MODEL REVIEW PLAN

RED COCKADED WOODPECKER HABITAT SUITABILITY INDEX MODEL

and

PINE WARBLER HABITAT SUITABILITY INDEX MODEL

ST. TAMMANY PARISH, LA FEASIBILITY STUDY

New Orleans District

October 2022

US Army Corps
of Engineers ®

Model Review Plan

Red Cockaded Woodpecker Habitat Suitability Index Model
and
Pine Warbler Habitat Suitability Index Model Spreadsheet Calculator

USACE, New Orleans District

1. Purpose

The purpose of this Model Review Plan is to outline the review process and requirements necessary to assure the quality of the Red Cockaded Woodpecker Habitat Suitability Index (HSI) model and the Pine Warbler HSI model spreadsheet calculator as submitted by the New Orleans District to the Ecosystem Restoration National Planning Center of Expertise (ECO-PCX) in support of the approval for regional use of the models. The review will consist of an evaluation of the technical quality, system quality, and usability of the models, as well as their conformance with current Corps policy. The review will be managed by the ECO-PCX in accordance with EC 1105-2-412, Assuring Quality of Planning Models. The review team will document the review process and provide an assessment of the technical quality, system quality, and usability of the models.

2. Reference and Guidance

2.1. Engineer Circular 1105-2-412, Assuring Quality of Planning Models, 31 March 2011.

2.2. US Army Corps of Engineers. Assuring Quality of Planning Models - Model Certification/Approval Process: Standard Operating Procedures. February 2012.

3. Background

The St. Tammany Parish, Louisiana Feasibility Study for flood damage reduction includes all of St. Tammany Parish in southeastern Louisiana. St. Tammany Parish has experienced repeated, widespread flooding from both rainfall and coastal storm flood events (i.e., riverine bank overtopping, high tides, waves, drainage, and storm surge) including historic flood impacts during Hurricane Katrina (August 2005) and the flood of August of 2016. The proposed action includes the construction and operation of a total of approximately 18.4 miles of a hurricane and storm damage risk reduction levee and floodwall, eight pump stations, eighteen vehicular/pedestrian/railroad floodgates, eleven ramps, thirteen sluice/lift gates 2.15 miles of channel improvements to Mile Branch in Covington, and nonstructural home elevations and floodproofing for eligible structures in the Parish. The proposed action would reduce flood risk to approximately 15,800 structures in the study area.

The Red Cockaded Woodpecker HSI model was developed by Tirpak et al. (2009). The model consists of eight variables: landform, landcover, successional age class, forest patch size, pine basal area, hardwood basal area, connectivity, and large pine density. The original model was developed to be applicable in the Central Hardwoods and West Gulf Coast Plain Bird Conservation Regions (Tirpak et al. 2009). New Orleans District proposes expanding this range (Smith, 2022) to include open pine ecosystems in the Gulf Coastal Plains based on information in Nordman et al. 2016. The St. Tammany Parish study team developed a spreadsheet calculator to reflect the variables and calculations of the Tirpak et al (2009) model.

The Pine Warbler HSI model spreadsheet calculator is based on the 1982 Fish and Wildlife Service Pine Warbler HSI model (Schroeder 1982). The model was developed to evaluate pine warbler breeding season habitat in deciduous and evergreen forests within the entire breeding range of the pine warbler in the eastern United States. The model includes three habitat variables: percent tree canopy closure of overstory pines, successional stage of stand, and percent of dominant canopy pines with deciduous understory in the upper one-third layer. The St. Tammany Parish study team developed the spreadsheet calculator to reflect the variables and calculations of the 1982 pine warbler model.

4. Documentation Provided by Proponent

4.1. Model Technical Documentation

- Tirpak, J.M., D.T. Jones-Farrand, F.R. Thompson III, D.J. Twedt, W.B. Uihlein III. 2009. Multiscale Habitat Suitability Index Models for Priority Landbirds in the Central Hardwoods and West Gulf Coastal Plain/Ouachitas Bird Conservation Regions. USDA General Technical Report NRS-49.
- Nordman, C., R. White, R. Wilson, C. Ware, C. Rideout, M. Pyne, C. Hunter. 2016. Rapid Assessment Metrics to Enhance Wildlife Habitat and Biodiversity within Southern Open Pine Ecosystems. Version 1.0. U.S. Fish and Wildlife Service and NatureServe, for the Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative. March 31, 2016.
- Schroeder, R.L. 1982. Habitat suitability index models: pine warbler. U.S. Department of the Interior, Fish and Wildlife Service. FWS/OBS-82/10.28. 8pp.
- Model Application Spreadsheet – Red Cockaded Woodpecker
- Model Application Spreadsheet – Pine Warbler
- Smith, P. 2022. Red Cockaded Woodpecker Geographical Range of Applicability for USACE Civil Works Projects.

