Model Certification/Approval Review

Comment and Evaluation Responses

Multiscale Habitat Suitability Index Models for Priority Landbirds in the Central Hardwoods and West Gulf Coastal Plain/Ouachitas Bird Conservation Regions: Red-cockaded Woodpecker

May/2023

Comment #1
The Habitat Suitability Index (HSI) model developed by Tirpak et al. (2009) is one of 40 models developed for priority bird species in the Central Hardwoods and West Gulf Coastal Plains regions of the southeastern United States. This review focuses exclusively on the Red-cockaded Woodpecker (RCW) and its determination as a suitable model recommended for model certification for use by the U.S. Army Corps of Engineers (USACE) in evaluating current habitat conditions for pine forest habitats where it occurs.
Relevant Assessment Criteria
Technical Quality: Highly functional model for assessing habitat suitability for RCW in pine-dominated habitats. System Quality: Model is easy to understand and interpret with metrics clearly defined for measuring/obtaining data for each variable.
Basis for Comment
The model clearly defines the parameters and methods for determining the HSI score for the 40 priority species. Most importantly, the models have been both verified and validated as defined in the report for most species including the RCW. In addition, these models have been peer-reviewed and accepted into the Journal of Wildlife Management, a highly-regarded journal within the wildlife field and shared with the 2006 Proceedings of the Eighth Annual Forest Inventory and Analysis Symposium. While the metrics within this model appear to perform well and have been verified and validated for determining the HSI, it is strictly related to habitat for RCW. Consideration of incorporating additional HSI models to better evaluate pine ecosystem would better inform overall habitat needs for a variety of species such as those that inhabit the shrub or grassland habitats in the understory.
Significance – Medium
Consider using multiple HSI models that better represent the entire pine-dominated ecosystem that includes assessment of the understory.
Recommendation for Resolution
Models for species such as Northern Bobwhite would better assess a primarily herbaceous understory while pine forests that contain shrubby understories would be captured with models for species such as Prairie Warblers. Other species such as Brown-headed Nuthatch or Bachman's Sparrow may also be useful in assessing the overall pine ecosystem. Alternatives in the future may consider modification of the Field Manual for Rapid Assessment Metrics for Wildlife and Biodiversity in Southern Open Pine Ecosystems 2016 (Appendix C) by White and Nordman.

USACE Evaluator Response
__X__Concur _____Non-Concur The model proponents agree that multiple HSI models is a better approach than the RCW HSI alone. For the St. Tammany Study, the Pine Warbler HSI would be used in addition to the RCW HSI to assess Project impacts. The CEMVN and USFWS are actively seeking funding to develop an ecosystem model for pine savannah habitat(s) that would take an ecosystem approach and consider the entire biological community as well as other ecosystem functions and services. We acknowledge the importance of the herbaceous layer and herbaceous layer variable(s) would be included in this model when it is developed in PED. The current long-term ecosystem modeling plan for this Study is to require a community model to assess impacts during the Pre-Construction Engineering and Design (PED) phase; if one is not available at the beginning of PED, the CEMVN would develop one through coordination with USFWS and other experts (e.g., ERDC). We have reviewed the information in White and Norman (2016) and would use it to help develop this model during PED. We would re-engage the ECO-PCX early in the planning process for this community model.
Reviewer BackCheck Response
Based on the evaluator response above, the panel provides the following response: __X__Concur ____Non-Concur

