FILED
582-20-1895
4/12/2022 1:39 PM
STATE OFFICE OF
ADMINISTRATIVE HEARINGS
Carol Hale, CLERK

ACCEPTED
582-20-1895
4/12/2022 1:40:53 pm
STATE OFFICE OF
ADMINISTRATIVE HEARINGS
Carol Hale, CLERK

SOAH DOCKET NO. 582-20-1895
TCEQ DOCKET NO. 2109-1156-IWD

IN THE MATTER OF THE APPLICATION OF PORT OF CORPUS CHRISTI AUTHORITY OF NUECES COUNTY FOR TPDES PERMIT NO. WQ0005253000	**§**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

AUDUBON TEXAS'S WRITTEN CLOSING ARGUMENTS

AUDUBON TEXAS
Scott Moorhead
2407 S. Congress Ave.
Ste E - #477
Austin, TX 78704
512-924-9695
scott.moorhead@audubon.org

REPRESENTATIVE FOR AUDUBON TEXAS

APRIL 12, 2022

TABLE OF CONTENTS

SOAH DOCKET NO. 582-20-1895
TCEQ DOCKET NO. 2109-1156-IWD

IN THE MATTER OF THE APPLICATION OF PORT OF CORPUS CHRISTI AUTHORITY OF NUECES COUNTY FOR TPDES PERMIT NO. WQ0005253000	**§**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

AUDUBON TEXAS'S WRITTEN CLOSING ARGUMENTS

TO THE HONORABLE ADMINISTRATIVE LAW JUDGES:

I. SUMMARY

In the above referenced matter, the focus of Audubon Texas is on indirect impacts considerations and how the proposed discharge could impact endangered and threatened bird species in the project area. State- and federally-listed endangered bird species have been using the project area, two of which, the piping plover and the whooping crane, are wintering species in this geography and accordingly rely on the ecosystem for food to stockpile energy for spring migration.[1] Direct observations from two distinct data sets of multiple bird species of different guilds in the project area support the position taken by the Texas Parks and Wildlife Department (TPWD), the Texas General Land Office (GLO), and experts called on all sides in this case that the proposed site is a critical recruitment zone for marine and aquatic species, as well as the avian species that rely on that environment for food, among other needs. Nonetheless, the impacts assessment for these aquatic-dependent bird species has been perfunctory at best, and has not advanced beyond *ipso facto* determinations that no impacts to bird species can be expected because either 1) as in the applicant's case, a) the project area is so narrowly defined

[1] AUD 212 TPWD Fact Sheet Piping Plover *Charadrius Melodus,* AUD 213 TPWD Fact Sheet Whooping Crane *Grus Americana,* AUD 214 TPWD Press Release: *Whooping Cranes Making their way to the Texas Coast*

and physically constrained that no suitable habitat was identified for the endangered and/or threatened species of interest (because none of these bird species are expected to loaf, nest, feed, or otherwise inhabit the surface or ~60 feet below the surface of the Corpus Christi Ship Channel (CCSC) near the proposed diffuser array[2] and b) the applicant does not undertake an indirect impacts assessment, or 2) in the Executive Director's case, because the discharge is not a petroleum discharge, and therefore cannot be expected to have impacts to species of interest. Such determinations are incomplete at best and do not sufficiently incorporate the available data that should have informed a more robust analysis. Moreover, the species used for the whole effluent toxicity (WET) tests may be insufficiently susceptible to changes in salinity, and may underrepresent potential lethality to other keystone organisms in the system or to critical forage for marine- and aquatic-dependent species, such as birds.

