



REGION 4
ATLANTA, GA 30303

May 14, 2025

MEMORANDUM

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FROM: Kip Tyler, Senior NPDES Permitting Specialist/Environmental Engineer
Water Division, Surface Water Protection Branch, NPDES Permitting Section

TO: Administrative record for Ocean Era's final modified NPDES permit (FLOA00001)

SUBJECT: Information regarding the removal of microplastic monitoring from the final modified NPDES permit for Ocean Era

Background

1. The water division (WD) director in Region 4 is delegated the responsibility to issue NPDES permits within Region 4 from the Regional Administrator. The Director of the Water Division of EPA Region 4 assigned me to be the permit writer responsible for developing the NPDES permit issued to Ocean Era. I am responsible for developing or overseeing the development of all supporting documents associated with the permit, and for reviewing and processing requests to modify the permit.
2. During 2024 and 2025, EPA processed a modification to Ocean Era's currently effective NPDES permit (2022 permit). The processing of the modified permit includes but is not limited to: creating a record for modifying the permit; coordination with federal agencies, state agencies, and the permittee; conducting additional analysis regarding environmental impacts and compliance with multiple laws; public noticing a draft modified permit and supporting documents; responding to significant comments; and issuing a final modified permit.
3. On 02/26/25, certain draft documents associated with the final modified permit were shared with WD management. These documents contained, among other information, the rationale for including microplastic (MP) monitoring in the modified permit, including scientific information that supports its inclusion into the permit conditions.
4. On 03/03/25, the WD Director asked if MP monitoring has been discussed with the permittee. My written reply on the same day informed management that monitoring for MP had been discussed with Ocean Era and that they approved sampling for MP as part of the modified permit conditions.
5. On 03/04/25:
 - I met with the Surface Water Protection Branch (SWPB) manager and the NPDES Permit Section (NPS) manager to discuss MP monitoring in the Ocean Era's modified permit. The SWPB manager stated that marine aquaculture is not a source of MP and cited various land-based sources of MP that contribute to the environment. The SWPB manager's position regarding aquaculture being a

source of MP is unsupported by the scientific information available. The SWPB manager's primary concern was the precedent-setting nature of including MP monitoring in a NPDES permit. The SWPB's manager's concern was politically motivated and/or policy driven and non-scientific. The SWPB manager stated that EPA HQ should be consulted and requested a meeting with Ocean Era.

- I followed this meeting with an email to document the discussion. I provided information about why MP monitoring was included in the modified permit: 1) scientific literature supports that marine aquaculture is a source of MP pollution; 2) the 2022 permit record for MP is not strong; 3) the revised net material is made of a material that can produce MP; 4) EPA received public comment regarding aquaculture being a source of MP pollution and the lack of MP monitoring in the draft modified permit; 5) the fact that no data has been collected for aquaculture facilities in any American federal waters; and 6) it could be legally risky to exclude MP monitoring due to the ongoing lawsuit over the 2022 permit.
6. On 03/06/25, at the request of the SWPB manager, the SWPB manager and I met with a representative of Ocean Era to discuss MP monitoring. The SWPB Manager again expressed concern to the permittee about the precedential nature of including MP monitoring in the permit. The SWPB manager asked the permittee if they would voluntarily monitor MP outside of the NPDES permit. The permittee stated that sampling for MP could be done outside of the NPDES permit; however, no oral agreement was made with the permittee to do so. Additionally, I am not aware of any written understanding or oral agreement with Ocean Era that MP monitoring would be performed.
7. On 03/10/25, the NPS manager informed me in writing that the permit's MP monitoring condition was elevated to HQ during the previous week. It is unknown who participated in the discussion with HQ, or if this HQ elevation included discussions about the scientific information that supports monitoring for MP in the Ocean Era permit.
8. On 03/14/25:
- Managers stated in an email that the reason for removing the MP monitoring included: 1) short term duration of the project; 2) scale of the project; 3) unlikelihood of being a significant source of MP; and 4) precedent setting nature of the permit condition.
 - After raising Scientific Integrity (SI) concerns on multiple occasions, I was directed by the NPS Manager in two emails to remove MP monitoring from the NPDES permit. In both emails, I was also informed that the work would be reassigned if I failed to remove MP from the final modified permit or if I disagreed with the approach. I perceived this as a threatening behavior and retaliation for alleging SI concerns or a differing opinion. Due to the threatening and inappropriate behavior by managers, I filed an allegation of Loss of SI¹ with the EPA's SI official and R4 SI Liaison.
9. On 03/27/25, only after the SI allegations were filed, I was given an opportunity to discuss MP monitoring with the WD Director and Deputy Director. I expressed my views that MP monitoring is reasonable and supported by the scientific literature. I stated that the rationale for monitoring MP aligned with the

¹ Loss of Scientific Integrity: Failure, intentional or not, to adhere to the Scientific Integrity Policy or to the principles of honesty, objectivity, and transparency; professional practices; and/or ethical behavior when conducting, managing, using the results of, and communicating about science and scientific activities.

regulatory and scientific basis for the permit's other monitoring conditions. I expressed potential ethical concerns, and standards of conduct concerns, that EPA managers should not request or requires permittee's to conduct any water quality sampling outside of the permit on an voluntary basis – especially when this is done verbally and not in writing.