Comment #2
The RCW HSI model is applicable across a large geographic area where open pine ecosystems occur, primarily that of the southeastern United States; therefore, consideration should be considered at the regional scale for model certification.
Relevant Assessment Criteria
Usability and/or Policy- This model meets the necessary requirements to evaluate RCW habitat in open pine ecosystems not only in the geographic regions where it was initially developed, but also other areas in the southeastern U.S. where these habitats occur. The criteria (parameters within the model) are comparable throughout the Southeast, with other subject matter experts (SME) in agreement for its broader use outside of the Central Hardwoods and West Gulf Coastal Plain regions (see Attachment 3 from John Tirpak).
Basis for Comment
The justification for including open pine forest habitats throughout the entire southeastern U.S. for use with the RCW HSI model on USACE projects is supported by peer-reviewed literature (e.g. Nordman et al. 2016) as well as correspondence from SMEs. Additional support can be providing by examining the overlap of other species such as Bachman's Sparrow, Pine Warbler, and Brown-headed Nuthatch that are dependent on pine ecosystems throughout the Southeast, as well as other species that commonly occupy these open pine ecosystems (e.g. Northern Bobwhite, Prairie Warbler). The prevalence for all of these species to use pine ecosystem regardless of pine species or where they occur throughout the Southeast further supports incorporating the use of the model beyond only the Central Hardwoods and West Gulf Coastal Plain/Ouachitas.
Significance – High
Incorporating the RCW HSI model as a certified model for evaluating open pine ecosystems throughout the entire Southeast as a regional model will have a high impact by providing multiple USACE projects the ability to assess pine-dominated systems.
Recommendation for Resolution
Recommend model for certification by the U.S. Army Corps of Engineers at the regional scale throughout the entire Southeast.
USACE Evaluator Response
__X__Concur _____Non-Concur The model proponents agree that the geographical range of applicability of the RCW HSI should include areas beyond where the model was originally developed to include all southern open pine ecosystems within the Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative (Nordman et al., 2016). We were conservative in our draft determination of the geographical range of applicability and concur with the reviewer's recommendation to include all southern open pine ecosystems throughout the southeastern United States. The RCW HSI geographic range of applicability justification document has been updated to reflect this.

Reviewer BackCheck Response
Based on the evaluator response above, the panel provides the following response: __X__Concur ____Non-Concur

Comment #3
Future modification of SI2 (forest patch size) may be necessary to determine if there is a threshold for which maximum suitability to sustain the species occurs. Other SI metrics should also be reevaluated as additional research becomes available to better inform modifications of the HSI equation.
Relevant Assessment Criteria
Technical Quality: SI score currently based on best available science
Basis for Comment
SI2 is calculated according to research on home range size for RCW. While studies do provide for the maximum and minimum home range for the species, the maximum size does not always mean that patch size is most suitable given many additional factors that determine optimal habitat. For instance, once forest patch size reaches 80 ha, suitability of 1.0 may generally occur if other suitable conditions within the forest stand are met. The 170 ha forest patch size is documented in the literature as the largest home range size, but may not be necessary to achieve all life requisites. It may in fact be that 170 ha was needed because the overall forest stand was of low quality, thus a larger home range was required to meet needs. Likewise, a smaller home range size that incorporates high quality pine forest may still be of higher suitability than a larger home range that incorporates a lower quality patch of pine forest. Additional metrics within the SI equations should be modified according to the best available science. The model was developed according to past studies that reflect certain maximum and minimum ranges (e.g. forest patch size, density of large trees). As future research further refines these metrics throughout the RCW range, the algorithms should be adjusted and tested for improved model performance.
Significance – Low
Modify equation for SI score as data becomes available
Recommendation for Resolution
Based on current knowledge, I agree with current equation but as additional data becomes available to better inform what is truly optimal patch size, alterations to equation to determine the final HSI and SI2 (and other SI scores) should be adjusted.
USACE Evaluator Response
__X__Concur _____Non-Concur Concur. This model is currently seeking approval for regional use and should be updated in the future as new data becomes available or the state of the science advances.
Reviewer BackCheck Response
Based on the evaluator response above, the panel provides the following response: __X__Concur ____Non-Concur

Comment #4
Define all acronyms within spreadsheets
Relevant Assessment Criteria
Usability: Definition of acronyms needed for better meeting usability of spreadsheet
Basis for Comment
Some acronyms within the associated spreadsheet for calculating the HSI score are not defined such as FWP/FWOP (Future With/Without Project) and TY (Target Year).
Significance – Low
Defining acronyms will assist with HSI calculations
Recommendation for Resolution
Define all acronyms wherever first mentioned in spreadsheet or model assessment
USACE Evaluator Response
__X__Concur _____Non-Concur Spreadsheets have been updated and all acronyms have been defined.
Reviewer BackCheck Response
Based on the evaluator response above, the panel provides the following response: __X__Concur ____Non-Concur

