

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

OCEANA, INC.,

Plaintiff,

v.

**GINA M. RAIMONDO, in her official
capacity as Secretary of the United States
Department of Commerce, et al.,**

Defendants.

Case No. 17-cv-829 (CRC)

MEMORANDUM OPINION

This case presents a challenge to a 2016 regulation issued by the National Marine Fisheries Service (“NMFS,” “Fisheries Service,” or “Service”) to curtail overfishing of the dusky shark, a migratory predator fish that inhabits coastal ocean waters from Nova Scotia to Brazil. The Service banned targeted fishing for the species in 2000 in an effort to reverse decades of population decline. The challenged regulation, by contrast, targets collateral “bycatch” of dusky sharks by boats seeking to land other types of fish. It establishes a series of “accountability measures” designed to reduce the number of dusky sharks that are mistakenly caught and to decrease the likelihood that those caught will perish as a result. The agency concluded that adopting these measures will achieve a 35 percent reduction in mortality, which in turn will slowly rebuild the dusky shark stock over the next century.

Plaintiff Oceana, Inc. does not believe the regulation goes far enough to protect the dusky. It questions the efficacy of the measures the Fisheries Service elected to include in the regulation. More fundamentally, it challenges the Service’s determination—upon which its selection of accountability measures was premised—that current bycatch of the dusky shark is “small.” That determination is flawed, Oceana says, because the agency failed to estimate the

true level of bycatch by extrapolating from two sets of existing data: mandated tallies of bycatch recorded by a limited number of NMFS-trained independent observers and similar counts maintained in logbooks kept by some individual fishing vessels. Oceana contends that estimating bycatch in this way would have revealed a more serious problem and led the agency to adopt more demanding remedies.

This is not the first time Oceana's challenge has been before this Court. In March 2019, the Court granted partial summary judgment in Oceana's favor, finding that the Fisheries Service had not adequately explained why it chose to disregard the data (and derivative estimates) that Oceana highlights. The Court remanded the regulation to the agency and directed it to either factor the omitted data into its analysis or better justify its decision not to do so. The Service responded with a comprehensive Supplemental Evaluation supporting its prior conclusions that Oceana's preferred estimates are not scientifically valid, that the disputed data bolsters its conclusion that dusky shark bycatch is indeed small, and that additional accountability measures are not needed to reverse overfishing and restore the health of the dusky population.

Still unimpressed, Oceana has renewed its challenge, and both sides have moved for summary judgment. Finding that the Fisheries Service has now offered a reasoned justification of the regulation, the Court will defer to its considerable scientific expertise and grant summary judgment in its favor.

I. Background

A. Dusky sharks and the Magnuson-Stevens Act

The factual and legal background of NMFS's efforts to restore the dusky shark population may be found in the Court's prior opinion. See Oceana, Inc. v. Ross, 363 F. Supp. 3d 67, 70–76 (D.D.C 2019) (Cooper, J.) ("Oceana I"). In short, the dusky shark is a slow-growing,

highly-migratory apex predator that was subjected to decades of commercial overfishing which depleted the population. See id. at 72–76. Since 2000, when NMFS prohibited all dusky shark landings, the agency has adopted numerous additional regulatory measures to curtail dusky shark mortality and help the species recover to a healthy state. See id. at 73–74. The most notable of those measures are Amendment 2 to the 2006 Highly Migratory Species (“HMS”) Fishery Management Plan—which, *inter alia*, cut commercial fishing quotas, restricted fishing times and areas, and prohibited fishing for the sandbar shark (a doppelganger of the dusky whose targeting had resulted in sizable dusky shark bycatch), see Administrative Record at 7077, 7087 (“A.R.”)—and Amendment 5b, the regulation at issue in this case. Oceana I, 363 F. Supp. 3d at 74–76. The adoption of both regulations were informed by periodic “stock assessments” which NMFS conducts to assess and monitor the health of particular fish species. Id. at 73–74. Prior to Amendment 5b’s adoption in 2017, dusky shark stock assessments had shown a substantial decline in overfishing. See A.R. at 7101.

1. The Magnuson-Stevens Act

NMFS’s efforts to rehabilitate the dusky shark population are guided by the Magnuson-Stevens Act (“MSA”), 16 U.S.C. §§ 1801 *et seq.* The MSA is designed to prevent overfishing in U.S. coastal waters and mitigate its effects where it has already begun. Oceana I, 363 F. Supp. 3d at 71. The MSA “empowers federal agencies to ‘provide for the preparation and implementation, in accordance with national standards, of fishery management plans which will achieve and maintain, on a continuing basis, the optimum yield from each fishery.’” Id. (quoting 16 U.S.C. § 1801(b)(4)). The act defines a fishery as “one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics” and “any

fishing for such stocks.” Id. § 1802(13).¹ “Optimum yield,” in turn, “means the amount of fish which will provide the greatest overall benefit to the nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems.” Id. § 1802(33)(A).

NMFS enforces compliance with the fishery management plans established under the MSA. See generally C & W Fish Co. v. Fox, 931 F.2d 1556 (D.C. Cir. 1991). Of relevance here, a 2006 amendment to the MSA requires all management plans to “establish a mechanism for specifying annual catch limits . . . at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.” 16 U.S.C. § 1853(a)(15). Although the MSA establishes regional fishery management councils to take primary responsibility for plans covering their respective regions, NMFS directly oversees management plans for highly migratory species, including the dusky shark. See id. §§ 1852(a)(3), 1854(c).

These management plans and the agency’s implementing regulations are subject to ten “National Standards,” id. § 1851(a)(1)–(10), and other MSA requirements, see id. §§ 1853(a), 1854(e). The two National Standards of greatest relevance here are standards 1 and 2. National Standard 1 requires fishery management plans to “prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.” Id. § 1851(a)(1). And National Standard 2 requires that plans “be based upon the best scientific information available.” Id. § 1851(a)(2).

¹ The opinion refers to a number of distinct fisheries throughout, such as the HMS Fishery and the Southeast Coastal Fishery, which are defined by NMFS based on the characteristics set forth in the MSA. See 16 U.S.C. §§ 1802(13)(A)–(B).

NMFS provides its own gloss on the statute’s mandatory National Standards through a series of guidelines. See 50 C.F.R. §§ 600.305–600.355. These guidelines do “not have the force and effect of law,” but the various regional councils and NMFS personnel must use them “to assist in the development of fishery management plans.” 16 U.S.C. § 1851(b). The guidelines specify how the agency is to develop and implement annual catch limits and accountability measures, two of the MSA’s key tools for managing fisheries. See, e.g., id. 50 C.F.R. § 600.310(g)(3). An annual catch limit is a “level of catch intended to ensure overfishing does not occur,” while accountability measures are “management control[s] intended to prevent annual catch limits from being exceeded, and to correct or mitigate overage of the annual catch limit if they occur.” See NOAA Fisheries, Southeast Regional Office, Frequent Questions: Annual Catch Limit Monitoring, <https://www.fisheries.noaa.gov/southeast/sustainable-fisheries/frequent-questions-annual-catch-limit-monitoring> (last updated August 29, 2019). As relevant here, the guidelines to the National Standards contain an exception providing that “[i]f an [annual catch limit] is set equal to zero and the [accountability measure] for the fishery is a closure that prohibits fishing for a stock, additional [accountability measures] are not required if only small amounts of catch (including bycatch) occur, and the catch is unlikely to result in overfishing.” 50 C.F.R. § 600.310(g)(3). The Court will return to this guideline later.

2. *Amendment 5b*

The latest salvo in NMFS’s battle against overfishing of dusky sharks, Amendment 5b to the 2006 HMS Fishery Management Plan “aims to achieve a 35 percent mortality reduction relative to 2015 levels, and rebuild dusky shark stock by the year 2107.” A.R. at 7111. That 35 percent figure is based on the agency’s 2016 stock assessment of the dusky shark which showed that, while dusky shark overfishing had been declining for some time, mortality still needed to

fall by 12 percent from 2015 levels to end overfishing, and that a further 35 percent reduction in mortality would be necessary to give the population a 50 percent chance at returning to sustainable levels in approximately 100 years. A.R. at 7079, 7101, 7104. Responding to this assessment, Amendment 5b adopts a number of accountability measures designed to reduce bycatch. It:

- requires recreational and commercial fishermen to undergo education on dusky shark identification to reduce bycatch retention rates by fishermen who catch, misidentify, and fail to release them;
- establishes a release protocol in the pelagic longline fishery;
- mandates training on how to safely handle dusky sharks to reduce mortality due to bycatch;
- requires fishermen in the recreational Atlantic shark fisheries and the directed shark bottom longline fishery to use circle hooks, thought to be less harmful and thus less likely to cause death after discard; and
- establishes a fleet communication protocol to help fishermen avoid areas where dusky sharks are likely to be ensnared.

See Oceana I, 363 F. Supp. 3d at 75 (citing A.R. at 7565).

As the annual catch limit for dusky sharks is zero, the agency also determined in Amendment 5b, pursuant to the National Standard guidelines exception noted above, that dusky shark catch (including bycatch) was small and that overfishing was unlikely to continue, in part due to the measures adopted in the amendment. A.R. at 417, 4830–31, 7571. In making this determination, the agency primarily relied on data from a variety of NMFS “observer programs” that place trained observers on a small number of fishing vessels to record, among other things, the species and number of fish that the boat encounters on a fishing trip. See Oceana I, 363 F.

Supp. 3d at 92–93.² Based on this data, the agency concluded that further accountability measures beyond those adopted in Amendment 5b were not required. See A.R. at 7490–91, 7570.

3. *Sources of data on dusky shark abundance*

Despite primarily relying on observer data in its determination that bycatch was small, the Fisheries Service additionally analyzed four other sources of dusky shark fishing data in crafting the 2016 stock assessment and Amendment 5b: logbook data, recreational data, seafood dealer data, and exempted fishing permits (“EFP”) data. See, e.g., AR at 7087–89, 7568–69, 8053, 10277. From each of these sources (like observer data), the primary outputs of interest were interactions (i.e. the number of instances in which the fishing boat either hooked, netted, or otherwise encountered a dusky shark) and mortalities. Each data set possessed unique features and flaws. See, e.g., Supp. Eval. at 39–45 (discussing the accuracy of the data sources relied upon by the agency). Those characteristics are highly relevant to the agency’s decisions at all points in Amendment 5b and on remand (as well as to the parties’ arguments here). As such, the Court will briefly summarize each data source, but, because most of the parties’ attention is directed to logbook and observer data, the Court will devote particular emphasis to those two sources.

As noted above, observer data on dusky sharks is collected by NMFS-employed independent observers who are stationed on certain (typically commercial) fishing vessels and report the number and location of bycatch, as well as whether the catch was released dead or

² Such encounters include interactions in which a fishing boat mistakenly hooks or nets a dusky shark and then releases the shark back into the water. These interactions can result in the dusky dying from injuries suffered during this process, what the Service refers to as “post-release mortality.” See Supp. Eval. at 30.

alive. See A.R. at 10269–70. Although both parties express confidence in the accuracy of the data reported by the observer programs, observer data only covers around five to fifteen percent of fishing vessels, depending on the fishery, due to the limited number of observers at NMFS’s disposal at any given time. See Supp. Eval. at 44.

The specific observer programs relevant here are: (1) the Northeast (“NE”) Fisheries Observer Program, which covers a “random[] select[ion]” of “approximately 8 percent” of trips taken by fishermen in certain non-HMS fisheries in the Northeast and certain non-HMS and HMS fisheries in the mid-Atlantic regions; (2) the Southeast (“SE”) Bottom Longline Observer Program, which covers between 5 to 10 percent of “all SE and Gulf of Mexico . . . trips that use bottom longline [fishing] gear”³ as well as one hundred percent of the 5 to 10 vessels in the Shark Research Fishery (a program established by NMFS in 2008 which allows limited landings of otherwise prohibited sharks for research purposes); (3) the SE Gillnet Observer Program, which covers 8 to 10 percent of all gillnet fishing trips by vessels from Florida to North Carolina and in the Gulf of Mexico; (4) the Gulf of Mexico Reef Fish Observer Program, which covers 2–5 percent of the Gulf of Mexico directed reef fishery; (5) the Gulf of Mexico Shrimp Trawl Observer Program, covering 2 percent of Gulf of Mexico shrimp trawl trips; (6) the Pelagic Observer Program, covering 10–15 percent of vessels fishing with pelagic longline gear⁴ on HMS permits. A.R. at 10268–69.

³ Bottom longline fishing involves anchoring a line to the seafloor with hooks attached at various intervals. NOAA Office of Protected Resources, Fishing Gear: Bottom Longlines, <https://www.fisheries.noaa.gov/national/bycatch/fishing-gear-bottom-longlines> (last updated July 23, 2019).

⁴ Pelagic longline fishing entails suspending hooks on a line at a certain depth where species such as the dusky shark may be present. NOAA Office of Protected Resources, Fishing

Logbook data generally tracks the same categories of information as observer data (interactions and mortalities) but is generated by the fishermen themselves rather than by trained observers. Supp. Eval. at 39. For that reason, logbook data coverage is generally more extensive than observer data: every commercial fisherman in the HMS fishery and any who receive a permit from NMFS's Greater Atlantic Regional Fisheries Office, as well as twenty percent of the fishermen in the SE Coastal Fisheries Logbook Program, are required to report their data via logbooks. A.R. at 10266–68; see also Supp. Eval. at 8–9 (tables presenting logbook data and listing coverages). This higher coverage level, however, comes with the cost of potential inaccuracy. Supp. Eval. at 39. The agency has been particularly concerned with issues of misidentification (as the dusky shark resembles, to the untrained eye, several other shark species), and over- and under-reporting by fishermen looking to influence fishing regulations. See Supp. Eval. at 39–40.⁵ The agency has also noted difficulties stemming from the differences in data and outputs among the logbook forms used by the various programs. See id.

The Service's logbook data programs are: (1) the HMS Logbook, covering Atlantic HMS permit holders using pelagic longline fishing gear as well as a select number of HMS permit holders using other types of fishing gear; (2) the SE Coastal Fisheries Logbook, primarily covering fishermen with commercial shark permits who do not use pelagic longline fishing gear and by fishermen with permits in the South Atlantic and Gulf of Mexico regions; (3) the Northeast Vessel Trip Reports, which covers fishermen with permits issued from the NMFS

Gear: Pelagic Longlines, <https://www.fisheries.noaa.gov/national/bycatch/fishing-gear-pelagic-longlines> (last updated May 9, 2019).

