

Carolina Madtom - Potential Habitat, July 2022 - NC Department of Transportation

File Geodatabase Feature Class



Tags

Carolina madtom, *Noturus furiosus*, Notu_furi, Fish, Aquatic, at-risk species, USFWS Bridge/culvert programmatic agreement, random forest model, machine learning, Transportation, NRTR, NCDOT, Environment, Location, North Carolina, ATLAS, North Carolina

Summary

This dataset was originally created in February 2022 as part of the Project ATLAS initiative at NCDOT to support the Environmental Analysis Unit (EAU) Mitigation and Modeling Unit with project delivery in the development phase.

The Carolina madtom model is a Random Forest (machine-learning) model. Random Forest models were used to predict the probability of habitat at the scale of USGS National Hydrography Data (NHD Plus V2) catchments and their associated stream segments (median area: 272 acres; 5th and 95th percentile area: 4 acres and 1541 acres).

This dataset supports the production of the Natural Resources Technical Report (NRTR). This dataset also contains information that may assist biologists in preparing background information for field surveys, in order to address protected species for Threatened & Endangered Species Survey Reports, and/or Biological Assessments. The model is intended to be used in project management tools to:

1. flag areas of higher versus lower risk of "May Affect" biological conclusions within a species range to improve project planning and management, and
2. add a landscape-scale perspective to improve biologists' field planning and site assessment

Description

The Carolina madtom Potential Habitat dataset is a polygon layer depicting high, moderate and low potential habitat locations for Carolina madtom in NC counties.

Carolina madtom (*Noturus furiosus*) is a freshwater fish species endemic to the Tar-Pamlico, and Neuse River (including the Trent) drainages in North Carolina. The species occurs in riffles, runs, and pools in medium to large streams and rivers. Ideally, it inhabits fresh waters with continuous, year-round flow and moderate gradient in both the Piedmont and Coastal Plain physiographic regions. Optimal substrate for the Carolina madtom is predominantly siltfree, stable, gravel and cobble bottom habitat, and it must have cover for nest sites, including under rocks, bark, relic mussel shells, and even cans and bottles. The Carolina Madtom faces a variety of threats from declines in water quality, loss of stream flow, riparian and instream fragmentation, deterioration of instream habitats, and expansion of the invasive predator Flathead catfish. These threats are expected to be exacerbated by urbanization and climate change.

The three levels are: Low, Moderate, and High Probability of Potential Habitat (based on similarity of environmental conditions to those found at known occurrence locations). The category thresholds were set based on the distribution of predicted values for known habitat. The High-Moderate threshold is set at the level where 90% of the observed potential habitat (species presence and reviewer judgments) falls within the High category (Presence Percent Correctly Classified). The Moderate-Low threshold were set at the level where 8% of the observed potential habitat (species presence and reviewer judgments) falls within the Moderate category and 2% within the Low category. The final thresholds for this species are 0.526 and 0.767 for the Low-Moderate and Moderate-High thresholds, respectively. Lower thresholds result in more of the range labelled as High

probability of habitat and greater misclassification of known non-habitat locations. Higher thresholds result in more of the range labelled as Low probability of habitat and greater misclassification of known habitat locations.

Given the larger spatial unit of ecological models and ecological characteristics of aquatic species, the landscape scale environmental attributes of potential habitat varied greatly among sites and could closely resemble non-habitat sites. It is important to remember that potential habitat (and non-habitat) can occur at any classification level within a catchment and must be verified by a qualified biologist.

For more information please click here <https://xfer.services.ncdot.gov/gisdot/Metadata/Atlas/TechDocs/>

Datasets developed under Project ATLAS do not replace any NRTR work for future projects and may not be used as a replacement for site visits / field surveys by qualified professionals and hence should be used only as a supporting platform for decision making. Use of this dataset for project scoping or screening is merely pre-decisional.

