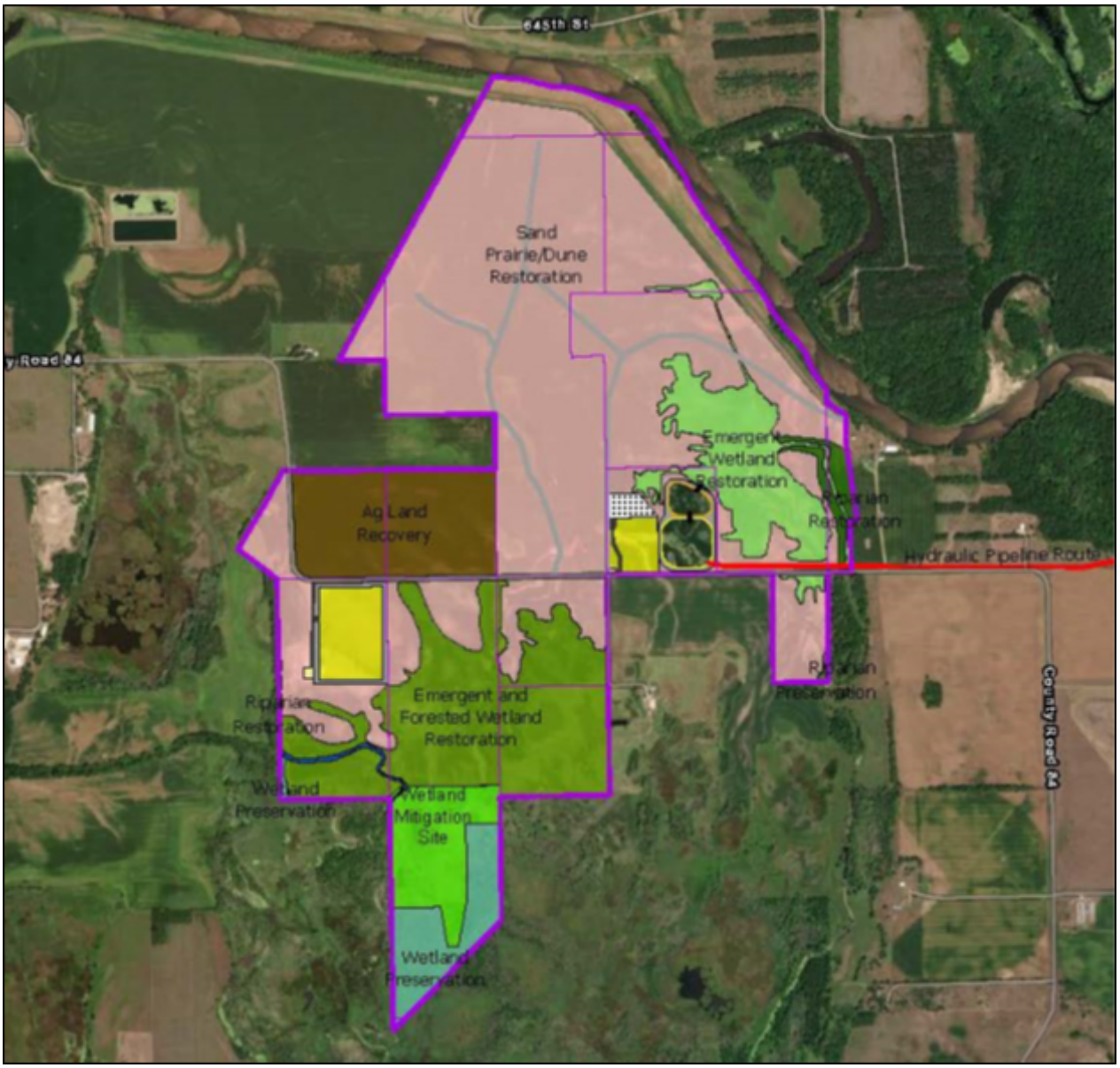
Appendix C:

Habitat Evaluation Procedures

Rolling Prairie Dredged Material Management Site
Gorman Creek Restoration
HABITAT EVALUATION PROCEDURES



US Army Corps of Engineers ®

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1. INTRODUCTION

This appendix describes the methods used to quantify the benefits of restoration actions taken by the U.S. Army Corps of Engineers as part of the Pool 5 Dredged Material Management Plan.