4.2. Model User Documentation

- Model user documentation has been included in the technical documentation listed above.

4.3. Model QA/QC Documentation/Activities

- No specific QA/QC documentation exists at this time.

5. Type/Scope of Review

Per EC-1105-2-412, 31 March 2011, the ECO-PCX recommends an Intermediate review, which is applicable to models of lesser complexity with lower risks of making an incorrect investment decision that could result in minimum impacts.

The following language defines the scope of the review and will be provided to the model reviewers.

5.1. Preliminary charge for reviewers

Input is being sought to help the US Army Corps of Engineers ECO-PCX determine the degree to which the subject models can be described as technically sound relative to their design objectives. In addition to the underlying theory, conceptualization, and computational aspects of the model, reviewers are asked to comment on aspects of the model that potentially affect its usability and reliability as a potential producer of information to be used to influence planning decisions.

While the specific review questions included below are intended to prompt the reviewer for information specific to the efforts to Approve for Regional Use, please feel free to offer comments believed relevant and appropriate to any elements of the technical quality and usability of the models as documented in the provided review materials. Accordingly, please provide responses to the sought scientific and technical topics listed below and perform a broad review of the models focusing on your areas of expertise, experience, and technical knowledge. Listed below are the model review charge questions.

5.1.1. Policy Review

1. Comment on the degree to which the model is able to accommodate climate change scenarios consistent with USACE inland hydrology guidance in Civil Works studies, designs, and projects (ECB 2018-14), and incorporating sea level rise scenarios, as appropriate.
2. Comment on the degree to which the model is consistent with USACE policies and accepted procedures for ecosystem restoration and mitigation planning.

5.1.2. Technical Quality

3. Does the model documentation include clear and precise description for the focus of the model? Discussion may include, but is not limited to geographic range, applicability limits, model domain, or boundary conditions.
4. Are the intended uses of the model defined, clear, and appropriate?
5. Are the spatial and temporal resolutions of the model described appropriately?
6. Are interpretations and conclusions sound, justified by the data and consistent with the objectives?
7. Are the assumptions and limitations of the model clearly communicated and supported?
8. Comment on the degree to which the model can be used as a tool to forecast conditions anticipated to occur during the period of analysis.
9. Does the model documentation sufficiently include a precise question or hypothesis and an appropriate underlying theoretical framework?
10. Are the most sensitive parameters or factors of the model identified and supported with sensitivity analyses?
11. Are the model variables, functions, and parameters clearly defined and dimensionalized, preferably in table format?
12. Is the organization of the model documentation satisfactory (e.g., no discussion in Results)?
13. Comment on the degree to which the model facilitates sensitivity, uncertainty, and risk analyses.
14. Comment on the degree to which the model is appropriate for use in the proposed area of geographic applicability.

5.1.3. System Quality

15. Are model computations presented in sufficient detail and ecologically relevant?
16. Does the model documentation sufficiently describe testing steps utilized during model development (i.e., consistency check, sensitivity analyses, calibration, validation)?
17. Has the model programming system been tested for errors? If not, what is the potential for errors to occur?
18. Does the model inform users of erroneous or inappropriate inputs or outputs?

5.1.4. Usability

19. What are the hardware, software, and operating system requirements of the model? To what degree can the hardware, software, and operating system requirements complicate use of the model?
20. Is user documentation user friendly and complete? Comment on the model's ease of use.
21. Are the input requirements evident to the user? Is the data readily available?
22. Is the required level of precision and accuracy of inputs documented?

6. Description of Tasks.

The model review tasks are:

6.1. **Model Review Plan Development.** This model review plan is being developed specifically to manage the independent model review.

6.2. **Conduct Review of Models.** The reviewers will assess the model using all documentation provided by the model proponent and the ECO-PCX. Reviewers will provide comments using the provided comment response template and should follow a four-part structure to include: 1) the review concern, 2) the basis for the concern (reviewer should note if the comment relates to technical quality, system quality, or usability), 3) the significance/impact of the concern, and 4) the probable specific action needed to resolve the concern.

