Western
Pacific
Regional
Fishery
Management
Council

February 11, 2014

Lance Smith
Regulatory Branch Chief
Protected Resources Division
National Marine Fisheries Service
Pacific Islands Regional Office
1601 Kapiolani Blvd., Ste 1110
Honolulu, HI 96814

Dear Lance:

The Western Pacific Regional Fishery Management Council (Council) hereby submits new scientific information regarding the 66 coral species proposed for listing under the Endangered Species Act (ESA)[1]. The Council worked in partnership with the world-renowned coral expert Dr. John "Charlie" Veron and the Pet Industry Joint Advisory Council (PIJAC) to make available substantial scientific information not considered by the National Marine Fisheries Service (NMFS) in its proposed rule. The Council requests that NMFS include these reports in its administrative record and reconsider the coral listing issue based on the best available scientific information.

The enclosed submission contains the following:

1. Overview report by Veron submitted to the Council[2]; and
2. Linked documentation of Veron's report containing:
    a. Spreadsheets containing species-specific distribution and abundance data;
    b. Updated distribution maps; and
    c. Analysis report comparing Veron's data and NMFS' proposed rule.

Veron's updated data are compiled primarily from extensive fieldwork conducted by him and his co-authors since the publication of the three-volume book *Corals of the World* in 2000. The data are part of a larger-scale effort to compile all available coral information into an open-access website, which will significantly advance the scientific information base for conducting vulnerability assessments of coral species around the world. The data provided here represent a small portion of what will be available on the website; however, from the perspective of the pending listing of 66

[1] See 77 Fed. Reg. 73220 (December 7, 2012)
[2] Veron, J.E.N. 2014. Results of an update of the Corals of the World Information Base for the Listing Determination of 66 Coral Species under the Endangered Species Act. Report to the Western Pacific Regional Fishery Management Council. Honolulu: Western Pacific Regional Fishery Management Council. 11pp. + Appendices.

species under the ESA, the data represent substantial scientific information that should not be ignored in NMFS' final determination.

Summary of Findings

Veron's dataset focuses on species-specific distribution and abundance, as these attributes provide a useful proxy for examining species vulnerability and resilience against extinction risk. NMFS' proposed rule was determined in large part by perceived vulnerability to climate change impacts at the genus- or family-level and failed to adequately consider species-specific data such as distribution and abundance[3]. As a result, species of certain genus including *Acropora* and *Montipora* were all proposed for listing regardless of their geographic distribution and abundance.

Veron's distribution data and updated maps provide an objective measure for determining each species' geographic range. In its proposed rule, NMFS was inconsistent in assigning species to "narrow", "moderate" and "wide" distribution categories, resulting in two species with nearly identical geographic ranges to be assigned into different categories. Veron's data show that the species proposed for ESA listing are broadly distributed across a wide range of ecoregions and habitats throughout the Indo-Pacific. The species with the most limited distribution among those proposed for listing also occupy substantial latitudinal or longitudinal ranges, providing a potential resilience for climate change impacts.

Distribution information from Veron also includes a measure of data robustness, providing the data user with a measure of uncertainty regarding the available data. One species in NMFS' proposed list, *Montipora lobulata*, is considered by Veron to have inadequate data for analysis due to uncertainty regarding its distribution. This indicates that the best available data for this species are not robust for the purpose of a listing decision under the ESA.

Occurrence data in Veron's information indicate that NMFS' proposed rule contained unverified data regarding species distribution. Veron's updated distribution maps compiled all available information from his surveys, existing literature, and occurrence records from other researchers, photographers and museum collections. These records are only confirmed as occurring in an ecoregion after they have been verified by an expert and are otherwise identified as "strongly predicted" or "published record considered to warrant further investigation". NMFS did not conduct a similarly rigorous verification of species occurrence in the process of developing the proposed rule, and this likely resulted in inaccurate distribution ranges. This is particularly evident for species occurring in the U.S. Territory of American Samoa, where Veron's data show 12 fewer species occurring in its waters than what NMFS reported during the public hearings.

NMFS' proposed list of coral species was driven by the original list of 83 species petitioned for listing. The petitioners indicated that they selected these species based on their designation by the IUCN as threatened with extinction and their occurrence in U.S. waters and "thus stand to benefit most from listing"[4]. The petitioner's list, and consequently NMFS' list of proposed corals, could not

[3] The Council previously outlined our concerns regarding the Determination Tool used in the proposed listing determination. Our review of the Determination Tool revealed that the flawed logic used in the Tool resulted in the perceived threats from ocean warming, acidification and disease considered at the first tier biasing the outcome toward ESA listing rather than a not warranted finding. The other three tiers of demographic, spatial and regulatory factors had little to no impact on the outcome, indicating that the tool failed to adequately consider all available information.

