

MINNESOTA WILDLIFE HABITAT EVALUATION SYSTEM (REV. 1)

INTRODUCTION

The Natural Resources Conservation Service (NRCS) provides assistance to clients to help them protect, maintain and enhance soil, water, air, plant and animal resources through the development and application of a Conservation Management System (CMS). A conservation management system consists of a combination of conservation practices and management measures that achieves a desired level of treatment (quality criteria) for the five resources mentioned above. The quality criterion for the Animal (wildlife) concern is as follows: **when addressing wildlife food, cover, and water requisites, a minimum of 40 percent of the habitat potential is achieved regardless of land use.** This criterion sets the minimum (non degradation) level for wildlife habitat on the planning unit.

Historically, the degree to which wildlife habitat was considered in the planning process was influenced by the objectives of the landowner. Too often, little emphasis was given to wildlife concerns, in part due to perceived conflicts between wildlife and production agriculture.

To fully incorporate wildlife concerns in the CMS planning process, an objective evaluation system must be implemented to quantitatively measure existing on-farm wildlife habitat, as well as the potential effects of proposed conservation measures. The **Minnesota Wildlife Habitat Evaluation System (WHES)** will be used to evaluate in general terms species richness, and the quality of existing wildlife habitat on a planning unit, where wildlife is not the primary planning objective. WHES will be the tool to determine when the quality criterion for wildlife habitat is met. WHES is useful in identifying deficient landscape features for general wildlife habitat on the farm/planning unit.

When the landuser's objective is intensive habitat and species population management, including threatened and endangered species, more intensive evaluation procedures may be required. In these situations, the NRCS state biologist or MDNR Area Wildlife Manager should be consulted.

PROCEDURES FOR EVALUATING WILDLIFE HABITAT

1. INVENTORY AND COVER TYPE OF FARM/PLANNING UNIT

Materials needed:

- Farm Service Agency (FSA) aerial photocopy
- Planning scale
- County soil survey

WHES was developed to evaluate important landscape ecoregions common to Minnesota (Fig. 1), and their relation to wildlife in general. This evaluation system has been simplified to limit the amount of time and field data collection.

Most of the required data may be obtained from readily accessible material such as landowner discussions, aerial photography, FSA maps, soil surveys etc.; in addition to standard on site field evaluations.

Using a FSA photo as a base map, inventory the entire planning unit. Cover type the planning unit into the following habitat types: cropland, grassland (includes pasture, hayland, roadsides, grass conservation practices, CRP etc), woodland, farmstead shelterbelts/field windbreaks, and wetlands. Number each field.

The planning unit may be subdivided into areas of similar habitat type and management. For evaluation purposes, fields of similar habitat types may be combined, and a representative sample used to score.

Each habitat type occurring on the planning unit will be evaluated and every habitat type scored to establish the existing benchmark condition. The worksheets allow for developing a weighted habitat suitability index for habitats consisting of multiple fields. The worksheets also allow for evaluating alternative management options by habitat type and field. A glossary of terms commonly encountered in the worksheets can be found in Appendix 1.

The habitat characteristics and scores identified on the worksheets are representative, and not intended to be absolute values. The planner may adjust scores based on best professional judgement and actual field conditions.

2. COMPLETE HABITAT INVENTORY WORKSHEETS WHES-1 THROUGH WHES-6 AS APPROPRIATE.

Each habitat worksheet contains an example to illustrate how to determine the appropriate Habitat Suitability Index (HSI). An example of a Summary Worksheet (WHES-7) is located in Appendix 2.

A. Cropland Habitat (WHES-1)

Cropland land use is defined as land used for row crop or small grain production. Cropland also includes hayland as part of an established rotation. Cropland habitat provides primarily winter food and cover, depending on the degree of tillage disturbance. **Residue management** and **crop rotation** determine whether waste grain and residue will be available for winter food and cover. **Pesticide use** can affect the amount and kind of weeds and insects which are important food sources.

Concealment cover is a critical habitat element and includes escape cover from predators, travel cover, winter cover, nesting cover and brood cover. Examples are; fencerows, rock piles, ditchbanks, conservation practices, emergent wetlands, brush piles, unharvested patches etc. Concealment cover should be at least 25' in width and 0.25 acre in size. Small inclusions of wetland, woodland or unharvested cropland may be included if they are too small to evaluate separately. Whenever possible, cover should be provided close to food sources to minimize movement.

