Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:
Tropical Cyclone Wind Exposure North Atlantic 1987-2016

1.2. Summary description of the data:
These data represent modeled, historical exposure of U.S. offshore, coastal, and international waters to tropical cyclone activity within the North Atlantic Ocean basin (1987-2016). BOEM Outer Continental Shelf Lease Blocks and equivalent areas for coastal and international waters were used to construct the grid by which exposure was quantified. Exposure was quantified using intersecting storm tracks, overlapping wind intensity areas, and mathematical return intervals. Symbology is based on the modeled occurrence of tropical storm force (34-knot) or greater winds per grid cell. Due to the way winds were calculated differently over land and over water, the interpretation of wind exposure metrics within coastal areas should be interpreted carefully. Data represent past climatology only and do not suggest predicted future impacts or exposure.

1.3. Is this a one-time data collection, or an ongoing series of measurements?

1.4. Actual or planned temporal coverage of the data:

1.5. Actual or planned geographic coverage of the data:
W: -106.773028, E: 7.303844, N: 70.951611, S: 0

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:

2.4. E-mail address:

2.5. Phone number:

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality
NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible
(describe or provide URL of description):

Process Steps:

- 2018-08-01 00:00:00 - CREATE THE GRID 1. Within the North Atlantic ocean basin only (since the EPAC grid uses only lease blocks), generate gridded fishnets for state waters and waters outside the EEZ that are not covered by OCS lease blocks. Make gridded cells coincident with lease blocks, as explained below. (NOTE: lease blocks and fishnets will not line up with the irregular lease blocks in the old Texas and Louisiana protraction maps.) 2. Per UTM zone, determine extent (top, bottom, left, right) of fishnet, using X and Y values referenced from BOEM's Official Protraction Diagram Maps (https://www.boem.gov/Maps-and-GIS-Data/) per region. Block size (cell width/height) in Gulf of Mexico is 15,840 feet, and 4,800 meters for the rest of the US. Note that the extent values for zones (fishnets) in the Gulf of Mexico and Atlantic will be different. Within the fishnet tool, set number of rows and columns to 0, uncheck the option to Create Label Points, and set output to POLYGON. 3. Define the fishnet's projection per respective UTM zone. Use projection BLM (US Feet) for Gulf of Mexico, and projection WGS84 (meters) for rest of US. 4. Project all UTM zones over the Gulf of Mexico (UTM 14, 15, 16, 17) into NAD27, and UTM zones over the rest of the North Atlantic basin into WGS84. Then project all UTM zones into NAD83. 5. Add a field (fishnetID) to each fishnet and populate it with the respective UTM zone name and a unique ID (number). For example "18N-112". 6. Merge UTM zones (fishnets) together. Where there is overlap between UTM zones (fishnets), priority should be given to the eastern UTM zone's grid cells. (NOTE: special attention was given to the regional area around the Florida Keys. Here, the OCS lease blocks are irregular, where blocks from the Atlantic and the Gulf of Mexico overlap. Furthermore, the UTM fishnets shift from feet to meters here, within UTM zone 17N). 7. Merge the Atlantic and Gulf of Mexico lease blocks together and give priority to Gulf of Mexico lease blocks where there is overlap with Atlantic lease blocks in UTM zone 17N. 8. Merge the North Atlantic composite fishnet and the composite lease blocks layer together, with overlap priority given to the lease blocks. 9. Remove all unnecessary fields and modify attributes as needed.
- 2018-09-01 00:00:00 - MODELING EXPOSURE 29. Buffer each subset (Cat 1, Cat 2, etc.) based on the respective MEW calculations for both overland and overwater (76 data sets total). Set Side Type field to right or left, depending on the buffer being run. Merge respective wind speed buffers (34kt, 50kt, 64kt) and then dissolve by storm ID (Serial_Num), storm name (Name), and season (Season). 30. Perform Spatial Join of the composite grid and buffers (34kt, 50kt, 64kt) to generate wind threshold counts per grid cell. 31. Perform Spatial Join of the composite grid and IBTrACS storm segments to generate storm segment counts per block. 32. Join count values of all outputs (34kt, 50kt, 64kt, and segments) together, based on the gridID field. 33. Calculate an average "return interval" value (30 years / count) per grid cell for each wind threshold (34kt, 50kt, 64kt). 34. Remove all unnecessary fields and populate others according to data dictionary.
- 2018-08-01 00:00:00 - CLIMATOLOGY STEPS (MEW calculations) 10. Using the Extended Best Track (EBT) dataset, calculate the Maximum Extent of Winds (MEW) values following these steps. MEW are wind radii distances per standard wind