Habitat Evaluation Procedures (HEP) were used to evaluate the benefits of wetland, stream and forest restoration for the project (Figure 1). Three habitat suitability index (HSI) models were used to quantify the benefits of the study area; they included: Habitat Suitability Index Models: Veery (Sousa 1982), Habitat Suitability Index Models: Great Blue Heron (Short & Cooper 1985), and the Upper Mississippi River System Floodplain Forest Habitat Model (USACE, 2021, Figure 2). The Veery model was used to assess a majority of the existing farmland and the area proposed for wetland restoration (combination Type 2 (wet meadow) and Type 6 (shrub swamp)), the Great Blue Heron model was used to assess the restored Gorman Creek, and the Upper Mississippi River System Floodplain Forest model was used to quantify forest restoration.

2. METHODS DATA AND GENERAL ASSUMPTIONS

2.1 HABITAT EVALUATION PROCEDURES

The U.S. Fish and Wildlife Service's 1980 version of Habitat Evaluation Procedures (HEP) was used to quantify and evaluate the potential project effects and benefits. The HEP methodology utilizes a Habitat Suitability Index (HSI) to rate habitat quality on a scale of 0 to 1 (1 being optimum). The HSI is multiplied by the number of acres of available habitat to obtain Habitat Units (HUs). One HU is defined as one acre of optimum habitat. Benefits of different alternatives can be quantified by comparing the projected HUs available without a proposed action to projected HUs with a proposed action or alternative. HSIs and HUs were calculated for the baseline (existing) conditions and for Future Without-Project (FWOP) and Future With-Project (FWP) conditions.

2.2 DATA SOURCES

Variables in the models required input from several available sources, as well as the collection and extrapolation and interpretation of additional data. Data inputs and their sources are discussed below.

2.2.1 TOPOGRAPHY & AERIAL IMAGERY

Topography from the project area was used to categorize land elevations within the project area. Aerial imagery from multiple sources and years were used to inform some inputs for habitat modeling.