B. Farmstead Shelterbelt Habitat (WHES-2a)

Shelterbelts provide important winter cover, food sources, and nesting cover for a wide variety of game and non-game species. Estimate the **height**, or projected height of the two tallest shelterbelt rows. Determine the **number of rows** in a planted shelterbelt, or estimate the **average width** in a natural woody shelterbelt.

A **variety of woody species, shelterbelt configuration** and **size** contributes to the diversity of the shelterbelt in terms of winter cover, food availability and species richness. Encourage the use of fruit-bearing trees and shrubs which provide a food source throughout the year, and native conifers for winter cover. **Grazing** of woody shelterbelts adversely affects wildlife habitat by removing understory, altering species composition, killing desirable species, and encouraging erosion. Wildlife benefits are maximized if a winter food plot is located within 300' of a shelterbelt.

C. Field Windbreak Habitat (WHES 2b)

Field windbreaks have significant wildlife values in an intensively farmed landscape. Birds use field windbreaks for attaching nests, singing perches, food sources, and as loafing and feeding sites during migration. Mammals often use field windbreaks as travel corridors.

Measure or estimate the **average height** of the field windbreak. Taller trees increase the total number of birds, and species diversity. **Pruning** of lower branches reduces bird nest use, and encourages machinery encroachment and ground disturbance. **Land use** adjacent to the windbreak influences use by ground nesting species. Permanent herbaceous cover provides greater cover than agricultural crops. Finally, wildlife use can be maximized by using a mixture of trees and shrubs in a single row, or planting a **multi-row** windbreak.

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C. Grassland Habitat (WHES-3)

Herbaceous cover consists of permanent hayland, pastureland, set-aside, CRP/RIM, roadsides, ditchbanks, soil and water conservation practices, etc. Herbaceous cover is important in providing nesting and winter cover.

The amount and quality of grassland present on a planning unit contributes directly to wildlife usage. **Vegetation management** affects the quality and degree of disturbance not only during the nesting season, but also residual growth for winter cover.

Optimal **vegetation height** is between 12" and 20" measured in early spring (April 15). The **size** and **configuration** of grassland habitat influence nest usage. Blocks of grass cover 20 - 40 acres in size are preferred. Minimum widths of 300' provide maximum benefit. A **composition** of mixed native grasses and forbs or cool season grass/legume mixtures provide greater diversity and wildlife value. It is not always necessary to provide optimal diversity on every grassland field however. The diversity of grassland mixtures may be achieved on multiple fields interspersed through out the planning unit.

D. Mixed Deciduous Woodland Habitat (WHES-4a)

Conifer Dominated Woodland Habitat (WHES-4b)

This index is intended to evaluate stand level areas with at least 25% canopy cover. Areas with scattered trees or very small inclusions of woody vegetation should be evaluated under the grassland or cropland habitat.

For the purposes of general wildlife habitat, woodlots consisting of a **variety of woody species** and **age classes** (herbaceous understory, vines, shrubs, sapling, pole, and mature) are desirable. **Grazing** of the woodlot adversely affects wildlife habitat by removing understory, altering species composition, and encouraging erosion. **Snags and den trees** provide shelter for cavity nesting species, and should be a minimum of 10" dbh. **Mast producing** trees provide a nut or fruit crop preferred by wildlife species through out the year. Wooded riparian zones are especially beneficial to wildlife by providing cover and travel corridors. Minimum riparian width should be 200'.

E. Herbaceous Wetland Habitat (WHES-5a)

Wooded Wetland Habitat (WHES-5b)

Materials Needed:

- USDA wetland determination
- US Fish and Wildlife Service, National Wetland Inventory map (NWI)

Wetlands provide critical habitat for a variety of species. Wetlands provide food, cover and water to both wetland dependent and non-dependent species. This index focuses on general wildlife diversity/productivity of wetlands located in the three major ecoregions (prairie, southern forest and northern forest) in Minnesota. WHES is not intended to evaluate nor to be used for species specific management. Other methods should be used when the landuser's objective is species specific management.

Wetland class richness serves as an indication of the diversity of the wetland and therefore as an indicator of potential wildlife species. Similar to class richness, the number of **subclasses** also provides an indication of potential wildlife diversity. The principle of wetland **size** is that larger wetlands tend to provide greater wildlife value.