⁵ The Appendix to this Opinion includes a reproduction of “Figure 8” from the Supplemental Evaluation, a prohibited shark identification placard, which demonstrates the close resemblance of the dusky to other shark species.

Greater Atlantic Regional Fisheries Office and includes “[m]ost non-HMS fishermen from the mid-Atlantic north to Maine” and some non-commercial fishermen. A.R. at 10266–68.

Recreational data emerges from four surveys that collect information, including estimates of interactions and mortality, from recreational fishermen “who may interact with dusky sharks during their regular fishing activities.” Supp. Eval. at 29. The recreational data programs are “the Marine Recreational Information Program (MRIP), the Large Pelagic Survey (LPS), the Texas Parks and Wildlife Department (TPWD) recreational survey, and the Southeast Region Headboat Survey (SRHS).” Supp. Eval. at 23.

The Exempted Fishing Permits database covers catches and interactions for the small number of individuals issued permits “for the purpose of conducting scientific research or other fishing activities aboard private (non-research) vessels.” A.R. at 10272–73.

Finally, seafood dealer data is generated by several groups of seafood dealers who are either required to or voluntarily report information about the species they purchase and sell. *Id.* at 10271–72.

B. The Court’s prior summary judgment decision

Following the enactment of Amendment 5b in 2017, Oceana commenced the instant suit challenging the regulation on the grounds that the Fisheries Service had not properly evaluated the magnitude of bycatch; had not ensured that the measures adopted would keep bycatch small; had not shown that the measures would result in the 35 percent reduction needed to rebuild the dusky population; and had failed to analyze a reasonable range of alternatives as required by the National Environmental Policy Act (“NEPA”). *See* Pl.’s MSJ, ECF 36-1 at i–ii. In its previous opinion, the Court primarily dealt with Oceana’s challenge to the data and analysis relied upon by NMFS in enacting Amendment 5b. In particular, the Court questioned NMFS’s exclusion of

logbook data from its assessment of the magnitude of the dusky shark bycatch problem and found that these issues warranted remand. Oceana I, 363 F. Supp. 3d at 77–78, 93–94.

However, the Court stopped short of rejecting NMFS’s chosen accountability measures, finding that Oceana had not shown that stricter measures were required given the evidence and analysis present in the administrative record. Id. at 84–85. Rather, the Court reserved judgment on the agency’s favored accountability measures (as well as Oceana’s NEPA claims) pending further consideration by NMFS of the disputed data issues on remand. Id. at 84–85, 93–94.

After the Court issued its first opinion, the parties submitted proposals on the scope and duration of remand and, having considered these submissions, the Court ordered NMFS to undertake several actions on remand. First, NMFS was required to “consider all relevant data related to dusky shark bycatch in the HMS and non-HMS fisheries, as it existed at the time of the agency decision, including logbook data and the data underlying the National Bycatch Reports” (an NMFS report that reflected relatively large estimates of dusky shark bycatch, but which the agency had not relied on in promulgating Amendment 5b). Remand Order at 1, ECF No. 59; see A.R. at 7095–96. Second, NMFS was required to address “[w]hether, considering all of the relevant data, the agency continues to conclude that additional accountability measures are not required because only small amounts of catch (including bycatch) occur, and the catch is unlikely to result in overfishing” and “[w]hether there is a scientifically valid basis for using the logbook data in conjunction with the observer data and other sources, including by extrapolation, to estimate the amount of dusky shark bycatch occurring in the HMS and non-HMS fisheries.” Remand Order at 1, ECF NO. 59. Finally, the agency was required to notify the Court of the need for any further agency action and, if it determined that no action was required, to

supplement the administrative record with the materials underlying that determination. Id. at 1–2.

C. NMFS’s actions on remand

NMFS memorialized its responses to the Court’s remand order in a “Supplemental Evaluation of Dusky Shark Bycatch Data” (“Supplemental Evaluation”), which underlies (most of) the Court’s review here.⁶ That evaluation contains three main sections. The first reviews the disputed data related to dusky shark bycatch. See Supp. Eval. at 2. The second answers (in the negative) the Court’s query regarding whether the data, fully considered, disturbed the agency’s conclusion that only a “small” amount of bycatch is occurring (and thus that the measures adopted in Amendment 5b were sufficient to end overfishing). See id. And the third articulates the agency’s reasons for concluding that there is no scientifically valid basis to extrapolate dusky shark bycatch data from logbooks and other sources to estimate the total amount of dusky shark bycatch. See id. The Court summarizes each section below.

1. NMFS’s review of bycatch data

In reviewing the data on dusky shark bycatch, NMFS considered data from the fifteen-year period between 2000 and 2015 but gave the most weight to data from what it termed the “recent years” of 2013 to 2015. Id. at 5. That data, in the agency’s view, “reflect[ed] the regulatory measures in place at the time Amendment 5b was adopted,” and thus more accurately reflected the levels of dusky shark mortality relevant to the NMFS’s decisions on Amendment 5b. Id. Beginning with logbook data, NMFS produced tables showing that reported deaths

⁶ Because the Court’s prior opinion reserved certain challenges Oceana mounted to Amendment 5b and because the Supplemental Evaluation augments the agency’s Amendment 5b analysis, the record underlying Amendment 5b, including NMFS’s prior analyses of the dusky shark population’s health, also form the relevant record for review.

across all fisheries had averaged 27 dusky sharks over the 2013–2015 period, a 97-percent decline from the 788 annual deaths reported in logbooks during the 2000-04 period. Id. at 9, 14. If accepted at “face value,” the agency reported that “this decline in mortalities is statistically significant.” Id. at 14.⁷ The agency concluded that all commercial logbook data showed a “substantial[]” decline in dusky shark interactions and mortalities since 2000, with the “average annual reported numbers of dusky shark mortalities in all logbook programs, individually or combined . . . in the 10s to low 100s of individual[] [sharks] per year” with the “vast majority of reported dusky shark interactions and mortalities occur[ing] in HMS fisheries.” Id. at 16.

The agency reached similar conclusions as to observer data, noting that observer coverage of the relevant fisheries had expanded even as “the number of observed [dusky shark] mortalities has declined in the most recent years [i.e. 2013–2015]” following “strict measures implemented to address dusky shark mortality in the shark research fishery in 2013.” Id. at 22. The agency reported that this data showed “dusky shark mortalities in all observer programs, individually or combined . . . in the 10s to low 100s of individuals per year.” Id. Analyzing these trends, the agency concluded that the observer data showed that “[m]ost observed interactions and mortality of dusky sharks occurred in the HMS pelagic longline and bottom longline fisheries,” with “[o]bserved mortality [] near zero in most years in the non-HMS fisheries.” Id.

⁷ For the SE Coastal Fisheries Logbook data, the agency excluded 2015 from its mortality tables because the “data for 2015 was an extreme outlier that came from one logbook form that NMFS determined: a) deviated markedly from other values in the logbook and observer data; b) upon investigation could not be valid given the reported circumstances in the logbook form; and c) would inappropriately skew the average if not excluded as an outlier.” Supp. Eval. at 15. Oceana does not challenge this exclusion.

For recreational data, the agency reported similar trends to those found in the logbook and observer data despite expressing serious reservations about the accuracy of the recreational data. Id. at 26–28. Specifically, the agency found that “[t]he frequency of dusky shark interactions and mortality has significantly declined over time in the recreational fisheries,” with “mortality estimates of dusky sharks in recreational fisheries [] in the 100s of individuals” or “to low 1000s.” Id. at 27–28, 33.

The Service also considered the extent to which reported interactions could result in so-called post-release mortality. Because some sharks die after their interactions with fishing vessels, the “actual [dusky shark mortality] is some fraction higher than the reported mortality numbers, but less than the total interactions.” Id. at 30. While stressing that estimates of post-release mortality would be scientifically invalid due to uncertainties in the underlying interaction data, the agency nonetheless calculated that such estimations applied to the recreational fishery would still place post-release mortalities in the 100s per year. Id. at 31. The agency continued to emphasize, however, that “[s]cientifically valid estimates of the amounts of post-release mortality cannot be generated,” and further suggested that the current number was “smaller as a result of the measures implemented in Amendment 5b.” Id. at 31–32.⁸

Finally, the agency concluded its analysis of the data by indicating that, consistent with the remand order, it had considered the data underlying the National Bycatch Reports and, while strenuously objecting to their validity, the extrapolations contained in the National Bycatch Reports themselves. Id. at 32. The agency noted that even taking these extrapolations for what

⁸ The Agency also discussed data from seafood dealers and a particular research program which authorizes some dusky shark catch. See Supp. Eval. 28–30. Oceana challenges neither of these data sources.

they were, the average total mortality would be 727 sharks per year. Id. at 33. These estimates, although “scientifically invalid and not acceptable for management purposes[,] . . . remain[ed] small” in the agency’s view. Id. at 32–33.

2. *NMFS affirms its conclusion that dusky shark bycatch remained small*

The Service next considered whether its determination that bycatch was small, and thus that additional accountability measures were unneeded, held up in light of its examination of the data sources discussed above. Id. at 35. In considering this question, the agency did not give “small” any specific definition, noting instead that the regulations were silent as to what, exactly, small amounts of catch were. Id. The agency took this regulatory silence to mean that “a ‘small’ amount of catch is . . . a fact-specific determination” left to the agency. Id. Having made that determination, NMFS concluded that bycatch remained small even in light of all the data because dusky shark mortality had declined by a statistically significant amount from 2000 to 2015, with recent years showing deaths of hundreds of dusky sharks and with all data sources reflecting the same pattern of large declines in mortality between 2000 and 2015. Id. The agency further concluded that bycatch was small when “compared to many fish stocks that have observed mortality amounts estimated in the hundreds and thousands of metric tons” and when compared to “total shark bycatch across all fisheries.” Id. Finally, NMFS found “the current level of bycatch to be small considering the high number of [fishing] trips involved (tens of thousands) compared to the number of mortalities, as reflected by the low per-trip levels in most fisheries.” Id.

All this, the Service maintained, showed that Amendment 5b hewed to the letter of the regulations. NMFS stressed that the overall point of the regulatory framework was “whether overfishing is being prevented as required under the Magnuson-Stevens Act.” Id. at 35–36. On

this count, the Service reaffirmed its original conclusions in Amendment 5b that minimal overfishing was occurring, necessitating “[o]nly a small reduction (12%) in fishing mortality.” Id. at 36. The agency pointed out that its review of the data showed that “interactions and mortalities in non-HMS commercial fisheries . . . are near zero in recent years, and therefore have negligible impacts on the stock,” thus justifying Amendment 5b’s focus on implementing accountability measures only in “the HMS fisheries.” Id. The agency thus determined that Amendment 5b’s accountability measures addressed the greatest sources of mortality revealed by the data and that the agency’s previous analyses had not missed “large sources of dusky shark mortality.” Id. at 37. As a consequence, the agency concluded that “[t]he analyses in Amendment 5b stand after considering the additional data” and that no further accountability measures were needed. Id.

3. *NMFS rejects extrapolations*

Lastly, NMFS explained its finding that extrapolations of total dusky shark bycatch lacked the scientific validity necessary for use in fishery management decisions. At the outset, NMFS noted that the “assessment of dusky sharks has been historically problematic because of misidentification and mis-reporting of total catches” (recall the shark identification chart appended to this decision) and that the “unreliability of the catch data that are available [for dusky sharks]” had led “the stock assessment scientists [to determine] several times that the use of a ‘catch-free’ stock assessment model is appropriate for dusky sharks.” Id. at 37. (The Court will expound on this “catch free” model later. See infra III.A.2.b.) The use of a catch-free model, according to NMFS, indicated “that the catch statistics that are available are unreliable and not useful for assessment purposes.” Id. at 38. The agency further explained that because “every source of data [on dusky sharks] is subject to a variety of serious caveats that limits its

utility in producing scientifically valid bycatch estimates,” the data “were repeatedly determined by NMFS scientists to be inaccurate and so uncertain as to be rendered useless for purposes of estimating absolute overall catch or population levels.” Id. NMFS “reaffirm[ed]” that conclusion. Id.

Turning specifically to the question of extrapolating bycatch, NMFS stated that, while it was “not averse to conducting extrapolations,” for an extrapolation to be scientifically valid “there must be some minimum level of confidence in the underlying data.” Id. The dusky shark catch data, however, lacked the necessary characteristics to justify minimal confidence, in NMFS’s view, due to misidentification and lack of coverage. Id. NMFS further reasoned that extrapolation requires “inferring something unknown from something that is known.” Id. In the case of catch extrapolations, that “means using the known sampled catch data to estimate what the unknown total catch data could look like,” an exercise that requires the “basic assumption[s]” that “1) the characteristics of the known data match the characteristics of the unknown data and 2) the proportion of all the catch sampled is known.” Id. Such assumptions, because they are imperfect, will necessarily leave the resulting extrapolation with “some level of uncertainty associated with it.” Id. While statistical tools may reduce this uncertainty, NMFS opined that “[n]one of those techniques can be effectively used for any of the data sources here because the gaps (number of zeros) in the data are large and the species are caught infrequently and in greatly varying conditions and circumstances.” Id. In other words, NMFS concluded that the “very limited non-zero data makes it impossible to test whether the sampled catch data matches the characteristics of all the catch data or what proportion of overall catch the sampled data represents” while the varying locales of dusky shark catch impeded geographically-based extrapolations even where the data was non-zero. Id. at 38–39.

NMFS then proceeded to outline numerous other purported limitations of the logbook and observer data, including, in the case of logbook data, the problems of species misidentification, under- and over-reporting of dusky shark interactions and deaths, and different and incomplete logbook information recorded across fisheries. *Id.* at 39–43. As to observer data, the agency noted that it “does produce extrapolated catches of many different species in different fisheries using observer data,” but that “when it does so, it uses both a combination of effort (e.g., total number of trips or number of hooks) from the logbooks and a combination of scientifically derived catch rate (CPUE) data from the observer program.” *Id.* at 44.⁹ That approach was unavailable here, the agency explained, because (with limited exceptions) “the observer data shows zero interactions in most years after 2007, [so] any extrapolations would be incomplete and would not produce [] total catch estimates across all fisheries and all years.” *Id.* As a result, the agency explained that “given the number of zeros in the observer data and the lack of confidence in the logbook data . . . the stock assessment scientists have repeatedly determined that such extrapolations for dusky sharks are not appropriate and would not be valid.” *Id.*

In short, because of the “significant gaps [in the data] for some fisheries and years,” the “problems with species identification and over-and under-reporting,” and the proliferation of zero values, NMFS concluded that there was no scientifically valid way to extrapolate dusky shark bycatch. *Id.* at 45.