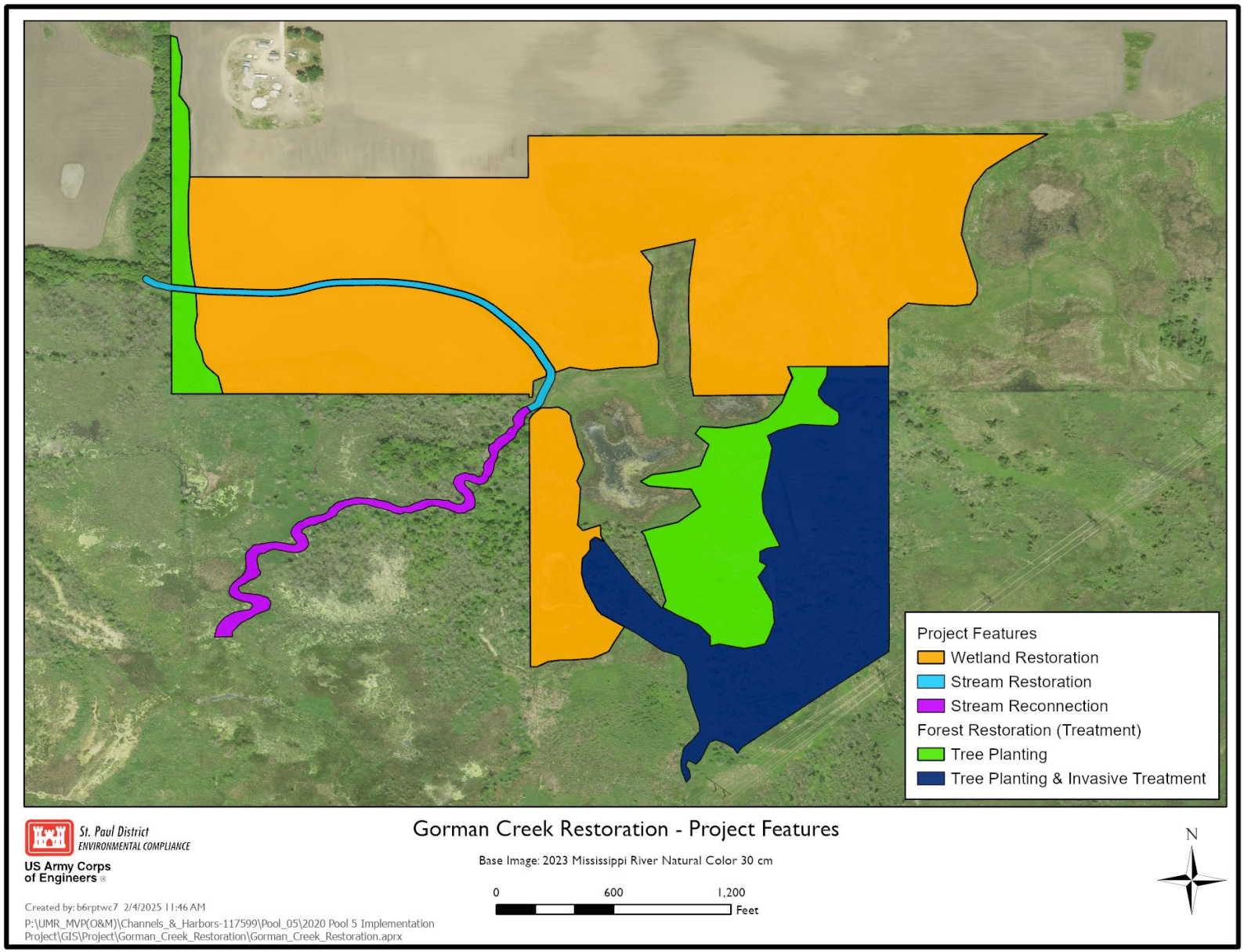
2.3 SOFTWARE

ArcGIS Pro version 2.6.1 was used to examine, evaluate, and present the various layers of spatial information used to develop suitability indexes for a variety of habitat variables. Spreadsheets developed in Microsoft Excel were used in data storage and analysis. The IWR Planning Suite Annualization Calculator was used to annualize habitat units.

2.4 GENERAL ASSUMPTIONS

Predicted FWOP and FWP conditions are used in the planning of all Corps restoration projects. These predictions are used to quantify the expected habitat benefits for use in alternatives evaluation and project justification. Predictions are based on factual information as much as possible; however, by their very nature, predictions require the considerable use of professional expertise and judgment. For this analysis, a few general assumptions were made as follows:

1. A 50-year planning period is used. The planning period for this project is 2025-2075.
2. The projection of FWOP conditions assumes no habitat restoration measures would occur in the study area. In this case, most of the project area would continue to be farmed, or not restored.


