree to pay into the program, similar to the PRFC program. Establishing an open, user pay program, could help achieve a financially sustainable program. The size of the program can be scaled according to the number of participants and level of funds contributed.	Addressed in Action 6.3.1.g.	N			
Upper Bay Alternatives. Don Merritt and Don Webster prepared a couple of reports between 2010 and 2015 that provided insightful information on oyster recovery alternatives for the Upper Bay as well as the prudent use of shell resources. Consider incorporating and/or referencing them.	Addressed in the Salinity Section 2.5.	N			
Throughout, clearly define 'fishery' and use consistently.	Throughout the document "fishery" is used as "anything that is harvested" and "industry" is used as "harvesters and beyond harvesters" i.e. seafood dealers and restaurants.	N			
Suggest tighter alignment in the plan between the fishery management options suggested and the ecosystem considerations in section 11. These should be directly coupled given the unique nature of oysters as an ecosystem engineer and habitat.	Additional text was added to Section 11.0.	N			
Utilize the Sustainable Fisheries Goal Implementation Team to coordinate sustainable oyster fishery and ecosystem efforts bay wide not just in Maryland. See suggestion for using the Chesapeake Bay Stock Assessment Committee for science, stock assessment updates, and BRP development.	Addressed generally in Section 2.0 Oyster Management, 2.5 Partners.	Y	p. 27-28. In the final version p. 14.		This part of the plan was moved to a separate subsection under Section 2.0. Oyster Management. It is now 2.5 Partners.
Support the development of more public hatcheries.	Industry infrastructure (which includes hatcheries) was added to Action 7.0.1.	Y	p.46. In the final version p. 49.	Action 7.1. Partner with other state and federal agencies, the University of Maryland and other state colleges and universities, non-governmental organizations, industry representatives and other stakeholders to further streamline state and federal permitting and to continue to implement and operate financing and education and training programs.	Action 7.0.1. Partner with other state and federal agencies, the University of Maryland and other state colleges and universities, non-governmental organizations, industry representatives and other stakeholders to further streamline state and federal permitting, to continue to implement and operate financing and education and training programs and to develop additional industry infrastructure.

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The term "optimal population growth" should be further defined in this document, and specific timelines for estimated growth should be clearly stated as actions are taken.	Optimal is a subjective term and Action 6 was somewhat vague and redundant to Actions 4.1.1 and 4.1.2. The department changed the strategy to clarify.	Y	30	Fishery Management Strategy 6.0 Manage the public fishery to achieve maximum sustainable harvest while keeping the oyster stock at a level that produces optimal population growth. Action 6.1 Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.	The language under strategy 6.0 was removed and replaced with the language from Action 6.1 Fishery Management Strategy 6.0 is now: Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.
Timely and accurate reporting of harvest, as well as strategic controls on effort should be specifically defined for each portion of the fishery. Working with the industry to develop methods for controlling effort is arguably the most important management action that can be taken given the current status of the resource, the value of the fishery to industry participants, and the importance of future generations to participate in a sustainably managed fishery.	Harvest reporting is addressed in actions 6.0.2, 6.0.3., and 6.3.1 h. Effort control is discussed in Appendix A.	N			
Virginia has had good success in recent years with rotational harvest based firmly on biological criteria to manage opening and closing multiple harvest bars within a region. Opening rotational harvest should be guided only by biological criteria, not set time periods. Moreover, enforcement must be strong enough to ensure that poaching does not compromise management, and these areas must receive specific, dedicated, generous replanting at the end of the season to ensure recovery for the next round of harvest.	Harvest reserve areas are managed solely by biological criteria. Rotational harvest areas can be managed by biological criteria if warranted.	N			
Section 6.1, page 32. The 2009 analysis estimated that there are approximately 36,000 acres of "productive oyster bottom" in the Maryland portion of the Bay. What % of this 36,000-acres is in sanctuaries?	Accepted suggestion but indicated the percentage is in the public oyster bottom since this section is not about sanctuaries.	Y	p. 32. In the final version p. 36.	An analysis conducted as part of the 2009 Programmatic Environmental Impact Statement estimated that there are approximately 36,000 acres of productive oyster bottom remaining in Maryland's Chesapeake Bay.	An analysis conducted as part of the 2009 Programmatic Environmental Impact Statement estimated that there are approximately 36,000 acres of productive oyster bottom remaining in Maryland's Chesapeake Bay of which 76% is currently outside of sanctuary areas.
Section 6.3, Page 35. We are pleased to see that the success of Virginia's rotational harvest system will be replicated in the Maryland portion of the Bay moving forward. In addition to other benefits, this will allow for accurate comparison of various restoration efforts that include, rather than exclude, the public fishery.	None needed.	N			
Fishery Management Strategy 6.0 – According the preceding discussion, the level that achieves the "maximum sustainable harvest" is the fishing mortality rate threshold. According to the 2018 stock assessment, Ucrash, if exceeded, will result in extirpation of oysters in Maryland. This is an unacceptable level of risk. The Plan should instead manage to achieve the fishing mortality rate target, or some percentage thereof (see comments in Section 4.0 Biological Reference Points) to achieve an increasing oyster population over time. Language in this section should be changed to reflect management actions striving to achieve the fishery mortality rate target. (pg. 30)	The fishery management strategy 6.0 was vague and redundant to actions under section 4 and was edited to clarify.	Y	p. 30. In the final version p. 33.	Fishery Management Strategy 6.0 Manage the public fishery to achieve maximum sustainable harvest while keeping the oyster stock at a level that produces optimal population growth. Action 6.1 Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.	The language under strategy 6.0 was replaced with the language under Action 6.1 Fishery Management Strategy 6.0 is now: Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.
Action 6.1 – Suggest: Adopt biological reference points (target and threshold fishing rate, target and threshold abundance) at an appropriate spatial scale that can be used to manage harvest at a level that grows the oyster population and develop management measures in conjunction with stakeholders. (pg. 30)	Action 6.1 replaced Fishery management Strategy 6.0 and the wording was changed.	Y	p. 30. In the final version p. 33.	Fishery Management Strategy 6.0 Manage the public fishery to achieve maximum sustainable harvest while keeping the oyster stock at a level that produces optimal population growth. Action 6.1 Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.	The language under strategy 6.0 was replaced with the language under Action 6.1 Fishery Management Strategy 6.0 is now: Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.
Action 6.1 – Considering the stock assessment developed biological reference points for each NOAA code, the only appropriate spatial management scale that would allow for 'objective and measurable criteria' to determine stock status is the NOAA code scale. (pg. 30)	Accepted suggestion.	Y	p. 30. In the final version p. 33.	Fishery Management Strategy 6.0 Manage the public fishery to achieve maximum sustainable harvest while keeping the oyster stock at a level that produces optimal population growth. Action 6.1 Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.	The language under strategy 6.0 was replaced with the language under Action 6.1 Fishery Management Strategy 6.0 is now: Adopt biological reference points (target and threshold fishing rate) at an appropriate spatial scale that can be used to manage harvest at a sustainable level and develop management measures in conjunction with stakeholders.
Action 6.1 – Consider a management construct similar to the blue crab fishery where annual surveys are used to assess the status of the stock and management measures are developed by the department to meet target fishing rates. Stakeholders weigh in on their preferred option out of those developed by the department. (pg. 30)	The blue crab situation is unique where estimates of crab abundance are derived directly from survey results. For oysters, abundance is estimated via the stock assessment model and the various data inputs are required annually to do this. It is possible to run the stock assessment annually and develop annual management measures, however, currently there is no predictive model to estimate the impacts of management changes.	N			

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Action 6.3 – This action is critical. Harvest reporting must match the spatial scale of fishery management and replanting so that the benefits and impacts of these actions can be directly quantified. The department should consider modernizing reporting methods to improve accuracy and compliance, including e-FACTS reporting, hail in/hail out, vessel monitoring systems and mobile reporting applications. Additionally, the department should consider instituting or increasing penalties for incorrect or incomplete harvest reporting. (pg. 30)	Harvest reporting is addressed in actions 6.0.2 and 6.0.3.	N			
Action 6.5 and Action 6.6 – Several studies, including the 2018 stock assessment, have identified deficiencies in the department's fishery-dependent and fishery-independent surveys.16 These deficiencies should be addressed, and appropriate calibrations developed to address any changes that are made. (pg. 30)	Issues related to both fishery dependent and fishery independent surveys are addressed in Section 8.0 Monitoring.	N			
Action 6.7 – The OysterFutures recommendations as well as public input on the stock assessment management "toolbox" suggested that the department needs to develop and implement limited entry to the oyster fishery. A 2016 analysis of the Maryland oyster fishery indicated that increases in oyster abundance and biomass are quickly compensated for by increases in fishery effort, suggesting that these controls alone are insufficient to bring harvest to sustainable levels, as was confirmed by the 2018 stock assessment and outlined in this document (pg. 16). Nearly 50% of fishery participants in 2010-2016 were opportunistic, having fished two or fewer years during the time period. Daily catch rates are rarely achieved, and most watermen fish a small percentage of available days.17 This allows for an influx of effort during years of strong natural recruitment. This is because current effort controls (e.g. # of licenses, seasons, catch limits) are ineffective. Direct action should be taken to establish appropriate levels of effort that will achieve target fishing mortality rates and implement management actions, including limited entry programs that will achieve these targets. Action 6.7 should be rewritten to reflect a commitment to develop and implement effort controls and limited entry programs, rather than just continuing to monitor a known, ongoing issue. (pg. 30)	Now that target and threshold levels of harvest have been identified, it is possible to manage within these levels regardless of the number of licenses. Fishery Management Strategy 6.0 confirms the use of biological reference points and Action 6.0.1. will evaluate the potential use of management tools including effort controls and limited entry. Action 6.0.6. addresses latent effort and potential strategies to control or decrease effort if necessary.	N			
Need to open brooks creek in little choptank..... this would open some for hand tonging and as well it would not disrupt any of the man made substrate oyster bars..... dredging is whats destroyed the oysters	The OMP provides a framework for managing oysters and lays out the strategies and actions for opening and closing areas. Specific areas would be designated through regulations and with stakeholder input.	N			
Overfishing is what got us the oyster population today. Eating oysters is not a necessity in our diet so therefore it is not a priority to fish for oysters. The fishermen can use aquaculture and farm oysters instead of harvesting wild ones.	Overfishing is addressed in Section 4.1 Biological Reference Points and specifically in actions 4.1.1. and 4.1.2. -developing risk-averse harvest management strategies and utilizing biological reference points.	N			
I do fully support the prohibition of dredging in certain times to protect the horseshoe crab mating population. I am also fully against disturbing the ocean/water/sea/river bottom from any dredging as it is not necessary in catching food. It only damages more than it helps. Plus seafood is not a necessity in the human diet.	None required.	N			
Protecting oysters and keystone species from harvest while they are establishing a stable population is more important than fishermen profits. Although I fully support the livelihood that fishermen make from fishing, over fishing is one of the main reasons the population and the bay is the way it is now. Harvests need to be strictly monitored in order to prevent that from happening again. The health of the environment matters more than profits.	Monitoring harvest is addressed throughout the OMP, specifically in the stock status section, the fishery management section, and the monitoring section.	N			
How do we sponsor a bill that would reduce the fishing of oysters until a all parts of the Bay can sustain current annual harvest numbers. This affects the livelihoods of our Waterman who need to be compensated for the reduction. This worked for our Rock Fish, lets give our Bays natural filters a chance to populate before its too late.	In Maryland, an idea or concept must pass through many processes before it results in a bill. Citizens of Maryland must approach their legislators to introduce a bill.	N			
I suggest that the plan include a moratorium be placed on any oyster harvest throughout the MD areas of Chesapeake Bay. I don't know the period of time for a moratorium but I would imagine nothing less than five years. This is similar to what was done for rockfish and was very successful. The commercial watermen would need to be paid for their loss of revenue.	The stock assessment result indicated the oyster stock is not overfished but overfishing occurred in 19 of the 36 areas assessed in the final year of the stock assessment, 2017-2018. With the overall goal of the OMP: to conserve, protect and where possible, rebuild oyster populations to fulfill their important ecological role and to support the culturally significant oyster fishery and industry, a moratorium was not considered.	N			
It documents the importance of protecting older, larger and greater fecund oysters for their greater reproductive contribution. It also documents the issue of harvest pressure noting not only the 737 oyster harvest licenses but also the total latent harvest pressure of 2,282 individuals. Later in the document there is reference to using "limited entry" as a control effort, but leaving the much larger issue of the latent effort up to the industry with no apparent input from the public to whom the resource belongs.	Accepted suggestion.	Y	p. 30. In the final version p. 33.	Action 6.6. Continue to monitor latent effort and work with the commercial industry to identify potential strategies to control or decrease effort if necessary.	Action 6.0.6. Continue to monitor latent effort and work with the commercial industry and other stakeholders to identify potential strategies to control or decrease effort if necessary.
page 30: 6.7: Important to gain control of the totally unrealistic latent effort represented by 2800 individuals with current right to oyster.	Addressed in Action 6.7 (in the final version Action 6.0.6).	N			
page 84. Oyster Management Tools, Input controls: The impact of gear type must be considered in setting harvest limits. The increasing data on the destructive impact of power dredging on smalls and spat requires it. An area managed by hand tongs might permit a sustainable yield quite different from one harvested by power dredging.	Gear limits are one of the tools listed in Appendix A to manage the fishery. Gear impacts would be a topic for discussion with the department's fishery advisory groups.	N			
Plan fails to address its own statement that "Oysters have been reported to live up to 20 years but 9 years is supported by science." or "Oyster fecundity rises very quickly with increasing shell height so that even a small increase in the number of older, larger oysters will cause a large increase in reproductive potential". This statement should result in a change in market size significantly above 3", an increase in sanctuaries, and a plan for rotational harvest outside of sanctuaries which allows oysters to grow to maximum reproductive capacity before being harvested. Plan fails to address any of these concerns raised by DNR itself.	Harvest size limits are one of the management tools in Appendix A. Any changes to size limits would need to be assessed by the department with input from stakeholders. Setting harvest size limits would be done through regulation.	N			
section 6.3 Rotational Harvest. Sanctuaries should not be sacrificed to achieve rotational harvest. There are large areas of the Bay where Oysters could be planted.	Section 6.3 does not say Rotational Harvest Areas will be in sanctuaries. The fourth paragraph (p.27 in the final version of the OMP) addresses justification for adjusting boundaries or removing sanctuaries if needed in the future.	N			
Include TURF's – A management strategy similar to harvest reserves however the private sector acts as reserve manager.	Since oysters are a public resource, it is the department's responsibility as a state agency to manage oysters in the Bay. TURF - territorial use rights in fisheries - were not considered.	N			

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This plan seems to be too slanted to the concept of attaining a maximum sustainable harvest. These are tired, antiquated ideas that remind me of the old grow seed oysters>>>move seed oysters>>>protect the planted oyster bars from poaching>>>allow the harvest of the oysters when the oysters reach marketable size. This is, and was, nothing more than a state-funded aquaculture program that is maintained for the exclusive benefit of commercial watermen to perpetuate a lifestyle that is slipping away. It seems as if the biology of the oyster and the significant benefits of a robust oyster population on the overall health of the Chesapeake are taking a backseat to the dated practice of allowing a wild harvest of the species.	None needed.	N			
This plan would better serve all of the citizens of the state of Maryland and the Chesapeake Bay watershed if it promoted the following: A five to ten-year moratorium on the commercial and recreation harvest of oysters to improve the population numbers and genetic diversity of the species.	The stock assessment results indicated the oyster stock is not overfished but overfishing occurred in 19 of the 36 areas in the final year of the stock assessment, 2017-2018. With the overall goal of the OMP: to conserve, protect and where possible, rebuild oyster populations to fulfill their important ecological role and to support the culturally significant oyster fishery and industry, a moratorium was not considered.	N			
We should also look at possible gear type changes. Power dredging should be expanded in some hard bottom areas and probably reduced in others. County Oyster Shell Committee's would be able to offer these possible changes.	The strategies and actions for managing each of the different types of management areas could consider gear impacts and/or changes. Any changes to be considered would need to include stakeholder input.	N			
After the passing of SB 448, the five major trib sanctuaries are off limits but the 46 remaining sanctuaries could still go into rotational harvesting. Recommendations from the Oyster Futures group suggested this possibility not only in the Little Choptank but also in the Choptank. Per that consensus process, I would think that all stakeholders are in agreement to this because the Oyster Future's process only dealt with the Choptank Complex. As a member of Oyster Futures, I think that the process could be spread to the rest of the bay.	The OMP fully supports the continuation of a sanctuary program in Maryland's portion of the Chesapeake Bay and has committed to ensuring sanctuaries are of sufficient size with at least 20-30% of productive oyster bottom and 50% of the 'best bars' (Action 5.0.2.).	N			
The fishery should be managed in a manner that removes fewer oysters each year than are produced and results in a growing oyster population over time. DNR should take into account the negative impacts of various harvesting techniques on oyster habitat in making management decisions.	Developing risk-averse harvest management strategies based on biological reference points is expected to maximize harvest over time, while resulting in a stable or increasing oyster population (OMP p.22).	N			
Any area open for harvest should have an associated management plan that includes a sustainable harvest level for that area, replanting requirements, and identification of funding and materials (shell/seed) that will be used in replanting.	Section 6.0 Fishery Management in the OMP addresses these issues for each of the different management areas.	N			
Fishery management actions should be easily enforceable and harvest reporting should be improved to ensure accurate data are utilized in subsequent stock assessments.	Enforcement is addressed in Section 10.0 and harvest reporting in actions 6.0.2 and 6.0.3.	N			
Overharvesting has occurred in the Tangier Sound and the Management Plan must address this issue	Section 4.0 Stock Status and Section 4.1 Biological Reference Points provides the background and management strategies/actions to address overfishing especially Action 4.1.2 - Develop risk-averse harvest management strategies based on biological reference points to achieve the target harvest fraction.	N			
The Yates Oyster Bar survey is over 100 years old. Yates is out of date, a plan for a new complete sonar scan of the oyster bottom is needed.	Section 6.1 Fishery Management Areas discusses the Yates Oyster Bars and other surveys, their caveats and short -comings, and lays out a strategy and actions to identify productive oyster habitat.	N			
New rotational harvest areas should not include existing sanctuaries. Existing public areas should be developed to add new oysters to the bay	Section 6.3 does not say Rotational Harvest Areas will be in sanctuaries. The fourth paragraph (p.27 in the final version of the OMP) addresses justification for adjusting boundaries or removing sanctuaries if needed in the future.	N			
Additional new funding is required to develop and manage rotational harvesting in the public fishery	Addressed in Action 6.3.1.d.	N			
Management Plan should support the process of reclaiming oyster shell from unproductive areas of the same oyster bars and simply reposition the shell to build up the existing productive area. Opportunities exist like the middle ground in Nanticoke. Local repositioning could be much less expensive than other options of bringing in new shell.	Action 3.0.5 generally covers shell reclamation.	N			
Section 6.0 should require that each harvest area have an individually tailored management plan specifying a sustainable harvest level, required replanting numbers (to assure that replenishment equals or exceeds harvest levels) and funding sources for replanting materials. The draft Plan recognizes that oysters are a keystone species that clean the water and provide habitat for hundreds of other sea life. By emphasizing "maximum sustainable harvest" (Fishery Management Strategy 6.0) as one of the goals, the Plan fails to provide a path to significant oyster restoration and to suggest realistic steps to address the serious problems reported in the Stock Assessment Report.	Section 6.0 Fishery Management, Strategy 6.0 clearly states that by adopting biological reference points (target and threshold fishing rate) at appropriate spatial scales, harvest can be managed at a sustainable level while allowing the oyster population to rebuild (Section 4.1). Section 6 also addresses each management area and lays out guidelines for harvest reserves (Action 6.2.1), the development of plans for rotational harvest areas (Action 6.3.1), and steps for opening and closing an oyster bar (Action 6.5.1). Replenishment Plantings are addressed in Section 6.6.	N			
[Change] gear type in two areas in Talbot County Public Fishery. Great Bar - change the gear type from power dredge back to hand tong for 5 years as a "test area". We would also like to see all of the surrounding bottom that is now power dredge turned into hand tong as well. This will benefit law enforcement as well as the watermen to prohibit the currently split gear type in Broad Creek. Miles River - change the gear type from hand tong to power dredge for 5 years as a "test area"	Evaluating gear impacts on specific areas and evaluating changes would need to be discussed with the department through the advisory groups. Any changes would be done through the regulatory process.	N			
Any population can expand, shrink, or be stable. In a stable one, each parent is replaced by a recruit during its life span. Data from this plan shows that Maryland oyster populations have been declining for over a century. Mortality can be from both human causes and natural causes. While most natural mortality may be unavoidable, human ones should be controlled where possible with proper management and enforcement.	None needed.	N			
Past management efforts have not reversed declines and have often accelerated them. Efforts to control harvest by limiting the number of harvesters, areas allowed, and allowable gear has done little to slow the loss of oysters. Recent scientific studies on the use of hatchery-produced oyster spat have pointed to alternative approaches that have shown promise and should be further explored.	Stock enhancement practices including planting hatchery spat-on-shell is discussed in Sections 5 and 6.6 of the OMP.	N			
In the past, Maryland's replenishment program served as a welfare program for a special interest group. Taxpayers should not be called upon to support a wild fishery. Replenishment programs funded even partially by taxpayer dollars should be terminated forever.	The replenition program wasn't welfare, but was a subsidy. Along with public funds, the program was also funded by fees and taxes levied on the industry. These taxes and fees were raised over the years at the request of the industry.	N			