Credits

The Environmental Analysis Unit (EAU) Mitigation and Modeling Unit within NCDOT was tasked to create this dataset. This dataset supports the production of the Natural Resources Technical Report (NRTR). Maintenance of this dataset is handled by the EAU.

Support and maintenance of the enterprise spatial database where this data resides is handled by NCDIT's Transportation GIS Unit.

Use limitations

The North Carolina Department of Transportation shall not be held liable for any errors in this data. This includes errors of omission, commission, errors concerning the content of the data, and relative and positional accuracy of the data. This data cannot be construed to be a legal document. Primary sources from which this data was compiled must be consulted for verification of information contained in this data.

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Extent

West -79.229783 **East** -77.023588
North 36.453084 **South** 34.907922

Scale Range

Maximum (zoomed in) 1:5,000
Minimum (zoomed out) 1:625,000

ArcGIS Metadata ►

Topics and Keywords ►

THEMES OR CATEGORIES OF THE RESOURCE biota, geoscientificInformation, inlandWaters, location, transportation, environment

* **CONTENT TYPE** Downloadable Data
EXPORT TO FGDC CSDGM XML FORMAT AS RESOURCE DESCRIPTION No

PLACE KEYWORDS North Carolina

THESAURUS ►

TITLE User

CREATION DATE 2022-02-25 00:00:00

PUBLICATION DATE 2022-06-01 00:00:00

[Hide Thesaurus ▲](#)

THEME KEYWORDS Carolina madtom, Noturus furiosus, Notu_furi, Fish, Aquatic, at-risk species, USFWS Bridge/culvert programmatic agreement, random forest model, machine learning, Transportation, NRTR, NCDOT, Environment, Location, North Carolina, ATLAS, North Carolina

THESAURUS ▶

TITLE User

CREATION DATE 2022-02-25 00:00:00

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[Hide Thesaurus ▲](#)

[Hide Topics and Keywords ▲](#)

Citation ▶

TITLE Carolina Madtom - Potential Habitat, July 2022 - NC Department of Transportation

CREATION DATE 2022-02-25 00:00:00

PUBLICATION DATE 2022-06-01 00:00:00

PRESENTATION FORMATS digital map

FGDC GEOSPATIAL PRESENTATION FORMAT vector digital data

[Hide Citation ▲](#)

Citation Contacts ▶

RESPONSIBLE PARTY

ORGANIZATION'S NAME North Carolina Department of Transportation - EAU Mitigation and Modeling Unit

CONTACT'S POSITION Environmental Program Consultant

CONTACT'S ROLE originator

CONTACT INFORMATION ▶

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HOURS OF SERVICE

9:00am – 5:00pm Monday - Friday

CONTACT INSTRUCTIONS

Please send an email with any issues, questions or comments regarding the ATLAS Data Search Tool, ATLAS Screening Tool or ATLAS Workbench. If it is an immediate need, please call the contact number or indicate as such in the subject line in an email.

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RESPONSIBLE PARTY

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[Hide Citation Contacts ▲](#)

Resource Details ►

DATASET LANGUAGES English (UNITED STATES)

DATASET CHARACTER SET utf8 - 8 bit UCS Transfer Format

STATUS completed

SPATIAL REPRESENTATION TYPE vector

* PROCESSING ENVIRONMENT Version 6.2 (Build 9200) ; Esri ArcGIS 10.8.1.14362

CREDITS

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Support and maintenance of the enterprise spatial database where this data resides is handled by NCDIT's Transportation GIS Unit.

[Hide Resource Details ▲](#)

Extents ►

EXTENT

GEOGRAPHIC EXTENT

BOUNDING RECTANGLE

WEST LONGITUDE -84.017454

EAST LONGITUDE -81.839144

SOUTH LATITUDE 35.022011

NORTH LATITUDE 36.167407

EXTENT CONTAINS THE RESOURCE Yes

EXTENT

DESCRIPTION

Data collection is complete.