10. On 04/16/25 and 04/18/25, the WD Deputy Director documented a final agency decision to remove MP monitoring from the modified permit. The Deputy Director did not provide any scientific information to support the removal. It is my understanding that management used their "discretion" to remove MP monitoring from the modified permit.

Scientific Data Supporting Monitoring for MP

11. Microplastics are a significant and growing concern in marine aquaculture, acting as an emerging pollutant with various negative impacts. They enter aquaculture systems from various sources, including the degradation of plastic-based equipment, feed sources, and feed packaging. These particles can cause harm to fish, potentially leading to impaired growth, oxidative stress, and other health issues. Furthermore, MP can carry other pollutants, like heavy metals or chemicals, further complicating the issue and introducing other variables not fully understood.
12. Cause and sources of MP from marine aquaculture sources:
 - EPA documented that sea-based sources of plastics include aquaculture farms and noted that "plastic netting and tubing used in ocean-based aquaculture operations can directly enter the marine environment via improper disposal." (USEPA, 2016).
 - Researcher shows that the concentration of MP in aquaculture environments is generally higher than in surrounding environments because of rapidly expanding aquaculture activities (Chen et al., 2018; Priscilla and Patria, 2019).
 - Aquaculture fish feed use high protein feed ingredients, mainly from wild-caught fishery sources. Due to the widespread existence of MP pollution, wild fish-based feed will introduce MP into the aquaculture environment during the feeding process (Zhou et al., 2021).
 - Packaging from various aquaculture products is a source of MP to the aquaculture environment. Expanded polystyrene boxes, corrugated plastic boxes and plastic trays are commonly used packaging for aquaculture products (Margeirsson et al., 2011; Skirtun et al., 2022).
 - Plastic products such as fishing nets, fishing ropes, and floating balls are used in offshore cages and raft culture. Their aging and damage cause a large number of plastic fragments to enter the aquatic environments (FAO, 2020). Due to long-term immersion, erosion, abrasion and collision in water, plastic debris is generated from plastic equipment and accumulates in the water.
 - Removal of biofouling from cages cause releases of MPs (Davidson, 2012). Fouling organisms wear and tear on nets and cages is a possible source of large amounts of MP (GESAMP, 2016).
13. Potential impacts to the marine environment:

- Microplastics from aquaculture operations can negatively impact wild fish by causing physical damage, disrupting their health and potentially affecting food web dynamics. The presence of MP in fish can have cascading effects on the food web, impacting higher trophic levels (Chen et al., 2021).
- Microplastics can act as vectors for contaminants, pathogens, and even antimicrobial-resistant genes (Bhat, 2024).
- EPA reported that the 48-hour EC50 values for *Daphnia* ranged from 5 - 80 g plastic material/L for certain plastic products (USEPA, 2016).
- An analysis on plastic debris accumulation in ocean floor sediments near finfish aquaculture using floating net-pens showed a higher concentration of MP in sediments close to the fish farm cages compared to the reference zones (Kruger et. al., 2020). Even though the fish farms were required to have a waste management plan, MP were measured at concentrations between 32 - 69 plastics/kg dry sediment.

14. Ocean Era specific issues regarding MP:

- Ocean Era will use best management practices (BMPs) to remove biofouling from the facility. Certain types and intervals of BMPs deployed (i.e., scrubbing materials, frequency of cleaning, etc.) could lead to more production of MP. Weathering could also be a factor for MP production. Ocean Era's BMP plan does not mention microplastics.
- Hydrogen peroxide may be used by Ocean Era to treat certain fish pathogens. Hydrogen peroxide is a reactive oxygen species that can damage monofilament polymers through oxidative stress can weaken the structural integrity of the line, may cause loss of tensile strength, and could affect the monofilament surface making it more susceptible to abrasion and impact damage. The degradation of MP caused by hydrogen peroxide is based on the usage duration, frequency, and concentration of hydrogen peroxide.

15. The above referenced scientific literature regarding sources and impacts of MP is not an exhaustive list. More literature showing MP sources and environmental impact is included in the references section of this document and/or within the administrative record for the modified NPDES permit.