[4] See Petition to List 83 Coral Species under the Endangered Species Act at p.2.

be farther from this intent. Veron's data verify that some of the species proposed for listing do not occur in U.S. waters, including the two species on the list with the most limited distribution and rarest abundance occurring exclusively in the Indian Ocean. Furthermore, those species proposed for listing and confirmed to occur in the U.S. are widely distributed species with most of their ranges occurring outside of U.S. waters, providing a substantial buffer against various threats compared to species with limited geographic distributions. This means that any benefit the ESA can provide under its federal protection in U.S. waters will only surmount to an insignificant, if any, contribution to the species as a whole in preventing extinction.

Additional Considerations

Several additional considerations are warranted along with Veron's data submission. First, even Veron's dataset, representing the best scientific information for Indo-Pacific coral species available today, does not have quantitative measures of abundance trends over time. Surveys conducted by the Corals of the World co-authors are extensive; however, most survey sites have not been revisited and thus comprehensive measures of abundance trends throughout each species' range are not available at this time.

Second, our understanding of coral depth distribution is restricted by the depths at which surveys have been conducted[5]. Most coral surveys conducted to date are carried out using SCUBA gear, limiting our knowledge of coral depth distribution to the limits of conventional SCUBA diving (>30-40 meters). Distribution and abundance surveys conducted by the Corals of the World authors are no exception. Coral surveys in the mesophotic zones are still at its infancy, and future surveys at depth will likely extend the depth ranges of known coral species.

Finally, recent scientific literature published since the proposed rule point to various mechanisms that may buffer coral reefs from ocean warming and acidification. For example, Shallenberger and colleagues (2014)[6] reported on the existence of diverse coral reef communities under naturally low pH approaching levels projected for the western Pacific open ocean by 2100. Storlazzi and colleagues (2013)[7] showed that regularly occurring internal tidal bores that bring cooler waters from depths greater than 50 meters lowered the temperatures around shallow-water reefs. These new findings introduce additional uncertainties in projections of climate change impacts on coral species across their range and provide additional insights to reef resilience that should be considered when assessing coral vulnerability to climate change impacts.

Conclusions

The Council believes that ESA has an important role to play in preventing extinction when implemented using the best available science. However, we believe that NMFS' attempt to list widely distributed coral species with limited species-specific scientific information on the basis of

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[5] Kahng, S. E., J. M. Copus, and D. Wagner. 2014. Recent advances in the ecology of mesophotic coral ecosystems (MCEs). *Current Opinion in Environmental Sustainability,* 7: 72-81.

[6] Shamberger, K. E. F., A. L. Cohen, Y. Golbuu, D. C. McCorkle, S. J. Lentz, and H. C. Barkley. 2014. Diverse coral communities in naturally acidified waters of a Western Pacific Reef. *Geophysical Research Letters,* 41, doi:10.1002/2013GL058489.

[7] Storlazzi, C. D., M. E. Field, O. M. Cheriton, M. K. Presto, and J. B. Logan. 2013. Rapid fluctuations in flow and water-column properties in Asan Bay, Guam: implications for selective resilience of coral reefs in warming seas. *Coral Reefs,* 32(4): 949-961.

sweeping and incomplete assumptions regarding climate change impacts is an ultimate degradation of ESA implementation.

Information provided by Veron clearly shows that NMFS disregarded the best available scientific information in developing its proposed rule. Despite a substantial amount of unpublished information available through Veron, NMFS failed to consult with or request a review from the world's most prominent coral expert during the listing process. The Council requests that NMFS reconsider the proposed rule to list 66 coral species under the ESA based on the best available scientific information provided here.

Please do not hesitate to contact me or my staff if you have any questions regarding this submission.

Sincerely,

Kitty M. Simonds
Executive Director

Enclosure:
Veron, J.E.N. 2014. Results of an update of the Corals of the World Information Base for the Listing Determination of 66 Coral Species under the Endangered Species Act. Report to the Western Pacific Regional Fishery Management Council. Honolulu: Western Pacific Regional Fishery Management Council. 11pp. + Appendices.

Cc: Samuel Rauch, Deputy Assistant Administrator for Regulatory Programs
Richard Merrick, Chief Science Advisor
Michael Tosatto, Regional Administrator, Pacific Islands Regional Office
Samuel Pooley, Director, Pacific Islands Fisheries Science Center
Western Pacific Regional Fishery Management Council Members
New England, Mid Atlantic, South Atlantic, Gulf, Caribbean, Pacific & North Pacific Fishery Management Council Executive Directors
Senator Brian Schatz, State of Hawaii
Senator Mazie Hirono, State of Hawaii
Representative Colleen Hanabusa, State of Hawaii
Representative Tulsi Gabbard, State of Hawaii
Representative Eni Faleomavaega, Territory of American Samoa
Representative Madeleine Bordallo, Territory of Guam
Representative Gregorio Sablan, Commonwealth of the Northern Mariana Islands
Senator Mark Begich, Chairman, Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard, Senate Committee on Commerce, Science & Transportation
Representative Doc Hastings, Chairman, House Committee on Natural Resources
Dr. John "Charlie" Veron, Coral Reef Research
Marshall Meyers, Pet Industry Joint Advisory Council