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Limit the commercial fishery by sun-setting all inactive permits and issuing no permits to new applicants. (allow a one-time transfer to an immediate family member)	The department is aware of the issues surrounding latent effort and will be working with the commercial industry and other stakeholders to identify potential strategies to control or decrease effort if necessary (Action 6.0.6). Any proposed entry limits would need to be adopted through the regulatory process.	N			
Set a goal to reduce the number of commercial permits by 5% each year until a 60% overall reduction occurs. (Consider sun-setting permits that are used less than ten days in a season, in order to achieve overall reductions).	The department is aware of the issues surrounding latent effort and will be working with the commercial industry and other stakeholders to identify potential strategies to control or decrease effort if necessary (Action 6.0.6).	N			
Set a policy whereby no public funding is used to replenish public bars and NOBs. Use transportation mitigation monies solely to support sanctuaries.	The department supports a balanced approach for oysters: sanctuaries, public fishery, aquaculture. In the last 5 years or so, the industry has averaged 2.5 million dollars per year and sanctuaries have averaged about 4.8 million dollars per year.	N			
A shell and oyster repletion program should be the harvesters' responsibility as long as those areas are to be harvested again.	Since oysters are a public resource, it is the department's responsibility to manage them including oyster replenishment.	N			
The department needs to develop a management plan for any area that is open for oyster harvesting. This plan needs to be specific to the fishery management area and needs to include three components at a minimum: a target fishing level that ends overfishing, replanting requirements, and identification of funding and other resource needs for the area. Target fishing levels should be designed to promote a growing oyster population that will provide ecological and economic benefits over time. Additionally, management plans for the fishery management areas need to include a strategy for ending overfishing where occurring. It's critical that over-harvesting is stopped so the oyster population has an opportunity to rebuild to a level that can sustain harvesting.	Section 6.0 Fishery Management, Strategy 6.0 clearly states that by adopting biological reference points (target and threshold fishing rate) at appropriate spatial scales, harvest can be managed at a sustainable level while allowing the oyster population to rebuild (Section 4.1). Section 6 also addresses each management area and lays out guidelines for harvest reserves (Action 6.2.1), the development of plans for rotational harvest areas (Action 6.3.1), and steps for opening and closing an oyster bar (Action 6.5.1).	N			
Action 6.1.1 – A new bay bottom survey is a commendable and long overdue. However, the complete reclassification of all management areas would require significant regulatory and legislative action to remove all references to any of the management area classifications listed. Additionally, the overlap between Yates bars, non-Yates bars, and NOBs is not significantly mismatched (~70% agreement). The department should conduct a new bay bottom survey but should not move forward at this time with redefining all management area boundaries until after a thorough review of the management consequences and in consultation with stakeholders. The new bay bottom survey should include an analysis of where habitat is being lost at a rapid rate and identify mechanisms (e.g. harvest gear types, management actions, planting history) in that area that could have contributed to the observed changes in oyster habitat. Remove language in Action 6.1.1 that states all management will be based on new charted bar boundaries and all existing management areas will be removed. (pg.33)	Since bar boundaries are within regulations, it will be a public process to redelinate them. Management needs to be based on the most up to date information, thus management of the oyster resource based on current bar boundaries is important. The intent of Action 6.1.1 is to conduct a new bay bottom survey and delineate the boundaries of oyster bars. Once the survey is completed, redefine oyster bars and manage the resource based on the new boundaries and not the older charts. This action will not remove all existing management areas. Looking at the rate of habitat loss and methods to reverse loss could be a future research recommendation.	N			
Action 6.1.2 – The charted boundaries should be based on the State's comprehensive bay bottom survey outlined in Action 6.1.1. Additional changes to bar boundaries on an ad hoc basis will make enforcement extremely difficult and cause confusion amongst user groups who may not know how or when these changes have been made. Changes to charted oyster bars should result only from comprehensive scientific surveys with ground-truthing, not anecdotal claims. Remove Action 6.1.2. (pg. 33)	Oyster populations are dynamic and changing. Action 6.1.2 allows bar boundaries to evolve as populations expand and shrink in different areas but based on the results of biological surveys and quantitative data.	N			
The inclusion of both harvest reserve areas and rotational harvest areas in the fishery management plan seems duplicative. The concepts underlying each of these should be combined to create management areas to utilize biological criteria to manage opening/closing areas that encompass multiple oyster bars within a region. These management areas should adhere to the following: a) Like harvest reserve areas, harvest management areas should be opened only after biological criteria are met, not on a set time period (e.g. 75% of oysters of market size)	Harvest reserve areas are managed solely by biological criteria. Rotational harvest areas can be managed by biological criteria if warranted. Keeping both strategies in the OMP provides the department additional management flexibility depending on the guidelines and plans for each area as laid out in the actions.	N			
b) Closed/open areas should encompass an entire bar/region and portions of bars should not be open/closed.	There are oyster bars where portions are within sanctuaries or MDE closed areas so this suggestion is not feasible.	N			
c) Open/closed areas should not be contiguous to facilitate enforcement	In order to accomplish this suggestion, entire oyster bars would either have to be opened or closed and that action would not be feasible.	N			
d) Enforcement must be sufficient to ensure that poaching does not undermine management of these areas	Addressed generally in Section 10.0 but directly stated in 2.2 Objective #7 - develop enforcement strategies that are compatible with the spatially defined management areas and their specific objectives.	N			
e) Before classification as a harvest reserve/rotational harvest area, there must be a management plan in place specific to that area that outlines the monitoring program, opening/closing criteria, replanting requirements, and identifies the source of funding and material for replanting. If funding or substrate/seed for replanting has not been identified, the area should not be allowed to be open for harvest.	Action 6.3.1.1 states that a plan be developed for rotational harvest areas. Plans for harvest reserve area are in regulation/statute already.	N			
f) Areas that are open to harvest must be replanted at the end of the season at a rate of 2:1 for each bushel harvested	Action 6.3.1.1.b addresses stock enhancement and substrate planting.	N			
Rotational harvest areas and/or harvest reserve areas are not synonymous with oyster sanctuaries and should not be considered as such. Oyster sanctuaries are preserved from harvest in the long-term and provide additional ecological benefits that do not accrue from closed harvest areas which suffer from lower quality habitat and truncated age distributions that limit their reproductive potential. Closed areas that are part of a rotational harvest or harvest reserve system should not be counted toward a goal of maintaining 20-30% of productive oyster habitat in sanctuary. This distinction should be stated explicitly in this section.	Section 6.2 or 6.3 does not state these Harvest Areas will be in sanctuaries. The last paragraph on p. 27 and ending at the top of p. 28 addresses the justification for removing sanctuaries if needed in the future.	N			
Rotational harvest areas and/or harvest reserve areas must be accompanied by harvest control rules and/or effort limits. By closing large areas to harvest through rotational harvest management, fishing effort is concentrated in areas that remain open to harvest. Unless this is accompanied by effort limitations, harvest areas will be quickly depleted, habitat will be destroyed, and negative externalities, including increased poaching, could result. Should include a statement that such management actions will include effort controls to protect areas outside of harvest reserves/rotational harvest areas.	Action 6.3.1 sets forth the development of a plan for rotational harvest areas including a list of required information. The department already has the ability to alter harvest controls and efforts in harvest reserve areas.	N			

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Allowing early opening of rotational harvest areas if disease or freshwater is expected to cause mortality is logistically infeasible without predictive models that indicate these factors are a threat. Additionally, the same section indicates that rotational harvest areas are opened only when monitoring indicates that there are a large proportion of market oysters available. If harvested early, small oysters will suffer additional mortality through harvest and handling and a large number of undersized oysters could be removed as market sized oysters would not predominate the catch. The removal of oysters due to presumed disease mortality also undermines the ability of oyster populations to develop genetic disease resistance. This criterion (opening areas due to disease or salinity) should be removed. (pg. 34)	Oysters planted for the primary purpose of harvest in rotational harvest areas could be opened earlier than planned to allow harvest before natural mortality rises too high due to freshets and/or disease. Timely monitoring results would be needed in order to successfully open areas and criteria would be included in a rotation harvest plan (Action 6.3.1). This is a different strategy than for other areas within the public fishery where oyster seed and spat-on-shell are not being planted for the sole purpose of harvest.	N			
Opening and Closing Oyster Bars Strategy 6.5 - This section needs to include a statement clarifying that public notice procedures for opening and closing bars pertains only to oyster bars within public harvest areas and does not include sanctuary areas. (pg. 37)	Text was added to clarify.	Y	p. 37. In the final version p. 40.	The department has the authority to close and then reopen specific oyster bars (or portions of bars) that have:	The department may close and then reopen specific oyster bars (or portions of bars) within an oyster harvest area that have:
Action 6.5.1 – To facilitate enforcement and provide clear, understandable boundaries, the full bar should be opened or closed, not a portion of a bar. Open and closed areas should not be contiguous. These criteria should be added to Action 6.5.1. (pg. 37)	There are oyster bars where portions are within sanctuaries or MDE closed areas so this suggestion is not feasible.	N			
Action 6.5.1 - Clarify what is intended by "flexible harvest." Harvest on all oyster bars should be based on pre-determined biological criteria determined by the department not simply by county oyster committee request. (pg. 38)	Text was added to clarify.	Y	p. 38. In the final version p. 41.	Action 6.5.1. 4. Allow flexible harvest of an oyster bar opened at the request of a county oyster committee while remaining within the limits and parameters established in regulation.	Action 6.5.1.4. Set harvest management parameters (e.g., specific bushel limits, time/day limits) of an oyster bar opened while remaining within the limits and parameters established in regulation.
Action 6.5.1 - This section does not include any description of the procedure or criteria for closing a bar, only opening it. The department should include procedures for closing a bar if 1) the sustainable harvest rate for that bar has or will be exceeded, 2) the total allowable catch for the fishery or that region has or will be exceeded, 3) the number of market sized oysters has dropped below 2 oysters per square meter, 4) the shell volume per bushel falls below the long-term average for that bar or region, or 5) other criteria deemed appropriate to prevent overfishing and habitat degradation. These procedures and criteria should be added to Action 6.5.1. (pg. 38)	The background/introduction for Section 6.5 Opening and Closing Oyster Bars covers the criteria: when undersized oysters become predominate (p. 40 in the final version of the OMP).	N			
There should be a guideline to ensure that in areas where county oyster committees and/or local governments in cooperation with local oyster committees invest funding and effort in cultivating bottom, planting and relocating shell and/or planting seed as part of an approved rotational harvest program, they are guaranteed the opportunity to legally harvest those areas (3-4 years after the investment). Without such assurance, the investments made by commercial watermen consistent with DNR's oyster management plan are subject to taking by subsequent statutory, regulatory or agency changes. This was indeed the case in 2010 with the designation of certain sanctuaries in locations where the industry had previously invested its own money and effort only to be denied (without compensation) the opportunity to realize a return on that investment (by way of being permitted to harvest legal sized oysters and/or relocating the smalls). Contrast this with the spending of federal dollars halting harvest in perpetuity.	Considering that the department is managing a public resource and replenishment plantings are made using public funds, there can be no guarantee that harvest can occur in subsequent years after replenishment occurs. Environmental impacts such as disease or freshets could cause high mortality or if the population becomes depleted action to halt the harvest may be required. In the past, the department has allowed a special circumstance harvest within a sanctuary, due to the area being planted with seed/spat-on-shell prior to it becoming a sanctuary.	N			
The department should re-evaluate if all current gear types should be permitted moving forward. The department has extensively studied the impact of power dredging, though those studies have yet to be released. However, the destruction to oyster habitat, particularly by power dredging and patent tonging, is well documented. 18,19 The use of power dredges increased as oyster abundance decreased as power dredges are a highly efficient harvesting method. Reverting to less efficient methods that are less damaging to oyster habitat (e.g. hand tonging) should be evaluated as a means to achieve fishing mortality and oyster abundance targets. An additional Action should be added to this section that states the department will consider if restricting gear types is necessary to achieve the Plan's goals and objectives. (pg. 30)	Evaluating gear impacts on specific areas and evaluating changes would need to be discussed with the department through the advisory groups. Any changes would be done through the regulatory process. The Substrate Strategy 3.0 promotes the conservation and protection of natural oyster substrate and Action 11.0.1 supports the ecological role of oysters for their structural and habitat importance.	N			
Maryland's oyster management plan should include an extensive effort at proper evaluation of all aspects of Spat Production.	An extensive evaluation of all aspects of spat production is beyond the purview of the OMP.	N			
The new Oyster Management Plan should require this sort of planning for ALL oyster sites in Chesapeake Bay [similar to the aquaculture policy of approved production plan for the site and then provide evidence that the plan is being followed].	Planning for oyster projects can be found in Section 2.3 Adaptive Management. Action 2.3.2 addresses the essential elements of project design, objectives, project review, monitoring, and evaluation.	N			
Any site without an approved production plan would be subject to be included in plans by others for inclusion in either of these activities. This would eliminate the prospective that regions with restoration potential be grandfathered into a category where little to nothing is done to help re-establish healthy oyster populations on these sites. Any site not under an approved management plan could be part of the public harvest area up until an approved management plan was in place for the site. This provision could help defer the costs of restoring the vast amount of potential oyster habitat that once covered over 200,000 acres in Maryland's Chesapeake Bay.	The OMP provides guidelines for planning oyster projects in each of the three management areas: sanctuaries, fishery management areas and aquaculture.	N			
We are deeply concerned that MD DNR's Draft Oyster Management Plan does not spell out specific plans to end the Baywide overfishing detailed in its recent stock assessment and ramp up more restoration of three-dimensional reefs.	The OMP lays out the process for addressing overfishing in Section 4.1. Biological Reference Points. The specifics of implementing the targets and thresholds will be determined with input from the stakeholders	N			
NCBO supports the approach of the Oyster Management Plan to include considerations beyond specific fishery management objectives and measures. There are few, if any other fisheries, that are so inextricably linked to ecosystem function as the oyster fishery. As such, the inclusion of fishery objectives, restoration goals, aquaculture promotion and ecosystem factors in the plan are welcome.	None Needed.	N			

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Historically more emphasis has been placed on the exploitative value of oysters and economic gain over the highly valuable role they play as an ecosystem engineer. The latter value of oysters calls for the need to bring a broader constituency, both geographically and socially, to the table when developing fishery management objectives and implementing them. Specifically, this means managing oysters with Chesapeake Bay wide recovery in mind and ensuring everyone who is affected by having healthy oysters in the Bay is provided an opportunity to weigh in. To date, the discussion has included scientists, watermen, conservation groups and resource managers and would benefit from broader public involvement.	None Needed.	N			
Overall, the draft Oyster Management Plan(OMP) provides a valuable framework with multiple concepts to lead towards a balanced fishery and improved oyster population, but lacks the specific details to achieve the stated goals, objectives, and actions that will improve the overall status of the oyster fishery and resource throughout the Chesapeake Bay.	None Needed.	N			
We fully respect and recognize the long and complicated history of the oyster fishery and resource in the Maryland, and understand that each of the many tools provided by the OMP have their own set of complexities and inherent trade-offs. We believe that these trade-offs should be clearly defined as specific management policies and regulations are finalized.	None Needed.	N			
Given the importance of the oyster fishery and resource to Maryland and the greater Chesapeake Bay region, it is important that DNR establishes an annual process for a transparent reporting of the relationship of funding to the overall goals and objectives defined in the OMP. This will aid in allowing stakeholder engagement in the importance of strong financial investments to achieve any goals and objectives, and assist in setting expectations for the numerous and variable outcomes that will be realized.	The FMP preface states that plans are annually updated. The Oyster Advisory Committee (OAC) will provide a forum for discussing oyster management, implementation, and tracking progress.	N			
CCA Maryland commends DNR on the completion of this broad and thorough draft OMP. We thank you for the consideration of our limited comments above, and look forward to future opportunities to provide more detailed input on the management of Maryland's oyster fishery and resource.	None Needed.	N			
Sierra Club urges aggressive action to revitalize the oyster population in Maryland. We recognize that DNR is tasked with balancing competing interests and needs. We further recognize that a long-term goal should be a healthy, sustainable economic system that allows for managed harvesting and consumption while supporting a sustainable and growing population.	None Needed.	N			
The plan notes that "even a small increase in the number of older, larger oysters will cause a large increase in reproductive potential." While we recognize the need for balance, we feel the plan seems tilted towards the interest of the oysterman (of whom there are less than 1000) against the interest of the other 6 million Maryland. And the Seirra Club has over 72,000 members and supporters in Maryland, all of whom are impacted by the health of the Chesapeake Bay and its tributaries.	The objectives demonstrate a balance in the plan with 5 sanctuary specific objectives and 5 public fishery/aquaculture objectives. In addition, the creation and maintenance of sanctuaries is intended to protect broodstock and increase reproductive capacity. Emerging global scientific consensus indicates that having 20-30% of an ecosystem within a protected sanctuary is a reasonable goal. In 2018, there were 252,285 surface acres in oyster sanctuaries, of which 31% were delineated in the Yates Oyster Survey and its amendments.	N			
We would ask you to consider strengthening your goals and timelines. The balance should be toward ecological restoration, not industry.	Noted.	N			
I'm disappointed to find that the current Draft Maryland Oyster Fishery Management Plan does not specifically and concretely address the low abundance and reverse the 150-year decline of oyster populations and habitat. Rebuilding oyster stocks and three-dimensional reef habitat should be the primary goal of management, to accelerate recovery of the Chesapeake Bay ecosystem	Rebuilding the oyster resource is stated directly in the goal and managing the resource based on biological reference points should allow oyster abundance to increase.	N			
In the short-term, balancing ecological and economic needs will be challenging, but the best available science must be the guide for management actions, if we are to reap long-term economic and ecological benefits.	None needed.	N			
Specifically, I ask that Maryland manage our oyster resource in a way that ends the overfishing described in last Fall's stock assessment, prevents overfishing in the future, rebuilds the oyster stock, continually increases shellfish habitat, grows the shell resource, and delivers the significant ecological benefits of three-dimensional oyster reefs.	Adopting biological reference points (target and threshold fishing rate) at an appropriate scale will be used to manage harvest thereby rebuilding the stock and preventing overfishing. Specific strategies and actions within the plan should increase oyster abundance, increase habitat and enhance ecological services.	N			
One recent management success may offer a model for wild oyster harvests: the blue crab fishery, in which annual surveys provide reliable stock assessments that are now driving successful management measures, which result in a fishery that is proving both sustainable and lucrative. That data-based framework allows stakeholders to shape their harvest for maximum benefit without jeopardizing conservation of the resource.	The blue crab situation is unique as estimates of crab abundance are derived directly from survey results. For oysters, abundance is estimated via the stock assessment model and the various data inputs required annually to do this. It is possible to run the stock assessment annually and develop annual management measures, however, currently there is not a predictive model to estimate the impacts of management changes.	N			
The Delmarva Fisheries Association (DFA) is a 501(c)(6) trade association established to protect, defend and enhance the commercial fishing industry in the DelMarVa region for present participants as well as future generations through all legal means while maintaining healthy and sustainable stocks of fish. With that mission in mind, we want to commend you for your recent Draft Maryland Oyster Management Plan and its stated goal to "protect the [oyster] resource while allowing optimal harvest."	None Needed.	N			
Regardless of whether the Maryland General Assembly succeeds in its goal to support legislation intended to thwart the ability of DNR to adaptively manage an iconic Bay resource, you have done a service to the commercial seafood industry by spotlighting the competing interests for the use and enjoyment of the Chesapeake Bay and its tributaries; and providing a forum for public discourse in this regard.	None Needed.	N			
While there have been some efforts to demonstrate that the sanctuaries are doing better than other areas, it is often over-looked that gear choices heavily influence stock assessment outcomes. It is therefore misleading and dangerous to compare stock that was measured using different gear as it establishes a false equivalency upon which data may be skewed to favor certain results over other, more accurate metrics.	For the specifics of the stock assessment and how different surveys and gear types were utilized in the assessment can be found in the reference document: A Stock Assessment of the Eastern Oyster, Crassostrea virginica, in the Maryland waters of Chesapeake Bay, 2018.	N			
We recommend vigilance on the part of DNR and the State in accepting and utilizing certain Federal funding that will limit the discretion and flexibility of DNR in future management decisions. Avoid Federal programs and funding that conflicts with the policy of adaptive management (Section 2.4) as circumstances change.	DNR considers its oyster goals when determining whether or not to accept funds oyster projects. The policy of adaptive management should not be in conflict with federal programs.	N			

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The 2019 draft Oyster Management Plan (Plan) produced by the department of Natural Resources (department) is a comprehensive document that will shape the management of oyster sanctuaries, fisheries, and the aquaculture industry for the foreseeable future. Thus, it is imperative that the document provide clear goals, objectives, and actions that will lead to the off-cited outcome of "more oysters in the water." Further, the Plan should seek not only to increase the number of oysters, but also the ecological function of oyster populations and the habitat that they create.	None needed.	N			
A 2011 analysis of oyster reefs indicated that oysters are functionally extinct in 85% of bays and estuaries worldwide, including Chesapeake Bay. Chesapeake Bay and the Gulf of Mexico are the only two regions where the wild harvest of oysters continues today despite historic losses of native oyster populations. ¹ Though oyster restoration can, and in some places already has, reestablish functional oyster populations and habitat, harvested areas far outnumber restoration projects in number and scale. Thus, conservative, science-driven management of oyster fisheries that accounts for the critical ecological function of oysters and strives to reverse the decline of oyster populations is fundamental to the future of the Chesapeake Bay.	None needed.	N			
Overall, it seems inappropriate for aquaculture to be included in a fishery management plan for the public harvest fishery. Although comments are provided throughout for aquaculture strategies and actions, the department should reconsider whether aquaculture, a private enterprise with its own set of statutory and regulatory guidelines, should be included in a management plan for the public fishery.	Aquaculture considerations have been included in all of Maryland's oyster management plans. The 2019 OMP considers the three major components of oyster production: sanctuaries, fishery management areas and aquaculture.	N			
2.3 Adaptive Management (believe Section 2.3 is missing or misnumbered in the draft Plan)	Accepted suggestion. Numbering has been corrected.	Y	p. 2, 9, 1. In the final version p. 11-14.	Header, Strategies, and Action Numbers	Adaptive Management should be 2.3. Salinity should be 2.4
Since the current administration says they prioritize the economy, I believe that more funding and action is necessary in order to further improve the health of the Chesapeake Bay. By improving our environment we indirectly improve our economy.	Socioeconomic considerations have been included in the OMP.	N			
Sanctuary & Reserves dont seem to be hitting the goals that were attributed.	The OMP addresses multiple methods to manage the oyster resource in addition to sanctuaries and reserves.	N			
Preface. In line 5 the goal of the FMP should be to protect the resource while allowing a sustainable harvest	Accepted suggestion.	Y	Preface	The goal of an FMP is to protect the resource while allowing optimal harvest.	The goal of an FMP is to protect the resource while allowing sustainable harvest.
Introduction: The introduction provides a good review as to how we have reached this depleted natural resource and its current	None needed.	N			
Overall the plan should be commended for acknowledging the basic environmental, economic and cultural components of commercial fisheries.	None needed.	N			
In sum, the Severn River Commission supports the Oyster Management Plan as drafted and looks forward to when the department actively manages this keystone species.	None Needed.	N			
The Western Shore Delegation is putting the Eastern Shore Watermen out of business. Two-thirds of the oyster harvest last year was the result of hard working Dorchester, Somerset and Talbot watermen. This Plan needs more consideration of the long term results.	In Section 9.0 Socioeconomic Considerations, the strategy and actions address the need to promote and support the socioeconomic benefits from the oyster industry and utilize a consensus process to engage stakeholders, advisory groups and scientists on oyster policies and management issues to result in decisions that have broad support.	N			
I don't know if the health of the Chesapeake will ever improve enough in our lifetimes to allow us to harvest oysters as a sustainable crop, but I do know that we can't make policies that cling to old, outdated ideas that ignore the new realities of our environment.	None Needed.	N			
All recommendations should be looked at with both economic and ecological benefit considered. No one wants the bay healthier than the Md. watermen.	Economic and ecological benefits are addressed in the OMP, and more specifically in the overall goal of managing the oyster resource.	N			
The draft DNR Oyster Management Plan contains an interesting and useful history about the oyster populations in Maryland waters as well as discussion of many general concepts about oyster harvesting and management.	None needed.	N			
Oysters should be managed for ALL citizens and not just commercial harvesters.	Utilizing sanctuaries and recognizing the ecological value of oysters are included in the plan and will result in the oyster resource managed for all citizens.	N			
We are genuinely disappointed with the 02/2019 draft Maryland Oyster Management Plan. Overall the document provides little in the way of policy changes, new actions, and regulatory proposals that will significantly alter the demise of oysters in Maryland waters of the Chesapeake Bay.	The OMP provides a framework for conserving, protecting and rebuilding the oyster resource. Specific processes are laid out to manage the oyster fishery and utilize biological reference points based on a science-based stock assessment, while continuing to create, maintain and protect oyster sanctuaries. Any new regulatory proposals will be developed through the regulatory process and with input from stakeholders.	N			
Oysters are a public resource. And as such, a management plan should equitably distribute all stakeholder interests throughout.	None needed.	N			
Luckily we are good at farming oysters (and humans have been farming oysters for 600 years). So we have the knowledge and ability to restock and to allow the species to rebound. This is the Plan's intention. Still, keeping management essentially unchanged will only allow for the continuance of the decline of this keystone species.	This is the first time risk-averse biological reference points are used to manage the public fishery.	N			
Please step up to the plate and manage the Maryland oyster as a public resource whereby the maximum public benefit is achieved.	The OMP provides a framework for balancing the protection and utilization of the oyster resource.	N			
Overall, Arundel Rivers encourages the DNR to revise the FMP to more closely align policy objectives and strategies with the scientific findings in the Stock Assessment, and we support any investment geared toward refining those findings, expanding capacity for enforcement and monitoring, and exploring opportunities to expand oyster populations through aquaculture.	The fishery will be managed based on biological reference points (target and threshold fishing rate) from the stock assessment, at an appropriate spatial scale, and developed and implemented in conjunction with stakeholders.	N			