Failure to Consider Microplastics as a Pollutant in the Permit Record

16. The 2022 permit record fails to mention MP; therefore, MP was not evaluated in the 2022 permit record that is currently effective. Specifically, MP was not considered in the fact sheet, the Biological Evaluation created to comply with ESA Section 7, EPA's Ocean Discharge Criteria (ODC) evaluation, Environmental Assessment (EA) used to comply with NEPA, or the Essential Fish Habitat (EFH) assessment developed to comply with the MSA.
17. The 2022 permit record partially relies on EPA's Effluent Limitation Guidelines (ELGs) for the Concentrated Aquatic Animal Production (CAAP) category. This rulemaking includes the proposed rule (2002), development document (2004), economic and environmental benefits analysis (2004), final rule (2004), and compliance guide (2006).² The CAAP ELG rulemaking from 2002-2006 does not consider MP as a pollutant.

² All documents are available at: www.epa.gov/eg/concentrated-aquatic-animal-production-effluent-guidelines

18. Microplastics was included in EPA's 2025 modified permit record within the reinitiation of expedited consultation with NMFS under ESA Section 7 (see below excerpt from EPA's consultation record). However, this analysis was narrow – it only considered the potential effects regarding MP from the cage material and only for the exposure routes to ESA-species within the action area that may encounter the facility. It does not include other MP sources from the entire facility (i.e., feed, feed packaging, cage materials other than netting, background, etc.), nor does it consider non-ESA species. This simplistic evaluation should not be extrapolated to be a sufficient analysis for all MP sources and potential impacts to the marine environment from the proposed project.

Excerpt from ESA Section 7 Reinitiated Consultation

Marine Debris - The use of Kikkonet netting material instead of copper alloy mesh may introduce plastic particles into the marine environment due to the natural wear and tear of the mesh netting over time. While the Kikkonet mesh is known to be very durable for extended periods of time, there is the potential for some amount of wear and tear which may lead to plastic entering the water column. However, due to the durability of the netting, regular netting inspections, and the short time span of the project (only 1 year), the effects from natural wear and tear of the KikkoNet to listed species is expected to be insignificant on ESA-listed species.

Basis for Microplastics Monitoring within the Modified Permit

19. EPA determined in the 2022 fact sheet that there was a “lack of demonstrated reasonable potential for the discharge to cause or contribute to an exceedance of CWA Section 304(a) criteria, all environmental monitoring parameters will be required to report only.” This determination was for all pollutants evaluated in the 2022 permit record (which did not include MP). Given that MP was not evaluated in the 2022 permit record, EPA did not perform a reasonable potential analysis for MP. The environmental monitoring (water quality and sediment) required by the 2022 permit and modified permit are based on the NPDES monitoring regulations, including best professional judgement, and the ODC regulations.
20. EPA completed an ODC Evaluation for the 2022 permit that determined sufficient information exists to conclude that the point source discharge from the Ocean Era aquaculture facility would not cause unreasonable degradation of the marine environment in accordance with 40 CFR 125.123(a);³ however, this ODC evaluation did not include MP. Pursuant to 40 CFR 125.123(a), EPA determined that using a water quality and sediment monitoring program was necessary to assess the impact of the discharge on the marine environment when deciding that the discharge will not have an unreasonable degradation. Therefore, EPA determined that monitoring for all pollutants considered within the 2022 permit were necessary to assess the impact of the discharge on the marine environment pursuant to 40 CFR 125.123(d).⁴ The following statement from the ODC evaluation documents that ammonia concentrations from the discharge are likely diluted to indiscernible amounts in the receiving waterbody; however, monitoring for ammonia is included in modified permit.

³ 40 CFR 125.123(a): If the director on the basis of available information including that supplied by the applicant pursuant to § 125.124 determines prior to permit issuance that the discharge will not cause unreasonable degradation of the marine environment after application of any necessary conditions specified in § 125.123(d), he may issue an NPDES permit containing such conditions.

⁴ 40 CFR 125.123(d)(2): Specify a monitoring program, which is sufficient to assess the impact of the discharge on water, sediment, and biological quality including, where appropriate, analysis of the bioaccumulative and/or persistent impact on aquatic life of the discharge;

ODC Evaluation: The ODC evaluation for the 2022 permit stated that ammonia would be undetectable and immeasurable within 30 meters of the cage at typical flow regimes (see page 44 and 65 of ODC evaluation).

21. In addition to the ODC regulations, the monitoring for MP is supported by multiple monitoring provisions of the NPDES regulations within 40 CFR 122.41(j)(1),⁵ 40 CFR 122.48,⁶ 40 CFR 122.44(i)(1)(iii),⁷ and 40 CFR 122.43(a).⁸
22. It is notable that MP was erroneously excluded from the list of pollutants considered in the reasonable potential analysis and the ODC evaluation used to inform the unreasonable degradation determination made in the 2022 permit issuance.
23. After reviewing EPA's entire record on MP pollution related to Ocean Era proposed facility, I determined that water quality monitoring (report only) for MP was reasonable, supported and required by the CWA implementing regulations, and scientifically defensible based on the available scientific literature.