IV. II. UNDERLYING FACTS AND DISCUSSION OF COMMISSION'S REFERRED ISSUES: 2A) Whether the proposed discharge will adversely impact: the marine environment, aquatic life, and wildlife, including birds and endangered or threatened species, spawning eggs, or larval migration 2H) Whether the Executive Director's anti degradation review was accurate

IIa. The Port uses a physically constrained definition of the project area that ignores facts, is inconsistent, and does not allow for consideration of indirect impacts

It bears repeating: the Corpus Christi Bay system has been designated as an estuary of national significance by the U.S. Environmental Protection Agency (EPA), and is home to more than 490 species of birds and 234 species of fish.[3] Nevertheless, the expert retained by the project

[2] EXHIBIT APP-LF-1-R, Rebuttal testimony of Dr. Lance Fontenot on behalf of the Port of Corpus Christi Authority, p. 37 lines 29-31, p. 38 lines 1-2.
[3] https://www.gulfbase.org/geological-feature/corpus-christi-bay

applicant to assess for possible impacts to species found that the project area, what was deemed the exposure area for endangered and threatened species, could not support suitable habitat for a single species of mammal or bird, because he used a constrained definition of the project area as being only the chronic aquatic life mixing zone, plus a "couple hundred" feet.[4] In his prefiled rebuttal testimony, he acknowledges the presence of multiple bird species in the area but concludes that there will be no impacts because the effluent will be "60+ feet below the surface" and "out of reach for birds foraging and nesting elsewhere in the shallow habitats elsewhere in the Nueces estuary." [5] Conclusively, he says

> It is my opinion that the proposed release of desalination plant effluent 60+ ft. below the surface in the CCSC will not affect any bird species in the region because this effluent will have negative buoyancy relative to the surrounding water, will rapidly dilute in the water column after exiting the diffuser, and will be out of reach to birds foraging and nesting in the shallow habitats elsewhere in the Nueces estuary.[6]

This is a direct impacts assessment, apparently based on the mobility of the species inventoried—that is, their mobility allows them to avoid the plume and go elsewhere.[7] To properly assess impacts to birds, one need conduct an indirect impacts assessment, because potential impacts to birds will be likely be indirect, not direct, and would contemplate changes in marine/estuarine organism recruitment and survivorship for key species that would potentially

[4] Deposition of Dr. Lance Fontenot, offered January 12, 2022 via Zoom, p. 61 lines 4-8
[5] EXHIBIT APP-LF-1-R, Rebuttal testimony of Dr. Lance Fontenot, lines 29-21, p. 38, lines 1-2.
[6] APP-LF-1-R, p. 37 lines 29-31, p. 38 lines 1-2
[7] Deposition of Dr. Lance Fontenot, p. 64, lines 12-13; p. 65, lines 2-12.

alter the availability of forage for species relying on those marine and aquatic communities.[8] An indirect impacts assessment could have considered impacts to whooping crane forage, for example, by connecting their dietary reliance on blue crab and assessing potential impacts to blue crab, a species that Dr. Fontenot identifies as epibenthic, or the kind of species that one would expect to encounter below the surface near the diffuser:

> The term used for those organisms that aren't truly under the mudline. They are above the mudline and above the benthic zone, but they are associated with benthic, a benthic habitat if that makes sense. An example of that would be a blue crab.[9]

Fundamentally, the applicant's expert simply does not assess for indirect impacts to marine- or aquatic-dependent species, and moreover, he does not leave room to assess for them, because the lack of an indirect impacts assessment, by definition, presumes there will be no impacts to the organisms that aquatic- or marine/estuarine-dependent species, including endangered and threatened species using the area, may rely on, such as blue crab in the case of whooping crane[10], or marine worms, or crustaceans in the case of piping plover,[11] just to name two marine/estuarine-dependent species of interest. The concern is not whether mammals, or in this case, avian (bird) species will "sink to the bottom,"[12] or encounter a brine plume 60 feet below the waterline, but whether changes in the benthic community or alterations to the abundance and distribution of species comprising the diets of marine- and aquatic-dependent species will be created by the discharge, a possibility that is never explored by Dr. Fontenot, who, even in his

[8] Excerpts PAC 55-R, Dr. James Tolan prefiled testimony, p. 350, lines 24-25, p. 351 lines 1-16.
[9] Dr. Lance Fontenot, oral deposed testimony given January 12, 2022, p. 114, lines 9-13.
[10] AUD 213
[11] AUD 212
[12] Deposition of Dr. Lance Fontenot, January 12, 2022, p. 65 lines 16-17

rebuttal testimony, where he seems to expand the project area to up to one mile from the outfall[13], only appears to elevate whether a direct impact to a species of concern is possible.[14] This incomplete assessment is clearly highlighted in his own summary[15], shown below, of major uncertainties in the site-specific ecological risk assessment. In the comments/observations section, the top four rows underscore the problem with the assessment:

Exhibit 9: Summary of major uncertainties in the site-specific ecological risk assessment

Area of Uncertainty	#	Assumption or Uncertainty	Impact on Risk Evaluation						Comment/Observation
			Underestimate			Overestimate			
			H	M	L	L	M	H	
problem formulation	PF-1	six indicator species represent entire aquatic community							the indicator species may not be most sensitive
	PF-2	many additional species included in the evaluation							better understanding of local community sensitivities
	PF-3	wildlife species excluded from the evaluation							no wildlife exposures to salinity at depth in CCSC
	PF-4	assessment focuses on habitat within CCSC							wetlands/seagrass beds out of reach of effluent salinity

We may not be using the most sensitive indicator species to assess lethality[16,17] and the test for impacts is whether wildlife will be exposed at depth in the CCSC—and of course, none of these bird or mammalian species are found at depth in the CCSC--while the test for wetland or seagrass habitat is whether they are directly impacted by the plume, rather than 1) whether benthic communities/recruitment of larval and juvenile organisms will be negatively impacted, leading to 2) populations/recruitment reduced at those nursery sites, which 3) could impact the marine- and aquatic-dependent species who depend on them for forage, among other things—the very definition of cascading effects.[18]

Such an approach is not synchronous with standard methodologies, and conflicts with his previous statement: "Suitable habitat, so that would be the habitat where these species could

[13] EXHIBIT APP-LF-1-R Rebuttal testimony of Dr. Lance Fontenot, p. 37, line 7
[14] Rebuttal testimony of Dr. Lance Fontenot on behalf of the Port of Corpus Christi Authority, p. 37, lines 17-19.
[15] APP-LFR-9
[16] PAC 47-R, p. 11, lines 14-18.
[17] Remand hearing transcript, Vol. 5, p.1209, lines 11-25, p. 1210 lines 1-10
[18] Remand hearing transcript, Vol. 5, p. 1207 lines 14-25, p. 1208 lines 1-8

occur, would occur, have been reported to occur."[19] By his own definition, suitable habitat for many of these bird species is all around the project area, and we have not one, but two distinct datasets to suggest where those species have been observed, in addition to expert natural resource management treatises[20] that provide a broad understanding of distribution and potential concerns.[21]

IIb. The applicant's assessment ignores its own stated standard methodologies and resources to consider species- and systems-level direct and indirect impacts

The EPA framework he used for his own assessment[22] explicitly lays out a standard approach for direct and indirect ecological impacts assessments in its executive summary:

> Ecological risk assessments evaluate ecological effects caused by human activities such as draining of wetlands or release of chemicals. The term "stressor" is used here to describe any chemical, physical, or biological entity that can induce adverse effects on individuals, populations, communities, or ecosystems. Thus, the ecological risk assessment process must be flexible while providing a logical and scientific structure to accommodate a broad array of stressors.
>
> The framework is conceptually similar to the approach used for human health risk assessment, but it is distinctive in its emphasis in three areas. First, ecological risk assessment can consider effects

[19] Deposition of Dr. Lance Fontenot, p. 201 lines 16-18.
[20] AUD 207, AUD 211-AUD2016
[21] AUD 202 and AUD 220
[22] Prefiled direct Testimony of Dr. Lance Fontenot, p. 12

> beyond those on individuals of a single species and may examine a population, community, or ecosystem. Second, there is no single set of ecological values to be protected that can be generally applied. Rather, these values are selected from a number of possibilities based on both scientific and policy considerations. Finally, there is an increasing awareness of the need for ecological risk assessments to consider nonchemical as well as chemical stressors. [23]