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The draft MP thoroughly lays out a broad vision for oyster management. However, there is no discussion of how any of this will be implemented or decisions made. The plan or subsequent documents needs to include details to support statements actions such as those listed below. Otherwise, decisions will likely get mired down in politics and subjective decision making, and not fulfill the goals and objectives laid out.	The OMP provides a framework for oyster management. Several actions lay the foundation for developing decisions. Details will be developed with input from stakeholders through the Oyster Advisory Commission and the Maryland DNR Shellfish Program.	N			
Maryland's oysters should be managed with the overarching goal of increasing production from each acre of oyster reef habitat no matter what the designated outcome for those oysters may be. This should not preclude goals that assist with the understanding of oyster management and production may be fertilized eggs, spat, market oysters, or knowledge. In these case of knowledge, the goals will center on science and the data it provides. Individuals, agencies, and other groups could all apply to MDNR for permission to operate oyster restoration/production programs. This would include MDNR itself which would manage selected acreages for the public fishery, Broodstock Sanctuaries, or Spat Production Sites.	Maryland's overall goal is to increase oyster production and the OMP provides the framework for accomplishing the task.	N			
As stated above, each site from each individual, agency, or group would be required to submit and have approved a production plan and to document that the plan was followed. Each site should also incorporate a scientifically valid monitoring plan that will allow rigorous evaluation at the completion of the proposed plan. A committee composed of members from the scientific community, should be tasked with review and approval of these plans. The committee shall not be weighted to favor any group or agency but should incorporate scientific rigor to ensure that it reaches its clearly defined goals. Plans should be of definite length but may vary according to the proposed goals. The costs of these monitoring programs must be built into any production plan and failure to complete monitoring shall result in revocation of the permit.	Guidelines have been laid out in several strategies and actions for adaptive management, shell/substrate, risk-adverse harvest management strategies, and establishing/expanding/reducing/removing sanctuaries and monitoring.	N			
By mandating production per acre be the overarching goal of any management plan and not simply attempting to regulate harvest actively the true objectives of oyster restoration may actually be met.	The stock assessment results provided the development of biological reference points that will be used to develop harvest management strategies designed to increase oysters production leading to greater density. However, setting goals, objectives and actions for each acre in the OMP would not be practical.	N			
The stated goal of the OMP is to "conserve, protect and where possible, rebuild the oyster resource to fulfill its important ecological role and support the culturally significant oyster fishery and industry throughout the Maryland portion of the Chesapeake Bay." This falls short of defining the role of an oyster in the regional ecosystem, and the known connections that an increase in oyster populations has or can have on numerous regionally important fisheries.	Section 11.0 Ecosystem Considerations addresses the role of oysters in the ecosystem.	N			
Goal 2.1, Page 8: Add the word "wild" or "public" to the goal so it reads, "The goal of the 2019 Oyster Management Plan is to conserve, protect and where possible, rebuild the oyster resource to fulfill its important ecological role and support the culturally significant public oyster fishery and industry throughout the Maryland portion of the Chesapeake Bay.	The current, more general statement, implies public or wild fishery.	N			
Given the critical ecological role of oysters in the Chesapeake Bay ecosystem, current low abundance and the continued declining trajectory of oyster populations and habitat, this goal as stated is inadequate. Rebuilding oyster populations and habitat should be of primary importance, not a secondary, qualified objective. Additionally, the functional extinction of oysters in Chesapeake Bay is not an outcome that should be tolerated or diminished. Though some believe the oyster fishery and industry is of primary import to the Chesapeake Bay region, it will not exist if management continues as it has for the past 150 years. However, a thriving industry can exist if scientifically-driven management that achieves rebuilding of oyster populations is implemented; therefore, this should be listed as the primary goal. (pg. 8) Suggest: The goal of the 2019 Oyster Management Plan is to rebuild oyster populations and habitat to significantly accelerate the pace of recovery of the Chesapeake Bay ecosystem and where possible, support an oyster fishery and industry. This plan will continually increase oyster habitat and the ecosystem benefits that accrue from oysters and oyster reefs. (pg. 8)	The overall mission of the department is to conserve and protect our natural resources. The OMP goal mirrors the department's overall goal. Oyster management can be differentiated from other resources because it is possible to rebuild the oyster population using stock and habitat enhancement techniques. The goal, as stated, incorporates these three aspects.	N			
page 8: 2.1 Goal: Strike "where possible" in first sentence. The latter part of that sentence should be changed to read "achieve a sustainable oyster fishery and growing aquaculture industry."	It might not be possible to rebuild all oyster populations around the bay (e.g. Back River in the upper bay) so "where possible" is a reasonable qualifier. If removed, it would give a false perception of what is possible.	N			
page 8: 2.2 Objectives: Define "compatible and equitable management measures". What public input is there on modifications of the FMP in the future under the adaptive management regime?	The dictionary definition for "equitable" is "dealing fairly and equally with all concerned." This is one of the primary objectives of the oyster plan. The dictionary definition for "compatible" is "capable of existing together in harmony." Objective #1 recognizes the need to balance management measures across many ecological and socioeconomic factors and different sectors (sanctuaries, public fishery, aquaculture) and do it in a way that is understandable, fair and enforceable. Any proposed changes to an FMP would require the development of an amendment. The amendment process is similar to developing a plan but at a smaller scale. This includes input from the advisory commissions and an open public comment period. Once an amendment is completed, it would go through the regulatory process of adoption by reference, which also solicits public input.	N			
page 11: 2.5, Zone 1. In low salinity areas that are dependent on planting seed, are cost effective calculations considered as a parameter for implementing an action?	DNR is evaluating the cost of current projects (e.g. Charles County Rotational Program), but results have not be finalized.	N			
The overall goal of the new oyster fishery management plan should be to end overharvesting and manage the oyster population to a scientifically defensible fishing level. Rebuilding the oyster population will result in both ecological and economic benefits. Prioritizing "equity" which could subordinate the long-term goal of increasing the oyster population to a short-term objective of satisfying a particular group of stakeholders, could lead to more overharvesting. This would not only deprive all the citizens of Maryland of the ecosystem services of oysters but could lead to the eventual depletion of the fishery, resulting in the economic hardship for watermen that the department of Natural Resources (DNR) is attempting to prevent.	Adopting biological reference points (target and threshold fishing rate) from the stock assessment at an appropriate spatial scale will be used to manage harvest at a sustainable level and should rebuild the stock.	N			
DNR needs to value and prioritize ecological benefits of sanctuaries rather than view them primarily as a source for larvae for harvested areas.	Sanctuary Strategy 5.0 inclusively states, "Continue to maintain a sanctuary program throughout Maryland's Chesapeake Bay with the purpose of protecting broodstock, enhancing natural recruitment and providing ecological services."	N			

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DNR needs to maintain 20-30% of oyster habitat in sanctuaries, including at least 50% of the best oyster habitat. DNR also needs to restore/protect the 5 restoration sanctuaries and ensure their continued success through an effective monitoring protocol.	Accepted suggestion.	Y	p. 9. In the final version p. 10.	Sanctuary Objective #3. Conserve and protect oyster habitat and biomass through maintenance of sanctuaries.	Sanctuary Objective #3. Conserve and protect oyster habitat and biomass through maintenance of sanctuaries so that 20-30% of oyster habitat and 50% of the 'best bars' is within sanctuaries.
There is a need for a conservative, risk-averse management strategy that accounts for the important ecological role of oysters as well as the increasing impact of climate change on their growth and reproduction.	Offsetting the target fishing level to achieve ecological, economic or other social goals requires an open stakeholder process to determine management objectives. Setting an abundance target could be accomplished given the identification of management objectives for the population and fishery which ideally would be accomplished through a stakeholder process.	N			
At a minimum, DNR needs to manage to the target fishing level and end overharvesting. Ideally, DNR should develop a target abundance level at which oysters are again contributing significantly to the ecological function of the Chesapeake Bay.	Addressed in Action 4.1.2 which will be clarified to specify that management strategies will be developed to achieve the target fishing level. Setting an abundance target could be accomplished given the identification of management objectives for the population and fishery, which ideally would be accomplished through a stakeholder process.	Y	p. 22. In the final version p. 24.	Action 4.1.2 Develop risk-averse harvest management strategies based on the status of oysters using the targets and thresholds for fishing mortality and the threshold for abundance.	Action 4.1.2 Develop risk-averse harvest management strategies based on the biological reference points to achieve the target harvest fraction.
DNR should continue to support the growth of the aquaculture industry through regulations and policies that facilitate private investment. DNR should also ensure the balanced representation of aquaculture stakeholders in forums and processes that impact the industry.	Addressed in Strategy 7.0 and Action 7.0.1..	N			
2nd Aquaculture Objective: The plan fails to address the process by which determinations will be formulated [in areas of suitable habitat]	p.48 Maryland lawmakers established the Aquaculture Coordinating Council to formulate and make proposals for advancing the industry.	N			
Additional state funding is required to meet goals of rebuilding the oyster resource	None needed	N			
Aquaculture expansion should be a priority over declining public fishery	The promotion of aquaculture is covered in Section 7.0.	N			
Public fishery overharvesting should be halted	Adopting biological reference points (targets and threshold fishing rate) from the stock assessment at an appropriate spatial scale will be used to manage harvest at a sustainable level.	N			
Opening sanctuaries for public commercial harvest should be prohibited	In general, sanctuaries do not allow public commercial harvest. Section 5.0 Sanctuaries Action 5.0.6 lays out criteria for removing or reducing the size of a sanctuary. The 5 large-scale sanctuaries are protected from public commercial harvest by Maryland statute.	N			
Maryland should complete the restoration of the 5 tributaries as required in the Chesapeake Bay Agreement	Stated in Sanctuary Objective #4 (p.10).	N			
We agree with the general statement of goals contained in section 2.1 of the draft Plan, but find the Plan has an over emphasis on harvesting with minimum focus on the critical need for oyster restoration and the need to significantly increase the oyster population.	The fishery management section requires more strategies and actions because there are different types of management areas, each requiring some unique actions. However, the sanctuary objectives clearly state the focus and balance the industry objectives.	N			
In particular, the Plan fails to address the most critical problem facing oysters in Maryland, namely the over harvesting of oysters and the risk of further decline in oyster populations.	Adopting biological reference points (targets and thresholds) from the stock assessment at an appropriate spatial scale will address overfishing and allow the stock to rebuild.	N			
The goal as stated in this section "to conserve, protect and where possible, rebuild the oyster resource to fulfill its important ecological role and support the culturally significant oyster fishery and industry throughout the Maryland portion of the Chesapeake Bay", is admirable. However, it does not adequately address the dismal state of Maryland's oyster populations. These are at an all-time low and have been for years. The plan outlines causes but fails to adequately emphasize overharvest, which is a principle one.	Adopting biological reference points (targets and thresholds) from the stock assessment at an appropriate spatial scale will address overfishing and allow the stock to rebuild.	N			
Page 8, Goal. Strike "where possible." Our long-term goals should be to rebuild the oyster population in its historic footprint. This will clearly not be easy or inexpensive in the short-term, but it should remain our long-term objective. Additionally, the goal should not be to "support the culturally significant oyster fishery and industry" but rather to "achieve a sustainable public oyster fishery and a vibrant aquaculture industry." The detailed goals under this do not clearly reference the importance of oyster aquaculture, as this is not part of "Maryland's traditional fishing economy."	It might not be possible to rebuild all oyster populations around the bay (e.g. Back River in the upper bay) so "where possible" is a reasonable qualifier. If removed, it would give a false perception of what is possible.	N			
Page 8, objective 2.22. Strike the word "consider" and substitute "Fully incorporate." Enhancing the ecological benefit of oysters needs to be a cornerstone objective of the plan on par with recreational or commercial harvest.	How to develop and implement ecological reference points is at the beginning of conception and therefore, fully incorporating into the plan at this point is premature.	n			
Page 9, Sanctuary Objectives. The plan should specifically state that 20-30 percent of the oyster bottom needs to be maintained in sanctuaries as an objective.	Accepted suggestion.	Y	p. 9. In the final version p. 10.	Sanctuary Objective #3 Conserve and protect oyster habitat and biomass through maintenance of sanctuaries.	Sanctuary Objective #3 Conserve and protect oyster habitat and biomass through maintenance of sanctuaries so that 20-30% of oyster habitat and 50% of the 'best bars' is within sanctuaries.
Page 9, Public Fisheries objective 1. Strike "more." The current public fishery is not sustainable, but it needs to be if we are to have a public fishery in the future.	The term "more" was removed.	Y	p. 9. In the final version p. 10.	Public Fishery Objective #1. Achieve a more sustainable public oyster fishery.	Public Fishery Objective #1. Achieve a sustainable public oyster fishery.
Page 9, Public Fisheries. Add a new objective 4 "Manage the public fishery to provide important ecological functions and yield adequate broodstock to sustain regional populations." (Same wording as the first objective under Sanctuaries). This objective should not be limited to sanctuaries, as they are a minority of the oyster habitat in the State.	The fishery is managed by season, cull size, closing areas (sanctuaries) and other measures that provide ecological functions.	N			
The goals and objectives identified in the draft plan prioritize fairness over scientific management. The primary goal of the FMP should be to rebuild - not conserve and protect, the oyster population with the understanding that a healthy population provides ecological and economic benefits (Page 8, Section 2.1).	The overall mission of the department is to conserve and protect our natural resources. The OMP goal mirrors the department's overall goal. Oyster management can be differentiated from other resources because it is possible to rebuild the oyster population using stock and habitat enhancement techniques. The goal, as stated, incorporates these three aspects.	N			

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The primary objective should be to implement science-based – not equitable, management measures for the oyster resource (Page 8, Section 2.2). The objective of being equitable in management is too subjective and can change as priorities change, and often excludes essential management actions.	The dictionary definition for "equitable" is "dealing fairly and equally with all concerned." This is one of the primary objectives of the oyster plan. The dictionary definition for "compatible" is "capable of existing together in harmony." Objective #1 recognizes the need to balance management measures across many ecological and socioeconomic factors and different sectors (sanctuaries, public fishery, aquaculture) and do it in a way that is understandable, fair and enforceable.	N			
The objectives listed for Sanctuaries need to include maintaining a sanctuary program that includes 20-30% of the oyster habitat with specific restoration and monitoring plans. This should include a continued commitment to the Chesapeake Bay Agreement that calls for the large-scale protection and restoration of five tributaries (included in the 20-30%) throughout MD's portion of the Chesapeake Bay.	Accepted suggestion.	Y	p. 9. In the final version p. 10.	Sanctuary Objective #3. Conserve and protect oyster habitat and biomass through maintenance of sanctuaries.	Sanctuary Objective #3. Conserve and protect oyster habitat and biomass through maintenance of sanctuaries so that 20-30% of oyster habitat and 50% of the 'best bars' is within sanctuaries.
The success of sanctuaries should not be measured solely on their ability to spread larvae to public fishery areas as that is not a quantifiable objective (Page 9, Section 2.2). Rather, the department should make it a priority to develop a monitoring protocol for understanding and quantifying ecosystem services of restored reefs.	It seems that you are referring to the Sanctuary Objective #1- Increase oyster populations to levels that improve important ecological functions and yield adequate broodstock to sustain regional populations. There is no reference to the public fishery areas in this objective. Section 5.0 describes the importance of sanctuaries and the department's commitment to maintaining a sanctuary program. Nowhere does it state that the success of sanctuaries is measured solely on spreading larvae to public fishery areas. In addition, in both Section 5.0 and Section 8.0, monitoring is important to measure progress and collect ecological data.	N			
The primary objective for the public fishery (Page 9, Section 2.2) needs to be to end over-fishing and manage to a scientifically-defensible level of harvest. The objective to achieve a more sustainable fishery suggests that the fishery is currently sustainable, which it is not as shown by the results of the oyster stock assessment. The department needs to develop a target fishing level and a target abundance level, both of which should be set to a level that results in a growing oyster population, not a maintaining population level.	The word "more" was deleted from the objective. The second objective "Manage the oyster fishery according to science-based biological reference points from the stock assessment" addresses overfishing and a scientifically-defensible level of harvest. Section 4.0 and 4.1 provide the basis for Action 4.1.2 - the development of risk-averse harvest management strategies and 4.1.1. the utilization of biological reference points.	Y	p. 9. In the final version p. 10.	Public Fishery Objective #1. Achieve a more sustainable public oyster fishery.	Public Fishery Objective #1. Achieve a sustainable public oyster fishery.
The goal expressed in the FMP is "to conserve, protect and where possible, rebuild the oyster resource to fulfill its important ecological role and support the culturally significant oyster fishery and industry throughout the Maryland portion of the Chesapeake Bay." The qualified goal of rebuilding the oyster resource "where possible" appears to relegate rebuilding the resource to a secondary objective, when in light of historically low abundance, rebuilding the resource should be a primary objective of the FMP. Arundel Rivers recommends striking the words "where possible" from the goal. Allowing this status quo to continue through "compatible and equitable" measures instead of scientifically defensible measures will continue to drive the oyster population toward "eventual disappearance".	It might not be possible to rebuild all oyster populations around the bay (e.g. Back River) so "where possible" is a reasonable qualifier. If removed, it would give a false perception of what is possible. Compatible and equitable refer to "capable of existing together in harmony" and "dealing fairly and equally with all concerned." This is one of the primary objectives of the oyster plan. It recognizes the need to balance management measures across many ecological and socioeconomic factors and different sectors (sanctuaries, public fishery, aquaculture) and do it in a way that is understandable, fair and enforceable. It is followed by "utilizing the best available data to support science-based management."	N			
Arundel Rivers recommends revising the "Overarching Oyster Resource Objectives" to reflect a strong commitment to science-based management of the resource with a goal of rebuilding it to a point where harvest rates are sustainable through natural recruitment of the population.	Objective #2 clearly supports science-based management and Section 4.0 and 4.1 commit to conducting stock assessments and utilizing biological reference points for a sustainable harvest.	N			
Objective 2.2 - #1 – How will this be developed and implemented?	Compatible and equitable management measures will be developed through the framework of this plan with input from advisory commissions and stakeholders, and implemented through actions in this plan and actions developed as the result of deliberations generated through adaptive management application.	N			
What are the long-term metrics for determining if the goals/outcomes for the ecology, culture, and economy are achieved?	The long-term metrics are the implementation of this Plan: implementing and tracking management strategies and actions and applying the adaptive management approach.	N			
Section 2.2 – Objectives: There is no mention of disease in the objectives or adaptive management measures. What is the approach for addressing/managing disease in the population?	Disease is covered in Section 2.4 Salinity Influences on Oyster Populations and specifically, Action 2.4.1. Consider how salinity influences reproduction, growth and mortality (particularly from disease and freshets) when developing oyster project objectives for sanctuaries and harvest areas. Action 6.4.2 Also addresses disease: Develop and utilize the seed transplanting guidelines to control the movement of diseases.	N			
Action 2.4.2 - #2: The text refers to 'baywide oyster objectives.' Does this refer to those in the Chesapeake Bay Agreement 2014 and EO 13508? Please add text to specify.	This action is meant to be general so that it can apply to many different types and locations of projects.	N			
Action 2.4.2 - #4: How does DNR plan to increase funding needed to support the monitoring goals discussed?	The action doesn't say anything about increasing funding. It states that monitoring is one of the essential elements of adaptive management and when specifying a monitoring protocol funding should be included to implement the monitoring.	N			
Objective #1 – Recommend clarification. Balancing the ecological and economic goals is challenging and often times incompatible. Therefore, its recommended that language for #1 be amended to "develop and implement the management of Maryland's oyster resource for ecological and socio-economic benefits taking into consideration the interests of Maryland citizens."	Compatible and equitable refer to "capable of existing together in harmony" and "dealing fairly and equally with all concerned." This is one of the primary objectives of the oyster plan. It recognizes the need to balance management measures across many ecological and socioeconomic factors and different sectors (sanctuaries, public fishery, aquaculture) and do it in a way that is understandable, fair and enforceable. Ecological considerations are covered by Objective # 3 and socioeconomic considerations are covered by Objective #9.	N			
Objective #5 – Recommend adding 'ecological and ecosystem service' monitoring programs. Collecting this information is needed to evaluate the benefits of management and restoration activities.	Accepted suggestion.	Y	p. 8. In final version p. 10.	Overarching Objective #5 - Continue oyster population surveys and fishery monitoring programs and make changes, as needed, to improve monitoring efforts.	Suggest: Objective #5. Continue oyster population surveys, fishery monitoring programs, and ecological and ecosystem monitoring, and make improvements as needed.
Public Fishery Objectives (Page 9). Recommend DNR clarify what is meant by "more sustainable".	Removed the word "more."	Y	p. 9. In final version p. 10.	Public Fishery Objective #1 - Achieve a more sustainable public oyster fishery.	Suggest: Objective #1. Achieve a sustainable public oyster fishery.
NCBO is pleased to see that the plan attempts to develop measures that enhance and conserve oyster habitat and as well as set biological reference points for the fishery. It seems the plan broadly addressed these issues without being too prescriptive. The interest in maintaining a level of flexibility is understood, but it weakens the imperative of developing robust management measures critical to achieving both a sustainable oyster fishery and ecosystem. NCBO suggests that the fishery management objectives consider optimal yield as a tool to consider the ecological roles of oysters within the fishery management framework.	The 2018 stock assessment estimated maximum sustainable yield from available data, a critical step in assessing the health of a population. Calculating optimal yield (OY) – which is generally reduced from MSY- requires that specific objectives for ecological, economic or social outcomes be defined - ideally through a stakeholder input.	N			