Manager Rationale for Removing Microplastics Monitoring

24. The reasons that managers cited for removing MP monitoring includes: 1) short term duration of the project; 2) scale of the project; 3) unlikelihood of being a significant source of MP; and 4) precedent setting nature of the permit condition (see items 6-10).
25. The reasons managers cited to remove MP monitoring from the final modified permit fail to align with the basis for decisions previously documented in the 2022 permit record.
 - Short term duration: The duration of discharge from the project will be approximately one year pursuant to the NPDES permit. A discharge duration of one year is sufficient to conclude the monitoring is necessary for any pollutant. The project's short duration was not considered when deciding whether monitoring requirements for all other pollutants in the permit that may also represent insignificant loads or concentrations to the marine environment.
 - Scale of project: The project's scale is small; however, the scale of the project was not a reason to exclude other monitoring in the 2022 permit for pollutants that may also be unsubstantial sources.

⁵ 40 CFR 122.41(j): Monitoring and records. (1) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

⁶ 40 CFR 122.48: All permits shall specify: (a) Requirements concerning the proper use, maintenance, and installation, when appropriate, of monitoring equipment or methods (including biological monitoring methods when appropriate); (b) Required monitoring including type, intervals, and frequency sufficient to yield data which are representative of the monitored activity including, when appropriate, continuous monitoring.

⁷ 40 CFR 122.44(i): Monitoring requirements. In addition to § 122.48, the following monitoring requirements: (1) To assure compliance with permit limitations, requirements to monitor: ... (iii) Other measurements as appropriate including pollutants in internal waste streams under § 122.45(i); pollutants in intake water for net limitations under § 122.45(f); frequency, rate of discharge, etc., for noncontinuous discharges under § 122.45(e); pollutants subject to notification requirements under § 122.42(a); and pollutants in sewage sludge or other monitoring as specified in 40 CFR part 503; or as determined to be necessary on a case-by-case basis pursuant to section 405(d)(4) of the CWA.

⁸ 40 CFR 122.43(a): In addition to conditions required in all permits (§§ 122.41 and 122.42), the Director shall establish conditions, as required on a case-by-case basis, to provide for and ensure compliance with all applicable requirements of CWA and regulations.

- Significant source of MP: Manager's opinions about MP not being a significant source of pollutants can not be confirmed in the context of other pollutants that and may not be quantifiable away from the proposed project's discharge.
- Precedent-setting nature: All monitoring within the permit is precedent setting given that no other water quality data is available from finfish aquaculture facilities in federal waters of the Gulf of America. Additionally, the reasons managers used for excluding monitoring fails to consider the proposed project's unknown variables given that no other aquaculture facility is permitted in federal waters of the United States.

26. Management's position about removing MP monitoring in the modified permit leads to a contradictory analysis regarding other pollutants within the 2022 permit. If management's rationale for excluding MP monitoring from the modified permit was applied to the 2022 permit, then the monitoring for all pollutants or parameters within the water column and sediment would not have been included in the 2022 permit.

Comments Received During the Draft Modified Permit Public Notice

27. EPA noticed the draft modified permit for public comment for 30-days starting on October 24, 2024.

28. EPA received comments regarding pollution risks of MP from the Ocean Era discharge. These comments also noted EPA's failure to assess the risk of MP. This comment places the issue of MP in the administrative record for the modified permit. The comment received is provided below.

Excerpt of Comment from Friends of Animals:

... "Additionally, EPA has stated that instead of biodegrading, plastic waste often breaks down into tiny pieces known as MP (less than 5 mm in size), which are nearly impossible to clean up once they are in the environment. Microplastics can contain or absorb toxic chemicals potentially presenting toxicological risks for organisms that ingest them. When aquatic organisms eat these plastic particles, MP – and the chemicals they carry – can make their way up the food chain. In fact, researchers have found MP in a variety of the fish and shellfish that people consume.

EPA has submitted a draft NPDES permit with this net modification included, yet somehow failed to analyze the effects of this new netting material, including entanglements and MP. This represents yet another way in which the VE facility will constitute unreasonable degradation of the marine environment. As mentioned above, unreasonable degradation has three regulatory definitions. Qualifying for any one of these definitions means unreasonable degradation exists. Risks from entanglements and MP meet at least two of these definitions. Entanglements threaten a wide variety of species, including fish, sea turtles, marine mammals, and birds, the killing of which would cause "significant adverse changes in ecosystem diversity, productivity, and stability." Meanwhile, MP are already known to bioaccumulate in fish, with one meta-study showing that 60% of fish worldwide had MP in them. This means that the VE facility, as an additional source of MP, represents a "threat to human health" through consumption of fish.

This lack of analysis of entanglement and pollution also violates NEPA. EPA failed to take a hard look at reasonably foreseeable effects from the use of the new net pen material, notably entanglements and pollution."