Comment #5
Similar to Comment #1, this model focuses only on habitat suitability for RCW. RCW is considered to be an umbrella species with high quality RCW habitat also benefitting many other species that inhabit both the canopy as well as at the ground and mid-story. However, it may be beneficial to incorporate additional species that rely on other components of the forest not captured in the RCW or Pine Warbler model.
Relevant Assessment Criteria
Policy: Consideration for other species of wildlife or ecosystem models in habitat evaluation for which mitigation may be required to fully evaluate pine ecosystems.
Basis for Comment
The Red-cockaded Woodpecker is considered to be an umbrella species as well as a keystone species. This is in part because RCW habitat generally incorporates fire management to maintain the proper understory which benefits other species such as Northern Bobwhite or Prairie Warblers. I recommend considering additional models to fully assess the habitat quality of open pine ecosystems beyond RCW and Pine Warbler. In general, areas that are assessed as higher-quality based on the RCW HSI model are also likely to rank high for other species. However, it is possible to have lower quality pine habitats for RCW but that are still more suitable for other species inhabiting pine ecosystems. Incorporating additional species that require different components within a pine forest (e.g. snag density, canopy cover) will allow for a more ecosystem approach in the future.
Significance – Medium to High
Consideration for other models that incorporate other metrics for pine forests will improve overall ecosystem assessment
Recommendation for Resolution
Consider incorporating other models such as Northern Bobwhite, Bachman's Sparrow, Brown-headed Nuthatch, Prairie Warbler, or other species that frequent pine forest but are not necessarily dependent on exclusively pine habitats.
USACE Evaluator Response
__X__Concur _____Non-Concur The CEMVN and USFWS are actively seeking funding to develop an ecosystem model for pine savannah habitat(s). This model would take an ecosystem approach and consider the entire biological community as well as other ecosystem functions and services. The current long-term ecosystem modeling plan for this Study is to require a community model to assess impacts during the Pre-Construction Engineering and Design (PED) phase; if one is not available at the beginning of PED, the CEMVN would develop one through coordination with USFWS and other experts (e.g., ERDC). We would re-engage the ECO-PCX early in the planning process for this ecosystem model.
Reviewer BackCheck Response
Based on the evaluator response above, the panel provides the following response: __X__Concur ____Non-Concur

Comment #6
Suggestion rather than a concern. Following mitigation acreage determinations from model analyses, suggestions for reestablishing long-leaf pine stands as are feasible.
Relevant Assessment Criteria
Policy: USACE should strive, as is feasible, to comply with "America's Longleaf Restoration Initiative" when restoring open pine ecosystems
Basis for Comment
Long-leaf pines historically covered much of the coastal plains region of the Southeast. For project lands that occur within the historic native range of long-leaf pine, replanting of this species should be a priority. Consultation with a forester to determine feasibility and planting rates with optimal wildlife habitat in mind should be a goal. In addition to reforestation with long-leaf pine as is feasible, consideration for establishing native warm season grasses and other beneficial herbaceous plants (e.g. legumes) should also be a priority for replanting. Finally, a management plan that incorporates future management actions such as prescribed burning should be implemented with determination of which parties will be primarily responsible for continued management to promote and maintain optimal open pine habitats.
Significance – Medium
Restoration of longleaf pines should be a priority, but is not essential for pine ecosystem restoration as other species are used by pine-dependent species including RCW.
Recommendation for Resolution
See recommendations and references within America's Longleaf Restoration Initiative for additional benefits for reestablishment of longleaf pine ecosystems
USACE Evaluator Response
__X__Concur _____Non-Concur Concur. Restoration of longleaf pines is a priority for mitigation planning. Management of existing pine stands and plantings are a part of the mitigation plan. Longleaf pines would be considered before any other pine species if plantings are implemented. Longleaf pines would be the only pine species planted if practicable (e.g., if it is not cost prohibitive and there are enough commercially available to meet our need).
Reviewer BackCheck Response
Based on the evaluator response above, the panel provides the following response: _X___Concur ____Non-Concur