Meaningful and useful data available, such as TPWD's information on species of concern suggestive of populations, communities, or ecosystems, was not leveraged in these assessments, nor were broader considerations for effects on any marine/estuarine-dependent populations, communities, or ecosystems. Dr. Fontenot stated that he derived his opinions in part by referencing TPWD's available data, but the record clearly shows that TPWD has published records of at least one species of interest—the endangered whooping crane, which winters in the area before returning 2,300+ miles to northern Alberta, Canada each year—using the project area, almost irrespective of which definition of project area is used[24], in addition to other documents in the record.[25] Several of those observations have been recorded in the past two years, and as TPWD records also show, there is increasing scientific interest in how the whooping crane population is using the greater region away from their own critical habitat unit (CHU), the Aransas National Wildlife Refuge, including areas in the Lydia Ann Channel, Redfish Bay, and the Corpus Christi Ship Channel—all locations where TPWD's own data

[23] EPA/630/R-92/001, FRAMEWORK FOR ECOLOGICAL RISK ASSESSMENT February 1992, page XV, paragraph three
[24] AUD 214, AUD 220
[25] AUD 202

shows to have observed sightings of whooping crane in the past few years.[26] Moreover, TPWD has data on many other species beyond whooping crane through the same nature tracker program. Far from being "flexible" but "structured," to accommodate "a broad array of stressors" the procedure applied was narrow and rigid—no suitable habitat at 60 feet below the waterline, and no impacts because no birds, seagrass, or wetlands will be directly in contact with a brine plume.

Furthermore, the applicant's nebulous definition of the project area was not a consistent definition of the exposure area, project area or the area considered for impacts assessment, terms which were used somewhat interchangeably in this process. In the 2021 technical memorandum created by Parsons for the Port of Corpus Christi (POCC), the reference/study area captured in the memo includes segment 2481, extending down the CCSC, capturing both lower Harbor Island and the opposite shoreline home to the CHU for piping plover in segment 2481.[27]

IIc. TCEQ also applied a different definition of the impacts area

In the Texas Commission on Environmental Quality's (TCEQ) own impacts assessment, which relied on a different rationale for a finding of no impact (which will be discussed below), there also was a clear reference to a much larger project area. The original memo produced by Dr. Wallace referenced the Piping Plover Critical Habitat Unit in the project area (italics and bold are from the original document as shown below):

> A watershed of high priority has been identified in segment 2481 of Nueces County. The piping plover, ***Charadrius melodus*** Ord, a threatened aquatic dependent species, is found in the watershed of

[26] AUD 220
[27] "Study Area" of the Parsons Technical memorandum for Sarah Garza, dated June 21, 2021, p. 2, Figure 1

> Segment 2481; **however, the facility is not a petroleum facility and the discharge is not expected to have an effect on the piping plover**….to make this determination for TPDES permits, TCEQ and EPA only considered aquatic or aquatic dependent species occurring in watersheds of critical concern or high priority as listed in Appendix A of the USFWS biological opinion. [28]

The area of concern that is referenced by TCEQ is also watershed-based and focused on Segment 2481 of the Corpus Christi Bay System, which is designated for exceptional aquatic life use[29] This begs the question: how is it that a segment designated for exceptional aquatic life—the highest-value category for waters under the Texas Surface Water Quality Standards (TSWQS), which means by definition that the aquatic life attributes 1) have "habitat characteristics" of "outstanding natural variability," 2) "species assemblage" that is "exceptional or unusual," 3) "abundant" "sensitive species" 4) "exceptionally" "high diversity" 5) "exceptionally high" "species richness" and 6) "balanced" "trophic structure"—does not support *any suitable habitat* for any endangered or threatened aquatic- or marine/estuarine-dependent avian species observed to be using the same segment?[30,31,32,33] According to TCEQ, that segment is 123.1 square miles[34] in size. Even if one were to constrain the limits of the geographical scope of the inquiry to the nearmost and CCSC-adjacent CHU for the piping plover—not the part of the unit that is further