GEOGRAPHIC EXTENT

BOUNDING RECTANGLE

WEST LONGITUDE -84.422111

EAST LONGITUDE -75.416034

SOUTH LATITUDE 33.730557

NORTH LATITUDE 36.617257

EXTENT CONTAINS THE RESOURCE Yes

TEMPORAL EXTENT

BEGINNING DATE 2022-06-01 00:00:00

ENDING DATE 2022-06-01 00:00:00

EXTENT

GEOGRAPHIC EXTENT

BOUNDING RECTANGLE

EXTENT TYPE Extent used for searching

* WEST LONGITUDE -79.229783

* EAST LONGITUDE -77.023588

* NORTH LATITUDE 36.453084

* SOUTH LATITUDE 34.907922

* EXTENT CONTAINS THE RESOURCE Yes

EXTENT IN THE ITEM'S COORDINATE SYSTEM

* WEST LONGITUDE 1932411.849503

* EAST LONGITUDE 2581414.396968

* SOUTH LATITUDE 427098.519356

* NORTH LATITUDE 983847.587614

* EXTENT CONTAINS THE RESOURCE Yes

[Hide Extents ▲](#)

Resource Points of Contact ►

POINT OF CONTACT

ORGANIZATION'S NAME North Carolina Department of Transportation - EAU Mitigation and Modeling Unit
CONTACT'S POSITION Environmental Program Consultant
CONTACT'S ROLE point of contact

CONTACT INFORMATION ►

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Hide Resource Points of Contact ▲

Resource Maintenance ►

RESOURCE MAINTENANCE

UPDATE FREQUENCY as needed

SCOPE OF THE UPDATES dataset

OTHER MAINTENANCE REQUIREMENTS

Maintenance of this dataset is handled by the Environmental Analysis Unit (EAU) Mitigation and Modeling Unit. Currently updating this dataset has not been planned. Support and maintenance of the enterprise spatial database where this data resides is handled by NCDIT's Transportation GIS Unit.

MAINTENANCE CONTACT

ORGANIZATION'S NAME North Carolina Department of Transportation - EAU Mitigation and Modeling Unit
CONTACT'S POSITION Environmental Program Consultant
CONTACT'S ROLE originator

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[Hide Resource Maintenance ▲](#)

Resource Constraints ►

LEGAL CONSTRAINTS

LIMITATIONS OF USE

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SECURITY CONSTRAINTS

CLASSIFICATION unclassified
CLASSIFICATION SYSTEM None

LIMITATIONS OF USE

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CONSTRAINTS

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[Hide Resource Constraints ▲](#)

Spatial Reference ►

ARCGIS COORDINATE SYSTEM

- * TYPE Projected
- * GEOGRAPHIC COORDINATE REFERENCE GCS_North_American_1983

* PROJECTION NAD_1983_StatePlane_North_Carolina_FIPS_3200_Feet

* COORDINATE REFERENCE DETAILS

PROJECTED COORDINATE SYSTEM

WELL-KNOWN IDENTIFIER 102719
X ORIGIN -121841900
Y ORIGIN -93659000
XY SCALE 3048.0060960121918
Z ORIGIN -100000
Z SCALE 10000
M ORIGIN -100000
M SCALE 10000
XY TOLERANCE 0.0032808333333333331
Z TOLERANCE 0.001
M TOLERANCE 0.001
HIGH PRECISION true
LATEST WELL-KNOWN IDENTIFIER 2264

WELL-KNOWN TEXT

PROJCS["NAD_1983_StatePlane_North_Carolina_FIPS_3200_Feet",GEOGCS["GCS_North_American_1983",DATUM["D_North_American_1983",SPHEROID["GRS_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Lambert_Conformal_Conic"],PARAMETER["False_Easting",2000000.002616666],PARAMETER["False_Northing",0.0],PARAMETER["Central_Meridian",-79.0],PARAMETER["Standard_Parallel_1",34.33333333333334],PARAMETER["Standard_Parallel_2",36.16666666666666],PARAMETER["Latitude_Of_Origin",33.75],UNIT["Foot_US",0.3048006096012192],AUTHORITY["EPSG",2264]]

