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MEMORANDUM

DATE: December 19, 2023

TO: National Marine Fisheries Service

FROM: Mississippi Sound Coalition

SUBJECT: U.S. Army Corps of Engineers Essential Fish Habitat Assessment, Bonnet Carre Spillway Operations

This memorandum is submitted on behalf of the Mississippi Sound Coalition. The Mississippi Sound Coalition is an organization of Mississippi coast counties, municipalities and non-profit organizations that are dedicated to protecting and restoring the historic natural resources of the Mississippi Sound.¹

The Coalition members are concerned that key assertions of “minor and temporary” impacts of Bonnet Carre Spillway operations in the Corps’ EFH Assessment are contrary to the available data and scientific literature. Many other assertions lack any citation to data or literature and are essentially unsupported opinion.

Essential Fish Habitat consultation can help clarify the impacts of Bonnet Carre Spillway operations on EFH and identify alternatives to mitigate impacts. Such alternatives can take place through action by the Corps under its existing authorities but could also be directed by Congress as necessary. The consultation can only play this important role of informing decision makers and protecting public resources, however, if the information used is accurate.

NOAA Fisheries states its role as the stewardship of the nation’s ocean resources and their habitat, by using sound science and an ecosystem-based approach to management. This is a time when NMFS should play that role and correct the mis-statements and unsupported assertions in the Corps’ EFH assessment.

¹ Members of the Coalition include Harrison County, Hancock County, the cities of Biloxi, D’Iberville, Gulfport, Long Beach, Pass Christian, Diamondhead, Bay St. Louis, Waveland, Ocean Springs, Pascagoula, and non-profits the Mississippi Hotel & Lodging Association and the Mississippi Commercial Fisheries United.

1. The 2019 Bonnet Carre Spillway openings caused oyster mortality at a scale that has prevented re-establishment of reefs.

Oyster reefs are among the only natural hard bottom in the Lake Pontchartrain/Lake Borgne/Chandeleur Sound/Mississippi Sound complex and form a critical element of EFH. As you know, NOAA has identified oyster reef conservation as an agency priority.

The Corps states the following in the EFH Assessment:

Salinity changes may result in oyster mortality when salinities drop below 5ppt for extended periods of time. However, once BCS operations are ceased, favorable conditions for oyster spat set and growth are expected to return. In addition, oyster reefs that experience salinity induced mortality still act as EFH by providing structured hard substrate habitat benefits to federally managed fisheries and their prey. Therefore, it is expected the range of BCS discharges are unlikely to have long term impacts to oyster reefs as EFH for federally managed species.

EFH Assessment at 90.

Like many of the statements in the EFH assessment, these statements use vague and conditional terms, and do not engage with the available data and actual Bonnet Carre Spillway operations.

You have already been provided with the citation to Morgan and Rakocinski (2022), which documented that in 2019 spawning stocks were completely decimated throughout the western Mississippi Sound region by Bonnet Carre Spillway discharge.² In 2019 the Bonnet Carre Spillway was open for 123 days, and operations extended into the summer months. These conditions actually resulted in complete mortality of oysters in the Western Mississippi Sound.

The Corps' statement that "favorable conditions for oyster spat set and growth are expected to return" after Bonnet Carre Spillway openings is misleading. In 2019 stocks were depleted to the point that recruitment has not occurred and populations have not re-established five years later. Gledhill et al (2020), concluded based on the 2019 opening that if BCS openings increase in frequency or duration oyster populations in Mississippi could remain unsustainable for harvesting.

Thus the salinity changes brought about by Bonnet Carre Spillway operations are established as causing widespread mortality of wild oyster stocks, to the point that wild stocks cannot recruit and re-establish. The Corps' failure to recognize these well-documented facts calls into question the entirety of its EFH assessment.