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Sanctuary: 4. Complete large-scale restoration in five tributaries by 2025.	The word "complete" was added to the objective.	Y	p.9. In the final version p. 10.	Sanctuary Objective #4. Conduct large-scale restoration in five tributaries by 2025.	Sanctuary Objective #4. Conduct and complete large-scale restoration in five tributaries by 2025.
Public Fishery: The most important objective of the public fishery should be a goal to end overfishing in all regions on a timeline which is based on objectives specific to a particular area. Thanks to long standing data sets and the recent oyster stock assessment, we now have scientific guidance to aid in the specific strategies that can guide management decisions at a higher resolution than simply statewide regulations.	Public fishery Objective #2 - Manage the oyster fishery according to science-based biological reference points from the oyster stock assessment - addresses the issue of overfishing.	N			
Management should seek to achieve abundance targets and avoid thresholds, and focus on clearly describe both the short and long terms goals supported by any specific objective in a given region.	Addressed in Action 4.1.3.	N			
Oyster Management Objectives 2.2, Aquaculture Objectives, Page 9: In item #5 add the words "and replenishment" – so it reads: "Support, enhance, and increase restoration and replenishment activities in other tributaries throughout the Chesapeake Bay."	The term "replenishment" is used in relationship to harvest, "replenish what is taken from harvest so harvest can occur again." The term "restoration" is used in relationship to sanctuaries, "no harvest areas."	N			
In Oyster Management Objectives 2.2, Aquaculture Objectives, Page 9: add a #3 objective as follows: 3. Consider and incorporate, where appropriate, the findings and recommendations of the Aquaculture Workgroup (of stakeholders) convened in 2018 by DNR.	DNR considers and incorporates findings and recommendations from all stakeholders and advisory groups like ACC, OAC, TFAC, SFAC as a regular part of the management process.	N			
Equity is a subjective criterion that varies based on the perspective of each stakeholder. As a management goal, it is intractable to implement as any management action could be perceived as inequitable by any particular group. NR §4-215 mentions equity in fishery management, but only in the context of allocating fishery resources amongst harvesters, not as a criterion for development of fishery management actions. Additionally, because of the differences in timeframe required to realize their benefits, in the short-term, ecological and economic management actions may not be compatible. That should not preclude the installation of management actions that, based on the best available science, would result in long-term economic and ecological gains. As such, both compatibility and equity are inappropriate drivers for management objectives that should instead be driven by science-based management actions that aim to achieve a rebuilt resource and functioning ecosystem. Suggest removing (1).	The dictionary definition for "equitable" is "dealing fairly and equally with all concerned." This is one of the primary objectives of the oyster plan. NR Section 4-215 uses the exact word "equitable" under allocation but the section before it also speaks of equity but not using that term. Under (d) (1) Conservation and management measures adopted under a fishery management plan, to the extent possible: (i) Shall prevent overfishing while attempting to achieve the best and most efficient utilization of the State's fishery resources; (iii) May not discriminate unfairly among groups of fishermen or have economic allocation as its sole purpose; (iv) Shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources and catches. All of these speak to fair and equitable without using those two words. The dictionary definition for "compatible" is "capable of existing together in harmony." Objective #1 recognizes the need to balance management measures across many ecological and socioeconomic factors and different sectors (sanctuaries, public fishery, aquaculture) and do it in a way that is understandable, fair and enforceable. As such, it is an important objective. We recognize your concern about important drivers have reordered the objectives to acknowledge the importance of science-based management.	N			
#3 This should be a primary objective of the oyster management plan. However, it should be acknowledged that current monitoring and management strategies employed by the department are inadequate to quantify ecological services and such metrics and associated monitoring programs will have to be developed to implement this objective. (pg.8)	Developing ecological and ecosystem monitoring has been added to Objective 5 and wording has been added to Section 8.0 Monitoring to describe the ecosystem components currently being surveyed (p.59).	Y	p. 8. In the final version p. 10.	Overarching Objective #5 - Continue oyster population surveys and fishery monitoring programs and make changes, as needed, to improve monitoring efforts.	Objective #5. Continue oyster population surveys, fishery monitoring programs, and ecological and ecosystem monitoring, and make improvements as needed.
#4 Adaptive management is a tool that is applied within a project management context to improve project outcomes. It should not be used to change fishery management plan objectives that delineate the goals of managing the resource. Should it become necessary to adjust the goals of this Plan, the department should do so through regulatory action that allows stakeholders the ability to provide their perspective on the goals of oyster fishery management. (pg. 8)	Adaptive management is a tool applied to project management and will be an iterative process at the project level. As the oyster resource changes over time and management measures are implemented, the plan will be periodically reviewed. If the management plan needed to be changed it would be accomplished by either revising the plan or developing an amendment. The amendment process is similar to the plan development process and would require the development of a draft with input from the advisory commissions and other stakeholders. Once an amendment is completed and signed, the amendment would be incorporated by reference into Maryland regulation through the regulatory process. Public input would be solicited both during the development of an amendment and again during the incorporation by reference into regulation.	N			
#6 Again, equity is subjective and intractable as a management construct. Numerous tools exist for evaluating the best use of resources to maximize optimal management. These types of tools should be used to determine the best use of limited resources and management measures that achieve a growing oyster population. (pg. 9)	The department will investigate the types of management tools available and evaluate their use.	N			
#7 Socioeconomic considerations should be noted in suggested management actions but should not be a primary driver of decision-making. If actions are necessary to preserve the oyster population that would cause negative economic hardship, additional actions should be explored to mitigate that hardship, but it should not preclude the appropriate science-based management of the resource. (pg. 9)	Objective #9 states, "Take into account socio-economic considerations during management decisions."	N			
Overarching Oyster Resource Objectives should include Manage the oyster resource in a way that ends overfishing and prevents overfishing in the future, rebuilds the oyster stock and provides for the significant ecological benefits that oysters and oyster reefs provide and Continually increase shellfish habitat and a positive shell budget that grows the shell resource.	Both the sanctuary and public fishery objectives address these concerns. Sanctuary Objective #1 (increase populations to improve ecological functions) and Public Fishery Objective #2 (management the oyster fishery on science-based biological reference points from the stock assessment).	N			
Sanctuary Objectives #1 Currently, there are no available techniques to ascertain the origin of oyster spat. The statement that sanctuaries should "yield adequate brood stock to sustain regional populations" should be removed as it cannot be quantified. Additionally, studies have indicated that the signal of recruitment enhancement is dependent upon the quality of habitat outside of sanctuary areas, so unless habitat in harvested areas is of sufficient quality and metapopulation dynamics are known, larval spillover effects may not be detected. (pg. 9)	The main reason for creating and maintaining sanctuaries is to protect broodstock, enhance natural recruitment and encourage disease tolerance while providing ecological services (p. 26). Sanctuaries protect larger oysters that have greater fecundity. Although there is no available technique to "tag" oyster larvae and determine where they settle, given the appropriate environmental conditions, more oyster larvae will be produced. It is reasonable to expect oyster larvae will be carried away from the sanctuary via wind/current. Oyster larvae require hard, sediment-free substrate (p.15) and appropriate habitat is a limiting factor. However, it will take extensive monitoring over many years to determine the benefits of sanctuaries and whether they will support (sustain) regional populations.	N			
#3 This objective should explicitly state that the Plan will retain in sanctuaries 20-30% of productive oyster habitat including at least 50% of the 'best bars' and that sanctuary areas are not equivalent to closed harvest reserve areas. (pg. 9)	Accepted suggestion.	Y	p. 9. In the final version p. 10.	Sanctuary Objective #3. Conserve and protect oyster habitat and biomass through maintenance of sanctuaries.	Sanctuary Objective #3. Conserve and protect oyster habitat and biomass through maintenance of sanctuaries so that 20-30% of oyster habitat and 50% of the 'best bars' is within sanctuaries.

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#4 This objective should include the full 2014 Bay Watershed Agreement commitment – “Restore oyster populations in 5 tributaries by 2025 and ensure their protection.” (pg. 9)	The five large-scale oyster sanctuaries are protected by Maryland statute.	N			
#5 This objective should be clarified to state that the restoration activities in other tributaries are intended for ecological restoration, not fishery enhancement, and that they are long-term projects. (pg. 9)	By definition, sanctuaries are intended for ecological restoration. Sanctuary Objective #3 addresses conserving and protecting oyster habitat through sanctuaries and Section 5.0 discusses sanctuaries in more detail.	N			
Public Fishery Objectives: #1 The department should provide additional clarification on what is meant by “more sustainable.” This implies that the current oyster fishery is sustainable, a statement that is not supported for the majority of harvest areas in Maryland. This statement should include more specific objectives like achieve a public oyster fishery that meets sustainable harvest rates set by a stock assessment. (pg. 9)	Public Fishery Objective was revised and the “more” was deleted.	Y	p. 9. In the final version p. 10.	Public Fishery Objective #1. Achieve a more sustainable public oyster fishery.	Public Fishery Objective #1. Achieve a sustainable public oyster fishery.
#2 This objective should state, as a guiding principle, that the department will aim to manage to the target biological reference points. (pg. 9)	It is stated in Action 4.1.2 (p.24).	N			
Additional Public Fishery Objectives – The department will review and update critical data sets for fishery management, improve monitoring and harvest reporting, improve enforcement and prosecute those who operate outside of the lawful limits of the fishery. (pg. 9)	These topics are discussed throughout the 2019 OMP.	N			
Aquaculture Objectives #1 It is unclear what activities within the department’s purview would achieve Objective 1. Instead, this goal should be amended to say Support policies and regulations that facilitate private investment in oyster aquaculture. (pg.9)	Section 7.0 Clarifies the activities and the strategy and actions state some specifics.	N			
Suggest being more specific about the other fish and shellfish species dependent on oyster reef habitats (such as striped bass, blue crab and black sea bass). ASMFC has identified shellfish habitat as a priority and has linked many managed species to this habitat type.	ASMFC has examined shellfish habitat in relationship to managed species along the entire eastern Atlantic coast. The number of individual species, both invertebrates and fish, would create a long list of species - too detailed for this document. In addition, many species are transient and although they may utilize oyster reefs, they are not truly dependent on them. However, we have added the 3 species you mentioned as examples on p.53.	Y	p. 53. In the final version p. 57.	Section 11.0 Ecosystem Considerations, first paragraph, sentence #6: Reefs support a diverse suite of resident and transient species including commercially, recreationally and ecologically important fish species and a diverse array of invertebrates species.	Section 11.0 Ecosystem Considerations, first paragraph, sentence #6: Reefs support a diverse suite of resident and transient species including commercially, recreationally and ecologically important fish species (eg. striped bass, blue crabs, black sea bass) and a diverse array of invertebrate species.
Suggest more specific development of oyster habitat quantity and quality metrics or indicators informed by habitat surveys, assessments, shell budget models, larval dispersal, salinity regimes, etc. These assessment indicators could be directly built into the stock assessment or at least considered side by side on a parallel timeline/schedule. NCBO can help with this.	These are generally incorporated into the development of a shell budget as set forth in Action 3.0.4. Larval dispersal needs more refinement before it can be considered.	N			
Restoring and conserving large, tributary scale areas for ecological purposes must continue. The reefs in Harris creek represent significant habitat enhancement over what was there pre-restoration. The added habitat value and ecosystem services should be documented and emphasized. The restoration sanctuary reefs are living labs and protections should be in place for their public and science benefits. NCBO can help with this.	Addressed in Section 5.0 Sanctuaries.	N			
NCBO suggest greater emphasis be given to the unique nature of the oyster fishery in the Preface and Introduction explicitly acknowledging the need to balance the oyster fishery with the value of oysters as fish habitat and the other direct social benefits oysters provide such as cleaner water.	The Preface is an overview of FMPs in general. Benefits of oysters from an ecological perspective are addressed in Section 11.0 and socioeconomic considerations are addressed in Section 9.0. Achieving a balance between public fisheries and the ecosystem is stated in the goal and implicitly throughout the OMP.	N			
Background on the presence and impacts of MSX and Dermo disease should include recent studies and information on the development of genetic resistance to MSX and Dermo in Virginia. Additionally, this section should include information on how disease challenges are critical to the selection for genetic disease resistance. (pg. 3)	Over the short-term (since 2004), disease has not been a prevalent issue in terms of mortality. The sanctuary program is intended to encourage disease tolerance through natural selection (p.26) and salinity influences on disease (Action 2.4.1) is considered when developing management strategies and actions. There have been a number of scientific research papers on the development of genetic resistance to disease in oysters but was not included in the 2019 OMP.	N			
Discussion of oyster fecundity should include a statement that oyster sanctuaries facilitate the survival and growth of large, fecund oysters as size classes are not truncated by harvest. This, in turn, increases reproductive potential. Include information from recent studies that indicate that oyster reefs that are restored and protected in sanctuaries have up to 700 times the reproductive potential of harvested reefs and that sanctuaries facilitate recruitment enhancement. 2.3 (pg. 4)	Addressed in Section 5.0 Sanctuaries.	N			
On page 4, the Cultch Index is described as a dataset beginning in 2017, yet page 5 discusses cultch index data from the past 13 years. Clarify the length of the cultch index data set. (pg. 4-5)	The index was developed in 2017 but encompasses data from 2004 to 2017. Text was changed to clarify.	Y	p. 4. In the final version p. 5.baseline; and starting in 2017, the Cultch Index is a measure of oyster habitat from the 53 oyster bar Spatfall Intensity Index subset (Tarnowski, 2018).baseline; and using data collected starting in 2005, the Cultch Index is a measure of oyster habitat from the 53 oyster bar Spatfall Intensity Index subset (Tarnowski, 2018).
Maryland’s Oyster Fishery - NR §4-215 requires a comparison of the current status of the fishery relative to its historic condition. Instead, this section compares current harvest levels with those of the 1980s, more than a century after the start of oyster fishery management. Provide additional explanation on why this comparison was made as opposed to the comparison with historic harvest to explain why it is “more realistic.” (pg. 5)	Accepted suggestion.	Y	p. 5. In the final version p.6.	Although peak historical harvest was 15 million bushels, harvest statistics beginning in the 1980s provide a more realistic picture of harvest.	Peak historical harvest in the 1880s was 15 million bushels, but at that time, the harvest was loosely managed and New England fishermen were rapidly removing oysters from the bay to supply national demand.
Oyster Surcharge and Bushel Tax – The document should state what the current bushel tax is and outline the history and origin of the bushel tax, changes to the tax over time, and how this tax compares with fishery cost recovery in other states. (pg. 6)	The oyster surcharge is stated in the OMP (p.6). Additional information on the oyster bushel tax and replenishment plantings can be found in Section 6.6 and specifically in Table 7 (p. 42). A comparison of oyster taxes compared to fishery cost recovery in Maryland to taxes/fishery recovery in other states was not warranted in the OMP. The history and origin of the bushel tax is recounted in Maryland’s Oysters: Research and Management by Kennedy and Breisch. The current bushel tax (Natural Resources Article Section 4-1020) became effective in 1982.	N			

Comment	DNR Response	Change to Draft (Y/N)	Page of Draft OMP	Original Draft Text	New Revised Text
As required by NR §4-215, this section should also include a discussion of the costs of managing the oyster fishery and current sources of funding for management administration. It should describe how these taxes and fees contribute, and at what level, to management cost recovery. It should also provide more information on the history of the Maryland department of Transportation funding, the various iterations of the memorandum of understanding between the department and MDOT, and a description of how the expenditures of MDOT funding have changed over time from administration, restoration and replenishment to exclusively replenishment. (pg. 6)	Accepted suggestion. A history of MDOT funding was not warranted in the OMP.	Y	p. 7	New paragraph.	Whereas all revenue generated from the oyster bushel tax, export tax, and oyster surcharge go towards public fishery replenishment plantings of seed and substrate, the annual grant from the Maryland Department of Transportation funds various functions within the department. The grant started in 1997 and the amount has ranged from \$1.5 million to \$2 million dollars annually. On average about 60% of these funds go towards planting seed and substrate on public fishery bottom. The remainder of the funds go towards operational costs, monitoring, and sanctuary plantings.
Gear Types – This section should include a discussion of the history of various gear types, particularly oyster dredges. This section should outline how permissible gear types changed over time and how that is related to oyster abundance to demonstrate that more efficient gear types were implemented as oyster abundance declined. This section should also include discussion on the relative impact of each gear type on oyster reef habitat and benthic environments.4.5 (pg. 7)	Gear use and restrictions are addressed in statute. Although specific gear impacts on habitat is not part of the plan, harvest impacts on habitat have been acknowledge. Section 3.0 states that harvesting decreases shell mass (p.15) and Substrate Strategy 3.0 promotes the conservation and protection of oyster shell. Paragraph 2 in Section 11.0 Ecosystem Considerations - states that "two centuries of harvesting has disrupted the balance between shell aggradation and shell degradation."	N			
Page 4, Introduction, Status. The OMP does not do a good job of presenting the decline of the oyster population in the Bay and the destruction of its habitat (oyster reefs) during the past 150 years. It is important to take note of the former abundance of oysters and oyster reefs in the Bay, prior to European settlement. Additionally, the decline of the population from these former levels has been due to over fishing and the removal of shell deposits. Although poor water quality and diseases have been negative impacts to oyster populations in the recent past, they are not what has delivered us to the low population levels of today.	The decline of the oyster population in Chesapeake Bay and the loss of shell habitat has been documented in many research papers and comprehensive reviews and noted in the 2019 OMP. The new plan is focused on addressing the current state of the oyster resource using a strategic, science-based management approach moving forward.	N			
Page 5, Maryland's Oyster Fishery. The report Introduction should also include several critical facts that make the management of the oyster population very different from other species with an FMP: 1) oysters create their own habitat – and the removal of an oyster from the population removes the habitat on which future generations will settle; 2) the vertical height of oyster reefs historically kept them off the bottom and the influences of siltation; and 3) oysters provide a very important "ecological service" in filtering phytoplankton from the water column and any value oysters provide as commercial or recreational resources must be judged against this ecological value.	These topics are addressed in Section 3.0 Substrate and Section 11.0 Ecosystem Considerations.	N			
Suggest adding text to summarize what the approach has been to oyster management in Maryland. Discuss current measures – 24% in sanctuary with 3 receiving intensive efforts thus far and 3 in planning stage, fishery rules, focus on aquaculture expansion since 2010, etc. This then leads to 'why are we in the need of altering our course and undertaking this new MP?' In order for this plan to be successful, it is imperative to understand past efforts and why the past efforts have not achieved desired outcomes. Some of this could be attributed to nature, or not having the data/scientific understanding, but it would strengthen this plan to have that information presented.	Addressed generally on p. 6-8.	N			
Life History – p 4 – last paragraph: With respect to the longevity of oysters, suggest adding text to communicate that some sanctuaries that received initial restoration efforts are still viable – Cook Point planted in 2011, and some Harris Creek reefs planted in 2012. These are at or approaching that 9 year estimate.	Oysters from plantings in Maryland have been reported to survive at least 9 years (p.4 of the OMP). For a complete review of the status of sanctuaries in Maryland access one of the source documents noted in the OMP: the Oyster Management Review: 2010-2015 (MDNR July 2016).	N			
Introduction – Current Status – p 4: Suggest adding text to provide a summary of the current number of oysters in the population as estimated from the stock assessment. Also, the current status should include text to recognize conclusions about overfishing from stock assessment.	Addressed in Section 4.0 (Stock Status).	N			
Introduction – Current Status – p. 5 – second paragraph: Suggest adding text to put both the Dermo and MSX data into context. What has been the range of the period of record?	Suggestion accepted.	Y	p. 5.	new sentence at end of 2nd paragraph	Since 1990 when disease information is reported in the Annual Fall Survey, the annual mean for Dermo prevalence has ranged from 38% to 93%, dermo intensity has ranged from 1.2 to 3.8, and MSX has ranged from 0.1% to 29%.
Introduction – Current Status – p. 5 – last paragraph of Section: Text states 'The increase in the Culch Index during the early 2010s reflects improvements in recruitment and survivorship during this period, especially the strong spatsets in 2010 and 2012.' Could closing an additional 13% of habitat to harvest - establishment of sanctuaries in 2010 - also have contributed? If so, add text.	The increase in culch index occurred when the sanctuary effort was just getting started. After the 2010/12 year, classes were harvested and the culch index reverted down to its earlier level. One could argue that the index might have dropped even lower had it not been for the sanctuaries, but the extent of this contribution (if any) would be purely speculative at this point.	N			

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(Page 6). To better understand the ROI, current revenue and expense summaries should be compiled and analyzed. In this instance, DNR should perform a cost recovery analysis to examine the cost of managing the commercial fishery (e.g. staff, monitoring, etc.) compared to the amount of revenue collected from the industry (e.g. license, surcharge, bushel tax) and applied to the cost for management.	This analysis has not been conducted and is in the Research Needs section. Oyster industry taxes, fees, etc do not fund DNR. To date, there has never been an assumption or expectation that the industry is supposed to pay for oyster management but the commercial industry does invest in the oyster resource unlike other fisheries. Additional information on the commercial harvest was added since the department doesn't have information that can be used for a ROI.	Y	p. 5. In the final version p. 7.	New text.	Whereas all revenue generated from the oyster bushel tax, export tax, and oyster surcharge go towards public fishery replenishment plantings of seed and substrate, an annual grant from the Maryland department of Transportation funds various functions within the department. The grant started in 1997 and the amount has ranged from \$1.5 million to \$2 million dollars annually. On average about 60% of these funds go towards planting seed and substrate on public fishery bottom. The remainder of the MDOT funds have been used for operational costs, monitoring, and sanctuary plantings.
(Page 8). Suggest that DNR include estimates of economic value of the oyster industry to illustrate its importance to the Bay's fishing community. For example, "In spite of Maryland's oyster harvest being a fraction of historical levels, the 2016 dockside value of \$14.9 million ranks as the second highest dockside value among all Maryland's commercial fisheries (behind blue crabs and ahead of striped bass)."	Addressed in Section 9.0.	N			
Section 8.0, Action 8.1, page 48: add stronger language than simply "coordinate sampling methodology" to control for gear bias in data.	Text was added to clarify.	Y	p. 48. In the final version p. 51.	Action 8.1. Conduct monitoring programs consistent with sampling procedure, timing of sampling, types of data collected and analysis and provide the results to a central database or databases. Coordinate sampling methodology among federal, state and non-governmental organizations for consistency.	Action 8.0.1. Conduct monitoring programs using scientifically accepted and consistent sampling procedures, timing, data collection and analysis, and provide the results to a central database or databases. Coordinate sampling methodology among federal, state and non-governmental organizations for consistency, taking into account sampling during different times of the year and sampling with different gear types.
This section suggests that data from the fall oyster dredge survey can be used to determine when a sanctuary is considered restored per the Oyster Success Metrics adopted by the Interagency Workgroup. However, the fall dredge survey does not quantify oyster density, reef footprint, or reef height, so this section should acknowledge that additional monitoring is necessary to determine if a sanctuary is considered restored. Moreover, dredging in these sanctuaries, even for a survey could cause significant damage to the three-dimensional structure and biological diversity of those restoration reefs, which may be key success criteria. (pg. 47)	Accepted suggestion. However, any damage from the one or two dredge tows per bar during the Fall Survey sampling is insignificant.	Y	p. 47, para 2, last sent. In the final version p. 50, para 3, last sent.	"The results of monitoring can also be used..."	"In addition, quantitative area-based surveys such as with patent tows or divers in combination with sonar surveys can be used..."
Projects should have a priori goals and criteria to define success of the management action, similar to those outlined in the Oyster Success Metrics adopted by the Interagency Workgroup. Monitoring programs should then be developed that will result in high quality data at appropriate spatial and temporal scale to determine if a project is meeting the predetermined criteria of success. The appropriate spatial and temporal scale will be longer for sanctuaries than for other management areas as the ecological benefits that result typically take decades to be realized. This should be stated explicitly. (pg. 47)	Text was changed.	Y	p. 47, para 2, last sentence	The results of monitoring can also be used to determine when a sanctuary is restored according to predetermined oyster metrics (Oyster Metrics Workgroup, 2011).	The results of monitoring can also be used to determine when a sanctuary is restored according to predetermined oyster metrics, recognizing that the appropriate spatial and temporal scale will be longer for sanctuaries than for other management areas as the ecological benefits that result typically take decades to be realized (Oyster Metrics Workgroup, 2011).
Recommendations for changes to the fall dredge survey, harvest reporting, and other surveys identified in the stock assessment and peer review report should be considered for implementation. This should be added as an Action. (pg. 48)	Accepted suggestion. Added as new Action 8.0.7.	Y	p. 52.	New action	Action 8.0.7 Consider and implement recommendations for changes to the Fall Oyster Dredge Survey, harvest reporting, and other surveys identified or used in the stock assessment and peer review reports.
Throughout the Plan, references are made to achieving certain ecological benefits, yet none of the department's existing surveys is designed for or capable of quantifying these benefits. Additional monitoring criteria and surveys should be identified that would allow for quantification of ecosystem service benefits, including biodiversity enhancement, fish production, nutrient removal, water filtration, etc. Add an Action that states monitoring programs will be developed to quantify ecosystem services. (pg. 48)	The current monitoring program takes into consideration physical environmental factors, habitat, and epibenthic biodiversity. The suggestion to develop more complex ecosystem monitoring programs will be considered.	N			
Monitoring data should be made readily available to academic institutions and researchers for development of projects and research programs that will benefit the oyster resource. (pg. 48)	Monitoring data is already available to the public.	N			
Special efforts should be made to improve monitoring of replenishment plantings to quantify the harvest return on investment to ensure efficient use of limited monetary and shell resources. Current programs do not include follow-up monitoring to quantify the effectiveness of the plantings and harvest data is too coarse to attribute to any one planting event. Thus, although oyster replenishment activities have been ongoing for more than 40 years, we have very little knowledge about the types of activities that work and whether the investment of resources has produced any significant positive benefits for the oyster resource. The department should seek increased funding necessary to conduct monitoring activities pursuant to the activities delineated in this Plan and to address significant research needs (Section 12.0). (pg. 48)	The Fall Survey annually samples some of the replenishment plantings and then continues to do so for a few years afterwards. It is impossible to sample all replenishment plantings as well as the other static samples. In the past, samples taken from the large-scale plantings made by the department were carefully documented. More recently, the plantings have been completed on a much smaller scale and dispersed over a larger area, so areas have been prioritized and subsampled. The department has decades of experience in what activities are successful, but annual environmental variability can cause problems and counteract best practices.	N			
Action 8.6 include "population dynamics"	Population dynamic parameters are already routinely monitored There were specific problems with the fishery-dependent fishing mortality estimates that needed to be addressed. To include population dynamics, a broad catch-all combining fishery-dependent and independent monitoring, would alter the intent of this action.	N			