Project Features
Wetland Restoration
Stream Restoration
Stream Reconnection
Forest Restoration (Treatment)
Tree Planting
Tree Planting & Invasive Treatment
St. Paul District
ENVIRONMENTAL COMPLIANCE
US Army Corps of Engineers
Gorman Creek Restoration - Project Features
Base Image: 2023 Mississippi River Natural Color 30 cm
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600
1,200
Feet
N
Created by: b6rptwc7 2/4/2025 11:46 AM
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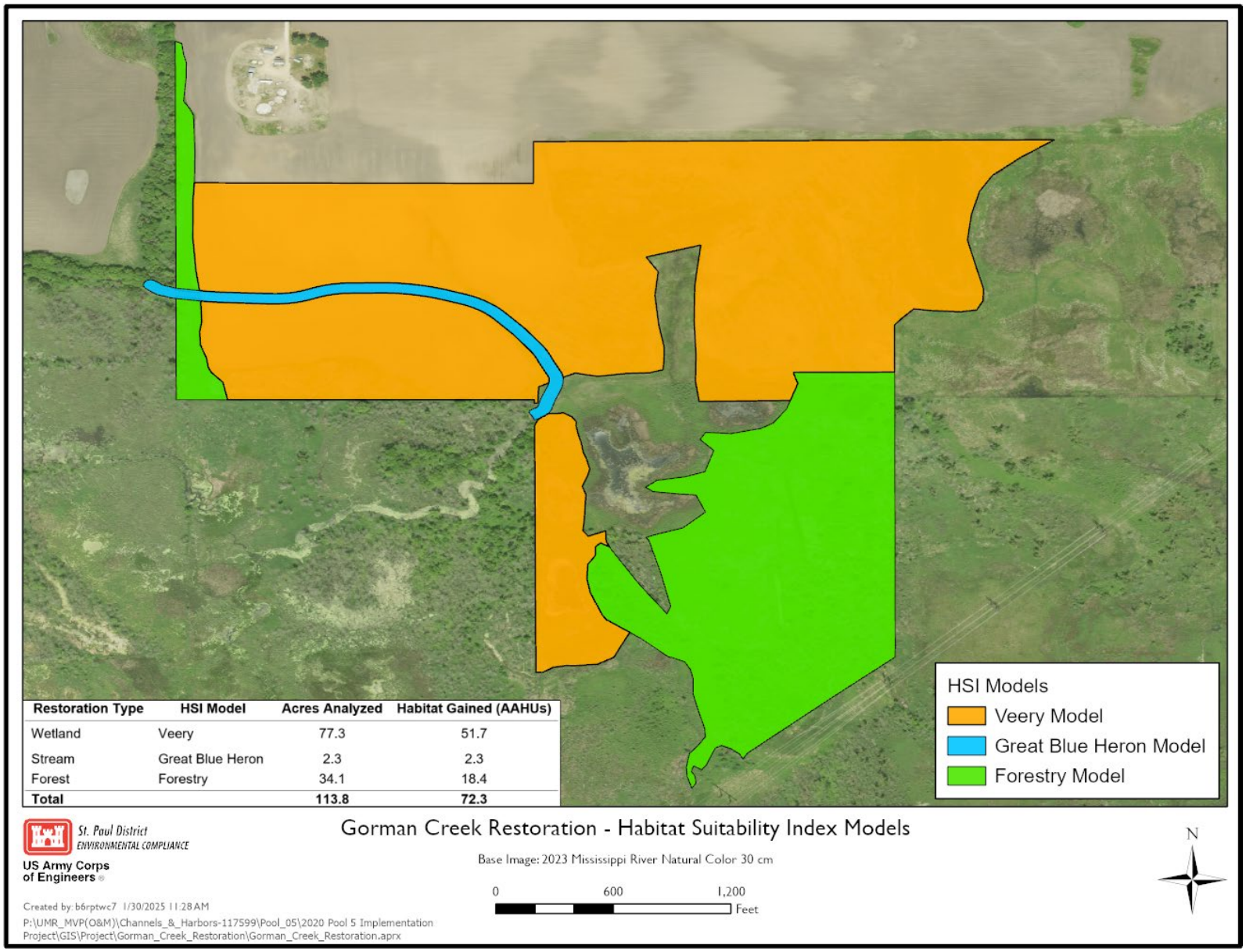
Figure 1.


HSI Models
Veery Model
Great Blue Heron Model
Forestry Model
Restoration Type | HSI Model | Acres Analyzed | Habitat Gained (AAHUs)
Wetland | Veery | 77.3 | 51.7
Stream | Great Blue Heron | 2.3 | 2.3
Forest | Forestry | 34.1 | 18.4
Total | | 113.8 | 72.3
St. Paul District
ENVIRONMENTAL COMPLIANCE
US Army Corps of Engineers
Gorman Creek Restoration - Habitat Suitability Index Models
Base Image: 2023 Mississippi River Natural Color 30 cm
0
600
1,200
Feet
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Created by: b6rptwc7 1/30/2025 11:28 AM
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Figure 2.