² Morgan, L.M., Rakocinski, C.F. (2022). Predominant factors limiting the recovery of the eastern oyster (*Crassostrea virginica*) in western Mississippi Sound, USA (2022). *Estuarine, Coastal and Shelf Science*, 264, art. no. 107652. DOI: 10.1016/j.ecss.2021.107652

In addition, the Corps addresses only oyster mortality and does not address Bonnet Carre Spillway impacts on recruitment and growth. Pruett et al. (2021) found low salinity assays based on 2019 Bonnet Carre Spillway opening water quality data significantly reduced shell growth, and hypoxia decreased both larval growth and survival.³

The Corps' assertion that "oyster reefs that experience salinity induced mortality still act as EFH" is also misleading and does not take into account the full impacts of Bonnet Carre induced oyster mortality. Dead oyster reefs are subject to burial by sediment and shell erosion. The dead reefs may provide some habitat for a period of time, but the value diminishes over time. We expect to provide additional information on this to you in the next 30 days.

Given these facts the Corps' conclusion that Bonnet Carre Spillway discharges are unlikely to have long term impacts on oyster reefs as EFH is demonstrably untrue and must be corrected.

2. The Area of Potential Effects of spillway discharges extends east of the Gulfport Ship Channel and to the Chandeleur Islands.

The Corps states without explanation that the Area of Potential Effects for Bonnet Carre Spillway openings is limited to the part of the Mississippi Sound west of the Gulfport Ship Channel and does not include the Chandeleur Islands. The water quality monitoring data and other information shows clearly that the impacts of the 2019 opening of the Spillway extended into the eastern Mississippi Sound and to the Chandeleur chain.

This is actually confirmed by Figures 45 and 46 in the Corps assessment, which show the modeled low salinities caused by the operation of the Bonnet Carre Spillway extend well into the eastern Mississippi Sound. The poster presentation attached to this memo further confirms this point, as does the fact of massive mortality of farmed oysters south of Deer Island.

Linhoss, et al demonstrated that salinity impacts of modeled Bonnet Carre Spillway openings reached to the Mississippi-Alabama border. The Linhoss modeling also demonstrated that decreases in salinity in Lake Borgne lasted more than a year.⁴ Modeling also demonstrates that salinity impacts of Bonnet Carre Spillway openings extend to the Chandeleur chain.⁵

³ Pruett, J.L., Pandelides, A.F., Willett, K.L., Gochfeld, D.J. (2021). Effects of flood-associated stressors on growth and survival of early life stage oysters (*Crassostrea virginica*)(2021). *Journal of Experimental Marine Biology and Ecology*, 544, art. no. 151615. DOI:10.1016/j.jembe.2021.151615

⁴ Linhoss, A.; Mickle, P.; Osorio, R.J. Simulating How Freshwater Diversions Impact Salinity Regimes in an Estuarine System. *J. Mar. Sci. Eng.* **2023**, *11*, 2349. <https://doi.org/10.3390/jmse11122349>

⁵ Darnell, Kelly M., et al. "Spatial and Temporal Patterns in *Thalassia Testudinum* Leaf Tissue Nutrients at the Chandeleur Islands, Louisiana, USA." *Estuaries and Coasts*, vol. 40, no. 5, 2017, pp. 1288–300.

NMFS should make it clear that the area of actual effect of Bonnet Carre Spillway operations is much greater than that asserted by the Corps.

3. Dismissal of impacts on SAV is unsupported and ignores the time required for recovery.

The discussion of impacts on submerged aquatic vegetation (SAV) is not specific, does not even identify the species affected, and lacks any grounding in the literature. For example, the Corps asserts that most of the species in the area of potential effect are euryhaline, so “negative impacts to SAV from salinity changes are unlikely.” Assessment at 88. Low salinity does negatively impact species affected by Bonnet Carre openings, including *Halodule wrightii* and *Thalassia testudinum*.⁶ SAV in the area affected by spillway operations are already under stress from other factors, but the Corps does not even address this fact.⁷

The Corps ultimately acknowledges the significant impacts of major Bonnet Carre Spillway openings on submerged aquatic vegetation, but dismisses the impacts, without any substantiation, as “temporary and minor.” Recovery of important species of SAV does not occur instantly, and Douglass, et al noted that their monitoring indicated a loss of resilience after severe losses.