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Add new action: Action 8.7 Conduct a periodic external review of the monitoring program	Section 8.0 states that "Monitoring programs should be periodically reviewed and adapted to the changing needs of restoration and stock assessment." (p. 47 of the 2019 OMP). A periodic external review of the monitoring program is conducted as part of the stock assessment and peer review process. Monitoring methods and results are reviewed, and recommendations are proposed to change/adjust monitoring to improve the results if necessary. In addition, the Fall Oyster Survey is reviewed annually by an internal panel. Action 8.0.7 has been added to clarify.	Y	p. 52.	New action.	Action 8.0.7 Consider and implement recommendations for changes to the Fall Oyster Dredge Survey, harvest reporting, and other surveys identified or used in the stock assessment and peer review reports.
Include ecosystem measures in monitoring	Ecosystem measures are already part of the monitoring effort. Text was added to clarify in Section 8.0 (p.50).	Y	p. 50.	New text.	In addition to the Fall Survey collection of oyster information, ecosystem measures also have been part of the monitoring effort. Physical environmental factors are monitored by other groups or agencies and are incorporated into the Fall Oyster Survey reports. Other ecosystem components including habitat (cultch), associated benthic epifaunal, competitors, and predators are recorded during the Fall Survey. An extended time-series of epibenthic organisms associated with the oyster bar community and their ordinal rankings has also been recorded for every bar surveyed.
Existing monitoring programs should evaluate and incorporate suggested improvements from the stock assessment and peer review report.	Accepted suggestion. Also addressed with the addition of Action 8.0.7.	Y	p. 47, paragraph 3. In final version p. 50-51.	Monitoring programs should be periodically reviewed and adapted to the changing needs of restoration and stock assessment	Monitoring programs methods should be periodically reviewed and adapted as needed
Monitoring programs should be developed that quantify ecosystem service benefits of oyster reef restoration and that can sufficiently track the outcomes of replenishment efforts to determine return on public investment.	Ecosystem measures are already part of the monitoring effort and text was added to clarify in Section 8.0 (p.50). The current monitoring program takes into consideration physical environmental factors, habitat, and epibenthic biodiversity.	N			
DNR should consider incorporating citizen science data and data from RiverKeepers to supplement their monitoring programs.	Accepted suggestion. Added new Action 8.0.8.	Y	p. 48. In the final version p. 52.	New action.	Action 8.0.8 Utilize scientific data collected by other entities when appropriate to assess the status of the oyster resource, track restoration and replenishment efforts and evaluate management strategies and actions.
Harvest reporting should be improved; penalties should be imposed for lack of reporting or misreporting of harvest information. And harvest information should be sufficiently granular to provide appropriate data for stock assessments. DNR should also consider electronic monitoring, vessel monitoring systems, and/or hail out/hail in for reporting and enforcement.	Addressed in actions 6.0.2 and 6.0.3.	N			
A monitoring protocol to calculate ecosystem services needs to be developed and utilized. Until ecosystem services are monitored and quantified they will continue to be seen as less important than harvest needs and resulting in certain necessary actions to be excluded.	Addressed in Section 11.0 Ecosystem Considerations. As ecosystem services are quantified a monitoring protocol will be recommended by the Oyster Best Management Practices panel.	N			
Current monitoring programs should adapt to overcome the deficiencies identified in the stock assessment. This should include a review of the Fall Dredge Survey protocols and harvest reporting techniques.	Text has been clarified in Section 8.0. In addition two new actions were added to clarify (Actions 8.0.7 and 8.0.8).	Y	p. 47, paragraph 3. In the final version p. 50-51.	Monitoring programs should be periodically reviewed and adapted to the changing needs of restoration and stock assessment	Monitoring programs methods should be periodically reviewed and adapted as needed
Harvest reporting data is a primary component of the stock assessment tool. Harvest information should be collected using modern, best available technology. The information collected should be coarse enough to provide the data necessary for the stock assessment. This data should also be made available to the public in an easy to use format that promotes independent research on the data and the fishery.	Addressed in Actions 6.0.2 and 6.0.3.	N			
The department should consider outside data from citizen groups and other water quality monitoring programs such as those managed by Riverkeeper and watershed organizations. It's understood that the department can only monitor when and where resources permit which often leaves gaps in certain priority areas. By strategically working with watershed groups, more data could be incorporated into the analysis and monitoring of management strategies.	Accepted suggestion. Added Action 8.0.8.	Y	p. 48. In the final version p. 52.	New action.	Action 8.0.8 Utilize scientific data collected by other entities when appropriate to assess the status of the oyster resource, track restoration and replenishment efforts and evaluate management strategies and actions.
Action 8.6: It would be beneficial to identify here or in the discussion, what the shortcomings of the current monitoring program are and how DNR would like to address/change/ and make improvements.	The monitoring program is reviewed during the stock assessment and peer review. Recommendations to improve the survey/data are proposed as part of the process. Actions 8.0.6, 8.0.7 and 8.0.8 clarify how changes to surveys and data collection could occur and how they can be incorporated.	N			

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(Page 47). Suggest adding an overview of DNR Fisheries' oyster disease monitoring and assessment program at the Cooperative Oxford Laboratory.	The Fall Oyster Dredge Survey description was expanded to give a better understanding of what is collected.	Y	p. 47, para 2. In the final version p. 50, para 2.	New paragraph.	Integral to the Fall Oyster Survey are five types of indices intended to assess the status and trends in Maryland's oyster populations: the Spatfall Intensity Index, a measure of recruitment success and potential increase of the population obtained from a subset of 53 oyster bars; Oyster Disease Indices, which document disease infection levels as derived from a subset of 43 sentinel oyster bars; the Total Observed Mortality Index, an indicator of annual mortality rates of post-spat stage oysters calculated from the 43 oyster bar Disease Index subset; the Biomass Index, which measures the number and weight of oysters from the 43 Disease Bar subset relative to the 1993 baseline; and the Cultch Index, a measure of habitat at the 53 Spat Intensity Index bars. In addition to the Fall Survey collection of oyster information, ecosystem measures also have been part of the monitoring effort. Physical environmental factors are monitored by other groups or agencies and are incorporated into the benthic epifaunal, competitors, and predators are recorded during the Fall Survey. An extended time-series of epibenthic organisms associated with the oyster bar community and their ordinal rankings has also been recorded for every bar surveyed.
Action 5.1.2 – The department should "identify and pre-authorize" appropriate areas within sanctuaries for planting oysters raised by oyster gardeners. Currently, oyster gardening plantings are approved on an ad hoc basis, often leading to delays for program coordinators who are waiting to hear back from department staff on approvals via email. The department should consult with program coordinators at the start of the gardening season and pre-authorize areas that may be planted with oyster gardening oysters so that the program may proceed on schedule. At the end of the season, program coordinators should compile and submit to the department a database of all oyster gardening plantings, including dates, quantities, and locations. (pg. 27)	Planting sites are pre-approved and are not ad-hoc. A group from time to time may suggest a new site that will be considered independently. Most planting sites already exist. The various groups are advised and encouraged to provide their seasonal planting sites and plan in advance, not as they arise through the season. A coordinators meeting is held every year well in advance of the planting season. End-of-season reports are already required. Perhaps some groups aren't aware of the process due to staff changes. The department will reach out again to ensure the procedures are followed. Additional text was added to Action 5.1.2 to clarify.	Y	p. 27. In the final version p. 31.	Action 5.1.2 Identify and authorize appropriate areas within sanctuaries for planting oysters raised by oyster gardeners.	Action 5.1.2 Identify and authorize appropriate areas within sanctuaries for planting oysters raised by oyster gardeners and maintain these planted areas as sanctuaries. Continue to confirm planting areas with oyster gardening groups in advance of the planting season.
Oyster Gardener Consultation – Prior to any management actions in areas with oyster gardening enhancement, the department should consult with the local oyster gardening program coordinator and participants on the investment of local oyster gardening programs in the vicinity of the proposed action. Areas that have received restoration plantings by oyster gardening groups should not be allowed to be open to harvest. (pg. 27)	This is the current practice: local groups are consulted. Garden sites are not subject to harvest since they are in sanctuaries. Even if a sanctuary boundary were to change, the garden oysters would be protected by maintaining the sanctuary boundary around their site.	Y	p. 27. In the final version p. 31.	Action 5.1.2 Identify and authorize appropriate areas within sanctuaries for planting oysters raised by oyster gardeners.	Action 5.1.2. Identify and authorize appropriate areas within sanctuaries for planting oysters raised by oyster gardeners and maintain these planted areas as sanctuaries. Continue to confirm planting areas with oyster gardening groups in advance of the planting season.
Oyster Gardening and Broodstock Enhancement – Oyster gardening oysters should be considered for broodstock enhancement given they are nearly a year old and of a larger size when planted. If a metapopulation approach to management were used, areas in need of broodstock could be prioritized for oyster gardening investments. (pg. 27)	Gardened oysters are considered as broodstock enhancement. To the degree that local groups are able to make targeted plantings, they will be utilized and encouraged. There are important logistical issues with moving oysters long distances (from one tributary to another for example, or long distances within one tributary). Groups and growers are set up to plant locally - they are not set up to move oysters long distances. They often use private small boats, even kayaks. DNR supports local efforts and local plantings. For urgent or priority broodstock enhancement needs, far more oysters can be planted via the hatchery program by the large planting boats than by gardening, and it is more cost effective. One year's worth of gardened oysters can be planted in a few days by the hatchery program. Note, targeting oysters to certain locations has been discussed during the gardening program since 2008, but the many local groups want "their" oysters in "their" tributary on sites that are close to their community. Moving oysters out of tributaries to other tributaries for ecological or broodstock reasons has not been well received. The groups, understandably, view that the effort to grow the oysters is local and the oysters should stay locally. A meta-population approach is used in oyster management/restoration but garden oysters with local volunteer labor and small boats is not the best way to accomplish this.	N			
Being involved & volunteering in the Maryland Grows Oysters was a help in the right direction	None Needed.	N			
We also endorse the delineation of procedures for managing the Marylanders Grow Oysters Program.	None Needed.	N			
DNR regulations and policies should continue to support and promote oyster gardening. Registration, record-keeping, and reporting should be aggregated through program coordinators, not required of individual oyster gardeners. Areas planted within sanctuaries by oyster gardeners should not be declassified for harvest regardless of the current Tier status of the Sanctuary.	Tasks are already aggregated through the coordinators. An exception would be if a grower is working on his/her own and not part of a local group, then the tasks would be completed by the individual. Garden sites are protected in sanctuaries and not available for declassification.	N			

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Section 5.2, Partner Strategy 5.2, Page 28: We applaud DNR's recognition that coordination between various stakeholders is paramount and would posit that DNR's careful attention to this legally mandated effort should reassure the General Assembly so that they can control their incessant impulse to legislate the oyster restoration efforts in the Bay, rather than leaving DNR and its scientists and partners to develop, implement and measure the success of this FMP that has been carefully crafted after years of delay and dissembling by various political and special interest groups.	None needed.	N			
The department should not presume the goals of partners in the Plan for the same reasons that are listed in this section – the motivations for all groups are different. Suggest removing "There are an array of objectives, directives, and interests among the groups, but the ultimate goal is the same: a thriving oyster resource that benefits the ecology, culture, and economy of the Chesapeake Bay." (pg. 27)	Text was changed to reflect the comment but not removed.	Y	p. 27. In the final version p. 14.	There are an array of objectives, directives, and interests among the groups but the ultimate goal is the same: a thriving oyster resource that benefits the ecology, culture and economy of the Chesapeake Bay. The challenge is bigger than one group can solve alone.	There are an array of objectives, directives and interests among the groups. The ultimate goal of the department is a thriving oyster resource that benefits the ecology, culture and economy of the Chesapeake Bay. The multi-faceted challenge of managing oysters is bigger than one group can solve alone.
Strategy 5.2 – Again, remove references to the goals of partner organizations. "The department will promote the effective coordination of state, federal, and local agencies, organizations and stakeholders." (pg. 28)	There is no mention of partner organizations' goals in Strategy 5.2. It is a general statement to meet oyster outcomes and reflects all the different possibilities - ecology, culture, and economy.	N			
Suggest clarifying what is intended by this section. It seems to imply that a new group or committee will be developed for the coordination of these efforts but does not explicitly describe the group, its makeup or its charge. (pg. 27-28)	Section 2.5 Partners (Section 5.2 in the draft OMP) - The main purpose of this section is to acknowledge that there are many partners and with limited resources, effective coordination is essential. Names of groups were purposely not included. Whether or not new groups/committees are needed will unfold as the plan is implemented.	N			
Preface, Page 1: Add the word "wild" to the fourth (4th) sentence so it reads, "The goal of an FMP is to protect the resource while allowing optimal wild harvest."	The preface gives a description of the fishery management process in general, not specifically about oysters. The addition of "wild" would not be appropriate in this context.	N			
The Oyster Advisory Commission has not reviewed the Plan. The OAC was to review the Plan at the February meeting, but instead Commissioners were briefed on the content and purpose of fishery management plans. Unless the OAC will be given an opportunity to review and discuss this specific proposal at a meeting before this plan is finalized, this statement should be removed. (pg. 1)	The draft OMP was sent to all members of the OAC and was discussed at the April 2019 meeting. The OAC had an opportunity to review and discuss the plan before it was finalized. In addition, additional comments were solicited during the regulatory process of adopting the plan by reference into regulation.	N			
FMPs are updated annually – These annual FMP updates have not been updated online or in the department of Legislative Services library since 2016 (2015 Update). The department should complete these updates, submit them to the General Assembly, and make them available online as soon as possible. (pg.1)	The annual FMP updates for 2017 (2016 year) and 2018 (2017 year) have been completed and are under review. For additional questions about their posting on-line, please contact the department's Legislative & Constituent Director, James McKittrick.	N			
Action 6.7.2 - We believe the current operating procedures and standards of CBF's Maryland Oyster Gardening program meet most, if not all, of NSSP's requirements for shellfish gardening. Any regulations put forth by the department to fulfill such requirements should build upon the current framework of existing, highly successful oyster gardening programs, and not interfere with or discourage such beneficial activities. Specifically, the department should consider the following recommendations: a) Minimize requirements for individual oyster gardeners by working through coordinating and sponsoring organizations like CBF. Sponsoring organizations already maintain registries of oyster gardeners, numbers of oysters, planting locations, etc. that are necessary for ongoing communications and existing permit requirements. Such responsibilities should remain with the program coordinators, who can provide information to the department upon request, instead of requiring gardeners to register with both their program coordinator and the department.	Coordinators (such as in the MGO Program) already handle registration and many other requirements. About 5 years ago, the department continued its long-standing practice of working through coordinators, thus relieving the individual growers of many specific requirements. The process includes having the coordinators keep records. The department doesn't envision changing the S-O-P but ensuring that the procedures are followed and adjusting specifics as necessary.	N			
b) Oyster gardeners should be required to sign a waiver indicating their understanding that oyster gardening oysters are intended for ecological restoration and that they agree the oysters will not be sold or consumed.	Oyster gardeners are well informed about the purpose of the growing program to protect young oysters during their vulnerable first year of life so they can be planted on local sanctuaries to enhance the oyster population. The growers are also made aware that the oysters are not safe to eat and cannot be sold.	N			
c) Require signage on cages and in a conspicuous location where oyster gardening is taking place indicating that the oysters are intended for restoration and are not to be sold or consumed.	Signs currently exist on the department's MGO cages.	N			
d) The department should not impose penalties on oyster gardeners. Penalties and permit revocations go beyond the scope of the NSSP guidelines and are likely to discourage many would-be gardeners. Regulations prohibiting harvest from closed areas and sale of oysters without the proper permit, which are the specific activities NSSP seeks to prohibit, already exist elsewhere in the Code of Maryland Regulations. (pg.42)	The department has no intention of penalizing and fining growers for participating in the MGO program. Since the department holds the permit for the MGO activities, the department is the responsible party. The participants in the program are fully aware that they are not allowed to sell oysters. If an individual is caught selling oysters without the necessary credentials, it would be against regulations and they could be fined.	N			
Action 6.7.3 – To protect public health and safety, the department should encourage the maintenance of existing statutory penalties for individuals caught harvesting oysters more than 200 feet inside a restricted shellfish harvest area (pg. 42)	This is an ongoing priority of the department and also an essential part of maintaining compliance with the NSSP.	N			
While we recognize that recreational oyster harvest is a relatively limited activity, we support the addition of necessary surveys and reporting requirements that will directly support the sustainable management of the overall oyster fishery. Reporting of recreational harvest can support future efforts to define and manage future recreational harvest activities.	None needed.	N			
Regarding proposed regulations on recreational oyster harvest - Existing regulations prohibit recreational harvesters from selling their oysters and existing bushel limits should prevent high volume of harvest. Limiting the ability of recreational harvesters to catch oysters from a boat would restrict them to intertidal and very shallow subtidal areas. In many Maryland waters, there are no oysters at these elevations and their availability may be limited by lack of public access to the shoreline, which may disproportionately benefit those who have access to private shoreline areas. (pg. 42)	Recreational harvesters are not limited to harvesting from a boat and shoreline harvesting is allowed. Recreational harvesters would need to purchase longer hand tongs or dive to harvest oysters in deeper waters.	N			
Action 6.8.3 – The department should include easily accessible online maps and/or tools to indicate to the public which areas are closed to oyster harvest. When combined with a separate recreational oyster harvest endorsement (see below), information on closed areas, harvest rules, and public health guidelines could be provided at the point of sale. (pg. 43)	The shellfish closure book is already online and MDE has a mapping tool that shows restricted and conditional closure areas. The shellfish closure book also has information about public health guidelines. Recently, the department added an online gear harvest map tool: http://gisapps.dnr.state.md.us/GearLineMap/	N			

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The department should consider instituting a separate endorsement to the recreational fishing license for the recreational harvest of oysters that includes a small fee (\$5) to facilitate data collection on recreational harvest and effort. The department should explore modifications to the online recreational licensing system that would allow for self-reporting of the previous years' catch or use real-time reporting systems via the department's mobile application, like systems used in deer hunting. (pg. 43)	The department could consider a recreational fishing license for harvesting oysters but any fees would need to go through the legislative process. Modifications to the online collection of recreational harvest and effort could also be explored.	N			
This section should include background and discussion on the sources and funding levels for replenishment plantings. It should also include a description of the return on public investment for replenishment plantings, specific to planted areas, not an aggregate total revenue from harvest that includes both planted areas and natural recruitment. If such analysis is not possible, the Plan should outline why it is not possible, as this is fundamental to evaluating the value of continuing these types of programs. (pg. 38)	Added information on funding levels.	Y	p. 38. In the final version p. 42.	New table	Added Table 7. The amount of replenishment plantings for the public fishery and the cost associated with the plantings.
The background section describes pilot programs for the use of alternative substrate on public fishery bottom. This should be stated as an Action. (pg. 38)	Added Action 3.9.0 to Section 3.0.	Y	p. 15. In the final version p. 17.	New text.	Action 3.0.9. Evaluate the feasibility and effectiveness of utilizing different alternative materials in public fishery areas for the purpose of improving harvest.
Replanting should be required at double the rate of harvest (2 bushels planted for each harvested) to ensure a positive shell budget and oyster population trajectory. This should be added as an Action. (pg. 39)	Addressed generally in Strategy 6.6 Use replenishment plantings to maintain and increase sustainable bar productivity for the public fishery.	N			
The department should increase bushel taxes, as requested by the OysterFutures workgroup. This should be added as an Action. (pg. 39)	Addressed generally in Action 6.6.4 Evaluate and consider future funding opportunities or the use of public-private partnerships to support replenishment plantings.	N			
This section should include a discussion on the capabilities and capacity of the Piney Point hatchery and a description of why the department would pursue encouraging private capacity for spat-on-shell facilities for use on repletion plantings over utilizing State-owned resources and facilities. (pg. 39)	Addressed generally in Action 6.6.1. As aquaculture becomes more prevalent, more larvae will be needed to supply spat on shell. Virginia has multiple hatcheries both public and private to support their aquaculture industry.	N			
Good to see climate incorporated. Temperature, salinity, and acidification changes are all going to impact oysters. A predictive model of these impacts would be a useful tool.	None needed.	N			
This section is one that benefits again from regional collaboration through the Bay Program Sustainable Fisheries GIT and the Climate Resiliency Workgroup.	None needed.	N			
Studies related to the impacts of gear on sub-market sized oysters and habitat should be completed and utilized in the determinations of what harvest gear is most effective for the overall benefit of the oyster fishery and resource.	A need for research pertaining to gear impacts on oyster populations, habitat, and shell can be found in Section 12.0 Research Needs.	N			
Research should be done on a spatial level that recognizes the variability in numerous conditions and the ability and rate of which the oyster resource can be rebuilt after such harvest gear impacts.	The research need pertaining to gear impacts is broad enough to allow for a spatial component.	N			
The department should prioritize which of these data gaps are critical to management and should be addressed first. Additionally, this section should include a summary of funding sources within the department that could be used to address these research questions and an annual budget that would support these activities. (pg. 56)	Research needs included in the management plan came from many sources and the original list was critically examined. Some research needs have been incorporated into the plan as actions. The remaining list has not been prioritized but categorized. Research needs in FMPs are often the basis for writing grants. Scoping and summarizing possible funding sources and budget is beyond the purview of this management plan.	N			
This section lists a commitment to working with industry partners on projects but does not include collaborating with the academic community. This should be explicitly stated. (pg. 56)	Accepted suggestion.	Y	p. 56. In the final version p. 60.	The department should continue to conduct pilot projects with industry partners and other interested private entities to improve its ability to manage the oyster resources.	The department should continue to conduct projects with industry partners, government partners, academics, non-profit organizations, and other interested entities to improve its ability to manage the oyster resources.
Changes to the department's current monitoring and survey programs recommended by the stock assessment report or its peer review report should be implemented. Further research will be necessary to calibrate oyster indices following any changes (pg. 56)	Addressed in Section 8.0 Monitoring.	N			
Data collected during routine monitoring or in the context of these research projects should be made publicly available so that researchers may use the data to develop and implement research programs to address knowledge gaps. (pg. 56)	Data collected by the department using public funds is available to the public upon request	N			
Other: In addition to economic research to quantify the oyster harvest industry, the department should conduct and support research on the direct, indirect, and induced economic benefits of the Maryland oyster aquaculture industry. (pg. 58)	Accepted suggestion.	Y	p. 58. In the final version p. 62.	Research the economic benefits and impacts of the oyster fishery and replenishment activities.	Research the economic benefits and impacts of the oyster fishery, aquaculture, and replenishment activities.
Research the genetic impact of commercial and restoration hatchery seed on the genetic diversity of Bay's oyster population	This was recently addressed in a research journal. See Hornick KM, Plough LV (2019) Tracking genetic diversity in a large-scale oyster restoration program: effects of hatchery propagation and initial characterization of diversity on restored vs. wild reefs. Online version in advance of print. https://doi.org/10.1038/s41437-019-0202-6	N			
Develop methods and procedures for approving artificial substrate materials	Methods and procedures for approving artificial substrate materials already exist via the permitting process by state and federal agencies.	N			
Research the interactions between shellfish aquaculture and Submerged Aquatic Vegetation (SAV).	Efforts are underway to evaluate the interactions between SAV and Maryland shellfish aquaculture activities on leases.	N			
Assess the effects of activities and gear/equipment used by Maryland shellfish growers on SAV	Efforts are underway to evaluate the interactions between SAV and Maryland shellfish aquaculture activities on leases.	N			
Identify scientific metrics to inform growers on equipment placement, spatial distribution and responsible harvesting and maintenance activities on leases where SAV has encroached.	Efforts are underway to evaluate the interactions between SAV and Maryland shellfish aquaculture activities on leases.	N			
DNR should explicitly seek out research funding or partner with academic institutions to carry out these research priorities.	Research needs delineated in management plans often provide the basis for writing a grant and successfully obtaining funding.	N			