REFERENCE SYSTEM IDENTIFIER

VALUE 2264
* CODESPACE EPSG
* VERSION 6.12(9.0.0)

[Hide Spatial Reference ▲](#)

Spatial Data Properties ►

VECTOR ►

* LEVEL OF TOPOLOGY FOR THIS DATASET geometry only

GEOMETRIC OBJECTS

FEATURE CLASS NAME CarolinaMadtomPotentialHabitat
* OBJECT TYPE composite
* OBJECT COUNT 22229

[Hide Vector ▲](#)

ARCGIS FEATURE CLASS PROPERTIES ►

FEATURE CLASS NAME CarolinaMadtomPotentialHabitat
* FEATURE TYPE Simple
* GEOMETRY TYPE Polygon
* HAS TOPOLOGY FALSE
* FEATURE COUNT 22229
* SPATIAL INDEX TRUE
* LINEAR REFERENCING FALSE

[Hide ArcGIS Feature Class Properties ▲](#)

[Hide Spatial Data Properties ▲](#)

Data Quality ▶

SCOPE OF QUALITY INFORMATION ▶
RESOURCE LEVEL **dataset**

Hide Scope of quality information ▲

DATA QUALITY REPORT - COMPLETENESS OMISSION ▶
MEASURE DESCRIPTION

After processing, the dataset is checked for drawing display and number of records and file sizes compared with source materials.

CONFORMANCE TEST RESULTS
TEST PASSED **Yes**
RESULT EXPLANATION
Pass

PRODUCT SPECIFICATION ▶
TITLE **NCDOT Geospatial Data Specifications**
CREATION DATE **2019-10-01 00:00:00**
PUBLICATION DATE **2021-06-17 00:00:00**

Hide Product specification ▲

Hide Data quality report - Completeness omission ▲

DATA QUALITY REPORT - CONCEPTUAL CONSISTENCY ▶
MEASURE DESCRIPTION

The dataset is converted to file geodatabase (FGDB) format using tools in ArcGIS. The geometry is checked, and if needed repaired

CONFORMANCE TEST RESULTS
TEST PASSED **Yes**
RESULT EXPLANATION
Pass

PRODUCT SPECIFICATION ▶
TITLE **NCDOT Geospatial Data Specifications**
CREATION DATE **2019-10-01 00:00:00**
PUBLICATION DATE **2021-06-17 00:00:00**

Hide Product specification ▲

Hide Data quality report - Conceptual consistency ▲

DATA QUALITY REPORT - QUANTITATIVE ATTRIBUTE ACCURACY ►

MEASURE DESCRIPTION

In addition to direct species observations, expert judgments of habitat conditions (Potential Habitat versus Non-Habitat) were gathered through desktop and field rapid site assessments.

Species experts provided feedback at two stages of model development. An early draft model was reviewed in ArcGIS Online. Completed via a desktop application, experts could scan and zoom to provide feedback on model performance based on their regional knowledge and any data layers they chose to add and view. Experts entered desktop assessments as high precision points (e.g., "this location is habitat or non-habitat") and/or low precision polygons (e.g., "this region generally provides good habitat or nonhabitat). After further development, an improved model received field validation. Field validation consisted of a rapid visual site assessment to judge a stream segment as Potential Habitat versus Non-Habitat based on evidence of stream condition and, in some cases, observation of associated species. All field validation reviews were entered as highprecision line features denoting the stream section observed.