3. HABITAT SUITABILITY MODELING

3.1 WETLAND RESTORATION

3.1.1 MODEL SELECTION

One of the primary restoration features to Gorman creek is to convert the existing farmland to a wetland area surrounding the re-routed Gorman Creek (Figure 1). Wetland restoration would target a wet meadow that could transition into a shrub swamp, which would have high levels of herbaceous cover that transitions into more shrubs into the future. To analyze the wetland area (Figure 2) under the existing condition, FWP, and FWOP, the veery model was used. The veery is a species of small woodland thrush, (*Catharus fuscescens*) that prefers moist soiled areas composing of thick shrubs and herbaceous cover. A total of 77.34 acres of land were evaluated using the veery HSI model.

3.1.2 VEERY HSI MODEL RESULTS

Existing and Future without Conditions

Under the existing condition and FWOP the area that is currently being farmed (71.05 acres) was given a zero for the veery model because a monoculture crop does not constitute herbaceous canopy cover that is suitable for the species. The southern evaluation area, below the Gorman Creek re-route is anticipated to grow some herbaceous and shrubs into the FWOP; however, it would take some time because it would have to happen naturally vs being planted.

Future with Project

Under the FWP condition, both wetland areas being evaluated would be planted with desired wetland herbaceous plants. This action would speed-up the process of transitioning both evaluation areas into a meadow wetland/shrub swamp. Over the planning period, percent herbaceous cover is anticipated to decrease after year 20 and have a slight increase in deciduous shrub crown cover.

3.1.3 VEERY HSI MODEL RESULTS SUMMARY

Table 1 shows how the HSI is anticipated to change over the project planning period of 50 years using the veery HSI model. These numbers compared the FWOP to get an incremental gain for the duration of the project (Table 4).

Table 1. Veery HSI model results summary.

Analysis	Acres	TY0 HSI	TY1 HSI	TY10 HSI	TY20 HSI	TY30 HSI	TY40 HSI	TY50 HSI
GC North No Action	71.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GC North Restoration	71.05	0.00	0.32	0.43	0.72	0.83	0.90	0.96
GC South No Action	6.29	0.24	0.24	0.41	0.38	0.38	0.67	0.77
GC South Restoration	6.29	0.24	0.24	0.67	0.77	0.87	0.92	0.96

3.2 CREEK RESTORATION

3.2.1 MODEL SELECTION

One of the main points of the project restoration is to restore Gorman Creek to its original channel before it was re-routed for farming. To account for habitat benefits associated with the Gorman Creek re-route, the Great Blue Heron HSI model was used to evaluate the footprint of the restored creek. One of the primary variables of the Great Blue Heron HSI model evaluates foraging habitat of the species, which requires shallow, clear water with a firm substrate that has the potential for fish. A total of 2.34 acres were evaluated using the Great Blue Heron HSI model.

3.2.2 GREAT BLUE HERON HSI RESULTS

Existing and Future without Project Conditions

Under the existing condition and FWOP the area being evaluated for the creek restoration was given a zero for the Great Blue Heron model because is does not provide direct foraging habitat for the species. Though the other variable in the model (i.e., reproductive index, potential for nests) are high, the forage habitat variable acts as a limiting factor, resulting in an HSI of zero for the creek restoration footprint.

Future with Project

Under the FWP condition, once the creek is restored, the habitat is not anticipated to change over the 50-year planning period. The area of the Gorman Creek re-route is within the Upper Mississippi River Basin, meaning it is very suitable for the great blue heron species.