[28] Dr. Wallace TCEQ Interoffice Memorandum dated August 20, 2018, used in the original hearing, AR-8 at ED-0072
[29] ED-MW-1 at 24 (citing 30 Tex. Admin. Code § 307.10(1)) from first hearing.
[30] https://www.tceq.texas.gov/assets/public/permitting/waterquality/standards/docs/june_2010_ip.pdf, last accessed April 11, 2022, p. 15 Table 1, derived from Table 3 in § 307.7(b)(3)(A) of the Texas Surface Water Quality Standards
[31] POCC Exhibit 6/A3A, Threatened and Endangered Species that May Occur Near the Project Area
[32] Emphasis added
[33] AUD 202, AUD 220
[34] https://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/02twqi/assessments/02_2481_data.pdf. Last accessed April 8, 2022.

east and south on the Gulf/beach side, but the outer reaches of the unit adjacent to the CCSC—one is approximately three miles from the proposed outfall location,[35] which suggests that the area deserving of an indirect impacts analysis would reasonably be at least that large. A radius of three miles from the project site overlaps with firsthand observations of many of the bird species of concern from the two different citizen science datasets provided and would have yielded a more useful starting point for indirect analysis, which could have focused on the diets of these at-risk species and whether potential impacts from the discharge would threaten year class strength[36], or a change in species abundance and distribution[37]. This contested case process involved a massive effort to appreciate the potential impacts from the proposed diffuser to impact larval recruitment of red drum and other species to the various seagrass beds habitat/sanctuary in the State Scientific Area, CCSC, and elsewhere. A similar geographic area of inquiry could serve for a project area definition to conduct an useful indirect impacts assessment; after all, we are attempting to assess for impacts on the species that are marine- and aquatic-dependent; furthermore, it is quite counterintuitive to imagine the species that are marine- and aquatic-dependent would somehow have a smaller spatial area for impacts—much of this proceeding has been focused, rightly, on potential impacts to juvenile aquatic organisms and whether they can successfully migrate to nursery grounds. That the impacts assessment for the aquatic- and marine/estuarine--dependent species impacts focuses on the subsurface near the diffuser array and not the feeding grounds in the larger system makes little sense.

IId. Suitable and critical habitat

[35] AUD 211 showing critical habitat unit for Piping Plover, second zoomed-in still image
[36] Remand hearing transcript, Vol. 5, Dr. Greg Stunz, p. 1234 lines 5-25, p. 1235 lines 1-14
[37] Remand hearing transcript, Vol. 6, Dr. Larry McKinney, p. 1510 lines 24-25, p. 1511 line1.

To the same point, TCEQ does not conclude there will be no impacts to the piping plover CHU because it is outside the project area; it concludes there will be no impacts to the plover unit because the discharge is not a petroleum discharge. TCEQ clearly recognizes the potential impacts area to include the piping plover CHU. Here it is useful to recall the formal definition of "critical habitat" under the Endangered Species Act:

> Critical habitat is defined in section 3 of the Act as: (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) Essential to the conservation of the species and (b) Which may require special management considerations or protections; and (2) Specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.[38]

These definitions have vital implications. First, it is self-evident: the finding of no suitable habitat in the project area is simply wrong; at the very least, there is not only suitable habitat, but critical habitat, for at least one aquatic- or marine/estuarine-dependent species: the piping plover. Such a dramatic contrast underscores the insufficiency of the applicant's habitat assessment and lack of an indirect impacts assessment for aquatic- and marine/estuarine-dependent species, not just the piping plover. Secondly, it calls out the potential value of special management

[38] Federal Register, Vol. 73, No. 98 / Tuesday, May 20, 2008 / Proposed Rules for Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Wintering Population of the Piping Plover (Charadrius melodus) in Texas, p. 29295, available at https://www.govinfo.gov/content/pkg/FR-2008-05-20/pdf/E8-10742.pdf#page=1, last accessed April 8, 2022.