In both reviews, time, knowledge, and/or access limitations prevented a true randomized design, but experts attempted to maximize the distribution of feedback spatially and across performance categories (True and False Positives, True and False Negatives) and to target areas with high uncertainty (high variance among models). Judgments vary in their spatial precision, including both polygons (low precision) and points and lines (high precision). Experts' judgments identify some non-habitat locations, but these are in the minority.

To ensure a balanced sample, additional catchments were randomly drawn as needed from the background (No Data catchments) to serve as pseudoabsence. Pseudoabsence catchments are unsurveyed catchments modeled treated as absence sites for the purposes of defining absence (versus presence) habitat characteristics.

CONFORMANCE TEST RESULTS

TEST PASSED Yes

RESULT EXPLANATION

Pass

PRODUCT SPECIFICATION ►

TITLE NCDOT Geospatial Data Specifications

CREATION DATE 2020-10-01 00:00:00

PUBLICATION DATE 2021-06-17 00:00:00

[Hide Product specification ▲](#)

[Hide Data quality report - Quantitative attribute accuracy ▲](#)

[Hide Data Quality ▲](#)

Lineage ►

LINEAGE STATEMENT

All species' models use occurrence data from the Natural Heritage Program (NHP Tier 2 data) and the NC Wildlife Resource Commission (NCPAWS data). Species occurrence observations identified as historic (extirpated) or older than 2000 are excluded from models, as are data with low spatial accuracy (e.g., NHP Accuracy "4-Low" or "5-Very Low"). NHP "3-Medium" accuracy observations were retained and labelled as Low precision and NHP 2-High and 1-Very High accuracy observations as

High precision data. The occurrence data are presence-only and are not a randomized or representative sample from the species' range. Models score any catchment with a current, moderate to high precision occurrence as "Potential Habitat".

Often multiple data records fell within a single catchment. For the purposes of modeling, to avoid pseudo-replication, duplicates were removed; each catchment was scored as potential habitat or non-habitat. Where a single catchment contained records of both potential habitat and non-habitat (OBSERVATION SET = "Conflict"), it was scored as habitat. Based on these decisions, the final model predicts the probability of any habitat within the catchment rather than the abundance of habitat within the catchment. With the available observation data (including pseudoabsence) 178 of the 12231 catchments were classified within the species expert delineated model range.

The environmental data attributes included variables drawn from the US EPA StreamCat and the NHD Plus V2 data. From the available StreamCat data, 87 raw data variables plus 12 indices were extracted. The raw data variables primarily described local catchment characteristics across a spectrum of land cover, climatic, physiographic, hydrologic, chemical, geological, and disturbance metrics. A few of these variables provided data at finer (riparian only) and coarser (all upstream watershed area) scales. The 12 indices (six for the local catchment and six for the entire upstream watershed area) were calculated values summarizing multiple raw variables to represent the quality of aquatic habitat conditions.

PROCESS STEP ►
DESCRIPTION

Geodatabase was forwarded on to the GIS Unit for publishing as part of data for project ATLAS.

PROCESS CONTACT

ORGANIZATION'S NAME North Carolina Department of Transportation - EAU Mitigation and Modeling Unit
CONTACT'S POSITION Environmental Program Consultant
CONTACT'S ROLE point of contact

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[Hide Process step ▲](#)

PROCESS STEP ►
DESCRIPTION

Data was reviewed in ESRI's Data Reviewer tool to verify geometry.

PROCESS CONTACT

ORGANIZATION'S NAME North Carolina Department of Transportation - EAU Mitigation and Modeling Unit
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CONTACT'S ROLE point of contact

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PROCESS STEP ►
DESCRIPTION

Random Forest models were used to predict the probability of habitat at the scale of USGS National Hydrography Data (NHD Plus V2) catchments and their associated stream segments (median area: 272 acres; 5th and 95th percentile area: 4 acres and 1541 acres). Random Forest models generate predictions through repeated construction of decisiontree style models. At multiple points during model construction and assessment, the random forest process draws a random subset of habitat and non-habitat data and selects a random subset of the environmental variables by which to compare them.