3.2.3 GREAT BLUE HERON HSI MODEL RESULTS SUMMARY

Table 2 shows how the HSI is anticipated to change over the project planning period of 50 years using the Great Blue Heron HSI model. These numbers were compared the FWOP to get an incremental gain for the duration of the project (Table 4).

Table 2. Great Blue Heron HSI model results summary.

Analysis	Acres	TY0 HSI	TY10 HSI	TY50 HSI
GC Stream Restoration No Action	2.34	0.00	0.00	0.00
GC Stream Restoration	2.34	0.00	0.97	0.97

3.3 FORESTRY RESTORATION

3.3.1 MODEL SELECTION

The Upper Mississippi River System Floodplain Forest Habitat Model (hereafter forest model) was the model chosen to assess forest habitat benefits for the project. This model provides a mechanism to assess the intrinsic quality of forest habitats based on standard metrics used in forest inventory and health assessment. This assessment can be further applied to quantify changes in habitat quality from forest management actions. The forest model was specifically designed to assess forest habitat benefits for large forest areas with a wide range of wildlife species. A total of 34.08 acres of land were evaluated using the forest HSI model.

3.3.2 FOREST HSI MODEL RESULTS

Existing and Future without Project Conditions

Existing areas being evaluated for the forest model within the project footprint are considered poor quality habitat and have very minimal trees present. On top of having limited existing trees, there are high levels of invasive species, which results in a lower HSI score. Under the FWOP, the berm area would have a slightly higher HSI score, because there are closer existing trees that would promote regeneration compared to the southern forest evaluation area.

Future with Project

The FWP shows higher scores for all measures compared to the FWOP conditions across the 50-year planning horizon. This is primarily due to the planned forest plantings and forestry management actions in both the berm and south forest areas.

3.3.3 FOREST HSI MODEL RESULTS SUMMARY

Table 3 shows how the HSI is anticipated to change over the project planning period of 50 years using the Forestry model. These numbers were compared to the FWOP to get an incremental gain for the duration of the project (Table 4).

Table 3. Forest HSI model results summaries.

Analysis	Acres	TY0 HSI	TY10 HSI	TY20 HSI	TY30 HSI	TY40 HSI	TY50 HSI
GC Forest Berm No Action	3.08	0.01	0.02	0.03	0.07	0.18	0.29
GC Forest Berm	3.08	0.01	0.48	0.56	0.63	0.68	0.74
GC South Forest No Action	31.00	0.01	0.02	0.06	0.09	0.15	0.22
GC South Forest	31.00	0.01	0.48	0.56	0.63	0.69	0.75

3.4 COMBINED HABITAT UNITS RESULTS

Habitat units (HUs) are the product of the HSI value and acres of a given area, such that one habitat unit is one acre of habitat with a perfect HSI score of one. Table 4 below summarizes the acres analyzed per evaluated model and what the habitat gained is comparing the FWP over the FWOP over the course of the 50-year project life. The total acres evaluated were 113.8 acres. The resulting average annual habitat units (AAHUs) for each model is also included in Table 4. The incremental gain determined by AAHUs demonstrates the amount of habitat gained by implementing the Gorman Creek Restoration.

Table 4. Acres per habitat type and average annual habitat units per habitat evaluation type.

Acres Per Habitat Type

	Veery	Forestry	Blue Heron	Total
No Action	77.3	34.1	2.3	113.8
Gorman Creek Restoration	77.3	34.1	2.3	113.8

AAHUs Per Habitat Type

	Veery	Blue Heron	Forestry	Total	Incremental Gain
No Action	2.9	0.0	3.0	5.9	-
Gorman Creek Restoration	54.6	2.3	18.7	75.5	69.6

References

Sousa, P. J. 1982. Habitat suitability index models: Veery. U.S. Dept. Int., U.S. Fish & Wildlife Service. FWS/OBS-82/10.22. 12 pp.

Short, H. L. and Cooper, R. J. 1985. Habitat suitability index models: Great Blue Heron. U.S. Dept. Int., U.S. Fish & Wildlife Service. Biol. Rep. 82*10.99). 23 pp.

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