threshold (34kt, 50kt, 64kt). 11. From http://rammb.cira.colostate.edu/research/tropical_cyclones/tc_extended_best_track_dataset/data/ebtrk_atlc_1988_2016.txt, right-click and save the EBT data (1988-2016) as a text file and open in Excel, setting custom fixed-width columns within the import wizard. Insert missing column breaks where necessary and set the width carefully, capturing the appropriate characters per column. Save file. 12. Assign each column a field name based on metadata here: (http://rammb.cira.colostate.edu/research/tropical_cyclones/tc_extended_best_track_dataset/docs/ebtrk_readme.txt). 13. Remove all EBT features in which storm type equals L, W, or D. (NOTE: No storm type values of 'D' were noted in the EBT data, even though the designation is stated within the metadata.) 14. Remove -99 values within fields. 15. Remove features if wind radii values in all four quadrants are zero. Per feature, even if only one of the four quadrants (per wind threshold) has a value above zero, retain the zero values in the other three cells for that wind threshold. 16. Remove all features with maximum wind values below 34 knots. (By definition, no wind radii values exist for EBT features with maximum winds below 34 knots, so these features are not relevant for MEW calculations.) 17. Modify the "longitudeWest" column by converting the values to negative values, so that features will plot appropriately (i.e. in the eastern hemisphere). Where necessary, convert longitude values within the eastern hemisphere by subtracting the value from 360. 18. Add the modified EBT data to ArcMap and export table as feature class. 19. Perform Select By Location, where all EBT points occurring over land (using a global countries layer) are selected. Include a 150nm buffer of the countries layer (with small islands removed) to select those EBT points occurring over land. (This is based on tropical cyclone literature, from Kruk 2010.) Export these selected features as a new feature class. These features will be used to calculate the average MEW values (buffer distances) for overland storm track segments. Switch the selection to select those features over water only. Export these selected features as a new feature class. These features will be used to calculate the average MEW values (buffer distances) for overwater storm track segments. If any overwater points exist over the Pacific Ocean basin, remove these. 20. For the overwater feature class, generate (storm) "category" values in a new field, based on wind speed values (see https://www.nhc.noaa.gov/aboutsshws.php). Due to the low sample of Cat 5 storms (1988-2016 = 28 points), combine these storms' (EBT points) wind radii values with the Cat 4 points when calculating MEW. 21. For the overland feature class, generate (storm) "category" values in a new field, based on wind speed values (see https://www.nhc.noaa.gov/aboutsshws.php). Due to the low sample of Cat 5 storms (1988-2016 = 24 points), combine these storms' (EBT points) wind radii values with the Cat 4 points when calculating MEWs. 22. Calculate MEW values per category for the overwater and overland features (separately) and record in a table. Compute averages for right (northeast, southeast) and left (northwest, southwest) quadrants. 23. Multiply all values by 0.67 to compute buffers for Eastern Pacific (EPAC) storms. This calculation is based on literature that has compared tropical cyclone sizes across global basins. This literature notes that wind swaths of EPAC tropical storms are approximately 33%

smaller than North Atlantic tropical storms. (NOTE: size proportions between the North Atlantic and Eastern Pacific storms are variable within the literature.)
- 2018-08-01 00:00:00 - STORM TRACKS STEPS 24. Extract those features in the IBTrACS data that are: 1) attributed to the North Atlantic (NA) basin; 2) occur in or after 1987; and 3) have maximum wind values above 33 knots. 25. Extract those features that are attributed as extratropical (ET), subtropical (SS), or tropical (TS). 26. Create a (storm) "Category" field. For features that are tropical storms ('TS'), modify the field value to the appropriate category, based on wind speed (see https://www.nhc.noaa.gov/aboutsshws.php). Also designate features as 'ET', 'SS', or 'TS' accordingly. 27. Separate the overland and overwater storm segments into separate feature classes. Do this by extracting all segments "completely contained" within the "land + 150nm buffer" layer. (NOTE: This was only done for the North Atlantic segments. The vast majority of Eastern Pacific segments (about 99%) within BOEM's Pacific lease blocks do not occur over land. Additionally, the MEW values for segments that do intersect land (i.e. Hawaiian Islands) compared to MEW values over water would be very minimal.) 28. For the overwater feature class, separate IBTrACS data by the seven categories (SS, ET, TS, 1, 2, 3, 4/5) into separate layers. Do the same for the overland feature class. (NOTE: For the ET, SS, and TS subsets, make additional subsets of these for the following segments: a) segments =34-49kt; b) segments =50-63kt; and c) segments >=64kt. This is required since not every ET, SS, and TS segment has winds greater than 50kt or 64kt, like Cat 1-Cat 5 segments do by definition.)

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:
- 1.3. Is this a one-time data collection, or an ongoing series of measurements?
- 1.4. Actual or planned temporal coverage of the data
- 1.6. Type(s) of data
- 1.7. Data collection method(s)
- 2.1. Point of Contact Name

- 2.4. Point of Contact Email
- 3.1. Responsible Party for Data Management
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.2. Name of organization of facility providing data access
- 7.2.1. If data hosting service is needed, please indicate
- 7.3. Data access methods or services offered
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.2. Data storage facility prior to being sent to an archive facility
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:

NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:

https://www.fisheries.noaa.gov/inport/item/66201

6.4. Process for producing and maintaining metadata

(describe or provide URL of description):

Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access

NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:
https://marinecadastre.gov/downloads/data/mc/TropicalCycloneWindExposure.zip
https://www.marinecadastre.gov/data/

7.3. Data access methods or services offered:

7.4. Approximate delay between data collection and dissemination:

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
Charleston, SC

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.