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DNR should also leverage opportunities through existing regulatory and enforcement activities to collect data to support research priorities.	Addressed in Section 12.0.	N			
Plans to produce more oyster healthy populations must use knowledge about the species and address gaps with plans to scientifically bridge those gaps and provide better understanding. Application of sound science will allow us to reverse the downward spiral of our resource. These should recognize aspects of successful restoration and ensure appropriate safeguards are in place to allow positive results.	Addressed in Section 12.0.	N			
Research the economic value of recreational uses of our Bay as it relates to the abundance of oysters and water quality, and determine whether Maryland economy might benefit from a drastic reduction of harvest of wild oysters.	The Chesapeake Bay Foundation provides a report on the Economic Benefits of Cleaning up the Chesapeake and it provides some insights into Maryland's economy, natural and ecosystems value: at: https://www.cbf.org/news-media/features-publications/reports/economic-benefits-of-cleaning-up-the-chesapeake-bay/	N			
Research the health implications from recreational and commercial Bay use as it relates to water quality. (Will more people recreate on our waters if it was cleaner? Yes. Will other fisheries benefit from more oyster abundance? Yes.)	The Chesapeake Bay Foundation also has information on their website about restoring the bay and its relationship to human health: https://www.cbf.org/issues/what-we-have-to-lose/cost-to-human-health.html	N			
Page 57, Biological Reference Points. Add objective to continue the bay-wide stock assessment and develop biological reference points for both population size and harvest.	Addressed in Action 4.2.	N			
Will DNR develop a prioritization for research needs? If so, mention how this will be done.	The department has not prioritized the research needs outlined in the 2019 OMP. However, research needs from the stock assessment, the 5-Year Report, and Oyster Futures were critically examined and some recommendations were incorporated as actions in the plan. As actions from the plan are completed, the current list of research needs in Section 12.0 will be used to further progress on restoring oysters to the bay.	n			
(Page 56). Recommend including an action to identify the diet of oysters (especially oyster spat), assess changes over time, and determine if diet composition influences growth and survival.	The diet of both larval and adult oysters including food ingestion and selection, and the effects of food size and concentration, has been studied by a number of researchers. Algae is the primary food source and hatchery operations over time have resulted in developing algal culture for optimum growth and development under hatchery conditions. Diet composition does influence growth and survival. Liang (1995) conducted laboratory experiments on larval feeding. Spatfall was affected by the nutritional value of food species during settlement. Algal species that supported slower growth rates resulted in lower spatfall. Feeding activity is also influenced by temperature and salinity (Rodstrom 2000). Other exogenous factors affecting feeding include water flow, particle concentration, and oxygen levels.	N			
(Page 11). The Draft OMP proposes to use the following three management zones which were established about 20 years ago. Zone 1: 5-11 ppt.; Zone 2: 12-14 ppt.; and Zone 3: 15+ ppt. The PEIS for Chesapeake Bay Oyster Restoration Alternatives completed in 2008 concluded that the following salinity zones for management were most justifiable: <11 ppt. (recognizing oysters are not commonly found below 5 ppt.; 11-15 ppt.; and 15+ ppt. Recommend DNR utilize recommendations from PEIS.	Accepted suggestion.	Y	p. 11. In the final version p. 13.	Zone 1 has an average salinity between 5 and less than 12 ppt, Zone 2 has an average salinity between 12 and 14 ppt and Zone 3 salinities are greater than 14 ppt (Chesapeake Bay Program, 2004).	Zone 1 has an average salinity >= 5 and <11 ppt, Zone 2 has an average salinity between >=11 and <15 ppt and Zone 3 salinities are greater than or equal to 15 ppt (U.S. Army Corps of Engineers, Norfolk District, 2009)
(Page 11-12). Recommend adding that "All seed and spat on shell plantings need to occur on high quality habitat to ensure maximum survival."	Addressed in section 3.0 Substrate.	N			
2.4 Salinity Zones The salinity zones delineated in this section differ from those in the 2009 Programmatic Environmental Impact Statement. These zones should be made to conform to the PEIS so that the management strategy evaluation tools developed as part of that process could be used to help inform management. (pg. 11-12)	Accepted suggestion.	Y	p. 11. In the final version p. 13.	Zone 1 has an average salinity between 5 and less than 12 ppt, Zone 2 has an average salinity between 12 and 14 ppt and Zone 3 salinities are greater than 14 ppt (Chesapeake Bay Program, 2004).	Zone 1 has an average salinity >= 5 and <11 ppt, Zone 2 has an average salinity between >=11 and <15 ppt and Zone 3 salinities are greater than or equal to 15 ppt (U.S. Army Corps of Engineers, Norfolk District, 2009)
Continue to be risk averse and keep sanctuaries in place.	Addressed in Sanctuary Objective #3.	N			
Throughout and foremost in sections referencing Sanctuaries, recognize the term habitat as referring to both the 2-dimensional hard substrate required for settlement and the 3-dimensional complex vertical structure required for enhanced ecological function. Functional habitat has both components.	Addressed in Section 3.0 Substrate (p. 15).	N			
Suggest using restored sanctuaries as living labs and document habitat value and ecosystem services	Addressed in Section 12.0 Research Needs (p. 60).	N			
Engage communities near sanctuaries in developing oyster restoration projects as BMPs toward the WIPS and TMDL. Could be pilots for nutrient trading.	Addressed in Section 12.0 Research Needs (p. 60).	N			
Ensure that sanctuary boundaries do not divide existing oyster bars.	Sanctuary boundaries may need to cut through a bar boundary for ease of enforcement.	N			
Another concern for me is the implication that rotational harvest could be directed to existing oyster sanctuaries. Restoration and replenishment are two completely different enterprises, and we have only begun to increase our oyster stocks recently, when they were clearly divided into separate programs. Sanctuaries must remain off-limits to wild harvest for the long-term, to provide additional ecological benefits of high-quality reef habitat and diverse age structure to build their reproductive potential.	Addressed in last paragraph of p. 27.	N			
The surface area of oyster sanctuaries is irrelevant to their scale for ecological conservation. What is important is that 20-30% of productive habitat is protected, as is recommended by the scientific literature. According to the department's rationale for sanctuaries, "protection of 20-30% of productive oyster bottom is in line with the recommendations of the best available science, and is a prudent step toward ensuring the long-term sustainability of Maryland's oyster resource." Currently, 24% of oyster habitat is in sanctuaries, so this language should be corrected to reflect the actual percentage of oyster habitat, rather than the percentage of surface area. (pg. 23)	Text changed to clarify.	Y	p. 23. In the final version p. 26.	In 2018, there were 252,285 surface acres in oyster sanctuaries, of which 31 percent (78,520 acres) was delineated in the 1906-1912 Yates Oyster Survey and its amendments (Maryland department of Natural Resources, 2016) (Figure 13).	In 2018, there were 252,285 surface acres in oyster sanctuaries, of which 78,520 acres was delineated in the 1906-1912 Yates Oyster Survey and its amendments (Maryland department of Natural Resources, 2016) (Figure 13). The 78,520 acres of historic chartered oyster bar area within sanctuaries equates to 24% of the total historic chartered oyster bar area as of 2018.

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Given the influence of environmental conditions on oyster recruitment, growth, survival, sedimentation, etc. a more appropriate comparison would be comparing sanctuary areas to nearby harvested areas within the same period in addition to looking at how sanctuaries perform before and after limiting harvest. (pg. 24)	Addressed in Section 12.0 Research Needs p. 60.	N			
Many Tier II and Tier III sanctuaries identified in the Oyster Management 5-Year Review Report were so classified not because of their poor performance but because they were data poor and their status relative to the criteria could not be determined. This should be acknowledged. (pg. 24)	The OMP did not provide an extensive review of the Oyster Management 5-Year Report but used it as a source document (p. 9). Section 5.0 acknowledges the complexity of oyster production in different areas and notes that it may take many decades to show how oyster populations respond to the absence of harvest. A sanctuary area that is data poor would not be enough justification for reducing or removing sanctuary status. Justification would have to be based on scientific information (Action 5.0.6). In addition, Section 12.0 Research Needs - addresses the issue of data gaps (p. 61).	N			
The necessity of significant investment for ecological restoration should not be considered an eliminating criterion for restoration. If an area would provide significant benefits as a sanctuary, restoration actions should be considered as federal and local partners are willing to pursue necessary funding to achieve such actions. Additionally, significant annual investments upwards of \$1.5 million support the public fishery, so the cumulative investments supporting that industry, including opening sanctuaries and planting them continuously to "contribute to the economic and cultural benefits of fishing communities" should be considered relative to the one-time cost of restoration. (pg. 24)	Section 9.0 Socioeconomics - provides additional information on economic analyses including valuation of ecosystem services. The results "suggest that the total potential return on oyster reef restoration investments justifies restoration and protection of oyster reefs" (p. 53). Page 27-28 (in the final OMP) does not consider investment as an eliminating criteria for restoration but states that financial investment is necessary for restoration within some areas.	N			
Action 5.1 – Replace with: Maintain a network of clearly marked oyster sanctuaries that protects 20-30% of productive oyster bottom, including 50% of the 'best bars' as described by the 2009 Best Bars report or a similar updated methodology throughout Maryland's Chesapeake Bay and its tributaries.	Accepted suggestion. Besides changing the action, more specificity was added to Sanctuary Objective #3.	Y	p. 25. In the final version p. 29.	Action 5.2 Ensure sanctuaries are of sufficient size and distribution to promote regional oyster production and ecological services and are managed based on defined and measurable criteria.	Action 5.2 Ensure sanctuaries are of sufficient size, include at least 20 to 30% of productive oyster bottom including and 50% of the 'best bars' are distributed to promote regional oyster production and ecological services, and are managed based on defined and measurable criteria.
Action 5.5 – (1) As stated above many areas of PSFA and outside the sanctuaries are underperforming. To justify how a proposed sanctuary will increase oyster abundance and biomass, it is likely that a restoration plan will have to be considered as a part of the justification, not as a subsequent step following delineation.	Action 5.0.5 - lists a series of steps as part of the delineation process. The first step would be to evaluate and then plan. The evaluation part would necessarily be the justification/background of the restoration and monitoring plan.	N			
Action 5.5 – (5) Include description of the amount of productive oyster bottom that would be protected and how much of that productive bottom is included in the 50% of 'best bar' area.	The amount of productive bottom and how much it would contribute to the best bar areas would vary depending on location and other environmental factors. This type of description would be part of the justification of the area and does not require specificity in the OMP.	N			
Action 5.6 – (1) The criteria listed here for declassification are entirely subjective without baselines for comparison. The department should instead use as a starting point the 5-Year Oyster Review Report, which suggests classifying sanctuaries into tiers based on a number of biological criteria. Additionally, the Plan states that several ecological benefits may take up to centuries to be realized, yet then suggests that 5 years is a sufficient amount of time to justify modifying sanctuary boundaries. A "sufficient amount of time" if used for the evaluation of these criteria should be no less than 10-15 years, including at least 5 years of continuous data collection in data poor sanctuaries.	Accepted suggestion.	Y	p. 25. In the final version p. 29.	1. Justify why the sanctuary should be removed or modified based on scientific information (e.g., if the area has poor habitat, low oyster densities or is not performing to expected outcomes of increased oyster production and beneficial ecological services given a sufficient amount of time).	1. Justify why the sanctuary should be removed or modified based on scientific information over time (e.g. ten years of data indicates that an area has poor habitat, low oyster densities or is not performing to expected outcomes of increased oyster production and beneficial ecological services).
Action 5.6 – (2) Here, the ecological benefits that accrue to all citizens are overruled if economic benefits, which accrue only to a small subset, would result from sanctuary declassification. Since oyster sanctuaries, by definition, do not produce economic benefits through harvest and the department's monitoring programs are insufficient to quantify ecosystem service values, this criterion is arbitrary and could be used to justify opening all sanctuaries. Action 2(b) should be removed.	Action 5.0.6 does consider ecological benefits in step 1. Justify why the sanctuary should be removed or modified based on scientific information (e.g. ten years of data indicates that an area has poor habitat, low oyster densities or is not performing to expected outcomes of increased oyster production and beneficial ecological services). In addition, economic benefits of oyster reefs and their ecosystem services are acknowledged in Section 9.0.	N			
Action 5.6 - The declassification criteria in this section suggests that opening sanctuaries to harvest is the only means to achieve enhanced oyster abundance and biomass. This suggests that the department intends to continue foregoing restoration efforts in state sanctuaries. Instead, the department should develop restoration plans for sanctuaries that could benefit from restoration actions. The department should also develop monitoring plans for data poor sanctuaries that will inform later decision-making.	Action 5.0.6 - The declassification criteria in this section does not suggest that opening sanctuaries to harvest is the only means to achieve enhanced oyster abundance and biomass. Sanctuary Objective #5 (p 10) clearly states the department's intent: Support, enhance, and increase restoration activities in other tributaries throughout the Chesapeake Bay. Actions 5.0.1 and 5.0.2 implement the intent.	N			
Action 5.6 – Additional Criteria for Sanctuary Declassification: a) Tier 1 and Tier 1A sanctuaries should remain closed to harvest and evaluated to determine if restoration actions are necessary; if so, the department should develop, execute, and monitor such actions;	Tier classifications from the departments 5-year report were based on data from 2010-2015. As more data becomes available over time, the classifications may change. Areas will be evaluated on a case by case basis. Action 5.0.4 addresses the monitoring of the sanctuaries.	N			
b) Tier 2 sanctuaries that are not data poor should remain closed to harvest to determine how they will respond to restoration action and continued removal of harvest pressure, as suggested in the 5-Year Oyster Management Review Report; Tier 2 sanctuaries should be evaluated to determine if restoration actions are necessary; if so, the department should develop, execute and monitor such actions	A sanctuary area that is data poor would not be changed based on lack of data. Any sanctuary area that is reduced in size or removed must be based on scientific information (Action 5.0.6). Tier classifications may change over time and areas will be evaluated on a case by case basis.	N			
c) Tier 3 sanctuaries that are so classified because they did not meet biological criteria could be declassified if there is interest from the industry in rehabilitating these areas and a demonstrated plan, prior to declassification, for planting, funding, and monitoring this area; if fishing mortality rates exceed the threshold or management actions do not result in an increase in oyster abundance or biomass, new management actions should be evaluated	Any declassification of sanctuary areas will be based on the steps in Action 5.0.6.	N			
d) Data-poor sanctuaries – the department should develop monitoring plans for these areas and reconsider their classification only after at least 5 years of continuous data collection	Action 5.0.4 addresses monitoring of sanctuaries.	N			

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e) Consultation with local stakeholder groups – prior to declassification, the department should consult with local stakeholder groups, particularly those who have an interest in oyster gardening or restoration areas within that sanctuary. Areas that have received restoration efforts through oyster gardening programs or restoration projects led by these organizations should not be declassified.	Action 2.5.1 addresses engaging stakeholders in the development of effective coordination strategies and resource planning. Any changes in sanctuary boundaries would require a change in regulation, which would go through public comment and include stakeholder groups. The gardened oysters are protected within sanctuaries.	N			
f) With declassification, the department should maintain in sanctuary 20-30% of productive oyster bottom, inclusive of 50% of the 'best bars'. (pg. 26)	Addressed in Action 5.0.2.	Y	p. 28. In the final version p. 29.	Action 5.2 Ensure sanctuaries are of sufficient size and distribution to promote regional oyster production and ecological services and are managed based on defined and measurable criteria.	Action 5.0.2 Ensure sanctuaries are of sufficient size, include at least 20 to 30% of productive oyster bottom and 50% of the 'best bars' distributed to promote regional oyster production and ecological services and are managed based on defined and measurable criteria.
I would like the sanctuaries to be closed off to harvest	Harvesting oysters from sanctuaries is prohibited by law and regulation. It is also stated in the OMP	N			
I fully support everything that is being done to protect the oysters and efforts in improving their habitat. There should be more oyster sanctuaries in order to speed up the population growth and health of the water. 9% is not nearly enough compared to the rest of the water that is being used for harvest.	One of the department's objectives is to conserve and protect oyster habitat and biomass through the maintenance of sanctuaries so that a minimum of 20-30% of oyster habitat, and 50% of the best bars are within sanctuaries. Action 5.0.5 provides steps for establishing new oyster sanctuaries or expanding the size of an existing sanctuary.	N			
I'm glad to see the draft oyster management plan clearly denotes the importance and value of sanctuaries, but am surprised it doesn't specifically state in section 5.0 or elsewhere that currently established sanctuaries will remain closed to any and all commercial and recreational harvest, certainly until such time that the wild stock of oysters can be declared recovered in the Chesapeake Bay. To allow any harvest in these areas would be the height of hypocrisy – I hope the finalized plan spells out the full protection of these sanctuaries more clearly.	The department states in Sanctuary Objective #3 that sanctuary areas will be conserved and protected. Sanctuaries are closed to oyster harvest by law and regulation. However, there may be some sanctuaries that are not performing well due to environmental conditions (e.g. the salinity is too low for recruitment). Action 5.0.6 provides steps to remove or alter a sanctuary if warranted.	N			
I oppose creating permanent sanctuaries as they would remove productive areas from any future harvest.	Actions 5.0.5 and 5.0.6 address steps for adding new sanctuaries and removing or altering existing sanctuaries.	N			
Sanctuaries are a critical component of growing the oyster population and 20-30 % of oyster habitat should remain in sanctuary, including 50% of the best oyster habitat. No Tier I or Tier II sanctuaries or areas where oyster abundance and/or biomass has been increasing in the absence of harvest should be declassified for harvesting.	Addressed in Action 5.0.2	Y	p. 25. In the final version p. 29.	Action 5.2 Ensure sanctuaries are of sufficient size and distribution to promote regional oyster production and ecological services and are managed based on defined and measurable criteria.	Action 5.0.2 Ensure sanctuaries are of sufficient size, include at least 20 to 30% of productive oyster bottom, and 50% of the 'best bars' are distributed to promote regional oyster production and ecological services, and are managed based on defined and measurable criteria.
Sanctuary boundaries should be easily enforceable and utilize straight lines wherever possible to facilitate enforcement using the MLEIN. Sanctuary boundaries should not cut oyster bars in half and should provide a sufficient buffer from the oyster habitat to the sanctuary boundary so that significant areas of oyster habitat are not within 200 feet of the sanctuary boundary.	Management lines are drawn in consultation with various stakeholder groups to achieve a variety of management objectives. To the extent practicable, lines are drawn in a way that facilitates compliance with the rules while balancing harvest opportunities with restoration efforts.	N			
No sanctuary should be declassified by public notice. A regulatory change to sanctuary boundaries should occur only following a public notice and public hearing. All declassified areas should exclude areas that have been planted for restoration by local, regional, state or federal entities.	Since sanctuary boundaries are listed in regulation, only a regulatory change could declassify a sanctuary and would go through the regulatory process with public notice and public hearing. Accepted suggestion regarding Marylanders Grow Oysters protection.	Y		Action 5.1.2. Identify and authorize appropriate areas within sanctuaries for planting oysters raised by oyster gardeners.	Action 5.1.2. Identify and authorize appropriate areas within sanctuaries for planting oysters raised by oyster gardeners and maintain these planted areas as sanctuaries.
20 – 30 % of Oyster habitat should remain in sanctuaries	Addressed in Action 5.0.2.	N			
Sanctuaries should not be declassified simply for public commercial harvest	None needed.	N			
Section 5.0: Sanctuary protections are an essential element of a plan to preserve and rebuild the resource. The plan should prohibit any decrease in the total % of best oyster habitat in sanctuary status and prohibit any harvesting in sanctuaries. Any boundary changes should take place through the regulatory process with public comment and sound scientific justification.	Sanctuaries are protected by law and regulation. Action 5.0.2 addresses the percentages. Any changes to boundaries would go through the regulatory process, which includes public comment.	Y	p. 25. In the final version p. 29.	Action 5.2 Ensure sanctuaries are of sufficient size and distribution to promote regional oyster production and ecological services and are managed based on defined and measurable criteria.	Action 5.2 Ensure sanctuaries are of sufficient size, include at least 20 to 30% of productive oyster bottom, and 50% of the 'best bars' distributed to promote regional oyster production and ecological services, and are managed based on defined and measurable criteria.
Section 5.1: The department has been very successful in supporting and promoting oyster gardening for restoration, and the plan should provide for aggregated record keeping by program coordinators (not by individual participants) and protect sanctuary areas planted by oyster gardening programs from declassification (without regard to the Tier classification of the sanctuary.)	Addressed in actions 5.1.2 and 5.1.3.	N			
All sanctuary areas should have a restoration plan associated with in order to monitor progress and scientifically justify the need for any change in actions. Before altering the designation of any sanctuaries and/or their boundaries, a restoration plan must be executed for a pre-determined amount of time chosen to be sufficient to monitoring progress towards success. Only then if a sanctuary action or boundaries need to be changed should it be done through regulation that allows for public review and comment. And those sanctuaries that have received plantings from oyster gardening efforts or through activities funded by local or federal programs should remain protected regardless of the reefs' tier status.	Sanctuary monitoring is addressed in Action 5.0.4. Any changes in the designation of a sanctuary will consider all of the steps outlined in actions 5.0.5 or 5.0.6. Clarifying text was added to the first step in Action 5.0.6. Any changes to sanctuary boundaries must go through the regulatory process, which includes public comment and public hearing. Plantings in sanctuaries by the Marylanders Grow Oysters program are protected by Action 5.1.2.	Y	p. 25. In the final version p. 29.	1. Justify why the sanctuary should be removed or modified based on scientific information (e.g., if the area has poor habitat, low oyster densities or is not performing to expected outcomes of increased oyster production and beneficial ecological services given a sufficient amount of time).	1. Justify why the sanctuary should be removed or modified based on scientific information (e.g., ten years of data indicates that an area has poor habitat, low oyster densities or is not performing to expected outcomes of increased oyster production and beneficial ecological services).