As a final matter, the agency conceded that “[a]rguably . . . one could conduct certain analyses to try to extrapolate the data” but that it was “NMFS’[s] scientific view, however, that

⁹ The Court will expound on the concepts of “effort” and “catch per unit effort” later. See *infra* III.A.2.

these are not valid approaches for extrapolating the total amount of bycatch (for reasons explained above) and, even if one attempted to use these approaches, the results would still show small catch.” Id. at 46. For example, a simple approach which scaled up the catch data generated by the “20 percent reporting vessels” in the SE Coastal Fisheries Logbooks would “yield an average mortality of 15 dusky sharks per year.” Id. Such an approach, the agency cautioned, “could be valid only to confirm that the extrapolated number would be small, and more precision is not possible” due to the “data limitations.” Id. The agency also noted that “one could, arguably, use the catch per unit effort (CPUE) from the observer programs covering those fisheries in conjunction with effort data from the SE Coastal Fishery Logbook for trips targeting those species to estimate total dead discards.” Id. But the proliferation of zeros in this data meant that “extrapolating the catches in combination with the [logbook] effort data . . . would still result in zero or very low numbers of dead dusky sharks.” Id. The agency reiterated that “given data limitations, this approach could be valid only to confirm that the extrapolated number would be small, and more precision is not possible.” Id. Thus, under either approach, the agency concluded that extrapolating the data “would yield mortalities in the 10s of individuals in recent years for commercial fisheries . . . and more precision is not possible.” Id.

D. Oceana’s present challenge

Following NMFS’s preparation of the Supplemental Evaluation and determination not to disturb the findings and accountability measures contained in Amendment 5b, Oceana renews its challenge in a further motion for summary judgment. Oceana takes aim at NMFS’s analysis in the Supplemental Evaluation and reiterates many of its original complaints about the adequacy of Amendment 5b’s protective measures, on which the Court’s previous opinion reserved

judgment.¹⁰ NMFS has filed a cross motion for summary judgment asking the Court to uphold Amendment 5b. The Court held a hearing on the parties' cross motions on January 28, 2021.

II. Legal Standards

The relevant legal standards are set forth in the Court's prior opinion. Nothing has changed. Briefly, Oceana seeks review of an administrative decision. The APA therefore supplies the relevant legal standard. Oceana I, 363 F. Supp. 3d at 76 (citing Oceana, Inc. v. Locke, 831 F. Supp. 2d 95, 106 (D.D.C. 2011); 5 U.S.C. §§ 701–06; 16 U.S.C. § 1855(f)(1)(B); Theodore Roosevelt Conservation P'ship v. Salazar, 661 F.3d 66, 72 (D.C. Cir. 2011)). Under the APA, courts should “hold unlawful and set aside” final agency actions that are “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.” 5 U.S.C. § 706(2)(A). As the Court previously emphasized, “[t]his arbitrary and capricious standard of review is a highly deferential one, which presumes the agency's action to be valid.” Oceana I, 363 F. Supp. 3d at 76 (quoting Env'tl. Def. Fund, Inc. v. Costle, 657 F.2d 275, 283 (D.C. Cir. 1981)). In applying this “narrow” review, a court may not “substitute its judgment for that of the agency,” but instead should ask only “whether the [agency's] decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment.” Citizens to Preserve Overton Park, Inc. v. Volpe, 401 U.S. 402, 416 (1971). This need for deference when exercising review is heightened where, as here, the agency is “evaluating

¹⁰ After NMFS issued the Supplemental Evaluation, Oceana moved to supplement the record with an expert declaration from Dr. Murdoch McAllister which challenged the agency's analyses in numerous respects. See ECF No. 67. The Court allowed supplementation of the record with the declaration for “the limited purpose of considering whether the agency failed to consider other potential causes of the decline in reported dusky shark interactions and deaths,” but denied the motion “in all other respects.” Oceana, Inc. v. Ross, 454 F. Supp. 3d 62, 66 (D.D.C. 2020) (Cooper, J.).

scientific data within its technical expertise,” Huls Am. v. Browner, 83 F.3d 445, 452 (D.C. Cir. 1996) (internal quotation marks omitted), and its determination is based on a “highly complex and technical matter[],” West Virginia v. EPA, 362 F.3d 861, 867–68 (D.C. Cir. 2004) (internal quotation marks omitted). The D.C. Circuit has cautioned that courts should “remain ever mindful that in performing ‘a searching and careful inquiry into the facts, we do not look at the [agency’s] decision as would a scientist, but as a reviewing court exercising our narrowly defined duty of holding agencies to certain minimal standards of rationality.’” Am. Trucking Ass’ns, Inc. v. Fed. Motor Carrier Safety Admin., 724 F.3d 243, 249 (D.C. Cir. 2013) (quoting Natl’ Env’tl. Dev. Ass’ns Clean Air Project v. EPA, 686 F.3d 803, 810 (D.C. Cir. 2012)).

The same principle applies to NMFS’s determination of what constitutes the best scientific information available for purposes of National Standard 2 of the MSA. See, e.g., The Ocean Conservancy v. Gutierrez, 394 F. Supp. 2d 147, 157 (D.D.C. 2005), aff’d sub nom. Oceana, Inc. v. Gutierrez, 488 F.3d 1020 (D.C. Cir. 2007) (stating that “National Standard 2 . . . does not require the NMFS to rely upon perfect or entirely consistent data,” but rather “is a practical standard requiring only that fishery regulations be diligently researched and based on sound science. Moreover, Courts defer to NMFS decisions that are supported in the record and reflect reasoned decision making, especially where, as here, the dispute involves technical issues that implicate substantial agency expertise.”). And where the facts conflict, “it is well established that NMFS may choose between conflicting facts and opinions, so long as it justif[ies] the choice.” Ctr. for Biological Diversity v. Blank, 933 F. Supp. 2d 125, 149 (D.D.C. 2013) (citations and quotations omitted).

III. Analysis

Oceana advances four central arguments in its summary judgment motion. *First*, it criticizes NMFS's use and analysis of the relevant data, focusing mainly on the agency's refusal to extrapolate from existing data in ways that Oceana maintains would paint a much bleaker picture of the dusky shark bycatch problem. *Second*, Oceana challenges the agency's determination that dusky shark bycatch is "small" under the terms of the agency's guidelines to National Standard 1, 50 C.F.R. § 600.310(g)(3). (It should be noted that these first two arguments overlap substantially.) *Third*, Oceana contests the agency's conclusion that Amendment 5b would result in a 35 percent reduction in dusky shark mortality. And *fourth*, Oceana purports to re-adopt the NEPA arguments advanced in its first motion for summary judgment, on which the Court previously reserved judgment.

Because the Fisheries Service has rationally justified its treatment of the data on remand, as well as its findings regarding bycatch and the expected mortality reductions from Amendment 5b, the Court will deny Oceana's motion for summary judgment and grant the Services' cross-motion.

A. NMFS's refusal to extrapolate raw data

Oceana contends that NMFS acted arbitrarily and contrary to past practice in deciding not to use the data considered on remand to develop an estimate of "total dusky shark bycatch" through extrapolation, instead choosing to rely on what Oceana characterizes as "raw, incomplete numbers" to inform its conclusions. Pl.'s MSJ at 10. Oceana argues that NMFS should have derived a total bycatch estimate in two ways: (1) by multiplying the SE Coastal Program logbook data by five (because logbooks were kept by only 20 percent of the fishing vessels operating in that fishery), or (2) by "using observer data in combination with the logbook

data to extrapolate total estimates of bycatch . . . because the strengths of one data set could correct the infirmities of the other.” Pl.’s MSJ at 11.

1. NMFS’s focus on data from 2013–2015

Before addressing Oceana’s arguments regarding NMFS’s reluctance to extrapolate from existing raw data, the Court will tackle a key framing question which undergirds many of Oceana’s arguments throughout its motion: what is the proper time period to analyze dusky shark bycatch for purposes of Amendment 5b and the Supplemental Evaluation? Oceana argues that the relevant period begins in 2008, and that the agency’s conclusions based on more recent, i.e. 2013–2015, data are thus lacking crucial context. Pl.’s MSJ at 21–22. There is some logic in Oceana’s position. Amendment 2, “which implemented the dusky shark rebuilding plan, was implemented in 2008 and included measures to significantly reduce dusky shark bycatch mortality.” Supp. Eval. at 5. And as Oceana points out, NMFS previously stated, in both Amendment 5b and past stock assessments, that 2008 was the relevant starting point for analyzing dusky shark bycatch. Pl.’s MSJ at 21–22 (citing A.R. at 7089, 1580). This issue matters because including mortality and interaction data from 2008 in the analysis shows greater raw (and average) dusky shark interactions and mortality.

NMFS, for its part, placed the most weight on the “‘recent’ years” of 2013, 2014, and 2015, though the agency included and presented data for the 2000–2015 period throughout its analysis. Supp. Eval. at 4–5. NMFS justified this focus in the Supplemental Evaluation by noting that these years “reflect[] the regulatory measures in place at the time Amendment 5b was adopted, including the dusky shark limits adopted in the shark research fishery in 2013.” *Id.* at 5. It elaborated that “[t]his time period is relevant for considering needed reductions in mortality and for comparison to the data in the early years to help identify impacts of the extensive

management measures that have been adopted since 2000.” *Id.* at 5–6. The agency further explained that “[d]ata from [2013–2015] is more reflective of current conditions in the fisheries . . . given the number of regulatory changes that have taken place over the time considered (e.g., closure of the directed fishery and designation of dusky sharks as prohibited, implementation of a rebuilding plan, and adoption of dusky shark limits in the shark research fishery).” *Id.* at 12. According to NMFS, then, “the most relevant data in assessing the magnitude of catch is from the recent period (2013[–]2015) as it reflects interactions and mortalities occurring with the entire pre-Amendment 5b suite of management measures in place.” *Id.* at 35.

The Court finds that NMFS has adequately justified its decision to accord more weight to data from 2013–2015 (and to use this data as the relevant benchmark for a variety of comparisons) when making its determinations regarding dusky shark bycatch. See Ctr. for Biological Diversity, 933 F. Supp. 2d at 149 (stating that where facts conflict, “it is well established that NMFS may choose between conflicting facts and opinions, so long as it justif[ies] the choice” (citations and quotations omitted)).

The Court begins with Oceana’s contention that NMFS’s focus on data from 2013–2015 arbitrarily deviated from its approach in Amendment 5b, which Oceana says adopted a wider lens and heavily relied on data immediately following 2008. This argument misconstrues the administrative record.

The portion of the record that Oceana primarily cites for its argument simply notes that certain data sources used by NMFS have “time series [which] begin[] in 2008 to coincide with the implementation of Amendment 2.” A.R. at 7089. To be sure, the section of Amendment 5b in which this sentence appears does state that “NMFS has . . . compiled the reported mortalities of prohibited sharks from 2008–2015” in order “[t]o better understand the scope of bycatch and

bycatch mortality occurring on the prohibited shark complex.” Id. at 7077. But this section, entitled “Prohibited Shark Bycatch Data Sources and Monitoring,” simply describes the agency’s choice of data sources to compile. See id. at 7077–79. It makes good sense that the agency would compile data over a long duration in order to observe changes in the fishery over time. The question, however, is not whether NMFS had to record or present older data alongside newer numbers, but rather which numbers were most relevant to determining dusky shark bycatch. And on that note, and indeed on that very same page, NMFS described its approach to monitoring dusky shark bycatch as expressly focusing on “[t]he most recent three-year moving average [i.e. 2013–2015].” Id. at 7089. That sentence appears in a section entitled “Monitoring Bycatch in the Prohibited Shark Complex” and, in contrast to the just-discussed section above it, does describe the agency’s decisions regarding the relevance of data from different time periods to tracking dusky shark bycatch. Id. Consistent with its approach in the Supplemental Evaluation, see, e.g., Supp. Eval. at 34–35 (comparing average annual mortality between 2000–2004 and 2013–15), NMFS stated in Amendment 5b that its approach to “monitor[ing] the observed bycatch of species in the prohibited shark complex” is “based on a comparison of the most recent three-year average mortality to previous three-year averages to help evaluate the impact of conservation and management measures,” A.R. at 7091.

The other citation Oceana provides for its argument that the Supplemental Evaluation is inconsistent with Amendment 5b points to a page of the record apparently discussing the 2009 dusky shark assessment; it is unsurprising, and wholly consistent with NMFS’s current position, that the agency focused on 2008 data (then the most recent year of data) when performing the 2009 dusky shark assessment. See id. at 1580. As such, NMFS appears to have acted

consistently with its practice in Amendment 5b and past stock assessments, in finding the more recent 2013–2015 data of particular relevance in the Supplemental Evaluation.

Nor was NMFS’s decision to focus on the more recent years otherwise arbitrary. To begin with, Oceana’s suit challenges the sufficiency of the measures NMFS adopted in Amendment 5b to improve the health of the dusky shark population. Amendment 5b, originally proposed in 2016 and finalized in 2017, aimed at percentage reductions in mortality *from 2015* levels, see, e.g., id. at 10221, 7104, a point Oceana concedes, Pl.’s MSJ at 2, 27. Because the dusky shark population has concerned NMFS for over two decades, the agency has adopted several waves of regulatory initiatives and tweaks to dusky shark management. In order to determine what marginal regulatory measures were required to reduce dusky shark mortality from 2015 levels, as Amendment 5b aimed to do, the relevant starting point would seem to be the baseline state of the population in 2015 as impacted by previous regulatory efforts.

It is true that data from a variety of time periods could be useful in establishing this baseline. Yet there is no obvious reason why data from all time periods would be *equally useful* as that from the most recent time period—much less that focusing on such recent data would be arbitrary and capricious—when deciding which actions to take to reduce mortality from current levels. In the Supplemental Evaluation, NMFS selected the data from the 2013–2015 period as most accurately reflecting the health of the stock immediately prior to Amendment 5b. In particular, NMFS found that those years reflected not only the extent of progress made in the aftermath of Amendment 2’s enactment in 2008 (which Oceana uses as its primary justification for focusing on 2008–15 data) but also, among other considerations, “the dusky shark limits adopted in the shark research fishery in 2013.” Supp. Eval. at 5. This period thus reflects the changes to the agency’s data collection activities in the dusky shark fisheries since 2008, the year

to which Oceana would extend the analysis. See, e.g., id. at 17 (describing the Pelagic Observer Program’s data collection methods in 2013–2015). A judgment of this nature, relying on agency expertise and explained in the administrative record, is not lightly disturbed. Ctr. for Biological Diversity, 933 F. Supp. 2d at 149. Therefore, because Amendment 5b was targeted at reductions in mortality from 2015 levels, and because data from 2013–2015 logically reflects the effect of the most recent regulatory and data collection measures adopted by NMFS for the dusky shark, the Court finds that it was not arbitrary for NMFS to primarily focus on these years in its review of dusky shark interaction and mortality data.