29. These comments and EPA's response creates a potential issue with the ongoing lawsuit for Ocean Era's permit given that: 1) MP was not evaluated in the 2022 permit record; 2) MP was only minimally considered under ESA in the modified permit record; 3) the available scientific literature supports monitoring conditions for MP in the NPDES permit; and 4) the NPDES and ODC regulations allow for MP monitoring.

Reasons for Creating this Memorandum

30. The conduct of science,⁹ scientific activities,¹⁰ scientific products,¹¹ scientific information,¹² and covered entities,¹³ as found in the SI Policy and other supporting documents, confirm that regulatory documents such as NPDES permits, are scientific products covered by EPA's SI policy.¹⁴
31. A final decision was made to issue a modified permit to Ocean Era for revisions to the facility including fish species, cage design, and facility design. The final permit package was routed for WD Director signature on 05/02/25 with the final permit being signed on or before 05/15/25. Prior to signature, managers made a final decision to remove MP monitoring from the final modified permit. (See other sections for context on manager decisions.)
32. As stated previously, after raising SI concerns on multiple occasions regarding the removal of MP monitoring from the draft modified permit, I was directed by the NPS Manager in two emails to remove MP monitoring from the final modified permit. In both emails from management, I was also informed that the work would be reassigned if I failed to remove MP from the final modified permit or if I disagreed with the approach. Managers used threatening behavior and retaliation in response to the concerns that I provided. Scientific differences of opinion do not constitute insubordination and are part of the scientific process;¹⁵ threats should not accompany differing opinions. Managers used the threat of the project's reassignment to inappropriately influence or coerce me into removing MP monitoring from the permit. Managers were not using active and open communications to deal with my concerns, including an opportunity for staff to contact the decision maker (i.e., the WD Director).

⁹ Conduct of Science: Formulation of hypotheses, study design, testing, data collection and analysis, modeling, systematic review, statistical analysis, interpretation, findings, conclusions, peer review, and other scientific activities.

¹⁰ Scientific Activities: Activities that involve the development and application of scientific methods and theories in a systematic manner, including, but not limited to, data collection, inventorying, monitoring, statistical analysis, surveying, observations, experimentation, study, research, integration, economic analysis, forecasting, predictive analytics, inference, modeling, technology development, scientific assessment, and qualitative analysis.

¹¹ Scientific Products: Work products that contain scientific information. These include, but are not limited to, journal publications, reports, abstracts, posters, presentations, audio recordings, videos, web content, risk assessments, technical studies and guidance, analytic methods, scientific database designs, technical tools and models, technical protocols, statistical surveys/studies, technical background materials, research plans, and research strategies. They can support a research agenda, regulatory program, policy position, or other EPA position or action.

¹² Scientific Information: Including, but not limited to, inputs, data (including knowledge acquired via lived experience), models, outputs, analyses, technical information, or scientific assessments related to such disciplines as the behavioral and social sciences, public health and medical sciences, life and earth sciences, engineering, mathematics, statistics, or physical sciences. This includes any communication or representation of knowledge, such as facts or data, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual forms. Environmental information, as defined by the EPA's Environmental Information Quality Policy, is a subset of scientific information.

¹³ Covered Entities: All EPA employees, political appointees, special government employees, and members of scientific or technical federal advisory committees. The Policy applies when these covered entities propose, conduct, or review EPA science, communicate about EPA science or scientific activities, apply science to EPA decision making, or manage or supervise EPA scientific activities.

¹⁴ USEPA. 2025. Scientific Integrity Policy. Available at: www.epa.gov/system/files/documents/2025-01/us-epa-scientific-integrity-policy.pdf

¹⁵

33. Given that legitimate scientific critique is a fundamental part of the scientific process, managers must take care not to intimidate, suppress, coerce, or otherwise inappropriately influence scientists or science. EPA policies prohibit decision makers from misrepresenting, exaggerating, or downplaying areas of scientific uncertainty in scientific, policy, communications documents, and in scientific sections of policy decisions. EPA managers are required to have open and honest communication at all levels, including opportunities for staff to contact senior leaders regarding scientific issues without fear of retaliation, retribution, or reprisal and encourage they report claims of retribution, retaliation, or reprisal.
34. Prior to my allegations of SI, managers did not attempt to resolve my concerns in a productive way such as: 1) developing mechanisms to resolve internal disputes that may arise related to releases of scientific information; 2) allowing me to review and correct the scientific content of the draft modified permit that is intended for public dissemination and that significantly relies on my analysis; or 3) allow other EPA scientists/engineers to peer review my scientific products, findings, or conclusions. Some of these approaches are documented in EPA's Approaches for Expressing and Resolving Differing Scientific Opinions.¹⁶
35. I notified my managers multiple times that a memorandum to file or differing scientific opinion would be created to document my position regarding MP monitoring in the modified permit and describe all circumstances that led to MP being removed from the final modified permit. The NPS Manager (Dan Holliman) stated that it is common to prepare a memorandum to file to record staff opinions.
36. To my knowledge, no other non-manager EPA engineer/scientist has contributed to the knowledge of whether MP monitoring should be included or removed from the Ocean Era modified NPDES permit. It would be significant if a meeting occurred without my input, as the primary person responsible for the permit conditions and analysis.
37. I am not aware that the EPA or EPA Region 4 WD has engaged in a rigorous scientific discussion about MP monitoring in NPDES permits for aquaculture operations including the permit for Ocean Era.
38. It is possible that Region 4 managers engaged in political interference¹⁷ or other interference¹⁸ when determining that MP monitoring would be removed from the final modified permit.