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Action 5.4 – Continue to monitor sanctuaries. What is the plan for future funding, and to have sufficient funds to accomplish this?	The annual Fall Oyster Dredge Survey and the Oyster Patent Tong Population survey (Action 8.0.2 and 8.0.3) are funded under state efforts to monitor oyster populations. If additional funding is not available, the methodology for monitoring sanctuaries will need to be evaluated and adjusted accordingly to continue to provide the data necessary for assessing progress.	N			
Action 5.5 – What is the process for selection of new sanctuaries or expansion of existing?	Action 5.0.5 lists steps to consider when establishing a new sanctuary. Recommendations for new sanctuary areas will come through the Oyster Advisory Committee with input from the scientific community and stakeholders. In addition, there would be a regulatory process to add sanctuary areas.	N			
Action 5.6 – What is the process for deciding that an existing sanctuary should be removed or reduced?	Action 5.0.6 lists steps to consider when reducing or removing a sanctuary. Recommendations for reducing or removing a sanctuary area will come through the Oyster Advisory Committee with input from the scientific community and stakeholders. In addition, there would be a regulatory process to reduce or remove a sanctuary area.	N			
Action 5.2: Text recognizes that scientific consensus supports 20-30% of an ecosystem within a protected sanctuary is a reasonable goal. Action 5.2 states 'Ensure sanctuaries are of sufficient size and distribution'. What is the process for ensuring this? Is DNR committed to maintaining 20-30% of the oyster habitat in sanctuaries? If so, state that size as the target rather than 'sufficient size'.	Addressed in Action 5.0.2.	Y	p. 25. In the final version p. 29.	Action 5.2 Ensure sanctuaries are of sufficient size and distribution to promote regional oyster production and ecological services and are managed based on defined and measurable criteria.	
Best Bar Analysis. DNR should review the Best Bar Analysis that Dr. Brian Rothschild conducted around 2010 using DNR's Fall Oyster Survey data. The analysis includes an assessment of oyster bar performance throughout Maryland that might be useful going forward.	Accepted suggestion.	y	p. 61.	New bullet	Conduct oyster bar analysis to determine if there has been a spatial shift in oyster productivity.
Sanctuary restoration metrics. There is no mention of the sanctuary restoration monitoring protocol and success metrics established by the CBP Sustainable Fisheries Goal Implementation Team. DNR is currently utilizing these monitoring and survey protocols which could be easily utilized to monitor the public fishery and aquaculture sites so all comparisons compare apples to apples.	Section 8.0 Monitoring - provides a broad overview of monitoring the oyster population. On p. 50, paragraph 3, last sentence: " In addition.....can be used to determine when a sanctuary is restored according to predetermined oyster metrics (Oyster Metrics Workgroup, 2011).	N			
Sanctuaries. Plan fails to address its own statement that "having 20 to 30% of an ecosystem within a marine protected sanctuary is a reasonable goal to ensure protection of biodiversity"	Addressed in Action 5.0.2.	Y	p. 25. In the final version p. 29.	Action 5.2 Ensure sanctuaries are of sufficient size and distribution to promote regional oyster production and ecological services and are managed based on defined and measurable criteria.	Action 5.0.2 Ensure sanctuaries are of sufficient size, include at least 20 to 30% of productive oyster bottom and 50% of the 'best bars' are distributed to promote regional oyster production and ecological services, and are managed based on defined and measurable criteria.
We congratulate DNR on drafting a comprehensive Oyster Management Plan, and for including strategies for sanctuary management in that draft plan. We endorse the Action Steps delineated to add a new sanctuary or to remove sanctuary status and encourage the DNR to utilize these Action Steps in an open-to-the-public procedure for future changes to sanctuaries.	None needed.	N			
This plan would better serve all of the citizens of the state of Maryland and the Chesapeake Bay watershed if it promoted the following: The perpetual designation of sanctuary areas that would never be open for harvest.	None needed. Sanctuaries are protected from harvest by law and regulation.	N			
Increasing the density of oysters to 1,000 per square meter increases the efficiency to almost 71%. Broodstock sanctuaries should be created and oysters added to increase the density to levels that provide for maximum egg fertilization.	Addressed generally in Sanctuary Objective #1: Increase oyster populations to levels that improve important ecological functions and yield adequate broodstock to sustain regional populations.	N			
Care should be taken to explain that oyster spawning and oyster recruitment (the production of spat) are two very different processes. While it is true that they are highly related, it is also true that oysters may spawn and produce no spat. It is also true that sites where spatfall is more common probably receive larvae of settlement stage from multiple spawning sites. For these reasons it is foolish to evaluate broodstock sanctuaries with the metric of increased spatfall. Broodstock sanctuaries should be evaluated by the density and composition of the oyster populations found within them. Some sites in regions that exhibit extremely low natural recruitment may require supplemental plantings to maintain either the proper density and or the proper age/size ratio to ensure successful larval production.	The Spatfall Intensity Index is a measure of recruitment success and potential increase of the population and is not used to evaluate broodstock sanctuaries. Sanctuaries have not been designated specifically as "broodstock" rather the creation and maintenance of sanctuaries is intended to protect broodstock (p.26). The Chesapeake Bay jurisdictions have formally adopted the metrics from the report "Restoration Goals, Quantitative Metrics, and Assessment Protocols for Evaluating Success on Restored Oyster Reef Sanctuaries" (Oyster Metrics Workgroup 2011) to assess the success of sanctuary restoration.	N			
These need to be protected forever. We need more highly functioning sanctuaries.	None needed. Sanctuaries are protected from harvest by law and regulation.	N			

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Pledge to restore tributaries 6-10 by 2035.	Addressed in Sanctuary Objective #4 -Conduct and complete large-scale restoration in five tributaries by 2025. Text was added to Section 5.0 p.28, last paragraph.	Y	p. 28.	New text.	The Chesapeake Bay jurisdictions have committed to implementing the goals and outcomes of the 2014 Chesapeake Bay Watershed Agreement. The oyster restoration outcome is to restore native oyster habitat and populations in ten tributaries of the Chesapeake Bay (five in Maryland and five in Virginia) by 2025. To date, large-scale restoration work has been conducted in Harris Creek, Little Choptank River, and Tred Avon River on 730 acres. Large-scale restoration in the Upper St. Mary's River and the Manokin River will start in 2019. Large-scale restoration activities can consist of pre-restoration oyster population surveys, planting substrate and oyster spat-on-shell, and post-restoration oyster population surveys to monitor progress. Federal, state and non-profit organizations have funded these restoration activities to date (Table 5).
Set a goal to increase sanctuary area that is thriving and meets current restoration goals to 15,000 acres (about 5% of the overall goal of 300,000 productive acres – a historic level).	Addressed in Action 5.0.2..	Y	p. 25. In final version p. 29.	Action 5.2 Ensure sanctuaries are of sufficient size and distribution to promote regional oyster production and ecological services and are managed based on defined and measurable criteria.	Action 5.0.2 Ensure sanctuaries are of sufficient size, include at least 20 to 30% of productive oyster bottom and 50% of the 'best bars' are distributed to promote regional oyster production and ecological services, and are managed based on defined and measurable criteria.
Page 23, Sanctuaries, Action 5.6. It doesn't make sense that a poorly performing sanctuary would be open to harvest, as they would only future reduce the oyster population. A restoration plan needs to be developed and implemented for each sanctuary.	Any changes to removing or reducing the size of a sanctuary will be justified based on scientific information gathered over time. There is a plan at the project level for each sanctuary area.	Y	p. 25. In final version p. 29.	1. Justify why the sanctuary should be removed or modified based on scientific information (e.g., if the area has poor habitat, low oyster densities or is not performing to expected outcomes of increased oyster production and beneficial ecological services given a sufficient amount of time).	1. Justify why the sanctuary should be removed or modified based on scientific information (e.g., ten years of data indicates that an area has poor habitat, low oyster densities or is not performing to expected outcomes of increased oyster production and beneficial ecological services.
Arundel Rivers is pleased to see the DNR's acknowledgement that "in most Maryland sanctuaries, substrate and seed plantings will need to occur to restore the population as this will increase oyster biomass" Id. 23. As discussed above, this recognition should guide any decision to alter boundaries of an oyster sanctuary. If there has been no investment in a given sanctuary, it should not be opened for harvest. This is especially so in light of the DNR's acknowledgement that "[g]iven the complexity of the Chesapeake Bay ecosystem, it could take many decades to show how oyster populations respond to the absence of harvest."	Addressed in Action 5.0.6.	N			
Section 5.0, Action 5.5, Page 25, add #5: Include all stakeholders, including impacted county governments and members of the public oyster fishery, in the process of adding new, or expanding, sanctuaries in the Bay.	Any sanctuary boundaries would be changed through regulation which includes all stakeholders and public comment.	N			
the Eastern oyster's three-dimensional reefs have historically played as vital a role in this estuary's ecosystem as corals have in tropical waters. Losing more than 90% of this habitat has caused profound negative changes in the Chesapeake's fisheries and other elements of its ecosystem. How much more valuable would Maryland's Bay waters be to us, its citizens, if we could restore our Bay's oyster reefs by even 30% over this century?	Ecosystem services are recognized in section 11.0 (p.57-59). The valuation of ecosystem services are found in Section 9.0 (p.53-54).	N			
Seed areas should be excluded from consideration for continued oyster fishery management. Seed areas do not increase the number of oysters in the Bay and will likely lead to increased mortality due to harvest mortality and mortality associated with transport and planting. The extended low disease mortality that has been observed for the past 14 years would not support seed transport for disease management. Should high freshwater flow years similar to 2018 continue into the future, moving seed to the upper portions of the Bay will likely lead to enhanced mortality. (pg. 35)	Seed area production has been limited by poor natural recruitment (spat settlement) and reduced shell availability making it not cost effective unless certain criteria are met (p. 30-40). Moving seed could be possible under the following conditions: moving seed from freshwater to more saline water to work around freshets; moving seed from high salinity areas to areas of similar salinity; or moving seed from areas currently off-limits to harvest (e.g. MDE areas) to "clean" water for a long period of time prior to harvest.	N			
page 35: 6.4 Seed Areas: Risk of disease spread is great and should be discontinued. If implemented the cost of disease prevention and monitoring should be factored in to cost accounting for project.	Generally addressed in Section 6.4 and Action 6.4.2.	N			
Seed areas. Transplanting Oysters has been shown to transport MSX and Dermo.Population has increased and diseases have decreased since transplantation has decreased.	A disease protocol will be developed to avoid spreading disease with input from the scientific community and stakeholders.	N			
The plan details diseases and their effect on oyster populations. These diseases may be affected by water quality (largely salinity). The plan states that at least one of these diseases (DERMO) is found throughout the oyster's range. As early as the 1970's MDRN's own Marine Animal Disease Program warned against moving spat from areas with heavy infestations of DERM to areas of lower salinity, where it had not been previously seen or known to cause epizootics, but those warnings were ignored. Creating a management plan in a system as complex as Chesapeake Bay requires flexibility to avoid consequences similar to the past.	A disease protocol will be developed to avoid spreading disease with input from the scientific community and stakeholders.	N			

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Page 35, Seed Areas. The risk of disease transport is too high and not worth the benefit. The use of "seed areas" should be discontinued. Additionally, contra strategy 6.4 the regional oyster population does not increase if the oysters transplanted are removed by harvest.	A disease protocol will be developed to avoid spreading disease with input from the scientific community and stakeholders.	N			
Section 6.4 – Seed areas – What is the process for developing the protocols identified to protect against disease transfers?	The department will work with the shellfish health staff and scientific community to develop a draft protocol. The protocol will be vetted through the Oyster Advisory Committee with input from stakeholders.	N			
Action 6.4.1 – Identify oyster habitat... for seed areas. How will this be done? What criteria will be used?	Areas with high spat counts (number to be determined) typically mid-to lower bay areas, (p. 38-39). Areas that may cause conflict with other user groups will be avoided.	N			
Section 6.4 – Seed Areas – p. 36, 2nd full paragraph: With regards to denying a planting due to disease presence, will these decisions be made using a recently acquired sample or the past year from the Fall Survey or something else? What will be the data source to make these decisions? Given concerns and past spread of disease through moving seed throughout the Bay, how can lessons learned be applied if it is determined that this practice is absolutely necessary?	Data from Fall Survey during the previous season will be used to compare disease information from the seed area and planting area. If there is not a nearby sample(s) to use, staff may go out and collect a sample at that particular location. Lessons learned in the past seed area program led to the development of the 2015 Mollusc Disease Control Policy.	N			
Agree with a process that brings in more stakeholders and is facilitated.	None needed.	N			
Another model that worked in the Choptank was the "collective impact" model to develop the Envision the Choptank Common Agenda.	The department recognizes the benefits of stakeholder involvement and transparency (Action 2.5.1). Also, the last paragraph of Section 9.0 (p.54) addresses the importance of a consensus approach to solutions.	N			
Also see this reference for assessing public level of interest in oysters and recruiting their engagement in oyster recovery https://www.sciencedirect.com/science/article/pii/S1476945X17300521	None needed.	N			
it is hard to overstate the importance of the public fishery generally and the wild oyster fishery specifically. To that end, we advocate for an equally overt acknowledgement on the part of the Maryland department of Natural Resources (DNR) regarding the deep socio-economic impact the wild fishery has on our State's heritage, economy and local fishing communities.	The overall goal of the OMP recognizes the importance of our culturally significant oyster fishery and industry. Section 9.0 acknowledges the oyster industry, aquaculture and restoration efforts..	N			
This section should include information from the 2017 analysis of the oyster fishery that indicates that the majority of watermen gross less than \$10,000 annually from the oyster fishery. This is significant as it indicates that there are few people making a living from this fishery, which is an important factor in socioeconomic considerations. (pg. 49)	Section 9.0 Socioeconomic Consideration - discusses the estimated monetary value of oysters in both the fishery and ecosystem as well as the portion of residents in the fishery profession.	N			
According to NR §4-215, management actions may not have economic allocation as their sole purpose, therefore, it should be noted in this section that while socioeconomic benefits may be considered, management actions must also meet science-based conservation goals. If management is driven by the goals to end overfishing and rebuild the oyster population, significant socioeconomic benefits will result. (pg. 49)	Section 9.0 acknowledges both the economic benefits of the oyster industry and valuation of ecosystem services and oyster reef restoration. Strategy 9.0 promotes and supports benefits from oyster reef restoration. Both actions 9.0.1 and 9.0.2 acknowledge restoration efforts and the need to engage scientists (and others) in a consensus process for developing resource policies and management.	Y	p.50. In the final version p. 54.	Socioeconomic Strategy 9.0 Promote and support the socioeconomic benefits from the oyster industry including aquaculture and oyster reef restoration.	Socioeconomic Strategy 9.0 Promote and support the socioeconomic benefits from the oyster industry, aquaculture and ecological services including restoration.
The department should also include the socioeconomic benefits that accrue from ecosystem services in their considerations. Ecosystem service benefits and their value to the citizens of Maryland should be considered on par with economic benefits of oyster harvest. This should be added as an Action. (pg. 50)	Accepted suggestion. Text was added to the strategy and action.	Y	p.50. In the final version p. 54.	Action 9.1 Continue to promote and support the analysis of socioeconomic data from the oyster industry, aquaculture and restoration efforts.	Action 9.0.1 Continue to promote and support the analysis of socioeconomic data from the oyster industry, aquaculture, restoration efforts, and ecological services.
page 49: 9.0 Socioeconomic Considerations: The economic evaluation and impact on communities for the wild harvest and oyster farmers should be reported separately.	Section 9.0 reflects a balanced approach on economic value including both the harvest and ecological services.	N			
Cultural value is a subjective criterion which can neither be observed nor quantified. It should not be used as a primary consideration in oyster fishery management, particularly if it would sway management away from scientifically-defensible actions. Economic impacts to the fishery and economic benefits from restoration can be quantified and can provide a sense of management trade-offs.	There are management trade-offs that will need a consensus process to engage stakeholders, advisory groups and scientists on resource policies and management issues (Action 9.0.2).	N			
Consensus process should include all public stakeholders not just industry and commissions etc. DNR should seek out public opinion on oyster restoration policy	The term "stakeholders" includes the general public. In addition, all advisory meetings are open to the public and public comment is solicited on management plans and proposed regulations.	N			
p. 49/50 – paragraph that crosses the two pages: Text references that estimates of the economic value of N sequestration have been developed. Suggest adding a summary of that information to communicate the estimated value, and why this is important with respect to the TMDL, etc.	Added text.	Y	p. 50 Last sentence from the paragraph started on p. 53.	New text.	An annual value of \$1,749,078 was associated with nitrogen denitrification and \$1,277,155 for phosphorus removal in Harris Creek Sanctuary.
Oyster Futures is mentioned, but there is no discussion as to how the draft MP or future plans yet to be developed will incorporate the recommendations of that effort. Add text to discuss the role the outcomes of Oyster Futures will play in future management decisions.	The plan development team incorporated recommendations from the Oyster Futures 2018 report into actions in the OMP. A consensus process, similar to the Oyster Futures Consensus Solutions process, may be used to develop policies and address management issues (Action 9.2).	N			
Applaud having a stock assessment in place and suggesting regular updates. Having an abundance target, or overarching goal for oyster recovery, is essential. The target could be revised as surveys reveal more information (adaptive management) but without this there is confusion about the objectives associated with oyster management. The 20-30% of functioning historic habitat/ sanctuary idea could be used to help develop this.	Stock assessments will be conducted every 2-5 years (Action 4.0.5). Management objectives will need to be established in order to develop an abundance target. Ideally this should happen through and open stakeholder process. The department will consider using 20-30% of functioning historic habitat to develop the target.	N			
Suggest having stock assessment review and updates coordinated by the Chesapeake Bay Sock Assessment Committee. They have been focused on blue crabs the past several years and could address oysters as well.	Since the stock assessment is limited to Maryland, CBSAC would not be the best venue for coordination. However, they could play a role in reviewing any outcomes.	N			
Suggest improvements to the habitat components of the assessment model going forward (improved shell budget, stock assessment model linked to an oyster reef ecosystem model to better account for reef level ecosystem services). This could be a research priority.	None needed.	N			
Section 4, Stock Status Strategy 4.0, Page 17: Include language that specifically requires equivalent gear be used when establishing biomass on oyster bars, whether they are within sanctuaries or not.	Biomass estimates are all based on fall survey dredge data.	N			

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Action 4.1 – The stock assessment and peer review report identified several deficiencies in the Fall Dredge Survey for its use in stock assessments. Additionally, the scale of assessment is limited by the scale of harvest reporting. The department should thoroughly review the effectiveness of current survey programs and make necessary changes to improve data for use in stock assessments. (pg. 17)	Harvest reporting and fishery dependent monitoring are addressed in actions 6.0.2 - 6.0.6. Reviewing the survey programs and implementing any changes are addressed in actions 8.0.6 through 8.0.8.	N			
Action 4.2 – Given the dangerously low abundance of oysters in Maryland, stock status should be reviewed more frequently than every 3-5 years. Stock assessment updates should be carried out no less frequently than every 2 years with a benchmark stock assessment every 6 years. If possible, stock status relative to reference points should be calculated annually. Any changes to biological reference points should be conducted in consultation with external stock assessment experts through a body like the Science and Technical Advisory Committee or the Chesapeake Bay Stock Assessment Committee. (pg.17)	Accepted suggestion.	Y	p. 17. In the final version p. 19.	Action 4.2. Conduct a Maryland Chesapeake Bay stock assessment at least once every three to five years to provide information on the status of oysters, re-examine stock assessment methods and parameters and make any necessary adjustments to the biological reference points.	Action 4.0.2. Conduct a Maryland Chesapeake Bay stock assessment at least once every two to five years to provide information on the status of oysters, re-examine stock assessment methods and parameters and make any necessary adjustments to the biological reference points.
The draft plan doesn't seem to specifically acknowledge the fact that oysters are currently overfished. With a tiny fraction of historic levels of oysters in the Bay I suppose it may be assumed by most reasonable people that oyster populations meet the definition of "overfished," but shouldn't this be explicitly stated to avoid any argument/confusion on the topic? I hope this also will be added in the final plan.	According to the 2018 stock assessment, oysters were not determined to be overfished, however, overfishing is occurring in some areas. Overfishing refers to the rate at which animals are removed from the population and occurs when fishing rates are too high for sustainability. Overfished refers to the abundance of the resource being below a designated level known as the threshold. It is possible to be overfishing but not overfished. In the case of oysters, overfishing is occurring in 19 of the 36 areas assessed (p.21). Text was changed to clarify.	Y	p. 21. In the final version p. 23-24.	First paragraph, last sentence (p.21) - For the purposes of comparisons with the harvest fraction reference points in this report, all estimates of harvest fraction are adjusted for the number of planted oysters. Third paragraph (p. 21) - In the terminal year of the 2018 assessment, which was the 2017-2018 harvest season, there was substantial variability among NOAA codes and regions in their status relative to the harvest fraction reference points. Nineteen NOAA codes had harvest fractions above the threshold reference point, three were between the target and threshold reference points and 14 were at or below the target reference point (Figure 12). In areas with targets and/or thresholds are 0 percent, oyster harvest is not sustainable without planting activities.	Second paragraph last sentence (p. 23) - The adjusted and unadjusted time series of harvest fraction for each NOAA code relative to the reference points are shown in Tables 3 and 4. Fourth paragraph (p.23) - In the terminal year of the 2018 assessment, which was the 2017-2018 harvest season, there was substantial variability among NOAA codes and regions in their status relative to the harvest fraction reference points. In the 201-2018 harvest season, overfishing was occurring in 19 of the 36 areas assessed if harvest fraction is adjusted for spat plantings (Figure 12, Table 4). The number of areas where overfishing is occurring increases to 31 with unadjusted values of harvest fraction (Table 3). In areas with targets and/or thresholds are 0 percent, oyster harvest is not sustainable without planting activities.
Oyster monitoring surveys should take into account the deficiencies identified by the 2018 oyster stock assessment and peer review report. DNR should make whatever changes are necessary to improve the stock assessment over time.	Addressed in actions 6.3 - 6.6 and actions 8.1 - 8.6.	N			
Adaptive management should be science based	Addressed in Action 2.3.1 and 2.3.2.	N			
More detail data (spatial scale) should be developed. Fall survey data is limited for effective fisheries management.	Addressed in actions 6.3 - 6.6 and actions 8.1 - 8.6.	N			
All computer models should have real Bay verification and validation.	None needed.	N			
Primary goal should be to build oyster stock not increase public harvest	None needed.	N			
Stock assessment should include details of aquaculture and sanctuaries contribution to overall numbers	Aquaculture and sanctuary contributions were included to the degree possible with available data. The need for improved data is addressed in research recommendations and in actions 6.3 - 6.6 and actions 8.1 - 8.6	N			
Section 4.1: The goal of the FMP is to "conserve, protect and where possible rebuild the oyster resource". The plan needs to include an abundance target level to assure that the oyster population is not simply maintained at current depleted levels but is on a rebuilding trajectory.	Management objectives need to be established in order to create an abundance target. Ideally this will happen through an open stakeholder process. Action 4.1.3 states the intent to develop an abundance target.	N			
Management has been unduly influenced by the commercial harvest industry. Negotiations between the management agency, elected officials, and commercial industry always result in actions that have failed to reverse overharvesting. Even activities initially designed to enhance spat production have been compromised by influence from commercial fishery advocates. We need to develop new ways to manage. In short, oysters should not be managed Bay-wide but according to local conditions based on what we have learned through over a century of scientific study. This concept is partially addressed in the plan but I feel it falls short in many areas.	The identification of target and threshold fishing levels from the 2018 stock assessment for each NOAA code provides a good foundation for managing at smaller spatial scales.	N			
Maryland oyster populations are broodstock limited. Chesapeake Bay oysters exist over a wide range of environments and these cause behavioral differences. A plan to enhance oysters must incorporate what is known about different populations and what can be expected from them. Lack of data from pre-1939 populations prohibits us from providing some concepts but data does point us to alarming occurrences. It is clear that we have been removing more oysters that have been replaced by natural reproduction. As shown by plan data, more oysters result in more harvesters but natural spatfall has declined as well.	None needed.	N			
Page 16, Stock Status. The OMP does not address the spatial scale at which DNR intends to manage the fishery. It would be beneficial if this issue was discussed and defined to achieve the OMP objectives.	The spatial scale at which management takes place will be dependent on the tools applied (Action 4.1.2) and will need further evaluation and discussion.	N			