This randomization is beneficial to reduce overfitting of the models. The model procedure tracks
(1) how frequently sites are predicted to be habitat vs non-habitat,
(2) which variables contributed most to accurate classification of habitat vs non-habitat sites, and
(3) overall statistics about model performance.

The models were run in R primarily using functions from the randomForest and rfUtilities packages. Multiple random forest models were run, each initiated with a different suite of environmental (predictor) and habitat/non-habitat (response) data. Models meeting minimum performance criteria were averaged to produce a single predicted probability of habitat per catchment. These model suites included six core models, plus two additional models if associate species had been defined. "Full Set" refers to models initiated with the 87 raw environmental variables from StreamCat plus the NHD Plus environmental variables, while the "Index Set" refers to models initiated with StreamCat's 12 calculated condition indices plus NHD Plus environmental variables. For the response variable, models

were run with all species observations and expert judgments ("All Habitat Data"), run with only the verified target species observations ("No Reviewer Habitat Data"), run with only the high precision observations (excluding large generalized polygons from reviewer and observation sets) ("No Low Precision Data"), and run with all habitat data for the target species plus the current, high precision observations of associate species ("Plus Associates" for species with expert identified associates).

- Full Set, All Habitat Data
- Index Set, All Habitat Data
- Full Set, No Reviewer Habitat Data
- Index Set, No Reviewer Habitat Data
- Full Set, No Low Precision Habitat Data
- Index Set, No Low Precision Habitat Data
- Full Set, Plus Associate Species Data
- Index Set, Plus Associate Species Data

The inclusion of reviewer data, low precision data, and/or associate species data did not always improve the models. Model statistical scores could be high, indicating good fit to available data, but fail to match experts' expectations based on knowledge of regional habitat variability. Also, low precision comments (large polygons) often included mixed habitat, introducing more noise than signal to the training data. Throughout the analysis, aattemp was made to balance consideration of both statistical and expert assessment.

Statistics to evaluate model performance:

- Sensitivity (SENS): The proportion of known habitat correctly identified as Potential Habitat (true positive rate).
- Specificity (SPEC): The proportion of known non-habitat (including pseudoabsence) correctly identified as Non-Habitat (true negative rate).
- Area Under the Curve (AUC): A summary of overall model performance based on both sensitivity and specificity.
- Cohen's Kappa (KAPPA): A summary of overall model performance based on performance relative to a random classification.

Individual models were accepted and carried forward if they achieved values of 0.6 or greater for sensitivity, specificity, and area under the curve. For this species, the models accepted and averaged to produce the final map and statistics were: FullSetNoRev,

All statistical values are to be interpreted with caution as each has unique limitations. The most informative statistic depends on the intended application and the nature of the underlying data.

PROCESS CONTACT

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CONTACT'S POSITION Environmental Program Consultant
CONTACT'S ROLE point of contact

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[Hide Process step ▲](#)

[Hide Lineage ▲](#)

Distribution ►

DISTRIBUTOR ►

CONTACT INFORMATION

ORGANIZATION'S NAME North Carolina Department of Transportation - EAU Mitigation and Modeling Unit
CONTACT'S POSITION Environmental Program Consultant
CONTACT'S ROLE distributor

CONTACT INFORMATION ►

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[Hide Distributor ▲](#)

DISTRIBUTION FORMAT

* NAME File Geodatabase Feature Class

VERSION 10.5

[Hide Distribution ▲](#)

Fields ►

DETAILS FOR OBJECT [CarolinaMadtomPotentialHabitat](#) ►

* TYPE Feature Class

* ROW COUNT 22229

DEFINITION

High, moderate and low potential habitat locations for Atlantic Pigtoe in NC counties.

DEFINITION SOURCE

NCDOT

FIELD OBJECTID ►

ALIAS OBJECTID

* DATA TYPE OID

* WIDTH 4

* PRECISION 0

* SCALE 0

* FIELD DESCRIPTION

Internal feature number.