2. NMFS’s general position against extrapolation

With that, the Court moves to Oceana’s criticism of NMFS’s decision not to extrapolate dusky shark bycatch from the available raw data. Oceana proposes two specific extrapolations, both of which it argues are superior to NMFS’s “partial” approach of considering only those interactions and mortalities reflected in the raw logbook and observer data. The first, a simple “scaling” approach, involves a straightforward multiplication of certain limited-scope logbook data by five to arrive at an overall estimate of bycatch from those sources. The second, involving a more complex mélange of observer and logbook data, would use this data to derive “effort” and Catch Per Unit Effort (“CPUE”) rates—essentially estimates of fishing activity and the amount of that activity that results in one dusky shark catch—that, in turn, may be used to arrive at an overall estimate of bycatch. Because NMFS’s responses to both of these alternatives touches on similar notes, it is worth laying out NMFS’s general position on extrapolations at the outset.

With respect to both of Oceana’s proposed extrapolations, NMFS argues that the data regarding dusky shark interactions and mortalities is simply too spotty to permit any

scientifically valid extrapolation. Any extrapolation, NMFS explains, involves estimating unknown data using known data. In order to create accurate extrapolations, it is thus necessary to understand the characteristics of the known (or “sampled”) data, the characteristics of the unknown data (i.e. the ways in which the unknown data does or does not differ from the known data), and the share of the whole data the sampled data represents. See Supp Eval. at 39.

However, “[b]ecause the [dusky shark] data in numerous years is zero . . . [NMFS believes] there is not a sample random and large enough to be statistically representative.” Id. And, even assuming the sample was representative, NMFS argues that performing the extrapolations urged by Oceana would still “result in very low total catch” due to the “number of zeros in the sampled catch.” Id. at 55. Because zero multiplied by any number remains zero, NMFS argues the prevalence of zeros in the data renders any extrapolation futile. See id.¹¹

NMFS also considered whether it could reduce the uncertainty of such estimates by using “strata”—i.e. developing accurate estimates of sub-groups of the population encountered in different circumstances which are then aggregated—as it had done in the past with some other species. See id. at 38–39. NMFS concluded, however, that it was unable to identify valid means to segment the dusky shark population in the way required to use strata for extrapolation because of the variety of circumstances and locations in which dusky sharks are encountered and caught. Id. Thus, NMFS resolved that, in contrast to the data supporting extrapolations that it “regularly conducts . . . in fisheries science and management,” the agency lacks the “minimum level of confidence in the underlying [dusky shark] data for any extrapolations to hold validity” due to

¹¹ For the sake of clarity, when NMFS says that mortality data in a given year is “zero,” it means that, according to the available reports, no fishing vessel or observer encountered or observed a dead dusky shark in a given year.

the infrequent and greatly “varying conditions and circumstances” under which dusky shark bycatch occurs. Id. at 38.

The Court will defer to NMFS’s expertise on this point. As a general matter, NMFS is correct in its assertions regarding the prevalence of zero values in the data recorded by the various logbook and observer programs. Focusing on logbook mortalities for the 2013–2015 period in non-HMS fisheries, zero mortalities were reported in each of the three years in the SE Coastal Fisheries Logbook Discard Form (GOM Reef Fish), SE Coastal Fisheries Logbook Discard Form (SE Snapper Grouper + Other), and NE Vessel Trip Reports. Id. at 9. In the SE Coastal Fisheries Logbook Trip Form (All Fisheries, kept-only), there were zero mortalities reported in 2013 and 2015, and three in 2014. Id. Zero entries are even present in the HMS Fisheries (where the dusky is more prevalent), as the SE Coastal Fisheries Logbook Discard Form (Shark Bottom and Longline Gillnet) shows no deaths in 2013. Id. The same is basically true for the observer data, with HMS and Non-HMS fisheries data alike riven with years of zero entries for dusky shark mortalities over the 2013–2015 period. See id. at 19. And the pattern holds true even just looking at interactions, rather than mortalities. Compare id. at 8 (Table 1) with id. at 18 (Table 3).

If the dusky shark is rarely recorded (alive or dead) in any of several data sources, that scarcity would seem to persist, as NMFS argues, when those sources are “scaled” or extrapolated by means of a straightforward multiplication. And while there are likely some mathematical techniques which could be applied to the spotty data in order to fill gaps or otherwise assist in avoiding this problem, such techniques are subject to the MSA’s requirement that they be scientifically valid. See 16 U.S.C. § 1851(a)(2). As the Court concludes below, it was not arbitrary or irrational for NMFS to conclude that the zeros in these data sets cannot be properly

filled-in by means of imputations or through a chimera of logbook and observer data, particularly given the scientific judgment the agency brought to bear in answering the question. See The Ocean Conservancy, 394 F. Supp. 2d at 157 (noting the great deference due to the agency when it provides a reasoned explanation for its choice of data under National Standard 2). With these general observations in mind, the Court turns to the specific extrapolations advanced by Oceana.¹²

a. NMFS’s rejection of a “simple scaling” extrapolation to estimate dusky shark mortality

Turning to Oceana’s specific objections, it argues first that the NMFS acted arbitrarily in not multiplying the SE Coastal logbook data by five to account for the fact that the program only records data from a random sample of 20 percent of fishermen. To begin with, the viability of Oceana’s preferred extrapolations is predicated on the sample of fishermen in question being random or otherwise representative of the remaining 80 percent of fishermen. Such a simple extrapolation is unlikely to be accurate if the sample is biased and the scaling factor (here five) is

¹² At the hearing on the parties’ motions for summary judgment, counsel for Oceana argued that the agency’s failure to extrapolate meant that it was not even in the right ballpark regarding catch magnitude. Hearing Tr. at 9:10–10:18. Counsel offered an example in which 10 percent of boats show a catch of 50 sharks, with a 5-shark margin of error on either side and argued that failing to multiply this range of 45–55 sharks by 10 meant that the agency missed vast amounts of catch. Id. But this example only works if one assumes that the 10 percent sampled data is representative of the remaining 90 percent, which, as explained above, the agency rationally concluded was very uncertain. As further uncertainty is introduced into this example, the range of possible results grows extremely large. For example, due to misidentification, it may be that the actual number of dusky sharks encountered by this 10 percent of boats is much smaller than the 50-shark anchor point. Or perhaps the sampled boats used an unusually effective fishing gear. Or perhaps they fished at a time of enhanced dusky shark activity due to migratory patterns. Or any of the myriad other scientific and technical reasons by which sampled data may not neatly reflect a subset of the unknown quantity. Issues of this nature necessarily require the application of scientific judgment to resolve. And, as explained above, the agency reasonably applied these standards in declining to extrapolate here.

not adjusted to account for this bias. However, as NMFS explained, the 20 percent sample is not randomly selected, but rather “weighted by area and fishing gear and ranked based on the previous year’s effort” which undermines any straight arithmetical extrapolation because it is not “based on a fully random sample.” Supp. Eval. at 46. Given this reality, the agency was within the bounds of reasonableness to reject a straight arithmetical extrapolation.

Oceana further argues that NMFS admitted that extrapolation was possible when it stated in the Supplemental Evaluation that one could “expand the data by ‘multiplying the reported mortalities in the SE Coastal etc.’” by 5. Id. On this telling, NMFS’s refusal to extrapolate in the face of this admission was arbitrary. Yet this significantly overstates what NMFS said. Of course, as NMFS acknowledged, it is possible to extrapolate in the narrow mathematical sense of plugging numbers into a formula, but what NMFS actually stated in the Supplemental Evaluation was that such extrapolations, although mathematically possible, would not be useful or scientifically valid. Id. That was so because, in addition to the heavy presence of zeros noted above, the logbook sample was not random, and thus the biases present would only be magnified by a crude extrapolation. Id. Moreover, as NMFS found, performing that crude extrapolation on SE Coastal logbook data results in an average mortality of only 15 dusky sharks per year. Id. Thus, while it is true that NMFS stated that such extrapolations could help confirm its conclusions regarding “small” bycatch, that was only in the context of indicating that these extrapolations are not generally viable.¹³

¹³ Oceana calls this position circular: NMFS rejected the use of extrapolations but then says they are valid to “confirm” that bycatch is small. This misses the mark. In context, NMFS is clearly performing the extrapolations only as an “even if” exercise, showing that even the extrapolated numbers which it rejected would fit with the broader conclusions it reached without those extrapolated numbers. See Supp. Eval. at 46.

A final point on this issue is worth making explicit. Oceana essentially requests not only that NMFS perform the extrapolations Oceana prefers, but also that NMFS rely on this data for management purposes. As shown in the Supplemental Evaluation, NMFS did perform certain of the extrapolations requested by Oceana as “checks” on its conclusions about the magnitude of bycatch and trends in the bycatch data but refused to rely on them for its primary estimates of bycatch. Because the Court credits NMFS’s reasons for its hesitancy against using crude extrapolations for management purposes given the spotty nature of the data and unrepresentative sample construction, NMFS did not err in deciding not to rely on these extrapolations in the way Oceana proposes. See The Ocean Conservancy, 394 F. Supp. 2d at 157.

b. NMFS’s rejection of mortality estimates produced by effort-and-CPUE based extrapolations

Oceana next faults NMFS’s decision not to perform a more complex extrapolation in which observer data and logbook data are used in conjunction to estimate total bycatch. See Pl.’s MSJ at 14. As the agency explained in its Supplemental Evaluation, such an extrapolation would first require using existing observer and logbook data to derive estimates for “effort” and “catch per unit effort” (or “CPUE”). See Supp. Eval. at 44–45. “Effort” in this context essentially means the level of fishing intensity in a given fishery and is often measured in terms of time (e.g., time spent fishing by all boats in the fishery) or number of hooks in the water over a given period. See id. at 44. CPUE, meanwhile, is calculated by simply dividing the number of catches of a particular fish by the amount of fishing effort to arrive at an estimate of the number of catches that can be expected for a given amount of fishing. See id. at 44–45.¹⁴ In order to arrive

¹⁴ To illustrate the concept with a grossly over-simplified hypothetical, suppose that ten fishing boats outfitted with the same gear spent a total 100 hours off the same reef fishing for a specific fish. One measurement of their combined “effort” would be 1000 hours. And if they

at an estimate of total catch, the agency would have to extrapolate these variables to account for the incomplete coverage of the underlying observer and logbook data, and then combine these extrapolations to arrive at total bycatch. See id. at 44–46. Although this extrapolation method is more complex, NMFS’s basic response to Oceana’s criticism is the same as it was to Oceana’s suggestion of a straight arithmetic extrapolation: that the gaps in the both the logbook and observer data render any extrapolation of the relevant variables too speculative to support management decisions concerning the dusky shark. Id. The agency has adequately explained and justified that position.

In its prior decision, the Court expressed a concern that the agency seemed to be using catch data derived from observer and logbook programs as inputs in the model it has historically used to conduct periodic stock assessments of the dusky shark population, even though NMFS referred to that model as “catch-free.” See Oceana I, 363 F. Supp. 3d at 73–74 n.3. Picking up on the Court’s observation, Oceana argues that its preferred CPUE and effort extrapolations use actual catch data in a similar fashion as the stock assessment model, which in Oceana’s view confirms the scientific validity of its approach. Because resolution of this issues hinges on an understanding of how NMFS uses observer and logbook data in it catch-free stock assessment model, the Court will pause for a moment to summarize its lay understanding of how that model operates.

landed 2000 fish, CPUE using this measurement would be 2000/1000, or 2. As explained further below, marine scientists can use CPUE as an input into a mathematical model to estimate the total abundance of certain fish species. They can also track changes in CPUE over time for a particular species to assess the relative abundance of the species in the waters being fished. Taking the above example, an increase in CPUE to 2.2 could indicate a growing population, all other variables remaining equal.

Perhaps the most intuitive way to investigate the health of any fish species population would be to simply track the total population of the species over time, monitoring changes due to births, catches, and deaths from natural causes, and comparing the current population to the population of some earlier period to determine the extent of any overfishing. Models that rely on catch data, biological information, and other measures of abundance to estimate both current and historical “absolute abundance” are known as “catch-based” stock assessment models, see Brewster-Geisz Decl. at 1–2, Cortes Dec. at ¶16, A.R. at 4387, and are used by NMFS in managing many marine species, including sea turtles and various marine mammals, see, e.g., A.R. at 7215–16. If the data necessary to calculate such absolute abundance over time were available for dusky sharks, determining whether the population was overfished would thus be relatively straightforward.

Problems emerge, however, when various empirical constraints prevent accounting for the total number of a species caught in any given year. As the Service explained, because “knowledge of the magnitude of total catches and discards” is necessary to estimate absolute abundance, the inability to measure total catch prevents the use of a catch-based stock assessment model. See, e.g., id. at 416, 8074. These empirical difficulties abound for dusky sharks, according to NMFS. It explains that the primary impediments to counting total dusky shark catch are misidentification and underreporting, though small sample sizes and the infrequent and varying conditions under which dusky sharks are caught pose additional problems. See id. at 8074 (“For numerous shark species there is uncertainty about the magnitude of commercial and recreational catches, in part due to identification problems. The level of reported discards is especially uncertain and may be underestimated because sharks are often not brought aboard for positive identification and may therefore go unreported. Without accurate

knowledge of the magnitude of total catches and discards, it is not possible to estimate absolute abundance levels for the population.”); Cortes Decl. at ¶33 (“Catch-based assessment methods were rejected because dusky shark catch data are inaccurate and too uncertain for use in catch-based assessment models. While catches of most shark species are often uncertain because of small sample sizes and high potential for these animals to be caught in a variety of fishing gears, what makes quantification of dusky shark catches—in particular historical catches—so difficult is the problem with incorrect identification.”).

Some combination of these difficulties exists with many marine species. In some cases, such as with the sandbar shark, agency scientists are still able to estimate absolute abundance due to characteristics of the species or the data itself. See Cortes Decl. at ¶31 (“Unlike dusky sharks, the sandbar shark stock assessment is catch-based, which means that absolute abundance estimates are possible.”); A.R. at 40 (table noting sandbar shark “biomass,” an estimate of absolute abundance). For other species, including the dusky, it may be impossible for the Service to accurately determine the total population of sharks or the total catch. See A.R. at 283, 10320–21 (noting that the catch-free stock assessment model was initially developed for the goliath grouper, for which scientists found it difficult to determine total population or catch).