considerations or protections, which underscores that decisionmakers may have latitude to pursue decisions and methods to develop protective conditions in critical habitat areas; and finally, the definition reminds us: the formal meaning of critical habitat under the Endangered Species Act explicitly recognizes that an area does not have to be occupied by a given species at a given moment in time for it to be critical and to have immense potential value for conservation. In other words, the presence or absence of species alone cannot serve by itself as the sole test to demonstrate its importance as habitat, importance to species survival, or broader conservation values. There are very clear echoes here to those principles outlined in the EPA framework referenced by Dr. Fontenot earlier: "Second, there is no single set of ecological values to be protected that can be generally applied. Rather, these values are selected from a number of possibilities based on both scientific and policy considerations." [39] These definitions also go to speak to the fallacy of the mobility argument that suffuses the applicant's rationale: there are different grades of habitat, some are higher-value than others, and there are indirect costs to using lower-value habitat versus higher value habitat.[40] The comparison of "suitable" v. "critical" illuminates this continuum, as do the formal definitions. The characterization of the piping plover critical habitat unit also offers a useful example:

> Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of

[39] P. XV of the 1992 EPA ecological assessment framework, prefiled testimony of Dr. Lance Fontenot
[40] Remand hearing transcript, Vol. 4. Dr.Lyle Tischler, p. 860 lines 23-25, p. 861 lines 1-25, p. 862 lines 1-7.

> the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.[41]

For the piping plover in the project area, beach habitat is inferior to bayside habitat. One must draw distinctions of habitat quality even within a single critical habitat unit[42], and there is a symbiotic relationship between the habitats themselves; i.e., the proximity of the secondary habitat is necessary to make the

[41] AUD 203, p. 3 of 17.
[42] AUD 211

critical habitat function most optimally for the species of concern. The secondary habitat may not be critical, but its proximity and suitability is nonetheless essential to the critical habitat for the unit/area to realize its greatest conservation value to the species in question.

IIe. TCEQ relied on a distinct set of criteria for assessment that may be rules-based

TCEQ's determination of whether the nature of the discharge could be expected to negatively impact species such as piping plover is indeed based on separate issues. The Procedures to Implement the Texas Surface Water Quality Standards (IPs) appear to offer guidance in this regard, and TCEQ has been steadfast that because the discharge is not a petroleum discharge, it does not require additional review[43], per 3. of the screening process (figure shown below). However, those same implementation procedures appear to permit discretion in applying the screening for impacts to species. Nowhere does it say that only petroleum discharges should trigger a consideration of the piping plover, only that a petroleum discharge south of Copano Bay necessarily triggers a screening of the piping plover.[44] Moreover, the implementation procedures derive from a biological opinion[45] that was issued in 1998 and has been updated periodically since.[46] The timing of those updates remains unclear, but it is nonetheless noteworthy that the IPs are dated 2010, and the biological opinion 1998 and perhaps thereafter. It is now 2022, and the next large-scale seawater desalination facilities built on the Texas coast will be the first. We

[43] Dr. Wallace TCEQ Interoffice Memorandum dated August 20, 2018, used in the original hearing, AR-8 at ED-0072
[44] Procedures to Implement the Texas Surface Water Quality Standards, RG-194, June 2010, p. 22, sections 3.-5., available at https://www.tceq.texas.gov/assets/public/permitting/waterquality/standards/docs/june_2010_ip.pdf.
[45] Remand hearing transcript Vol. 9 p. 2401 lines 23-25, p. 2402 line 1.
[46] Deposition of Peter Schaefer, January 27, 2022, P. 121 lines 14-16

would also note that much has changed since 1998 and 2010 in terms of our awareness of species distribution and recovery.

Screening Process

After permit applications are declared administratively complete, TCEQ staff screen them as follows:

1. The first classified segment that the discharge enters is determined.

2. The list of segments in Appendix B on page 211 (taken from Appendix A of the USFWS biological opinion and subsequent updates) is consulted to determine whether there is a potential for the listed species to occur anywhere within the watershed of the segment or whether the listed species is known to be only in a particular water body.

3. If the species has a potential of occurring anywhere within the watershed of the segment, TCEQ staff may compare the location of the discharge against the HUCs listed in the biological opinion to more accurately determine whether the discharge may impact listed species.

   Note that TCEQ staff also screen applications from petroleum facilities south of Copano Bay (Segment 2472) to determine whether these discharges could potentially have any adverse effect on the piping plover, a species of high priority.