Information Removed and Added to the Final Permit Record

39. The following draft information was removed from the final modified permit pursuant to the final decision and direction by WD managers:

MPs monitoring (report only) was deleted from Table 1 of Part II.A.1. Footnote 8 was deleted:

¹⁶ USEPA. 2020. Approaches for Expressing and Resolving Differing Scientific Opinions. Available at: www.epa.gov/scientific-integrity/approaches-expressing-and-resolving-differing-scientific-opinions

¹⁷ Political Interference: Interference in the conduct, use, or communication of science directed or conducted by political officials and/or motivated by political considerations. It also includes interference by career employees and other covered entities acting under the direction of a political appointee or for their own political purposes.

¹⁸ Interference: Inappropriate, scientifically unjustified intervention in the conduct, management, communication, or use of science. It includes, but is not limited to, censorship, suppression, or distortion of scientific or technological findings, data, information, or conclusions; inhibiting scientific independence during clearance and review; scientifically unjustified intervention in research and data collection; and/or inappropriate engagement or participation in the peer review process or on federal advisory committees. Interference in this Policy does not refer to non-scientific parts of policy decisions or changes in agency priorities.

“NPDES permits generally require water quality sampling according to the methods outlined in 40 CFR Part 136. No standard method for analyzing MP exist. Sampling outside of EPA’s standard is allowed only with specific approval from the permitting authority and if an alternative method is justified and documented in the permit itself. A "non-approved method" refers to a chemical analysis method that is not listed as an approved test procedure under the EPA's 40 CFR Part 136 regulations, meaning it cannot ordinarily be used for officially monitoring pollutants in water samples under the Clean Water Act; it is a method that has not been validated and accepted by the EPA for nationwide use in environmental testing. The requirement to perform MP sampling provides the permittee with flexibility to use a non-approved method to monitor for MP. Within 90-days of the modified permit’s issuance date, Ocean Era is required to develop and submit an Environmental Monitoring Plan to EPA. The plan shall provide the method that will be used to monitor and analyze for MP. Reporting units shall depend on the method used to analyze MP.”

40. The below draft information was removed from the final fact sheet item 6.5 pursuant to the final decision and final direction by WD managers:

“Microplastics Monitoring: Ocean Era revised the cage material from copper to a lightweight polyethylene terephthalate monofilament. EPA determined that monitoring for MP was warranted due to the new net material potentially introducing small plastic particles into the marine environment and to determine whether it poses any ecological threat. However, no standard method for analyzing MP exists. NPDES permits generally require water quality sampling according to the methods outlined in 40 CFR Part 136. Sampling outside of EPA’s standard is allowed when the permitting authority determines that an alternative method is justified and documented in the permit. A "non-approved method" refers to an analysis method that is not listed as an approved test procedure under the EPA's 40 CFR Part 136 regulations, meaning it cannot ordinarily be used for officially monitoring pollutants in water samples under the Clean Water Act; it is a method that has not been validated and accepted by the EPA for nationwide use in environmental testing. The requirement to perform MP monitoring provides the permittee with flexibility to use a non-approved method. Within 90-days of the modified permit’s issuance date, Ocean Era is required to develop and submit an Environmental Monitoring Plan to EPA. The plan shall provide the method that will be used to monitor and analyze for MP. Reporting units shall depend on the method used to analyze MP.”

41. The below information was removed from the response to comment (RTC) item 2.2 following WD manager’s final decisions and directives:

Response to Item 2.2: “EPA added water quality monitoring for MP in the final permit – the rationale for this change is provided within the RTC.”

Response to item 3.3: “The use of Kikkonet material, instead of copper alloy mesh, could introduce plastic particles into the marine environment due to the natural wear and tear of the mesh material over time. While the Kikkonet mesh is known to be very durable for extended periods of time, the material may degrade over time and may lead to plastic entering the water column. The effects from natural wear and tear of the KikkoNet to listed species is expected to be insignificant due to the durability of the netting, regular cage inspections, and the short lifespan of the project. However, EPA determined that water quality monitoring (report only) for MP is appropriate considering that some scientific literature

indicates that pollution from marine aquaculture includes MP.¹⁹ EPA's justification for including MP monitoring also considers the permittee's goal of providing scientific data for a demonstration project, which can inform EPA's review of future offshore finfish aquaculture operations.