To deal with these data-limited species, marine scientists have developed tools which permit the evaluation of a population’s health relative to an unexploited state without the need to estimate total catch or absolute abundance. So-called “catch-free” stock assessment models are one such tool. See id. at 10320–21 (introducing catch-free stock assessment models and contrasting them with “[o]ne of the most common” modeling strategies used in data-poor species which “is simply to define [the minimum stock size threshold] in terms of historical indices of abundance that supposedly represent a desirable stock condition,” but arguing that these

approaches are a poor fit for the MSA as “recovery time cannot be estimated”). The mathematical niceties of such models are complicated (and beside the point), but the basic intuition behind them is relatively simple: even if the total population and catch are unknown, available information on the stock’s prevalence relative to periods in which the stock was known to be healthy can provide useful information regarding the current health of the species and the rate at which the species is being depleted (or enhanced, as the case may be). See id. at 10320.

To apply this catch-free model, the agency uses expert judgment and information on historical fishing efforts directed at a species to estimate a year in which the population in question appears to have been in “virgin,” i.e. unexploited, condition. See id. at 64, 111. The agency can then use partial catch data (derived from logbooks and observer forms) to produce effort and CPUE estimates which enable historical comparisons of the relative intensity with which the species was fished and the relative rates at which that fishing resulted in catch.¹⁵ Used in conjunction with other data sources, these rates enable the agency to make scientifically informed estimates of abundance relative to the virgin state. In other words, the agency is able to assess what the available data (biological, partial catch, fishery, and expert) reveal regarding the relative rate of depletion from a species’ “virgin stock” and thus the current status of its population. See Cortes Decl. at ¶35; A.R. at 416. If done correctly, such an analysis produces estimates regarding the relative health of the population and rates of recovery or depletion that NMFS views as scientifically valid in managing the species (but does not produce a point

¹⁵ Effort series also aid the agency in determining whether a change in observed catch was the result of greater or lesser fishing activity (as, all things equal, less fishing effort should likely result in reduced catch observed), or if the catch changes were really attributable to changes in abundance. See Cortes Dec. at ¶15. For much the same reason, effort series are sometimes useful in explaining changes in CPUE (as, all other things equal, an increase in effort results in lower CPUE). See id.

estimate of the total number of animals living at any given time). See A.R. at 10320–21. Notably, Oceana has not contested the efficacy of this approach.

To be sure (and as explained above), catch-based models also rely on comparisons between the populations at different time periods to assess the health of a fish population. The primary difference between catch-based and catch-free approaches to assessing population health is simply that catch-based models are capable of estimating total catch and comparing the absolute abundance of the population over time while catch-free models are not. Instead of relying on total catch to compare absolute abundance over time, catch-free models compare various alternative measures of population health—some of which rely on *partial* catch data—to those same measures at earlier, typically healthier, periods. Effort and CPUE are two of these alternative measures of relative abundance which the agency used in its catch-free model for the dusky shark. See, e.g., id. at 4374–77 (noting, in the course of the 2016 dusky shark stock assessment update, that the agency was using “CPUE Series” and describing the development of relative effort series); id. at 4457 (describing “what was done in the 2016 dusky shark [stock assessment] update” and noting “[f]ive indices of relative abundance (CPUEs)” and “Effort Series” were used and were “the same data inputs that were vetted in the previous benchmark assessment”).

It was the output of this catch-free stock assessment model that showed that the dusky shark remains overfished and that catch must be reduced by 12 percent in order to end overfishing and by 35 percent in order to give the population a 50 percent chance of recovery to 1960 virgin levels within approximately 100 years. See id. at 7055 (“Based upon the best available scientific information and the scientific judgment of NMFS experts, the preferred alternatives are expected to reduce dusky shark mortality overall by at least 35 percent and

would rebuild the stock by 2107. Furthermore, this mortality reduction is greater than the reduction needed to end overfishing consistent with the stock assessment results (12 percent).”); id. at 7104 (noting that the 2107 rebuilding date is estimated with a “50 percent probability”).

Against this background, the Court moves to Oceana’s objection that the agency arbitrarily refused to use observer and logbook data to develop CPUE- and effort-based extrapolations of total catch in Amendment 5b’s bycatch analysis. Oceana is correct that, as part of the catch-free stock assessment process of the dusky shark, NMFS did use some catch data to estimate CPUE and effort. See, e.g., id. at 4374–77, 4457. Oceana therefore raises legitimate questions, as the Court did in its prior ruling, about why NMFS declined to use logbook and observer data as the basis of a model estimating bycatch in Amendment 5b.

Despite these questions, however, review of the Supplemental Evaluation and the government’s renewed briefing reveals that the Service’s historical use of logbook and observer data in conducting periodic stock assessments was consistent with its use of the same data in developing Amendment 5b. In both instances, the agency acted on the understanding that logbook and observer data are useful for certain purposes, but not for extrapolating point estimates of unknown parameters such as total population or total bycatch. This understanding is reflected in several key features of the Service’s catch-free stock assessment model. First, the data used in the catch-free stock assessment model was partial. The agency selected data only from certain sets of logbook and observer programs deemed by NMFS scientists to be reliable as indicators of relative abundance. See id. at 4374–75 (describing the five data sets for which CPUE was calculated); id. at 4376–77 (describing the datasets used to produce relative effort series). Second, the agency did not use estimated catch data. Rather, the CPUE and effort series produced by the agency for the stock assessments emerged directly from the raw catch and

fishing data present in the limited data series considered without any additional imputation or estimation. See id. at 4374–4377. And third, the agency did not use these CPUE and effort series to produce any estimates of catch or CPUE or effort in areas not covered by the partial data. See id. at 4387–4403 (describing the catch-free stock assessment model and outputs as part of the 2016 stock assessment).¹⁶ This approach to the stock assessments is therefore consistent with how NMFS reached its bycatch conclusions in Amendment 5b—only using partial, raw data and drawing conclusions on that basis to the extent possible without extrapolating or estimating catch amounts in areas not covered by the data. See Supp. Eval. at 37–48 (explaining the agency’s refusal to extrapolate and its conclusions regarding bycatch size).

Oceana’s arguments thus place it between the devil and the deep blue sea. Oceana has not challenged the design of the stock assessment model or the percentages by which the model showed dusky shark mortality should be decreased in order to rebuild the stock. That model, however, relies on just the sort of *mélange* of partial catch data as the agency’s determination regarding bycatch on remand and, similarly, never extrapolates that partial catch data. If these non-extrapolative methods result in valid estimates of the rates of overfishing that Oceana relies on to challenge the agency’s action on bycatch, it is hard to see how a similar refusal to

¹⁶ To be clear, NMFS has explained that it did use the partial catch data from various observer and logbook programs to calculate effort and CPUE numbers, but that calculation was not an “estimation,” in the sense of going from an unknown quantity to a known quantity. It was simply a matter applying basic mathematical operations to known—and partial—quantities (e.g. observed catch in the partial data divided by effort in the partial data in the case of CPUE). See, e.g., A.R. at 8057 (describing the CPUE and, equivalently, catch rate calculations in several fisheries). The Court agrees with the agency that this calculation required no “gap filing” in the partial data of the kind Oceana advocates and no extrapolation from the partial effort and CPUE estimates to calculate similar estimates for fisheries whose partial catch data was not one of the sets relied on by the agency

extrapolate could be scientifically bankrupt when used to reach a conclusion about bycatch that is not to Oceana's liking.¹⁷ In both modeling choices, the Service's decision centered on data-reliability issues that, in its scientific judgment, undermined scientifically valid extrapolation.¹⁸

The agency therefore acted reasonably and consistently in concluding that extrapolated effort- and CPUE-based estimates of total bycatch were not a scientifically valid source of catch information in its Supplemental Evaluation. The Court will not lightly displace the agency's expert judgment in this area of scientific and methodological complexity. That is especially so in light of the apparent acceptance of such methods by the broader scientific community, Oceana's apparent faith in the methods and their conclusions in the stock assessment context, and the use of similar methods for other species that NMFS manages.¹⁹ See Am. Trucking Ass'ns, Inc., 724

¹⁷ It should be noted that Oceana has not argued that effort and CPUE estimates have value in the bycatch analysis other than as the basis for one of its favored extrapolations. That is, unless these metrics are used to extrapolate out estimates of total bycatch, Oceana does not contend that there is any independent value in performing the math to arrive at effort and CPUE estimates based on partial data.

¹⁸ The Court does not mean to suggest that there are no scenarios in which the two decisions could differ and thus require different modeling choices; the agency itself admitted that there could be certain extrapolations performed with certain subsets of the data here that would result in potentially valid conclusions (but only with respect to partial catch data). See Supp. Eval. at 44 (noting that the CPUE- and effort-based extrapolation method could be useful to estimate partial catch data in "specific years for specific fisheries" but stating that it would not be capable of "produc[ing] a total catch estimate[] across all fisheries and all years . . .").

¹⁹ One further note on this point: The Court's prior opinion was skeptical of NMFS's refusal to use the observer and logbook data in combination to correct for their respective flaws in considering bycatch. As Oceana emphasizes, the Court specifically noted that in locating "hot spots," where dusky shark interactions were frequent, the agency used both logbook and observer data, and found it puzzling that the agency had not taken a similar approach with bycatch. See Oceana I, 363 F. Supp. 3d at 83. And Oceana argues that the refusal to use the two datasets in conjunction to extrapolate total bycatch falls afoul of the Court's prior opinion. But that is not what the prior opinion required. It did not suggest that using the two sets of data in combination was necessarily valid for all purposes, just that, if it were not, NMFS needed to explain where it was useful, where it was not, and the limitations the combination possessed.

F.3d at 249 (noting, in the context of arbitrary and capricious review, that “[courts] remain ever mindful that in performing ‘a searching and careful inquiry into the facts, [they] do not look at the [agency’s] decision as would a scientist, but as a reviewing court exercising our narrowly defined duty of holding agencies to certain minimal standards of rationality . . .’” (quoting Nat’l Env’tl. Dev. Ass’n’s Clean Air Project, 686 F.3d at 810)).

3. *NMFS’s actions in Amendment 5b and on remand compared to its past practice regarding the use of extrapolations*

Oceana next contends that the agency deviated from past practice in failing to extrapolate the data in the way Oceana would prefer. Oceana points specifically to NMFS’s past practice of extrapolating certain data in other commercial fisheries with uncertain data (such as sea turtles) and its use of extrapolations in “early versions of Amendment 5b.” Pl.’s Opp. at 14. This, Oceana contends, subjects the agency to a duty to acknowledge and provide a “reasoned explanation” for the deviation. See FCC v. Fox Television Stations, Inc., 556 U.S. 502, 515 (2009).

It is undisputed that NMFS has never extrapolated the data in the way Oceana demands in its past stock assessments or analyses of the health of the dusky shark population. See Defs.’s MSJ at 21; cf. Pl.’s Opp. at 14 (describing the ways in which Oceana claims the agency deviated from past practice). As such, it is something of a misnomer to characterize NMFS’s refusal to perform such extrapolations here as a break with its past practice. In fact, NMFS’s refusal to

See id. at 83–84. On remand, NMFS addressed this concern by explicitly incorporating analysis of logbook data into its conclusions regarding dusky shark bycatch, considering them in conjunction with observer data, and yet explaining why extrapolations from these data sets, whether standing alone or together, was not a scientifically valid approach to the problem. See Supp. Eval. at 46.

extrapolate comports with its past decisions in managing the dusky shark population as well as its past explanations for these decisions. See, e.g., A.R. at 297 (2011 assessment of the dusky shark population noting the “high degree of uncertainty in reported catches” of the dusky shark which made it “not possible to estimate absolute abundance levels for the population” and describing the reasons for deciding against “stock assessment models that rely on catch data”).

Further, the agency’s refusal to extrapolate did not go unexplained on remand. As a result, even if the Court were inclined to characterize NMFS’s actions here as a break with past practice, NMFS would not have acted arbitrarily in refusing to extrapolate for the purposes of Amendment 5b. See Fox, 556 U.S. at 515. Oceana’s argument essentially turns on the fact that in managing *other non-dusky shark species* the agency sometimes uses extrapolations like those Oceana advocates here. But that is a far cry from showing that the agency’s actions deviated from its past decisions regarding extrapolations in the case of dusky sharks, much less that this refusal to extrapolate went unexplained. As noted above, NMFS reasonably concluded that it could not perform the extrapolations Oceana demands without sacrificing accuracy and scientific validity. Therefore, whether or not NMFS “deviated” from its practice in the case of other rarely encountered fish, the Court finds that NMFS adequately acknowledged the propriety of extrapolations in other cases and yet explained its decision not to extrapolate here. See, e.g., Supp. Eval. at 46 (noting that CPUE-based extrapolations are done “for other more data-rich shark species” but rejecting them in the case of the dusky shark due to “very low numbers of observed dead dusky sharks”).

It is true, as Oceana points out, that at least one document in the administrative record shows that the Southeast Fisheries Science Center advocated in favor of certain extrapolations to estimate bycatch in Amendment 5b during the amendment’s early stages. See A.R. at 2181

(selection from 2013 Southeast Fisheries Science Center report stating “[a] better approach would be to follow what is done for estimating protected resource using ‘Incidental Take Levels.’ Due to the reliability of observer data compared to logbook data, under this approach, observer data are used to estimate a rate of capture and that rate is extrapolated to the entire fishery (or smaller spatial scale) using effort data from the logbooks. This approach is considered appropriate for sea turtles, which means it should also be appropriate for dusky shark.”). But again, NMFS has explained why it chose not to use this approach, namely that the prevalence of zeros in the data prevented an effective estimation of bycatch. See, e.g., Supp. Eval. at 38. Further, the Southeast Fisheries Science Center ultimately endorsed the agency’s approach in 2016. See A.R. at 4365 (email from director of Southeast Fisheries Center stating that “[s]taff from the Southeast Fisheries Science Center have reviewed the subject materials and . . . find[s] [that] the numbers are accurate and the methodologies you used in the document are appropriate.”). One opinion, repudiated by the institutional author and rejected by the agency with adequate explanation, is not sufficient to show that the agency’s action was arbitrary.