4. If the application screening indicates that the discharge has a potential to affect a listed species, USFWS is formally notified via either the SPIF or the Notice of Application and Preliminary Decision.

5. TCEQ staff performs further reviews of discharges that are formally reported to USFWS in step 4 to determine whether additional or more stringent permit limits are necessary. In making this determination, the location of the discharge within the county, the distance from the segment or water body in question, the size of the discharge, and the type of species (for example, fish, amphibian, invertebrate, or plant) are all considered.

Additional Permit Limits

Finally, we recall that following the checklist does not assure compliance with substantive standards:[47]

> However, following the procedures is not sufficient on its own to ensure that the proposed discharge complies with the

[47] From the original hearing, PAC Reply at 18-19 (citing Save Our Springs Alliance, Inc. v. Tex. Comm'n on Envt'l Quality, No. D-1-GN-19-003030 (345th Dist. Ct. Travis County, Tex. Oct. 29, 2020)).

> substantive antidegradation standards. The Commission's referred issue requires a determination of whether the antidegradation review was "accurate," not simply whether it followed TCEQ's procedures. Protestants' and OPIC's arguments implicate whether the ED's antidegradation review meets the substantive standards, in particular whether Segment 2481's designation of "exceptional aquatic life use" will be maintained and whether water quality will not be lowered by more than a de minimis amount.[48]

IIf. Key species foundational to the diets of threatened and endangered birds species in the area were not considered

Key species necessary to the diets of threatened and endangered species in the area were not considered/used in the (WET) testing method (blue crab, white/brown shrimp)[49,50.] Blue crab is a keystone species[51] in the area and an indicator species— a "canary in the coal mine"[52] and would have yielded important information about vulnerability and potential impacts[53], but it was not subject to WET testing[54] and neither blue crab nor shrimp were included in the applicant's expert assessment.[55] Blue crab is essential to the whooping crane.[56] Dr. Stunz elevated the concept of year class strength in fisheries science. A strong year class—when factors such as fecundity, reproduction, recruitment, and survivorship of a species create an abundance of species in a

[48] Proposal for Decision, p. 39, second paragraph, Administrative Law Judges, February 5, 2021.
[49] Excerpts PAC 55-R, Dr. James Tolan prefiled testimony, p. 28 lines 3-9
[50] Remand hearing transcript, Vol. 5, p.1209, lines 11-25, p. 1210 lines 1-10.
[51] Remand hearing transcript, Vol. 5, p. 1058, lines 3-21.
[52] Remand hearing transcript, Vol. 5, p. 1057, line 23.
[53] Excerpts PAC 55-R, Dr. James Tolan prefiled testimony, p. 28, lines 3-9.
[54] PAC 47-R, p. 11, lines 14-18.
[55] Remand hearing transcript Vol. 4, Dr. Nathan Knott, p. 980 lines 5-25, p. 981 lines 1-4.
[56] AUD 213, AUD 217

given place—is paramount to understanding potential indirect impacts.[57] Weak year classes and strong year classes impact the scarcity or abundance of forage for higher trophic level species relying on that food source, as well as commercial harvest and recreational harvest of species (i.e. sportfishing).[58] There is a demonstrated correlative relationship between strong year classes of blue crab and whooping crane survivorship, and weak year blue crab classes and whooping crane mortality [59]. It has been documented that blue crab recruitment patterns rely on this project area, and the Aransas Pass to move in an and out of the broader estuarine system.[60] Experts for the applicant seem to dismiss the possibility that meaningful numbers of whooping cranes are in the project area, but TPWD is absolutely interested in their presence outside the critical habitat unit at Aransas National Wildlife refuge because there is value in learning more about their behavior as they expand their range.[61] One important question that could have been addressed in an indirect assessment: what happens to the blue crab recruitment up Lydia Ann and Aransas channels, given the potential results from the particle flow assessments, which by the applicant's assessments may comprise more than 50% of the particle transport?[62] This is a natural follow up question to the "mismatch hypothesis"[63] and concerns over "cascading effects"[64] and to Dr. Holt's surmise in the initial hearing[65] and could yield important questions about the relationship between salinity, larval recruitment, survival rate of forage species, and indirect impacts.[66, 67]