* DESCRIPTION SOURCE

Esri

* DESCRIPTION OF VALUES

Sequential unique whole numbers that are automatically generated.

Hide Field OBJECTID ▲

FIELD Shape ►

* ALIAS Shape

* DATA TYPE Geometry

* WIDTH 0

* PRECISION 0

* SCALE 0

* FIELD DESCRIPTION

Feature geometry.

* DESCRIPTION SOURCE

Esri

* DESCRIPTION OF VALUES

Coordinates defining the features.

Hide Field Shape ▲

FIELD Mean ►

* ALIAS Mean

* DATA TYPE Double

* WIDTH 8

* PRECISION 0

* SCALE 0

FIELD DESCRIPTION

Multiple random forest models were created using different data selection criteria (eg include or exclude low precision points, include or exclude reviewer desktop judgments, use raw environmental variables or composite indices, etc). Each model outputs a probability of suitable habitat value. Using all models passing statistical tests (>.6 for sensitivity, specificity, and Area under ROC Curve) Mean and Standard Deviation were calculated.

Based on the mean, the thresholds for the bins (Low, Moderate, High probability) were calculated.

DESCRIPTION SOURCE

NCDOT

[Hide Field Mean ▲](#)

FIELD SD ►

ALIAS StandardDeviation

* DATA TYPE Double

* WIDTH 8

* PRECISION 0

* SCALE 0

FIELD DESCRIPTION

Multiple random forest models were created using different data selection criteria (eg include or exclude low precision points, include or exclude reviewer desktop judgments, use raw environmental variables or composite indices, etc). Each model outputs a probability of suitable habitat value. Using all models passing statistical tests (>.6 for sensitivity, specificity, and Area under ROC Curve) Mean and Standard Deviation were calculated.

DESCRIPTION SOURCE

NCDOT

[Hide Field SD ▲](#)

FIELD Shape_Length ►

* ALIAS Shape_Length

* DATA TYPE Double

* WIDTH 8

* PRECISION 0

* SCALE 0

* FIELD DESCRIPTION

Length of feature in internal units.

* DESCRIPTION SOURCE

Esri

* DESCRIPTION OF VALUES

Positive real numbers that are automatically generated.

[Hide Field Shape_Length ▲](#)

FIELD Shape_Area ►

* ALIAS Shape_Area

* DATA TYPE Double

* WIDTH 8

* PRECISION 0

* SCALE 0

* FIELD DESCRIPTION

Area of feature in internal units squared.

* DESCRIPTION SOURCE

Esri

* DESCRIPTION OF VALUES

Positive real numbers that are automatically generated.

[Hide Field Shape_Area ▲](#)

FIELD PotHabitat ►

* ALIAS PotHabitat

* DATA TYPE String

* WIDTH 25

* PRECISION 0

* SCALE 0

FIELD DESCRIPTION

Model Output - Low, Moderate or High potential habitat

DESCRIPTION SOURCE

NCDOT

LIST OF VALUES

VALUE Low

DESCRIPTION Low probability of Habitat

ENUMERATED DOMAIN VALUE DEFINITION SOURCE NCDOT

VALUE Mod

DESCRIPTION Moderate probability of Habitat

ENUMERATED DOMAIN VALUE DEFINITION SOURCE NCDOT

VALUE High

DESCRIPTION High probability of Habitat

ENUMERATED DOMAIN VALUE DEFINITION SOURCE NCDOT

VALUE No data

DESCRIPTION No data available within USFWS area for species

ENUMERATED DOMAIN VALUE DEFINITION SOURCE NCDOT

[Hide Field PotHabitat ▲](#)

[Hide Details for object CarolinaMadtomPotentialHabitat ▲](#)

[Hide Fields ▲](#)

Metadata Details ►

METADATA LANGUAGE English (UNITED STATES)