6.3. **Meeting to Discuss Review Results.** The model review team will meet with the ECO-PCX and model proponent to discuss initial review comments and recommendations and outline a plan for resolution. The model proponent will coordinate with the ECO-PCX regarding whether responses are necessary. Responses may include agreement/disagreement with any part of the comment and rationale, and any actions or changes to the model that the proponent will make. The ECO-PCX and model proponent will provide responses to the comments back to the reviewers. The reviewers should backcheck proponent responses.

6.4. **Proponent and ECO-PCX Summary.** Based on the review comments, the ECO-PCX will identify actions or modifications the proponent needs to undertake in order to gain a recommendation for approval. The ECO-PCX will close-out the review when it determines identified issues have been resolved to its satisfaction.

6.5. **ECO-PCX Recommendation Package Development.** The ECO-PCX Model Review Manager compiles a model approval or certification recommendation package for the ECO-PCX Operating Director. The recommendation package should be provided to the Operating Director in an email from the Model Review Manager.

The model recommendation package should include the model review plan, model documentation, comments, comment resolution, a copy of the model software or spreadsheet, as appropriate, and two draft memos.

a) The first draft memo is prepared for the signature of the ECO-PCX Operating Director to transmit the model recommendation to the ECO-PCX Director.

b) The second draft memo is prepared for the signature of the ECO-PCX Director to transmit the model approval or model certification to the District Commander.

6.6. **ECO-PCX Operating Director Review.** The Operating Director of the ECO-PCX reviews the model recommendation package. Any comments on the model review and recommendation should be resolved between the Operating Director and the model review team. Once comments are resolved, the ECO-PCX Operating Director signs a memo to the ECO-PCX Director recommending model approval or model certification under one of the delegated authorities.

The memo should be provided by email from the ECO-PCX Operating Director to the ECO- PCX Director with copies furnished to the ECO-PCX Model Review Manager and the ECO- PCX Account Manager for the MSC where the study is being conducted.

6.7. **ECO-PCX Director Approval.** The ECO-PCX Director reviews the model recommendation package. The Director may request additional information or direct further review as needed prior to signing the memo. If the Director agrees with the recommendation, a memo should be signed documenting the approval/certification. The signed memo is then emailed back to the Operating Director for distribution and record keeping.

6.8. **Approval Memo Distribution.** The ECO-PCX Operating Director distributes the model approval/certification memo by email to the model review team, the model review manager, the home MSC and the Project Delivery Team. After distribution the memo should be filed with the model review documentation in the ECO-PCX electronic files.

6.9. **Model Library Update.** A copy of the model and all relevant documentation will be uploaded onto the Ecosystem Restoration Model Library. The library is housed on the IWR APT site.

7. Review Team Composition

The ECO-PCX proposes review of the model documentation and supporting literature. The review will address all technical quality, system quality and usability certification criteria, including the criteria regarding whether the model properly incorporates Corps policies and accepted procedures.

The ECO-PCX proposes to use reviewers within USACE with the following expertise:

- ECO-PCX Model Review Manager – The review manager will be responsible for facilitation of the model review process through recommendation of the model to the ECO-PCX Operating Director.

- Ecologist – the reviewer should be a senior-level biologist and must have expertise relevant to southeastern U.S. ecology.

- Spreadsheet Modeling Specialist – the reviewer should have expertise in MS Excel and knowledge of habitat suitability index model application within the MS Excel framework.

8. Schedule

The following is a draft schedule for the model review. Revisions to the model to address model deficiencies will require adjustments to the schedule below.

Initial Kick-off Meeting/Begin Model Review	October 2022
Interim Review Teleconference	As needed
Complete Model Review	October 2022

Model Proponent Evaluations Submitted to ECO-PCX	November 2022
Reviewers' Backchecks to ECO-PCX	November 2022
Final Model Comment Response Record	November 2022
ECO-PCX Recommendation Package	December 2022

9. Cost

Estimated cost to complete each level of review is:

Ecologist (Jacob Jung)	$3,000
Spreadsheet Modeling Specialist (Evan Hill)	$2,000
ECO-PCX Model Review Manager (Kip Runyon)	$6,000
Total:	$11,000

10. Points of Contact

ECO-PCX Point of Contact:	Greg Miller	504-481-9683
ECO-PCX Model Review Manager:	Kip Runyon	314-331-8396
Model Proponent Point of Contact:	Patrick Smith	504-862-1583