Model Certification Plan

Chicago Area Waterways System Habitat Index
Chicago District

1. General. The purpose of the review is to evaluate the technical quality, system quality and usability of the Chicago Area Waterways System Habitat Index (CAWSHI) model. The model is developed to assess fish habitat suitability in the highly developed canal and wastewater treatment system for Chicago area. The model will be managed by the Ecosystem Restoration Planning Center of Expertise (ECO-PCX) in accordance with EC 1105-2-412, Assuring Quality of Planning Models. The review team will document the certification process and provide an assessment of the technical and system quality and usability of the model.

2. Reference and Guidance

a. Engineering Circular 1105-2-412, Assuring Quality of Planning Models, 31 March 2011.

3. Background. The CAWSHI model is a regional model developed by others. The model was developed by LimnoTech in consultation with academic fisheries experts. The model is used to assess fish communities relative to physical habitat in a highly developed urban setting. The literature citation for the model is listed below.

The CAWS Habitat Index model was developed to meet the objectives of the Chicago Area Waterway System Habitat Evaluation and Improvement Study undertaken by the Metropolitan Water Reclamation District of Greater Chicago *(MWRDGC, 2010).* The objectives of this study were to: i) determine physical habitat 2 characteristics for all reaches of the CAWS using applicable physical habitat metrics and data collected from the CAWS; ii) use a multi-metric habitat index to evaluate physical habitat conditions in the CAWS; iii) use physical habitat data and the multi-metric index to assess the relative importance of physical habitat to fish in the CAWS; and iv) determine a system of classifying or categorizing reaches within the CAWS according to their physical habitat *(MWRDGC; ES-1).*

A literature review determined that no existing fish habitat suitability model would be immediately applicable to the CAWS, and therefore development of a system-specific index would be required *(MWRDGC, 25, 2010).* The MWRDGC Study found that the process used in developing the Michigan Non-wadeable Habitat Index (NWHI) developed by Merritt et al. and Wilhelm et al. (2005) could be used as a basis to develop a habitat index for the CAWS *(MWRDGC, 28, 2010).* The basic outline for this process includes:

1. Sequential reduction of a list of habitat variables using screening, correlation analysis, and principle components analysis;

2. Identification of the key habitat variables that best explain fish data using multiple linear regression and professional judgment; and
3. Incorporation of the key habitat variables into an index that can be applied to measure variation in the system *(MWRDGC, 28, 2010)*.

The NWHI process used a logical, stepwise methodology to systematically reduce the field of potential habitat variables *(MWRDGC, 28-29, 2010)*. Through regression analysis, twelve key habitat variables were identified and applied to fish data gathered by the MWRD in the CAWS between 2001 and 2007 *(MWRDGC, 105, 2010)*. A greater discussion of the fish and habitat variables that were used in the model can be found in Sections II.B and II.C, *Description of Model Development Process* and *Description of Input Data*, respectively. After the key variables were identified, multiple linear regression and the application of additional CAWS-suited variables were used to develop the raw and normalized CAWS Habitat Index. Development of this index is discussed in detail in Section II.B, *Description of Model Development Process.*

Overall, the final selected regression model was well correlated with the fish data, producing an R2 value of 0.48 (*MWRDGC, 133, 2010).* As depicted in Table 1, when compared with other established habitat index studies that used multiple linear regression, the goodness-of-fit of the CAWSHI is favorable *(MWRDGC, 134, 2010)*.

4. Documentation to be Provided by Proponent.

Model documentation is provided in the literature citation below. Digital copies of the model documentation were provided to the ECO-~~co~~PCX (Theiling) in April 2011. Spreadsheets used to apply the model on the Jamaica Bay Ecosystem Restoration Project will also be provided.

Comment [U1]: What are they using for calculations? A spreadsheet? Can we review it? Or should ATR review it? Should we recommend that LRC develop a spreadsheet?

Metropolitan Water Reclamation District of Greater Chicago. 2010. Chicago Area Waterway System habitat evaluation and improvement study: habitat evaluation report. Prepared by LimnoTech, Ann Arbor, Michigan.

5. Type/Scope of Review

The ECO-PCX is proposing to conduct a General Level of review based as it was developed according to prescribed standards and has been tested and validated. The model developers conducted and documented external peer review. The model was developed to understanding the importance of physical habitat to aquatic life in the CAWS and on identifying which particular habitat factors are relatively more important than others. The model is not significantly complex.

6. Description of Tasks . The model review tasks are listed below.

a. **Review model documentation and supporting literature.** A general model review includes discussions between the ~~EcoPCX~~ ECO-PCX and the model proponents to outline the approach for review based on the Protocols for Certification of Planning Models and to coordinate review documents..

b. **Conduct assessment of models.** The Eco-PCX will conduct an assessment of the model using information contained in EC 1005-2-412.

~~c. **Meeting to discuss findings.** Not Required.~~

~~d~~c. **Prepare Draft Quality Assurance Report.** ~~Not Required~~A summary of model findings will be prepared.

e.. **Meeting to discuss Draft Quality Assurance Report.** A conference call with the ECO-PCX, model proponent and Headquarters Subject Matter Expert will be held to discuss findings in the draft report.~~Not required~~

f. **Prepare Final Quality Assurance Report.** The ~~EcoPCX~~ ECO-PCX will attach the final report to ~~prepare a~~ the recommendation to HQ. ~~with the determination of the model review.~~

7. <u>Review Team Composition</u>. The ECO-PCX proposes to review 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 proposed composition of the model certification team is listed below.

Proposed Model Review Team

	Area of Expertise
Chuck Theiling	MVD Ecosystem Modeling Regional Technical Specialist

8. Schedule. Following is a draft schedule for the model review. Revisions to the model to address model deficiencies will require adjustments to the schedule below.

Kick-off Meeting	30 March 2010
Conduct Assessment	May 2010
Draft Report	June 2010
ECO-PCX Submit Recommendations to CECW	FY 2011

9. Cost

The estimated cost of the model certification review is shown below. The total cost is estimated at $4,000.

Corps

	hours	rate	Cost
Model Review Manager	30	140	$ 4,200
Total			**$** 4,200

6. Points of Contact.

ECO-PCX Point of Contact: Jodi Staebell	309.794.5448
ECO-PCX Model Review Manager: Chuck Theiling	309.794.5636
Model Proponent Point of Contact: Brook Herman	312-846-5559