4. Flows from the Caernarvon Diversion are miniscule compared to the Bonnet Carre Spillway and attempts to analogize the impacts of that diversion to the Bonnet Carre Spillway lack any scientific basis.

The Corps asserts that reports on the effects of freshwater from the Caernarvon diversion on the Mississippi River suggest that the Bonnet Carre Spillway may have beneficial, or at least only temporary effects. Assessment at 102, 103. Caernarvon diverts at most 8,000 cubic feet per second of Mississippi River water. This is less than the amount the Bonnet Carre Spillway discharges when it is closed. In operation the Spillway discharges up to 30 times this amount of Mississippi River water.

In addition, the most recent assessment of the Caernarvon indicates that it resulted in a net loss of marsh area, indicating that the increased nutrient supply and flooding from

⁶ Douglass JG, Chamberlain RH, Wan Y, Doering PH. Submerged Vegetation Responses to Climate Variation and Altered Hydrology in a Subtropical Estuary: Interpreting 33 Years of Change. *Estuaries Coast.* 2020 Mar 13;43(6 Sep 2020):1406-1424. doi: 10.1007/s12237-020-00721-4. PMID: 34121962; PMCID: PMC8193826.

⁷ Pham, L. T., P. D. Biber and G. A. Carter. 2014. Seagrasses in the Mississippi and Chandeleur Sounds and Problems Associated with Decadal-Scale Change Detection. *Gulf of Mexico Science* 32 (1).

the river can be negative influences on marsh health.⁸ The Corps elsewhere argues that additional nutrient inputs may be a benefit to marsh vegetation, but this is not supported by the evidence at Caernarvon.

5. The Corps has full authority to modify Bonnet Carre Spillway operations and has done so in the past.

The Corps asserts in its assessment that considering use of the Morganza floodway to mitigate impacts on EFH would violate the Congressional authorizations for Morganza and the Bonnet Carre Spillway. As set out in our March 29, 2023 memorandum, the Corps has full authority to modify flows through the different elements of the Mississippi River and Tributaries Project, and in fact has done so. As an example, the Corps has operated the Bonnet Carré Spillway above its design capacity. In 2011, the Corps operated the Bonnet Carré Spillway at 316,000 cubic feet per second, 66,000 cfs over its design capacity. *MR&T 2011 Post Flood Report*, p. IV-54.⁹ At the same time the Corps was operating the Morganza Spillway at 186,000 cfs, less than a third of its design capacity of 600,000 cfs.

As a judge once noted for a different Corps project, “it imparts both stupidity and impracticality to Congress to conclude that the statute impliedly forbids any change in a project once approved, and thus prevents the agency official from providing for the unforeseen or the unforeseeable, from accommodating newly discovered facts, or from adjusting for changes in physical or legal conditions.” *Creppel v. U.S. Army Corps of Engineers*, 670 F.2d 564, 572-73 (5th Cir. 1982). NMFS should not accept the Corps’ interpretation that Congress intended to foreclose any consideration of strategies to mitigate impacts to EFH. Again, if the Corps lacks the authority to mitigate the severe impacts of Bonnet Carre Spillway operations, the EFH consultation process can inform Congress and other decision makers of changes in law that are required.

If we can clarify or provide further information on any of these subjects, please let me know. The members of the Mississippi Sound Coalition and the citizens they represent are relying on the National Marine Fisheries Service to assure the information used in the consultation process is accurate and reliable.

⁸ Turner, Robert & Layne, Michael & Mo, Yu & Swenson, Erick. (2019). Net Land Gain or Loss for Two Mississippi River Diversions: Caernarvon and Davis Pond. *Restoration Ecology*. 27. 10.1111/rec.13024.

⁹

https://www.mvd.usace.army.mil/Portals/52/docs/regional_flood_risk_management/Docs/SectionIV-MRTOperation.pdf.