The same is true for what Oceana characterizes as NMFS’s willingness to extrapolate in early stages of Amendment 5b. See Pl.’s Opp. at 14 (citing A.R. at 4361–64). For this proposition, Oceana cites a lone email from an NMFS official to the director of the Southeast Fisheries Center which contains an excel file with tables showing certain extrapolated dusky shark interaction and mortality totals. A.R. at 4361–64. The email states that NMFS was “working on the proposed rulemaking documents.” Id. at 4361. However, nothing in this email indicates the attached numbers were to be used for management purposes, and NMFS explained in Amendment 5b and the Supplemental Evaluation why it ultimately decided not to extrapolate from raw data for management purposes. An email apparently exchanged prior to even

proposing Amendment 5b does not outweigh the extensive explanations the agency provided both in Amendment 5b and on remand as to why it chose not to extrapolate.

Oceana points out that the refusal to extrapolate estimations of bycatch is logically separate from the decision to refuse to use extrapolated estimations of catch in the stock assessment. But, as noted above, while the two questions are theoretically separable, there is no reason why NMFS's justification for its hesitation to extrapolate in general would not apply equally in both settings. In the Supplemental Evaluation, NMFS did the additional legwork of explaining how its concerns about extrapolation, first articulated in the context of stock assessments, persisted when considering the narrower question of bycatch totals. See, e.g., Supp. Eval. at 45–48.²⁰

4. NMFS's treatment of recreational data containing extrapolations

Oceana also claims that NMFS did in fact use extrapolations in its bycatch analysis, namely those contained in certain recreational fishing datasets, and that NMFS did not sufficiently explain why it considered those extrapolations but refused to extrapolate from commercial logbook and observer data. See Pl.'s MSJ at 16.

²⁰ At the hearing, counsel for Oceana argued that the agency chose the catch-free model because historical data was poor and left the agency with no way to effectively estimate the numerical abundance of the shark at earlier periods, necessitating the usage of the catch-free model to determine relative abundance changes over time. Hearing Tr. at 8:12–8:20. Oceana argued that this justification for the catch-free model does not apply to bycatch extrapolations which are naturally concerned with current catch numbers. Id. However, even if the lack of historical data posed an issue for the agency's stock assessment efforts, the administrative record is clear that the agency's stated preference for the catch-free model turned on the identification and data issues described above, and not solely on the paucity of historical data. See, e.g., A.R. at 416.

True, NMFS referenced extrapolated estimates of recreational fishing mortality in its Supplemental Evaluation (as well as in Amendment 5b and prior stock assessments). Crucially, however, these estimates were not derived by NMFS for the purpose of Amendment 5b but rather were calculated and provided by the “relevant survey programs.” See Supp. Eval. at 23. Moreover, NMFS appears nowhere to have endorsed the values provided by these surveys as accurate measures of bycatch. For example, in promulgating Amendment 5b, NMFS stated that recreational data showed high levels of dusky shark interaction and mortality but noted that “[t]he percent standard error (pse) of these extrapolated [recreational survey] estimates are high (greater than 50), indicating high uncertainty in the estimates” which renders the “values [] not suitable for management purposes.” A.R. at 7092. The agency reiterated this concern in the Supplemental Evaluation, noting that the recreational data are “extrapolated estimates based on multiple complementary statistical surveys with varying levels of precision.” Supp. Eval. at 4. That, combined with the rarity of encountering a dusky shark and frequent misidentification, resulted in “extremely wide confidence intervals” which even extended to “zero in some cases.” Id. at 44–45. Additionally, the Large Pelagic Survey, which focuses on the areas of greatest dusky shark mortality, showed zero dusky shark mortality going back to 2011. A.R. at 10261, 10241–43. And while NMFS considered the extrapolated recreational survey data on remand as directed by the Court, the agency did not reverse its longstanding opposition to relying on such data for management purposes. See Def.’s Reply at 14. NMFS used the recreational data on remand essentially as a sort of “trend check” to see if it supported the declining mortality and interaction trends present in the logbook and observer data. That exercise does not contradict NMFS’s general opposition to extrapolation or require further explanation, particularly given that, as noted elsewhere, NMFS performed similar comparisons using logbook data deemed

unreliable for management purposes generally. See Supp. Eval. at 46 (performing “checks” with mathematically extrapolated logbook and observer data).²¹ In short, as with extrapolations from logbook and observer data, NMFS never treated the recreational data as a valid basis from which to make management decisions and thus did not act inconsistently in complying with the Court’s instruction that it explain its treatment of recreational data on remand.

B. NMFS’s determination that dusky shark bycatch is “small”

Oceana raises a variety of legal and factual challenges to NMFS’s reaffirmation of its conclusion that dusky shark bycatch remained “small” and was unlikely to result in overfishing. Oceana insists that bycatch is not small and that, as a result, the agency was required to adopt additional accountability measures and limit dusky shark bycatch to a low, but non-zero, number.

To recap, the MSA “empowers federal agencies to ‘provide for the preparation and implementation, in accordance with national standards, of fishery management plans which will achieve and maintain, on a continuing basis, the optimum yield from each fishery.’” Oceana I, 363 F. Supp. 3d at 71 (quoting 16 U.S.C. § 1801(b)(4)). NMFS is responsible for developing fishery management plans for the dusky shark and other highly migratory species. 16 U.S.C. §§ 1852(a)(3), 1854(c). Those plans are subject to ten “National Standards,” with National Standard 1 requiring that fishery management plans “prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.” 16 U.S.C. §§ 1853(a), 1854(e), 1851(a)(1). NMFS’s guidelines interpreting National Standard

²¹ The Court’s prior opinion described the agency’s willingness to compare “limited, extrapolated data for commercial fishing against large, extrapolated estimates for recreational fishing” as “perplexing.” Oceana I, 363 F. Supp. 3d at 82 n.13. The agency’s response that its comparison did not legitimize the use of the extrapolated data for management purposes resolves any confusion the Court had. See Supp. Eval. at 44–45; A.R. at 7092.

1, 50 C.F.R. § 600.310(g)(3), clarify how to develop and implement annual catch limits and accountability measures, though they lack the force of law, 16 U.S.C. § 1851(b). NMFS's guideline for National Standard 1 states that "[i]f an [annual catch limit] is set equal to zero and the [accountability measure] for the fishery is a closure that prohibits fishing for a stock, additional [accountability measures] are not required if only small amounts of catch (including bycatch) occur, and the catch is unlikely to result in overfishing." 50 C.F.R. § 600.310(g)(3).

Since 2006, the annual catch limit for dusky sharks has been set to zero and fishing for dusky sharks has been prohibited. As such, the question whether additional accountability measures are required turns on whether "only small amounts of catch (including bycatch) [is occurring], and [whether] the catch is unlikely to result in overfishing," *id.*, as well as the compatibility of this guideline with the broader dictates of the MSA. As explained below, the Court finds that the application of the guideline to dusky sharks comports with the MSA, and that NMFS reasonably concluded that dusky shark bycatch is small.

1. NMFS's application of the guidelines

Oceana contends that the legislative history of the MSA and NMFS's own regulatory guidelines "demonstrate that the Fisheries Service's application of its guideline exception to an overfished population . . . is unlawful." Pl.'s Opp. at 23. As it did prior to remand, Oceana highlights NMFS's guideline to National Standard 1 and argues that the exception for further accountability measures in 50 C.F.R. § 600.310(g)(3) is only "appropriate for some healthy populations with small bycatch," and not for "a species like the dusky shark that is overfished, in a rebuilding plan, and has suffered years of continued overfishing." *Id.* The Court remains unpersuaded.

The Court previously held that there is no inherent conflict between the MSA and National Standard 1 as interpreted by NMFS. As the Court observed, “[t]he primary evil the MSA guards against, is overfishing.” Oceana I, 363 F. Supp. 3d at 86. It therefore “makes sense that the requirement for additional accountability measures for [annual catch limit] overages would turn, at least in part, on whether those overages were significant and whether they resulted in overfishing.” Id. This fact is confirmed by the 2006 MSA amendments Oceana cites here, which require “all fishery management plans to ‘establish a mechanism for specifying annual catch limits’ and ‘measures to ensure accountability,’ but only to the extent necessary to ensure that ‘overfishing does not occur in the fishery[.]’” Id. (quoting 16 U.S.C. § 1853(a)(15)). Because the agency’s guideline “focus[es] on accountability measures sufficient to constrain overfishing,” it is “thus in keeping with the MSA, not contrary to it.” Id. As such, there is no necessary tension between setting the annual catch limit for dusky sharks equal to zero and applying the guideline exception, as the agency did here, provided the requirements of the exception (and the APA) are followed.

Oceana responds that even if this exception is consistent with the MSA, its application to the dusky shark is improper. Oceana’s factual arguments on this point will be dealt with below. As for its legal argument, Oceana emphasizes a provision of the same guideline which states that “for stocks . . . in rebuilding plans, the [accountability measures] should include overage adjustments that reduce the [annual catch limits] in the next fishing year by the full amount of the overage, unless the best scientific information available shows that reduced overage adjustment, or no adjustment, is needed to mitigate the effects of the overage.” 50 C.F.R. § 600.310(g)(3). Oceana interprets this provision to require heightened protections for “overfished populations that are in rebuilding plans” and argues that it “indicates that the default

approach for overfished stocks is to hold catch (including bycatch) to a strict limit and to assess and account for the effects of overages every year.” Pl.’s Opp. at 24.

However, there is no reason why this “rebuilding plan” provision should be read to conflict with the application of the “zero-annual-catch-limit” provision. On their face they address different situations and prescribe different actions. The zero-annual-catch-limit provision applies in cases (like the dusky shark) where the annual catch limit has previously been set at zero, while the rebuilding plan provision applies in situations (unlike the dusky shark) where the stock is in a rebuilding-plan but the annual catch limit has not yet been set to zero. See 50 C.F.R. § 600.310(g)(3). The rebuilding-plan provision, moreover, involves, in certain circumstances, “reduc[ing] the annual catch limits in the next fishing year” when overages occur. Id. Such reductions could result in a situation where an annual catch limit is reduced to zero after a year of catch overages, at which point the zero-annual-catch-limit provision relied upon by NMFS would naturally apply. This possible scenario makes sense, as there would be no way to apply the rebuilding-plan provision’s admonition to “reduce the [annual catch limits]” where the annual catch limit is already set to zero. Id.

Oceana’s contrary interpretation of these provisions would lead to a mix of contradictory commands. It would require the agency to set a very low, but non-zero, annual catch limit and monitor the stock for overages on a yearly basis. If the agency detected an overage, Oceana would have it selectively apply the requirements of the rebuilding plan provision: the agency would be required to issue new accountability measures on a yearly basis but also forbidden from reducing the annual catch limit to zero (as otherwise the zero-annual-catch-limit provision would apply). Oceana’s approach flies in the face of both the express allowance for annual catch limits of zero in the guidelines and the requirement of the rebuilding-plan provision to “reduce

the [annual catch limits] in the next fishing year by the full amount of the overage” when overages occur.²² See id. There is simply no part of the MSA, National Standard 1, or NMFS’s guidelines that requires the agency to set an annual catch limit to some small, non-zero number that it must monitor and adjust on a yearly basis (yet never reduce to zero), much less that this approach represents the “default,” as Oceana suggests.²³ Pl.’s Opp. at 24.

Nor does legislative history support Oceana’s favored requirements. It is true, as Oceana points out, that one Congressional Committee touted “requir[ing] adherence to scientifically-established mortality limits from one year to the next.” S. Rep. No. 109-229, at 21 (2006). But this language is nowhere to be found in the MSA. Oceana nonetheless suggests that 16 U.S.C. § 1853(a)(15) embodies this requirement. See Pl.’s Opp. at 23. That provision states that the agency must “establish a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.” 16 U.S.C. § 1853(a)(15). This provision provides no purchase for Oceana’s arguments. First, the cited language clearly contemplates “multiyear plan[s]” or “regulations” as an alternative to

²² The Court also stands by its prior holding that NMFS reasonably rejected fixing “a tolerable catch level above zero” given that determining this number would be “highly speculative” and could result in increased interactions by sending the message to fishermen that “interactions are permissible at some level” Oceana I, 363 F. Supp. 3d at 92 (citing A.R. at 7089, 7133–34, 7491 and Locke, 831 F. Supp. 2d at 119); see also, e.g., A.R. at 7314 (noting that “[a]ny estimated [annual catch limit] greater than zero, whether for all prohibited sharks or for dusky sharks alone, would have extremely high uncertainty, no confidence in its likelihood to end overfishing and rebuild the stock, and may encourage increased catch.”).

²³ The Court notes that NMFS has committed, in the Supplemental Evaluation, to “continue to monitor dusky shark bycatch on an annual basis . . . and has the authority to take additional steps if needed to ensure that the amounts of bycatch remain small.” Supp. Eval. at 48. This would seem to go a long way towards assuaging Oceana’s fear that the agency will never revisit the status of dusky shark bycatch by relying on the zero-catch provision.

“annual specifications,” as opposed to the year-by-year catch limit adjustments that Oceana seems to think are required. *Id.* Second, the phrase “measures to ensure accountability” in Section 1853(a)(15) means something quite different than the legislative history’s phrase “requir[ing] adherence to scientifically-established mortality limits from one year to the next,” S. Rep. No. 109-229, at 21, and does not carry the same legal effect. And third, there is nothing about the phrase “including measures to ensure accountability” that conflicts with the guidelines’ zero-annual-catch-limit provision, which, as noted, is expressly limited to situations where both bycatch is small and overfishing is unlikely to result. 50 C.F.R. § 600.310(g)(3). Conditioning the applicability of the zero-annual-catch-limit provision on bycatch and the risk of overfishing would seem to precisely embody, or at least not obviously conflict with, the statute’s command to develop “measures to ensure accountability” with catch limits. 16 U.S.C. § 1853(a). Thus, as the Court’s prior opinion explains, National Standard 1 and the zero-annual-catch-limit guidelines provision, as interpreted and applied by the NMFS here, are fully consistent with the MSA’s requirements. *See Oceana I*, 363 F. Supp. 3d at 86–87. And as the Court explains below, applying the exception here was appropriate based on the agency’s conclusion that bycatch was small and unlikely to result in overfishing.

2. *NMFS’s factual findings underlying its determination bycatch was “small”*

Again, the annual catch limit for dusky sharks is set at zero and fishing for dusky sharks is prohibited. As such, the question as to whether additional accountability measures are required turns on whether “only small amounts of catch (including bycatch) [is occurring], and [whether] the catch is unlikely to result in overfishing.” 50 C.F.R. § 600.310(g)(3). Small goes undefined in the guidelines. On remand and in Amendment 5b, NMFS declined to give it a formal definition, instead stating that “small” as used in 50 C.F.R. § 600.310(g)(3) is necessarily

a “fact-specific” determination. Supp. Eval. at 35. Oceana maintains that NMFS failed to “present any rational basis for concluding that bycatch is ‘small’ or unlikely to result in overfishing.” Pl.’s Opp. at 26.