[57] Remand hearing transcript Vol. 5, p. 1234 lines 5-25, p. 1235 lines 1-14
[58] Remand hearing transcript, Vol. 5, p. 1236 17-25
[59] Remand hearing transcript, Vol. 6, p. 1449 lines 10-13.
[60] Remand hearing transcript, Vol. 6. p. 1446 lines 9-24
[61] AUD 220
[62] Remand hearing transcript, Vol. 2, P. 406 lines 23-25, p. 407 line 1.
[63] Remand hearing transcript, Vol. 5, p. 1234, lines 12-25, p. 1235, lines 1-12.
[64] Remand hearing transcript, Vol. 5, p. 1207 lines 14-25, p. 1208 lines 1-8.
[65] Original hearing, Dr. Scott Holt, transcript Vol. 3 at 17, "the larvae that are coming into the inlet are sort of the winners, you know, they're the ones that have actually managed to be picked up in the tidal current and brought into the estuary. They have a chance to actually get to the nursery ground."
[66] Remand hearing transcript, Vol. 5, p. 1236, lines 19-25.
[67] 30 Tex. Admin. Code § 307.4(g)(3).

Another element of the indirect impacts question that did not receive due attention from the applicant revolves around the concept of ecosystem homeostasis.[69] The concept of homeostasis is straightforward and was discussed throughout this hearing—organisms and ecosystems themselves tend towards equilibrium, and abrupt changes—in temperature, or ambient water speeds, or salinity, for example—can disrupt that balance, sometimes fatally.[70] A useful example of this disruption was used several times invoking the concept of an Australian discharge that altered the abundance and distribution of species around an outfall discharge, with the intimation that this might in and of itself be a good thing. That is simply not the case.[71] In examples cited by Drs. Knott[72] and McKinney[73], a new class of predators frequents the diffuser during operation, and then leaves once operations are suspended. Leaving aside the question of what the predators might have been feeding on, another concern is that the species distribution has changed, and new competition has been introduced for resources. Arguments were made that change in abundance and diversity around the diffuser outfall is in and of itself a good thing[74], but that is simply not the case:

> (T)he ecosystem, by definition, is a series of connections, and you can't really pick out one of those connections without having, you know, some expectation of a result in another one. Classic example in lecture, if it was a child's balloon, you squeeze one part of it, another part has to expand to account for that. There's a lot of interactions that go on. Many of those interactions, we don't even

[69] Remand hearing transcript, Vol. 5, p. 1056, lines 2-16.
[70] Remand hearing transcript, Vol. 5, p. 1056, lines 2-16.
[71] Remand hearing transcript, Vol. 5, p. 1057 lines 1-7.
[72] Remand hearing transcript, Vol. 4, p. 1016, line 11.
[73] Remand hearing transcript, Vol. 6, p. 1510, lines 12-25.
[74] Pre-filed testimony, Dr. Nathan Knott, p. 11, lines 19-20.

> fully understand as scientists, but they're --especially Ecosystems are very delicate, so they're sensitive is what we mean by that. You manipulate one portion of it, you might expect that you would see consequences of that in other areas. [75]

Imagine, for example, if the abundance of red drum were to go up as a result of this discharge. In a vacuum, perhaps, many might argue that such a result is indeed a good one, and sportfishers might rejoice. Consider, though, that red drum prefer crabs, marine worms, and crustaceans.[76] What consequences might that have on the species who also rely on those organisms, e.g. whooping crane and piping plover?

III CONCLUSION

For the reasons discussed above, the record supports findings and conclusions that the proposed draft permit does not meet applicable requirements concerning remanded issues 2A and 2H. Accordingly, Audubon Texas respectfully recommends denial of the permit.

[75] Remand hearing transcript Vol. 5, pg. 1055, lines 10-24.
[76] https://tpwd.texas.gov/huntwild/wild/species/reddrum/