METADATA CHARACTER SET utf8 - 8 bit UCS Transfer Format

SCOPE OF THE DATA DESCRIBED BY THE METADATA dataset

SCOPE NAME * dataset

* LAST UPDATE 2024-01-26

ARCGIS METADATA PROPERTIES

METADATA FORMAT ArcGIS 1.0

STANDARD OR PROFILE USED TO EDIT METADATA ISO19139

METADATA STYLE ISO 19139 Metadata Implementation Specification

CREATED IN ARCGIS FOR THE ITEM 2024-02-01 14:09:54
LAST MODIFIED IN ARCGIS FOR THE ITEM 2024-01-26 19:12:58

AUTOMATIC UPDATES

HAVE BEEN PERFORMED Yes
LAST UPDATE 2024-01-26 19:12:58

ITEM LOCATION HISTORY

ITEM COPIED OR MOVED 2022-01-13 14:35:25
TO
\\cltmain\GIS_DATA\GIS\Projects\3322_NCDOT\10077103_ModelingAssistance\7.2_Work_In_Progress\spatial\ECOS Species Data\Consultation_Range_WIP\Combined\IPAC_All_20211210Copy
FROM
\\cltmain\GIS_DATA\GIS\Projects\3322_NCDOT\10077103_ModelingAssistance\7.2_Work_In_Progress\spatial\ECOS Species Data\Consultation_Range_WIP\Combined\IPAC_All_20211210

[Hide Metadata Details ▲](#)

Metadata Contacts ►

METADATA CONTACT

ORGANIZATION'S NAME North Carolina Department of Transportation - EAU Mitigation and Modeling Unit
CONTACT'S POSITION Environmental Program Consultant
CONTACT'S ROLE point of contact

CONTACT INFORMATION ►

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ADMINISTRATIVE AREA NC
POSTAL CODE 27610
COUNTRY US
E-MAIL ADDRESS ATLAS@ncdot.gov

HOURS OF SERVICE

9:00am – 5:00pm Monday - Friday

CONTACT INSTRUCTIONS

Please send an email with any issues, questions or comments regarding the ATLAS Data Search Tool, ATLAS Screening Tool or ATLAS Workbench. If it is an immediate need, please call the contact number or indicate as such in the subject line in an email.

[Hide Contact information ▲](#)

[Hide Metadata Contacts ▲](#)

Metadata Maintenance ►

MAINTENANCE

UPDATE FREQUENCY as needed

OTHER MAINTENANCE REQUIREMENTS

Maintenance of this dataset is handled by the Environmental Analysis Unit (EAU) Mitigation and Modeling Unit. Support and maintenance of the enterprise spatial database where this data resides is handled by NCDIT's Transportation GIS Unit.

MAINTENANCE CONTACT

ORGANIZATION'S NAME North Carolina Department of Transportation - EAU Mitigation and Modeling Unit
CONTACT'S POSITION Environmental Program Consultant
CONTACT'S ROLE originator

CONTACT INFORMATION ►

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[Hide Contact information ▲](#)

[Hide Metadata Maintenance ▲](#)

Metadata Constraints ►

SECURITY CONSTRAINTS

CLASSIFICATION unclassified

CLASSIFICATION SYSTEM None

LIMITATIONS OF USE

The North Carolina Department of Transportation shall not be held liable for any errors in this metadata. This includes errors of omission, commission, errors concerning the content of the data, and relative and positional accuracy of the data. This data cannot be construed to be a legal document. Primary sources from which this data was compiled must be consulted for verification of information contained in this data. Datasets developed under Project ATLAS do not replace any NRTR work for future projects and may not be used as a replacement for site visits / field surveys by qualified professionals and hence should be used only as a supporting platform for decision making. Use of this dataset for project scoping or screening is merely pre-decisional.

CONSTRAINTS

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[Hide Metadata Constraints ▲](#)