EPA notes that NPDES permits generally require sampling according to the methods outlined in 40 CFR Part 136. Unfortunately, no standard method for analyzing MP exist. There are situations where sampling outside of EPA's standard may be allowed, but only with specific approval from the permitting authority and if an alternative method is justified and documented in the permit itself. A "non-approved method" refers to a chemical analysis method that is not listed as an approved test procedure under the EPA's 40 CFR Part 136 regulations, meaning it cannot ordinarily be used for officially monitoring pollutants in water samples under the Clean Water Act; it is a method that has not been validated and accepted by the EPA for nationwide use in environmental testing. The final modified NPDES permit will allow Ocean Era flexibility to use a non-approved method to monitor for MP. Within 90-days of the modified permit's issuance date, Ocean Era is required to develop and submit an Environmental Monitoring Plan to EPA."

42. The statements within the modified permit record were directed to be included by management using their rationale (as previously described). The current statements within the modified permit record do not align with the scientific information available or with my professional/scientific opinion including best professional judgement. The below statements within the Response to Comments regarding MP were directed to be included by managers.

- EPA Response within Item 3.3 of the Response to Comments: "Regarding the comments received about ocean pollution related to microplastics, a "marine aquaculture monofilament net microplastic" refers to tiny plastic particles that are released into the marine environment when a plastic gear used in aquaculture degrades over time. For example, the small plastic fibers from the breakdown of net fibers can contribute to microplastic pollution within the aquaculture area and wider ocean ecosystem. To help mitigate the risk of microplastic pollution from the proposed facility, Ocean Era has proposed to regularly monitor the strength of the net pen material and measure the width of the netting. When any netting is measured to be less than 1.4 mm due to degradation or material elongation, the fish will be removed, and the net pen will be retired. Net pen material replacement is unlikely given the short duration (~1-year) of cage deployment. The short duration of the facility within federal waters, replacement of net material as necessary, and the large amount of dilution available in the Gulf of America adequately mitigates any risk of microplastics."
- The following response within Item 3.3 of the Response to Comments was within the reinstituted ESA Section 7 consultation document and not directed by management: "The use of Kikkonet netting material instead of copper alloy mesh may introduce plastic particles into the marine environment due to the natural wear and tear of the mesh netting over time. While the Kikkonet mesh is known to be very durable for extended periods of time, there is the potential for some amount of wear and tear which may lead to plastic leaching into the water column. However, due to the durability of the netting, regular netting inspections, and the short time span of the project (only one year), the effects from natural wear and tear of the KikkoNet to ESA-listed species is expected to be insignificant. On February 18, 2025, NMFS issued an ESA concurrence letter that stated, "the proposed action is not likely to adversely affect the NMFS ESA-listed species and/or designated

¹⁹ Haodi Wu, Jing Hou, Xiangke Wang. 2023. A review of MP pollution in aquaculture: Sources, effects, removal strategies and prospects. *Ecotoxicology and Environmental Safety*, Volume 252, 114567, ISSN 0147-6513. < <https://doi.org/10.1016/j.ecoenv.2023.114567> >

critical habitat.” On February 18, 2025, NMFS also determined that under the FWCA that adverse effects that might occur on marine and anadromous fishery resources would be minimal, and NMFS did not object the issuance of the permit under FWCA.”

Summary

43. Mangers made a final decision to remove MP monitoring from the modified NPDES permit based on policy related reasons that may include political motivations that is not supported by the available science. Management’s decision is not consistent with the rationale for monitoring all other pollutants in the 2022 or modified NPDES permit.
44. The modified permit conditions related to MP monitoring are likely inconsistent with CWA Sections 402 or 403, and all applicable implementing regulations for the NPDES program.
45. I certify that the information contained in this memorandum is true and accurate to the best of my knowledge.