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The department needs to develop a plan to check that status of the stock every two years with new data obtained through landings, assessments, and surveys. This update needs to be done at a scale that accurately represents the effectiveness of sanctuary activities and the public fishery areas. At least every 5 years, and before the development of a new FMP, the department needs to conduct a full stock assessment. And since the current stock assessment identified deficiencies in the available data, the department needs to make necessary changes to their monitoring and data collection methods in order to improve the stock assessment tool overtime.	Accepted suggestion.	Y	p. 17. In the final version p. 19.	Action 4.2 Conduct a Maryland Chesapeake Bay stock assessment at least once every three to five years to provide information on the status of oysters, re-examine stock assessment methods and parameters and make any necessary adjustments to the biological reference points.	Action 4.0.2 Conduct a Maryland Chesapeake Bay stock assessment at least once every two to five years to provide information on the status of oysters, re-examine stock assessment methods and parameters and make any necessary adjustments to the biological reference points.
Action 4.3 – What is the process for updating?	The process for updating the model is to run the same base assessment model with an updated time series of data inputs. When improvements to the model occur and result in changes to the model technique then the data inputs would result in a benchmark stock assessment. At that point a new peer review would be required. This benchmark process would occur less frequently than an update, and generally only when there is substantial new information based on new research.	N			
(Page 17-22). The Fishery should be managed based upon "Optimum Sustainable Yield" versus "Maximum Sustainable Yield". MSY does not incorporate the ecological benefits of oysters that are reflected in the goal statement of this FMP. DNR should consider the oyster futures model for guidance on how to balance the competing goals of economic benefits and ecosystem services. One of the highlights of the Oyster futures process was the development of the computer model that evaluated trade-offs between preferred harvest strategies and ecosystem benefits of oysters. This approach could be used to develop an optimal sustainable yield (OSY) approach to manage Maryland's oyster resources.	It is correct that OY requires determination of management goals that balance stakeholder needs. The Oyster Futures model will be considered.	N			
To return to a stable population, Maryland oysters need more recruitment and less mortality. Another approach must be adopted. Rather than managing populations by attempting to control harvest, they should be managed on a regional or bar specific basis. Each site should be treated as a separate populations with its own set of characteristics and behaviors. Not all populations can be expected to produce significant numbers of spat and some will experience disease mortality over time. Nor will all sites produce significant quantities of fertilized eggs to contribute to natural spatfall.	None needed	N			
Arundel Rivers is encouraged to see the DNR's explicit acknowledgement that "Using some geologic and anthropogenic substrates as a foundation in restoration may provide more interstitial space and three-dimensional structure, thus increasing the ecosystem benefit of reefs as habitat for more species and increasing surface area for spat settlement." Id. 14. This statement coupled with Action 3.3 to "Promote the creation of oyster reefs with higher profiles above the bay bottom to enhance oyster productivity" tracks with the state of science on oyster habitat and ecosystem services and DNR's support for these sorts of projects is appreciated.	None needed.	N			
Applaud addressing the need for alternative substrates given limited shell resources. See additional resource for this section https://chesapeakebay.noaa.gov/habitats-hot-topics/oyster-reef-alternative-substrate-literature-review	None needed	N			
Roger Mann is completing a shell budget model that should be reviewed as part of this plan development.	Mann's report was not completed prior to the OMP. When it is completed, the department will consider the shell budget model.	N			
Recognizing the importance of shell and, only implement actions that add to available habitat, without removing existing habitat. While there are numerous factors that drive the systemic loss of shell in the region, it should be a continued priority to find ways to retain harvested shell in Maryland. Alternative substrates should be used in both sanctuary and fishery areas. Alternative substrates should be studied for use in harvest areas.	Accepted suggestion.	Y	p. 17.	New text.	Action 3.0.9 – Evaluate the feasibility and effectiveness of utilizing different alternative substrates in public fishery areas for the purpose of improving harvest.
Section 6.6, Page 38. We appreciate the prohibition on the use of alternative substrate that adversely impacts navigation, other fisheries, the ecosystem or harvest gear. We recommend adding language that requires rigorous scientific study of the long-term impact of construction rubble and other "alternative substrate" being dumped into the Bay. Certain testing and, if necessary, remediation should be required, as part of this FMP, prior to non-indigenous material being dumped into the Bay for use in oyster restoration efforts. This testing and remediation, as well as other environmental factors, should be calculated in any cost comparisons between natural and alternative substrate (i.e., the carbon footprint of making new concrete balls, the carbon footprint of extracting and transporting stone or construction rubble from long distances, etc.).	Generally addressed in Action 3.0.5 - Evaluate and develop cost-effective strategies to identify sources and quality of shell and alternative substrate to supplement oyster habitat throughout Maryland's Chesapeake Bay.	N			
There should be a guideline stating a universal preference for natural indigenous oyster shell as the substrate of choice for any future work in Bay Agreement restoration sanctuaries (Harris Creek, Tred Avon River, Little Choptank River, Manokin, St. Mary's). Implementation of any updated oyster management plan should be conditioned on the availability of natural shell.	Natural indigenous oyster shell is the preferred substrate but shell is currently limited. In order to complete oyster restoration activities, alternative substrates must be considered. Strategy 3.0 addresses both aspects of the issue - Promote the conservation and protection of natural oyster substrate (oyster shell) and evaluate and utilize alternative substrates as a method to ensure that the rate of habitat accretion exceeds loss (p.16).	N			
The Administration, DNR and OAC should continue pressing the U.S. Army Corps of Engineers for approval of the Man O'War Shoal shell dredge permit and other permits for shell dredging in the upper Bay. Maryland has waited long enough for this critical element (shell) of our oyster restoration efforts; while Virginia's oyster fishery continues to outperform Maryland using our proven past practices (and dredge).	None needed.	N			
Alternative substrate materials such as construction debris and non-indigenous mixed shell pose a threat to Maryland's waters and aquatic ecosystem. For decades the U.S. EPA has reported the issue of PCB contamination in building material debris and bricks caused by the application of PCB caulk. (https://www.epa.gov/pCBS/polychlorinated-biphenyls-pCBS-building-materials). Given the unknowns and questionable testing protocols for alternative substrate, natural indigenous oyster shell is the most cost-effective and protective.	Section 3.0, first paragraph, p.16, acknowledges that alternative substrates "should be used in a manner that does not negatively impact the Chesapeake Bay (e.g. creating navigational issues by altering the water depth, introduction of pollution or contaminants, etc.). Action 3.0.5 addresses the need to develop cost-effective strategies.	N			

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Provide references for statements about high relief and low relief reefs. In this context, what is defined as "high" and "low"? Recruitment, survival and reef persistence are improved on high relief reefs, not simply due to lower sedimentation, but also due to the hydrodynamic effects of 3-D structure in the marine environment.6,7 (pg. 13)	Accepted suggestion.	Y	p. 13. In the final version p. 15.	Reefs with higher profiles above the bay bottom appear to promote enhanced oyster productivity due to less sedimentation. Low-profile reefs are subject to sediment deposition on the reef surface thus making the substrate less suitable for recruitment.	Reefs with higher profiles above the bay bottom appear to promote enhanced oyster productivity due to less sedimentation and hydrodynamic effects. Low-profile reefs are subject to sediment deposition on the reef surface thus making the substrate less suitable for recruitment.
This section should include a description of the characteristic vertical relief of harvested 'bars' and restoration 'reefs' and the height to which bars are constructed for repletion plantings. This section should also include information on the impacts of harvesting gear on oyster reef height. (pg. 13)	Action 3.0.3 Promote the creation of oyster reefs with higher profiles above the bay bottom to enhance oyster productivity - clearly supports the creation and maintenance of reef height. Research studies have concluded that low-relief reefs are less successful. The appropriate reef height for restoration will be determined by the characteristics of the restoration site.	N			
Suggest: "Maryland's Chesapeake Bay is currently shell limited, where shell degradation and removal by harvest is greater than shell accretion and there is not enough fresh or dredged shell to replenish and restore all oyster habitat (Maryland department of Natural Resources, 2018)." (pg. 13)	Shell can be lost from processes other than harvest, so the sentence was kept as a general statement to include all reasons for loss.	N			
This section should include a description of prior shell reclamation programs, including descriptions of areas identified as buried shell deposits that have not yet been pursued. (pg. 13)	Including a history of prior shell reclamation programs is beyond the purview of the OMP. Action 3.0.5 addresses evaluating and developing cost effective strategies to identify sources of quality shell.	N			
The description of alternative substrates greatly understates their performance and utility, particularly in restoration projects. This section should include a description of the lengthy history of alternative substrate use in the Bay, the results of monitoring efforts in Harris Creek that indicated 400 times greater oyster density on alternative substrate reefs8, the extensive body of scientific literature supporting the use of alternative substrates (as reviewed by NOAA)9, and information on the cost-effectiveness of these materials.10 (pg. 13)	In depth information on these topics can be found in A Literature Review of Alternative Substrate Options for Oyster Restoration in Chesapeake Bay (NOAA Chesapeake Bay Office 2017) and in the restoration plan for Harris Creek, monitoring reports (2015, 2016, 2017) and the 2018 Implementation update found on the Maryland DNR website (https://dnr.maryland.gov/fisheries/pages/oysters/harris-creek.aspx). Including this information was beyond the purview of the OMP.	N			
Suggest: "Geologic and anthropogenic substrates are the most effective option in oyster sanctuaries." (pg. 13-14)	These substrate types cannot definitively be stated "as the best" given the short time these substrates have been studied in large-scale restoration sanctuaries.	N			
The statement that alternative substrates negatively affect the Bay due to navigational issues is incorrect. Any material, including oyster shell, can cause a hazard to navigation if not constructed to the permitted height or not marked properly. In fact, if successful, oyster reef restoration in sanctuaries may gain sufficient vertical profile to do so in time and reef crests that attenuate wave action may be important for coastal resiliency under the paradigm of sea level rise. Other concerns, including chemical composition, debris, etc., have been addressed by the environmental impact statement for the use of alternative substrates in the Bay; therefore, "if the substrates do not negatively impact the Chesapeake Bay in other ways" should be removed, as it is simply a value judgement with no scientific justification. (pg. 14)	The first paragraph (p. 16) discusses the many aspects/considerations of selecting substrates for oyster replenishment and restoration activities and gave navigational issues as one possible example. Rather than remove navigation as a concern, additional text was added.	Y	p. 13-14. In the final version p. 16.	However, geologic and anthropogenic substrates may be a viable option in oyster sanctuaries, if the substrates do not negatively impact the Chesapeake Bay in other ways (e.g. navigational issues from altering the water depth).	Geologic and anthropogenic substrates could be the most viable option for oyster sanctuaries but should be used in a manner that does not negatively impact the Chesapeake Bay (e.g. creating navigational issues by altering the water depth, introduction of pollution or contaminants, etc.).
This section should include discussion about pilot programs currently ongoing in Virginia and the Gulf of Mexico exploring the use alternative substrates in harvested areas. (pg. 14)	Accepted suggestion.	Y	p. 17.	New text.	Action 3.0.9 – Evaluate the feasibility and effectiveness of utilizing different alternative substrates in public fishery areas for the purpose of improving harvest.
Substrate Strategy 3.0 – Suggest removing "when appropriate" unless specific conditions are listed in the actions or strategy that define what constitutes an appropriate use of alternative substrates. (pg. 14)	Accepted suggestion.	Y	p. 14. In the final version p. 16.	Strategy 3.0 Promote the conservation and protection of natural oyster substrate (oyster shell) and evaluate and utilize alternative substrates when appropriate to ensure that the rate of shell accretion exceeds loss.	Strategy 3.0. Promote the conservation and protection of natural oyster substrate (oyster shell) and evaluate and utilize alternative substrates as a method to ensure that the rate of habitat accretion exceeds loss.
Action 3.1 – The distribution and use of limited resources should be based on actions that, with reasonable certainty, have a high probability of growing the oyster population and oyster shell resources, rather than a perception of what is equitable. Instead, multiple science-based tools are available to evaluate the use of shell and alternative substrates under various management scenarios, including management evaluation tools developed as part of the 2009 Programmatic Environmental Impact Statement and the Oyster Futures model. Any process developed to govern the use of a limited public resource should maximize the return on the public good, which for the use of oyster shell, will only be realized by processes that result in more oyster shell. (pg. 14)	None needed.	N			
Action 3.2 – This action needs additional clarification. As written, it is unclear what the intent of this action would be. (pg. 14)	Action 3.0.2 was written generally so the department can examine shell loss due to many different reasons (sedimentation from the Conowingo Dam after hurricanes, dredging, increased stresses from anoxia and disease) and consider activities like the Virginia Shell Replacement Program in seed areas to mitigate effects, aquaculture benefits, and emerging markets for the trade of nitrogen pollution credit to fund reef restoration.	N			
Action 3.3 – In what context would this action be applied? In harvested areas, high relief reefs are quickly knocked down and shell is scattered and broken, leading to enhanced shell losses overall. To conserve limited resources, high relief reefs should be used primarily in no-take areas. (pg. 14)	The promotion and creation of oyster reefs with higher reef profiles would generally apply to restoration efforts in sanctuaries. Limitations on gear use such as hand tongs or diving only, could be considered in some harvest areas with input from the oyster industry.	N			
Suggest: Action 3.9 – Develop pilot programs to evaluate the feasibility and effectiveness of utilizing alternative materials in harvest areas. (pg. 15)	Accepted suggestion.	Y	p. 17.	New text.	Action 3.0.9 – Evaluate the feasibility and effectiveness of utilizing different alternative substrates in public fishery areas for the purpose of improving harvest.
page 13: 3.0 Substrate : With the shell deficit alternative substrates that have proven very effective in sanctuaries must be considered for a sustainable public fishery. That might require gear modifications. Building on Virginia's initial experience with alternative materials in its public fishery, Maryland must begin its own experimentation.	Accepted suggestion.	Y	p. 17.	New text.	Action 3.0.9 – Evaluate the feasibility and effectiveness of utilizing different alternative substrates in public fishery areas for the purpose of improving harvest.

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3.0 substrate Coal Ash has no place in the Bay. It is a known carcinogen. Of the alternative substrates, granite has been shown to be effective in testing in Harris Creek.	The department is aware of the issues regarding the potential contamination from using pellitized coal ash.	N			
Add an action: Action 3.9 Develop regulations for adopting substrate materials.	Natural Resource Articles Section 4-205 and Section 1-104 states that the department can use different substrate materials. If a specific regulation for using a particular substrate was needed the department would need to get a permit to place these materials.	N			
It should be formally recognized that alternative substrates are more than just a "viable option"; they are outperforming all other substrates in restoration sanctuaries. They should, therefore, be considered the primary substrate choice in restoration areas.	Oyster larvae will settle on virtually all hard substrates but there are differences in setting, density and survival. Given the short time frame for restoration efforts in the bay, it is too early to definitively state that alternative substrates should be the primary substrate in restoration areas. It may be that a mix of oyster shell and alternative substrates would provide the best outcomes.	N			
Oyster shell (buried or fresh) is a limited resource, so DNR needs to implement a management strategy that greatly enhances the overall growth of the oyster population since growing more oysters is the only way to produce additional shell.	Addressed in sanctuary restoration and public fishery replenishment plantings.	N			
DNR should conduct pilot studies on the use of non-shell substrates in harvest areas to determine the feasibility of using them in oyster replenishment programs.	Accepted suggestion.	Y	p. 17.	New text.	Action 3.0.9 – Evaluate the feasibility and effectiveness of utilizing different alternative substrates in public fishery areas for the purpose of improving harvest.
The decision on how to best allocate limited monetary and shell resources should be based on a scientific assessment on how the use of these resources would best contribute to growing the oyster population, using tools like the OysterFutures model or the assessment tools from the 2009 Programmatic Environmental Impact Statement.	Scientific data will be part of a decision-making process stated in Action 3.0.1.	N			
We should also stop promoting the false assumptions that harvesting activity actually benefits oyster populations. This mantra has been used time after time however it is not true that "working the oyster ground will clean the shells and allow them to attract spat better". If we accept that somehow oyster shells left after harvesting are actually cleaner than those on non-harvested bars, it is unreasonable to think that after three months sitting on the bottom of the Bay they will have remained "clean". This fallacy should be silenced until there is scientific evidence that can be used to back its claims up. Additionally, if this belief was accurate then explain why oyster reefs that receive the most harvesting activity have not exhibited expansion and higher densities of oysters. I propose that the opposite is true.	None needed.	N			
Sites [for substrate placement] should be selected that will be able to physically support oysters as they grow and attract other species to form productive oyster reefs.	Addressed in Action 3.0.6.	N			
Surveys should be undertaken that would identify potential sites to mine buried oyster shell deposits from sites in Chesapeake Bay for use in bottom stabilization. These surveys should NOT be limited to the Upper Bay as buried shell deposits are found over a wide distribution which mimics the historical distribution of oysters.	Addressed in Action 3.0.5.	N			
Any site selected for restoration activity should be surveyed using state of the art survey techniques to determine the amount of exposed shell present, the percentage of the site with an acceptable amount of exposed shell, and accurate boundaries for each of these factors.	Addressed in Action 3.0.6.	N			
It is only after the survey indicates that the site exhibits an adequate amount of exposed shell material throughout an acceptable amount of the entire site should it be deemed ready for oyster spat deployment. Sites that are marginal may require some degree of bottom preparation prior to spat deployment.	Addressed in Action 3.0.6.	N			
The type of material and the amount of material required should be factored into a cost analysis for each site. Sites that require excessive amounts of bottom preparation should be removed from consideration.	Addressed in Action 3.0.6.	N			
Data from these surveys [MDNR Fall Survey] should be used to establish sites with a greater likelihood of receiving a significant natural spatset. The current state of understanding of the natural spatset phenomena may allow sites to be selected with a higher probability of receiving significant spatsets but it will not totally eliminate attempts to utilize a site that experiences a setting failure for one or more years. Metrics should be established for performance of shell or other material deposited at the spat production sites that would prohibit the movement of shell materials with non-cost effective quantities of spat.	Addressed in Action 3.6.	N			
Page 13, Substrate. The OMP should clearly recognize the success of alternative substrates in the restoration tributaries. Additionally, alternative substrates may prove effective in public fisheries areas with alteration of harvest methods. Given the shortage of shell, the plan should suggest the investigation and development of harvest methods in the public fishery on alternative substrates.	Given the short time frame for restoration efforts in the bay, it is too early to definitively state that alternative substrates should be the primary substrate in restoration areas. Accepted suggestion regarding alternative substrate in public harvest areas.	Y	p. 17.	New text.	Action 3.0.9 – Evaluate the feasibility and effectiveness of utilizing different alternative substrates in public fishery areas for the purpose of improving harvest.
Substrate Action 3.6: The wild fishery and submerged land lease applicants would benefit from clear and reasonable guidance on the procedures and policies for expanding and reducing oyster bar boundaries. Suggest the following revision: Develop comprehensive maps of current oyster habitat within Maryland's Chesapeake Bay that include reducing and expanding Public Shellfish Fishery Area oyster bar boundaries. Utilize best available data to locate oyster habitat and ground-truth the best areas for placing available substrate.	Action 3.0.6 allows for all bottom areas. Actions 5.0.5 and 5.0.6 provide guidance on the procedures for altering bar boundaries.	N			
The decision for how to allocate the use of oyster shell and alternative substrate needs to take into consideration what the most effective tool for rebuilding the oyster population is at a specific location.	Action 3.0.1 is written in general terms to allow for site specificity.	N			
Knowing this, and understanding that sanctuaries prioritize restoration practices over harvesting practices, alternative substrates should be the primary substrate used in sanctuaries as it is more effective at restoring habitat than using the limited shell supply to build reefs with. Permitting the use of alternative substrate in sanctuaries would make eligible the use of more shell for other areas of management.	Given the short time frame for restoration efforts in the bay, it is too early to definitively state that alternative substrates should be the primary substrate in restoration areas. It may be that a mix of oyster shell and alternative substrates would provide the best outcomes.	N			

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Considering again that the primary objective of this FMP should be to rebuild the oyster population, the only way to make more oyster shell is to grow more oysters. Therefore, in this FMP the department should prioritize strategies that help to grow the oyster population so more shell can be made available for the different needs associated with the different oyster management areas (sanctuaries, public fishery areas, etc.)	Addressed in Action 3.0.1.	N			
Action 3.1 – How will this decision-making process be developed? Timeframe?	The decision-making process will be developed through a consensus building process that involves the department, scientific community and stakeholders. The time frame hasn't been developed yet.	N			
Action 3.3 – How will you promote the creation of reefs with higher profiles? This has met resistance in the past, particularly from the crabbing industry as 3D reefs are viewed as conflicting with harvests.	Though the natural growth of the oysters and planting suitable amounts and size of substrates.	N			
Action 3.4 – How will a shell budget be developed?	The process most likely will start with the results from Roger Mann's modeling research.	N			
2nd paragraph: Text states 'Oyster shell plantings in low recruitment areas may not be the best use of the limited shell available, however, oyster seed (which consist of live oysters and shell) may be a better option.' A better option for what? What outcome is desired in these low recruitment areas? Establishing a population? Providing areas for public harvest? Add text to explain.	Accepted suggestion.	Y	p. 13. In the final version p. 15.	Oyster shell plantings in low recruitment areas may not be the best use of the limited shell available, however, oyster seed (which consist of live oysters and shell) may be a better option.	Oyster shell plantings in low recruitment areas may not be the best use of the limited shell available, however, oyster seed (which consist of live oysters and shell) may be a better option for public fishery replenishment and sanctuary restoration.
2nd paragraph: Text states 'However, the department is in the process of applying for a permit from the U.S. Army Corps of Engineers to dredge for shells in the upper Chesapeake Bay.' Please correctly characterize the status. Suggest including the following text: "The Corps of Engineers, Baltimore District proffered a provisional permit to DNR to dredge some shell from the Man O'War Shoal on May 17, 2018. Upon the approval of this shell dredging by the Maryland Board of Public Works, and issuance of Water Quality Certification and Coastal Zone Management Consistency concurrence by the Maryland department of the Environment, this permit can be validated by the Corps of Engineers."	Accepted suggestion.	Y	p. 13. In the final version p. 15.	However, the department is in the process of applying for a permit from the U.S. Army Corps of Engineers to dredge for shells in the upper Chesapeake Bay.	The U.S. Army Corps of Engineers (USACE) Baltimore District, proffered a provisional permit to the department to dredge some shell from the Man O'War Shoal on May 17, 2018. Upon the approval of a Water Quality Certification and Coastal Zone Management Consistency concurrence by the Maryland department of the Environment, this permit can be validated by the USACE.
2nd paragraph: The plan should document the pros and cons of shell dredging, and post achievements/shortfalls.	The NOAA Technical Memorandum NMS-NE 220, A Review of the Ecological Effects of Dredging in the Cultivation and Harvest of Molluscan Shellfish (2011) addresses the physical, biological, chemical and socioeconomic effects of dredging oyster shell. In addition, the department provides extensive background on Man O'War Shoals on its website (https://dnr.maryland.gov/fisheries/Pages/oysters/permit-applications.aspx). Reporting the pros/cons of shell dredging and the justification of shell dredging is beyond the purview of the OMP.	N			
3rd paragraph: The text lists 'anthropogenic' alternative substrates (porcelain, concrete, and coal ash) as commonly used. This is not accurate. Suggest revising text to communicate that these are other possible substrates that have been used, but their use is not common anymore. Now substrate plantings have been focused on stone and mixed shell.	Although the anthropogenic alternative substrates have not been used for large-scale restoration, the materials are still being used in other projects both in the bay and nearby waters.	N			
This sections does not fully describe the current knowledge about substrates and their performance. Suggest adding text to characterize performance thus far: Initial monitoring results from Harris Creek for 3-year old reefs completed in 2015, 2016, and 2017 identified that reefs constructed to 12 inches off the bottom using stone are consistently supporting 3-4 times the density of oysters as similar low relief oyster shell reefs; those constructed using mixed shell have similar densities as low relief oyster shell reefs.	Addressed generally at the top of p. 16 and in Substrate Strategy 3.0 - Promote the conservation and protection of natural oyster substrate (oyster shell) and evaluate and utilize alternative substrates as a method to ensure that the rate of habitat accretion exceeds loss. The department provides extensive information on Harris Creek on its website (https://dnr.maryland.gov/fisheries/pages/oysters/harris-creek.aspx).	N			
Substrate Strategy 3.0: Suggest adding the following text to the end: ", and maximizes oyster production."	Substrate does not necessarily equate to oyster production. Text was changed to clarify the relationship to habitat accretion..	Y	p. 14. In the final version p. 16.	Strategy 3.0 Promote the conservation and protection of natural oyster substrate (oyster shell) and evaluate and utilize alternative substrates when appropriate to ensure that the rate of shell accretion exceeds loss.	Substrate Strategy 3.0 Promote the conservation and protection of natural oyster substrate (oyster shell) and evaluate and utilize alternative substrates as a method to ensure that the rate of habitat accretion exceeds loss.
Arunde! Rivers notes DNR's strategy to "evaluate and utilize alternative substrates when appropriate..." We suggest that DNR explicitly state the criteria by which it will judge the propriety of using alternative substrate in the FMP.	Criteria will be developed by the department and with input from stakeholders when the evaluation is conducted. "When appropriate" was removed from the text.	N			