NMFS approached the “fact-specific” question of whether dusky shark bycatch is “small” from a variety of avenues, each leading to the same conclusion. First, the agency determined that bycatch remained small because dusky shark mortality had declined in a statistically significant manner from 2000 to 2015, with recent years showing deaths in the hundreds and with all data sources reflecting the same pattern of large declines in mortality between 2000 and 2015. Supp. Eval. at 35. The agency also found dusky shark bycatch to be small “compared to many fish stocks that have observed mortality amounts estimated in the hundreds and thousands of metric tons.” *Id.* NMFS further found “the current level of bycatch to be small considering the high number of [fishing] trips involved (tens of thousands) compared to the number of mortalities, as reflected by the low per-trip levels in most fisheries.” *Id.* Finally, the agency determined that catch was small given that “prohibited shark species [including the dusky] represent[ed] a limited portion of total shark bycatch across all fisheries.” *Id.*

a. NMFS’s reliance upon the benchmarks to determine that bycatch is “small”

The most natural way to assess the size of dusky shark bycatch would be to compare it to the overall population of the shark. But, as explained above, such a comparison is impossible here given the limitations on using stock assessment models to estimate total population abundance of the dusky. Indeed, counsel for Oceana noted the inability to perform a comparison to total population at the hearing on this motion. *See* Hearing Tr. at 16:1–16:10 (“The Court: . . . Is there anywhere in the administrative record that you can see where the agency has endeavored to estimate the total population of dusky sharks? [Counsel for Oceana]: No. The agency doesn’t

have an exact number of the population . . .”). In any event, nothing in the statute requires that a comparison to total population underlie the determination of whether bycatch is “small.”

Oceana’s argument, rather, is that the Service did not calculate an estimate of bycatch by extrapolating from the existing raw data found in the observer reports and vessel logbooks. That calculation, Oceana contends, would have revealed bycatch to be much larger than what NMFS found, and dictated more stringent accountability measures.

The Court has already determined that the Service reasonably decided not to estimate bycatch by extrapolating from logbook and observer data due to its misgivings about the data’s reliability. See supra at III.A.2.b. That determination forecloses Oceana’s argument that the Service understated bycatch by refusing to make the proposed extrapolations. Accepting the Service’s expert determination that the underlying data is unreliable necessarily means that any extrapolated estimate of bycatch based on that data would be equally if not more unreliable—garbage in, garbage out. The Service’s rejection of estimated figures in determining the quantum of bycatch thus complied with the MSA’s command to rely on “the best scientific information available.” 16 U.S.C. § 851(a)(2); see The Ocean Conservancy, 394 F. Supp. 2d at 157 (noting the great deference due to the agency when it provides a reasoned explanation for its choice of data under National Standard 2).

Nor did the Service fail to consider deaths of dusky sharks following their live release, as Oceana charges. The agency specifically considered this issue in the Supplemental Evaluation, but expressly found that estimates of post-release mortality would not have scientific validity due to uncertainties in the underlying interaction data. Supp. Eval. at 31. The agency repeatedly emphasized that “[s]cientifically valid estimates of the amounts of post-release mortality cannot be generated,” for essentially the same reasons the Court has already credited in rejecting

Oceana’s extrapolation arguments. Id. at 32. Moreover, the agency noted that measures adopted through Amendment 5b had likely reduced dusky shark post-release mortality, suggesting that the current number was “smaller as a result of the measures implemented in Amendment 5b.” Id. at 31. Even calculating such numbers without regard to the potential beneficial effects of Amendment 5b, the agency determined that the resulting amount of bycatch (in the 100s of sharks per year) would be small. Id.²⁴

b. NMFS ultimate conclusion regarding bycatch size

The only remaining question is whether the Service adequately explained its conclusion that bycatch is small based on the data that it did rely on. It did.

The Court begins with an obvious, but important, fact: “small” is a relative concept. NMFS treated it is as such, approaching the question of whether bycatch was small as one of relative magnitude and comparing the data at hand to a variety of plausible benchmarks. Specifically, the agency compared dusky shark bycatch to the levels of catch the population had experienced in the past, the number of trips per catch, and the catch observed in stocks of other shark and fish species. Id. at 35. Each of the Service’s relative comparisons is reasonable. The dusky’s past catch history provides important background regarding the size of the current catch relative to past periods of overfishing. Information on the number of trips per catch helps demonstrate the relative rarity of dusky shark catches. And comparisons with catch amounts in

²⁴ As an exercise in completeness, NMFS did consider whether extrapolated bycatch totals would still be small. See Supp. Eval. at 32–33, 45–46. It concluded that the totals would still fall in the range of hundreds of sharks, which the agency would characterize as “small.” See id. at 45–46. This “even if” conclusion appears justified given that the magnitude of catch revealed by the extrapolations is similar to that shown in the unextrapolated case.

other shark and fish species provides a cross-species check regarding the magnitude of the dusky's bycatch.

Resisting this conclusion, Oceana argues that the agency “failed to clearly identify which of its own flawed numbers it relied on to determine whether bycatch is ‘small.’” Pl.’s MSJ at 25. But there is no requirement in the guidelines or the MSA that the agency limit itself to one single number when making this “fact-specific” determination, nor does Oceana point to one. Instead, Oceana argues that the real problem is that the agency inconsistently described the mortalities in question, at points discussing “recreational mortalities . . . in the 100s to low 1000s,” Supp. Eval. at 33, at other points as in the “10s of sharks per year with interactions in the 100s,” id. at 35, in still other places as “likely in the 100s of dusky sharks per year across all commercial and recreational fisheries,” id. at 47, and, in at least one instance, as only in the 10s, id. at 46; see Pl.’s MSJ at 25.

Oceana’s arguments again misconstrue the record. Each of the estimates noted above refers either to mortality from different data sources or to different time periods. See Supp. Eval. at 25 (table showing dusky shark mortalities in the recreational fishery as 220 in 2013–15 and 1,728 over the entire 2000–2015 period); id. at 33 (describing the numbers in that table as in the hundreds to low thousands); id. at 35 (noting that commercial fisheries between 2013–15 saw mortalities in the tens and interactions in the hundreds); id. at 46 (noting that performing Oceana’s favored extrapolations would still show a logbook mortalities “in the 10s of individuals in recent years for commercial fisheries”). The closest NMFS comes to inconsistency is in its conclusion, where it notes that the agency found bycatch to be small because it is between “10s to 100s of dusky sharks per year,” and, later on that page, stated that “[b]ased on available data . . . bycatch is likely in the 100s of dusky sharks per year across all commercial and recreational

fisheries.” *Id.* at 47. But there is no real inconsistency here. The agency gave a range of tens to hundreds of sharks per year and then identified the higher end of the range to be more “likely.” *Id.*²⁵ The agency thus did not present inconsistent findings regarding bycatch size.

C. NMFS’s conclusion that dusky shark catch is unlikely to result in overfishing

As noted, when catch limits for a species are set at zero, as with the dusky shark, additional accountability measures are not required when NMFS determines that catch is “small” *and* that “the catch is unlikely to result in overfishing.” 50 C.F.R. § 600.310(g)(3). Oceana challenges the Service’s determination on this second point as well. It argues first that because NMFS relied on incomplete data and adopted measures which only address the HMS fishery, it failed to show that Amendment 5b would prevent overfishing. Pl.’s Opp. at 29. It further contends that the agency failed to provide evidence that the measures in Amendment 5b would prevent overfishing by reducing mortality by 35 percent given the higher mortalities reflected in Oceana’s preferred extrapolations. Pl.’s MSJ. at 29.

1. NMFS’s analysis of HMS vs. non-HMS mortality

The first contention—that NMFS relied on incomplete data—has been addressed *ad nauseum* throughout this opinion; NMFS did not err in its analysis of the data on remand by refusing to extrapolate in the way Oceana requests. See supra III.A. As to the focus on HMS fisheries, the agency pointed to data showing that “interactions and mortalities in non-HMS commercial fisheries . . . are near zero in recent years, and therefore have negligible ongoing

²⁵ Oceana also argues that NMFS failed to show that the measures in Amendment 5b would reduce mortality by the 12 percent required to end overfishing. Because this argument is identical in content to its argument that the agency failed to show that the measures in Amendment 5b would reduce mortality by the 35 percent necessary to rebuild the stock, it is addressed below.

impacts on the stock.” Supp. Eval. at 36. The Court continues to believe NMFS acted appropriately in making these findings. Because the Amendment 5b accountability measures addressed the greatest sources of mortality revealed by the data and because the agency’s previous analyses had not missed “large sources of dusky shark mortality,” *id.* at 37, the Court defers to NMFS’s approach to the data, and finds that NMFS did not err in targeting the accountability measures in Amendment 5b at reducing dusky shark mortality in the HMS fisheries.

Oceana’s counter arguments miss the mark. First, Oceana contends that there is no good evidence regarding the contribution of HMS vs. non-HMS fisheries to total dusky shark mortality. However, as detailed in the Supplemental Evaluation, NMFS presented logbook data showing that “it takes between 12 and 14 HMS trips to kill one dusky shark while it takes 2,030 to 28,689 non-HMS trips to kill one dusky shark.” *Id.* at 36. It also cited observer data showing that “[o]n average . . . HMS fisheries had between 1 and 67 dusky shark mortalities per year while non-HMS fisheries had on average zero mortalities each year.” *Id.*; *see id.* at 9 (logbook data); *id.* at 19 (observer data). What’s more, NMFS described how the accountability measures contained in Amendment 5b would reduce mortality in the recreational fisheries by requiring the use of circle hooks, mandating training in handling and releasing sharks to reduce post-release mortality, and offering training on prohibited shark identification to “reduce mortality associated with mistaken landings.” *Id.* at 37; *accord* A.R. at 7245–55. These findings more than justify NMFS’s conclusion regarding the relative contributions of HMS vs. non-HMS fisheries to dusky shark mortality.

Oceana responds that the data highlighted by NMFS is incomplete, suggesting instead that “[t]he National Bycatch Report extrapolations demonstrate that bycatch interactions are

closer to 700 sharks per year in those non-HMS fisheries between 2006 and 2013.” Pl.’s MSJ at 28.²⁶ Consistent with the remand order, NMFS considered both the data underlying the National Bycatch Reports and the extrapolations contained in the National Bycatch Reports themselves. Supp. Eval. at 32–33. Having done so, the agency expressly rejected the use of the extrapolations in the reports for management purposes, noting that they were created “at the request of the National Bycatch Report preparers and with the understanding that they were not provided for fishery management purposes.” *Id.* at 39 n.7 (citing A.R. at 8226). Such extrapolations, the agency stated, were not considered the “best available science” by the agency’s “expert scientists and fishery managers” due to the same extrapolative issues discussed elsewhere in this opinion. *Id.* Further, as noted above, NMFS reasonably focused on the 2013–2015 period when making its determinations in Amendment 5b and the Supplemental Evaluation. *See supra* at III.A.1. Thus, even if the Court were inclined to accept the 2006–2013 extrapolations contained in the National Bycatch Reports despite the agency’s misgivings, the Court would not be convinced that the numbers cited by Oceana provided the relevant data for the agency’s decision here.

Second, Oceana asserts that NMFS erred in not considering declining abundance as an alternative explanation for declining mortality. On that score, the administrative record shows that the decline in mortality since 2000 has been precipitous while the decline in relative abundance of dusky sharks also began to slow, and perhaps even rebound, in the years immediately following the prohibition on landings in 2000. *Compare* A.R. at 4775 *with id.* at

²⁶ As noted above, the National Bycatch Reports are NMFS reports which contain relatively large estimates of dusky shark bycatch but which the agency did not rely on in promulgating Amendment 5b. Remand Order at 1, ECF No. 59; *see* A.R. at 7095–96.

4779. According to Dr. Enric Cortes, lead analyst on the original dusky shark stock assessment and supervisor of the 2011 and 2016 assessments, this decline implies “that a continuously declining population is not the reason for declines in reported catches or fishing mortality.” Cortes Decl. at ¶¶23–24. This conclusion was explained in the Supplemental Evaluation, where NMFS noted that declining mortality was reflected in the data even as observer coverage increased. See Supp. Eval. at 21–22.

2. *NMFS’s conclusion that Amendment 5b’s measures were sufficient to reduce dusky shark mortality*

As stated above, Amendment 5b adopted five measures to reduce dusky shark mortality.

It:

- requires recreational and commercial fishermen to undergo education on dusky shark identification to reduce bycatch retention rates by fishermen who catch, misidentify, and fail to release them;
- establishes a release protocol in the pelagic longline fishery;
- mandates training on how to safely handle dusky sharks to reduce mortality due to bycatch;
- requires fishermen in the recreational Atlantic shark fisheries and the directed shark bottom longline fishery to use circle hooks, thought to be less harmful and thus less likely to cause death after discard; and
- establishes a fleet communication protocol to help fishermen avoid areas where dusky sharks are likely to be ensnared.

Oceana I, 363 F. Supp. 3d at 75 (citing A.R. at 7565).

Oceana contends that NMFS violated the MSA by failing to provide evidence that the measures adopted in Amendment 5b could achieve the dusky shark mortality reductions necessary to end overfishing and rebuild the population. Pl.’s MSJ at 29. At the outset, Oceana again contends that mortality is higher than the agency represents, based on the various

extrapolations discussed previously. The Court need not dwell on this: for the reasons already explained, NMFS acted reasonably in using the data it did. See supra III.A.

Oceana also insists that the measures NMFS adopted are ineffective because the agency failed to specifically quantify the mortality reduction attributable to each measure. However, because the agency could not estimate the total population of dusky sharks, it concluded that there is “no reliable objective way to quantify the total amount of mortality reduction attributable to each of the individual measures.” A.R. at 7245. There is thus simply no way to provide the kind of hard evidence Oceana seems to believe is required. In any event, there is no requirement that the Court is aware of in the statute or the regulations that the agency’s judgment on the suitability of particular accountability measures be based on a calculation of quantitative mortality reduction. Instead, it need only to be based on the “best scientific information available.” 16 U.S.C. § 1851(a)(2). In this case, where hard data is hard to come by, that best evidence is satisfied by the opinions of the expert scientists whom the agency consulted when promulgating Amendment 5b and the studies cited in Amendment 5b itself. See Nat’l Fisheries Inst., Inc., 732 F. Supp. at 223. On this point, the Court finds that NMFS provided adequate justifications for its determination that the measures in Amendment 5b would achieve the necessary mortality reductions.