References

1. Chen, C.-L., Kuo, P.-H., Lee, T.-C., Liu, C.-H. 2018. Snow lines on shorelines: solving Styrofoam buoy marine debris from oyster culture in Taiwan. *Ocean Coast. Manag.* 165, 346–355.
2. Chen, G., Li, Y., Wang, J., 2021. Occurrence and ecological impact of microplastics in aquaculture ecosystems. *Chemosphere* 274, 129989.
3. Chunheng Miao, Jiahao Zhang, Ruixin Jin, Tianhao Li, Yifei Zhao, Maocai Shen. 2023. Microplastics in aquaculture systems: Occurrence, ecological threats and control strategies. *Chemosphere*, Volume 340, 2023, 139924, ISSN 0045-6535, <https://doi.org/10.1016/j.chemosphere.2023.139924>.
4. Davidson T. M. 2012. Boring crustaceans damage polystyrene floats under docks polluting marine waters with microplastics. *Mar. Pollut. Bull.* 64, 1821–1828. doi: 10.1016/j.marpolbul.2012.06.005
5. FAO. 2020. Sustainability in Action. State of World Fisheries and Aquaculture, Rome, p. 200.
6. Haodi Wu, Jing Hou, Xiangke Wang. 2023. A review of microplastic pollution in aquaculture: Sources, effects, removal strategies and prospects. *Ecotoxicology and Environmental Safety*, Volume 252, 2023, 114567, ISSN 0147-6513, <https://doi.org/10.1016/j.ecoenv.2023.114567>.
7. Huntington, T. 2019. Marine Litter and Aquaculture Gear – White Paper. Report produced by Poseidon Aquatic Resources Management Ltd for the Aquaculture Stewardship Council. 1539-ASC/R/01/C
8. GESAMP. 2016. Sources, fate and effects of MP in the marine environment: part two of a global assessment” (Kershaw, P.J., and Rochman, C.M., eds). (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP/UNDP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection). Rep. Stud. GESAMP No. 93, 220 p.
9. Golam, K. 2023. Impacts of microplastic on fisheries and seafood security — Global analysis and synthesis, *Science of The Total Environment*, Volume 904, 2023, 166652, ISSN 0048-9697, <https://doi.org/10.1016/j.scitotenv.2023.166652>.
10. Guanglong Chen, Yizheng Li, Jun Wang. 2021. Occurrence and ecological impact of microplastics in aquaculture ecosystems, *Chemosphere*, Volume 274, 2021, 129989, ISSN 0045-6535, <https://doi.org/10.1016/j.chemosphere.2021.129989>.
11. Iván A. Hinojosa, Martin Thiel. 2009. Floating marine debris in fjords, gulfs and channels of southern Chile, *Marine Pollution Bulletin*, Volume 58, Issue 3, Pages 341-350, ISSN 0025-326X, <https://doi.org/10.1016/j.marpolbul.2008.10.020>.
12. Krüger L, Casado-Coy N, Valle C, Ramos M, Sánchez-Jerez P, Gago J, Carretero O, Beltran-Sanahuja A, Sanz-Lazaro C. 2020. Plastic debris accumulation in the seabed derived from coastal fish farming. *Environ Pollut.* 2020 Feb;257:113336. doi: 10.1016/j.envpol.2019.113336.
13. Lin L, Chen CC, Zhu X, Pan K and Xu X. 2022. Risk of aquaculture-derived MP in aquaculture areas: An overlooked issue or a non-issue?. *Front. Mar. Sci.* 9:923471. doi: 10.3389/fmars.2022.923471

14. Lusher, A.L.; Hollman, P.C.H.; Mendoza-Hill, J.J. 2017. Microplastics in fisheries and aquaculture: status of knowledge on their occurrence and implications for aquatic organisms and food safety. FAO Fisheries and Aquaculture Technical Paper. No. 615. Rome, Italy.
15. A.G.M. Sofi Uddin Mahamud, Mithila Saha Anu, Artho Baroi, Anindita Datta, Md Shihab Uddine Khan, Mariya Rahman, Tamanna Tabassum, Jarin Tasnim Tanwi, Tanvir Rahman. 2022. Microplastics in fishmeal: A threatening issue for sustainable aquaculture and human health, *Aquaculture Reports*, Volume 25, 2022, 101205, ISSN 2352-5134, <https://doi.org/10.1016/j.aqrep.2022.101205>.
16. Skirtun, M., Sandra, M., Strietman, W.J., van den Burg, S.W.K., De Raedemaeker, F., Devriese, L.I., 2022. Plastic pollution pathways from marine aquaculture practices and potential solutions for the North-East Atlantic region. *Mar. Pollut. Bull.* 174, 113178.
17. USEPA. 2016. State of Science White Paper – A summary of literature on the chemical toxicity of plastics pollution to aquatic life and aquatic-dependent wildlife. Office of Water, Office of Science and Technology. EPA-822-R-16-009.
18. Zeliang Su, Liangfu Wei, Linyong Zhi, Xiaomei Huang, Xu Wang, Jun Wang. 2024. Microplastics in aquafeeds: Occurrence, sources, effects and considerations for aquatic food production, *TrAC Trends in Analytical Chemistry*, Volume 176, 117760, ISSN 0165-9936, <https://doi.org/10.1016/j.trac.2024.117760>.
19. Zhou, A., Zhang, Y., Xie, S., Chen, Y., Li, X., Wang, J., Zou, J. 2021. Microplastics and their potential effects on the aquaculture systems: a critical review. *Rev. Aquac.* 13, 719–733.