With those threshold issues out of the way, the Court moves to Oceana’s objections to the specific measures contained in Amendment 5b. To set the stage, the Court emphasizes what it stated in its first opinion: when an agency “chooses between alternatives—so long as each alternative can reasonably be expected to advance the agency’s objective—it is prudent to defer to its choice, not dictate it.” Oceana I, 363 F. Supp. 3d at 92 (citing Nat’l Fisheries Inst., Inc., 732 F. Supp. at 223).

a. Communication and relocation protocols

Starting with the communication and relocation protocols, Amendment 5b requires vessels with certain shark-directed permits to quickly report where they experienced any dusky shark interaction and to move at least one nautical mile away from the location of the interaction. It also encourages vessels to move farther if conditions suggest the presence of more dusky sharks. A.R. at 7335. Oceana argues that most fisherman already comply with these protocols voluntarily and that such protocols only function well in the presence of Oceana's favored low-but-non-zero catch limits or other incentives to avoid dusky shark interactions. See Pl.'s Opp. at 34.²⁷ Yet, the agency found that similar communication and relocation requirements were effective at reducing mortality in other species, such as sea turtles, certain marine mammals, and certain sawfish. A.R. at 7335. Those species, NMFS determined, are comparable to the dusky shark because they exhibit similar patterns of crowding at certain depths and in certain water conditions. Id. at 7335. While it is true that the agency received comments noting prior compliance with these protocols, the agency also received comments indicating that some fishermen were not in compliance. See id. at 7582 (describing comments received during Amendment 5b stating that some fisherman objected to complying with the communication and relocation protocols even as "many" other fishermen already voluntarily practiced a version of the protocol). And although Oceana may be correct that these protocols are difficult to monitor and vary in effectiveness depending on the structure of sanctions for non-compliance, NMFS

²⁷ There is, of course, some tension in these two arguments: how can it be both that fisherman already comply with the protocols and that the protocols are ineffective absent additional sanctions? The tension goes unexplored in the briefing and is ultimately irrelevant here given the Court's conclusion that the Service acted rationally on the basis of the empirical evidence in the record.

drew reasonable comparisons to the protocols for other species in exercising its scientific judgment that the protocols could be effective for the dusky shark as well. See id. at 7335–36, 7581–82. Moreover, fishermen face civil and criminal penalties under the MSA for non-compliance with the protocols. 50 C.F.R. §§ 635.21(c)(6)(ii); 635.71(d)(25), 600.735. Given this evidence, and the propriety of the agency’s conclusions regarding the mortality and interactions data on remand, the agency acted reasonably in concluding that a communication and relocation protocol would have a meaningful impact on dusky shark mortality.

b. Circle hooks for certain HMS permit holders

Amendment 5b requires permitted vessels in certain HMS fisheries to use “circle” hooks as opposed to “J” hooks, which the agency viewed as more lethal to dusky sharks. Oceana challenges that decision on the grounds that the agency does not know what percentage of dusky sharks are caught on J-hooks. Pl.’s Opp. at 34–35. But there is no data in the record, or elsewhere apparently, on what share of dusky sharks are caught on J versus circle hooks. NMFS therefore could not have relied on such non-existent data. Instead, in Amendment 5b, the agency justified its preference for circle hooks by reference to studies showing that circle hooks are up to 66 percent less likely to lodge in the throat or gut of a fish than J-hooks, “thereby reducing injury and associated mortality.” A.R. at 7251. The agency also relied on studies suggesting that circle hooks should “reduce the mortality rate of [hooked] dusky sharks by 63 percent.” Id. While NMFS found that it was “not possible to quantify the total mortality reduction on the overall dusky shark population,” it expected the overall mortality reduction to be significant. Id. Because the data Oceana demands does not appear to exist and NMFS appears to have relied on the best scientific information available in making its decision, the Court finds NMFS’s decision to require circle hooks to be reasonable. See The Ocean Conservancy, 394 F. Supp. 2d at 157

(describing the deference due to the agency when it provides a reasoned explanation for its choice of data under National Standard 2).

c. Circle hooks for commercial bottom longline fishermen

Amendment 5b also contains a similar circle-hook requirement for commercial bottom longline fishermen. Id. at 7565. Oceana argues that there is insufficient evidence showing circle hooks to have positive effects on bycatch mortality for bottom longline fishing. See Pl.’s Opp at 34–35. Oceana correctly points out that NMFS admitted in Amendment 5b that “the positive effects of circle hooks” on “bottom long line gear” “have not been [] apparent based on the limited available data.” A.R. at 7339; see also id. at 8925–26 (research paper presenting results of study into circle versus J hooks in longline captured marine animals). In particular, the most relevant study had shown that most sharks in this fishery were hooked in the jaw, rather than the throat or gut, which poses less of a danger. Id. at 7339. Still, NMFS noted that fishermen in the study used larger J-hooks. And it cited portions of that same study stating that because the circle hook requirement would cause the fishermen to switch from “smaller J-hooks that could be swallowed by sharks,” it may “thus reduce the mortality rate of sharks that may have become gut-hooked with these smaller J-hooks.” Id. Like the other alternatives, NMFS found that it was “not possible to quantify the total mortality reduction this alternative would have.” Id. The Service nevertheless concluded that this measure could be “expected to significantly contribute to the overall mortality reduction of 35 percent,” because it would reduce the likelihood of death for the hundreds of sharks hooked by commercial bottom longline fishermen. Id.

The Court agrees with Oceana that the evidence supporting the use of circle hooks in the bottom-longline fishery is less strong than that underlying some of the other accountability measures adopted in Amendment 5b. But ultimately, the Court finds no fault with NMFS’s

conclusion that circle hooks could be effective in reducing mortality even in the bottom longline fishery; NMFS relied upon the best information available, made reasonable inferences, explained those inferences, and thereby justified its conclusion in this messy, expertise-dependent area.

See The Ocean Conservancy, 394 F. Supp. 2d at 157.

d. Dusky shark identification training

Finally, Oceana attacks the agency's decision to increase training for fishermen in dusky shark identification. It argues that NMFS lacks evidence showing such training will decrease mortality and that previous training efforts have been ineffective. See, e.g., Pl.'s Opp. at 35. NMFS responds that while some commercial fishermen were required to attend identification training in the past, the training did not include identification of dusky sharks. See A.R. at 7130 (noting that "vessel owners and operators [in certain fisheries] are required to participate in the [training] workshops every three years" but indicating that training required by Amendment 5b would add "a section on shark identification, handling and release, and fishing regulations" to these trainings). And recreational fishermen do not appear to have been required to attend any identification training at all. Moreover, NMFS points to studies supporting the efficacy of training. One study found that improved handling and identification could result in "compliance rates with prohibited species regulations [of] over 98 percent, including reducing illegal landings by 95 percent" and "reduced post-release mortality rates." Id. at 7246 (citing studies reproduced at id. at 8905–07 and id. at 8992, 8999). The fact that some of these studies were drawn from other species and that dusky sharks are subject to frequent misidentification may reduce the efficacy of these programs. Still, the evidence NMFS cites suggests that such programs have the potential to substantially reduce mortality. See id. at 7246 (discussing the value of training programs); id. at 7490 (discussing comment regarding difficulty of identifying and

differentiating dusky sharks from Galapagos sharks); Supp. Eval at 37 (discussing species misidentification problems and unreliability of catch data). Thus, despite the potential limitations of additional training, the Court concludes that NMFS has sufficiently justified its finding that these efforts would reduce mortality.

Because the Fisheries Service provided reasoned justifications for the effects of its chosen measures and based its justification on the best evidence available to it, the Court finds that the agency has sufficiently supported its conclusion that the chosen measures would reduce mortality by the 35 percent required to enable dusky shark recovery.

D. Oceana's NEPA claims

Finally, Oceana's complaint includes a claim under National Environmental Policy Act ("NEPA"). Oceana does not offer additional argument regarding its NEPA claim in its briefing here, choosing instead to "adopt[] its prior briefing" on the NEPA questions via a footnote in its reply. Pl.'s Opp. at 3 n.1. The Court would ordinarily question whether such a cursory argument, advanced in a reply, creates any obligation for NMFS to respond, much less for the Court to decide, these questions. But since the Court previously reserved on the NEPA claim, it will reach the issue.

Briefly, NEPA requires agencies "take a hard look at environmental consequences" and "provide for broad dissemination of relevant environmental information." Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989) (internal quotation marks omitted). As part of this "hard look," id., NEPA requires agencies to prepare an environmental impact statement ("EIS") anytime they propose a "major Federal action[] significantly affecting the quality of the human environment," 42 U.S.C. § 4332(C). Crucial to any EIS is its presentation of the "environmental impacts of the proposal and the alternatives in comparative form," which

“sharply defin[es] issues and provid[es] a clear basis for choice among options by the decisionmaker and the public.” 40 C.F.R. § 1502.14.

In the first round of summary judgment briefing, Oceana argued that NMFS violated NEPA’s requirement that it consider and evaluate alternatives to achieving the agency’s stated goal. Pl.’s MSJ at 40 (citing 40 C.F.R. § 1502.14 and 42 U.S.C. § 4332(C)). Oceana claimed that the agency failed even to take a hard look at whether its chosen path would lead it to its desired destination. Id.

In its prior opinion, the Court noted that “it need not reach Oceana’s NEPA argument given that it does not differ materially from its MSA argument, on which basis the Court [had] already remanded Amendment 5b.” Oceana I, 363 F. Supp. 3d at 94. And Oceana conceded at the hearing on its present summary judgment motion that rejection of its MSA claims would also require rejection of its NEPA claims. Hearing Tr. at 21:18–21:21. Having now reached, and rejected, Oceana’s MSA arguments, the Court stands by its prior conclusion regarding the overlap between Oceana’s NEPA claims and its MSA claims. Almost all of Oceana’s arguments on the NEPA question have been addressed in the sections of this opinion discussing the agency’s purported failures under the MSA, and thus do not bear further analysis. Specifically, the Court has rejected Oceana’s arguments that the agency was required to set a specific numerical cap on bycatch, see supra III.B.1, that the agency was required to have specific estimates of mortality reductions for its preferred accountability measures, see supra III.C, that the agency was required to estimate fishery-wide catch totals using extrapolation, see supra III.A, and, more broadly, that the agency was in all instances required to give extrapolated or precise numerical estimates regarding all of its actions, see supra III.A–C. Accordingly, the Court also rejects Oceana’s NEPA arguments.

IV. Conclusion

For the foregoing reasons, the Court will deny Oceana's Motion for Summary Judgment and grant the Fisheries Service's Cross Motion for Summary Judgment. A separate Order shall accompany this Memorandum Opinion.

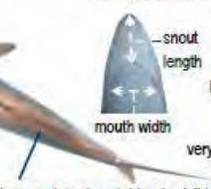
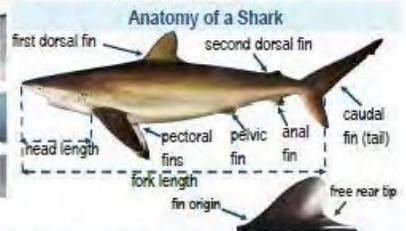
CHRISTOPHER R. COOPER
United States District Judge

Date: March 30, 2021

APPENDIX

PROHIBITED SHARK IDENTIFICATION
FOR THE FISHERIES OF THE U.S. ATLANTIC, GULF OF MEXICO, AND CARIBBEAN

Less common prohibited sharks not pictured: *Whale, Basking, Bigeye Sand Tiger, Sixgill, Bigeye Sixgill, Sevengill, Galapagos, Caribbean Sharpnose, Narrowtooth, and Smalltail Sharks*

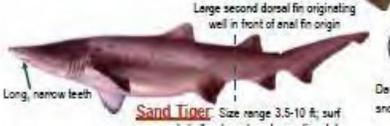



Ridgeback sharks have an interdorsal ridge (a visible line or crease of raised skin between dorsal fins)

Ridgeback Sharks (also known as "Brown" or "Sand" Sharks)
All Ridgeback Sharks Are Prohibited, except for Tiger, Oceanic Whitetip, and Smoothhound Sharks

<p>Snout length equal or shorter than mouth width</p>  <p>Dusky Shark: Size range 3-12 ft; nearshore to outer continental shelf</p>	<p>Snout length equal or greater than mouth width</p>  <p>Bignose Shark: Size range 2.5-9 ft; offshore</p>
<p>First dorsal fin originating behind pectoral fins</p>  <p>Sandbar Shark: Size range 2-8 ft; inshore shallow coastal waters ***Sandbar sharks can be retained in the shark research fishery only***</p>	<p>Large eyes, often green</p>  <p>Night Shark: Size range 2-9 ft; offshore</p>
<p>First dorsal fin originating over pectoral fins</p>  <p>Silky Shark: Size range 2.5-11 ft; offshore ***Silky sharks can be retained on commercial bottom longline and gillnet gear only***</p>	<p>Long, pointed snout</p>  <p>Caribbean Reef Shark: Size range 2.5-10 ft; tropical continental shelf waters</p>

Commonly Encountered Prohibited Non-Ridgeback Sharks

<p>Flattened body, wide pectoral and pelvic fins</p>  <p>Atlantic Angel Shark: Size range 2.5-5 ft; shallow to deep water</p>	<p>Large second dorsal fin originating well in front of anal fin origin</p>  <p>Sand Tiger: Size range 3.5-10 ft; surf zone and shallow bays to outer continental shelf</p>
<p>Long, narrow teeth</p>  <p>White Shark: Size range 5-20 ft; coastal and offshore</p>	<p>Dark underside to snout and lower jaw</p>  <p>Longfin Mako: Size range 7-13 ft; offshore</p>
<p>Grey to black on top, underside white</p>  <p>Bignose Thresher: Size range 3-10 ft fork length; mostly offshore</p>	<p>Large eyes; deep groove behind head</p>

If You Don't Know, Let it Go
Release Ridgebacks

All sharks within a species are not identical; however, these are common characteristics for the majority of individuals.
Young sharks can vary in appearance from adults. Size ranges are approximate.

Prepared by L. Latchford, C. Hutz, T. Curtis, and S.B. Redding, National Marine Fisheries Service. <http://www.cmfis.noaa.gov/shark/>
Photographs and/or illustrations provided by NMFS, NMFS Apex Predators Program, Diane Pezleski, W.B. Driggers II, and S. Iglesias.
June 2017

Source: "Figure 8," Supp. Eval. at 42.