Sites with more permanent water score higher. Wetlands with a **surrounding habitat** that provides cover, feeding, or reproductive value are important to wildlife. This characteristic rates the type, amount, and diversity of the surrounding habitat. **Wetland interspersion** evaluates the degree of open water, and edge in a wetland. **Juxtaposition** evaluates whether the wetland being evaluated is a significant part of the landscape or wetland complex. **Wetland management** evaluates the degree to which the landuser protects/enhances the functions and values of the evaluated wetland.

F. Farm Habitat Quantity and Diversity - Farmland Region (WHES-6a)

Farm Habitat Quantity and Diversity - Forested Regions (WHES-6b)

Diversity of habitat types on the farm/planning unit is important. Habitat diversity can be determined by the number of differing habitat types within a species home range or the local planning landscape. This index evaluates the diversity of habitat elements within the farm or tract being planned. This index also recognizes habitat diversity within a 1-mile radius of the planning unit to consider landscape diversity.

From the center of the farm, measure the number of differing habitat types present at the varying distances identified. Habitat types on adjacent farms may be counted if it is evident that the habitat type is not likely to change in the near future.

3. DETERMINATION OF FARM/PLANNING UNIT WILDLIFE HABITAT SUITABILITY

Complete the worksheet WHES-7 "WHES Summary Worksheet". The summary worksheet calculates a weighted habitat suitability index for the entire farm/planning unit being evaluated under present conditions and under alternative management conditions. Additionally, the appropriate worksheets will enable the planner to identify deficient factors by habitat type and field, and suggest alternative measures to improve overall habitat quality. WHES worksheets 1-7 provide the documentation necessary to determine whether the planning unit meets the Minnesota Field Office Technical Guide quality criteria for Animals (wildlife).

For each habitat type listed on WHES-7, enter the habitat suitability index from the appropriate worksheet. Complete the following steps; **(1)** multiply the index by the acres of that habitat type to calculate the weighted habitat suitability index. Repeat this procedure for all habitat types present. **(2)** summarize the weighted habitat suitability indices for cropland, shelterbelts, grassland, woodland, and wetland. **(3)** divide the weighted habitat HSI by the total acres in the planning unit to calculate the habitat suitability index for the existing habitat types on the planning unit. **(4)** finally, add the landscape diversity index, and multiply by .5 to calculate the overall planning unit HSI (refer to Appendix 2 for a sample summary worksheet). Repeat this procedure for proposed alternatives as necessary.

NOTE: any habitat type comprising more than 25% of the planning unit acreage must have a minimum HSI of .40 for that habitat type to meet the quality criteria.

4. ALTERNATIVE DEVELOPMENT

The NRCS Field Office Technical Guide (FOTG) provides many soil and water conservation practices which are beneficial to wildlife. Use the FOTG to help choose a combination of practices to create a conservation system that meets production and wildlife objectives. For further technical assistance, contact your local Natural Resources Conservation Service, MN Department of Natural Resources, County Soil and Water Conservation District or US Fish and Wildlife Service representative.

REFERENCES

Cowardin, Lewis M. et al. 1979. Classification of wetlands and deep water habitats of the United States. US Fish and Wildlife Service Off. Bio. Ser. FWS/OBS 79/31.

Dasmann, R.F. 1981. Wildlife Biology. Wiley and Sons, 2nd Ed.

Finch, D.M. et al. 1993. Status and management of neotropical migratory birds. Gen. Tech. Rep. RM-229. Fort Collins CO. USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station.

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- Galatowitsch, S.M. and van der Valk, A.G. 1994. Restoring prairie wetlands, an ecological approach. Iowa State University Press, 1st Ed.
- Green, Janet. 1995. Birds and Forests; A Management and Conservation Guide. Minnesota Department of Natural Resources.
- Minnesota Department of Natural Resources 1985. Woody Cover Plantings for Wildlife.
- Rodgers, R.D, and Wooley, J.B., 1983. Conservation tillage impacts on wildlife. Journal of Soil and Water Conservation 38(3).
- Schroeder, R.L. 1986. Habitat suitability index models: wildlife species richness in shelterbelts. US Fish and Wildlife Service Biological Report 82(10.128).
- Svedarsky, W.D. 1987. Wildlife values of single-row shelterbelts. Northwest Experiment Station News, Vol. 15 No. 1.
- Technologies to Benefit Agriculture and Wildlife - Workshop Proceeding 1985. Washington D.C.; US Congress, Office of Technology Assessment, OTA-BP-F-34.
- US Army Corps of Engineers 1988. The Minnesota wetland evaluation methodology for the north central United States.
- US Fish and Wildlife Service 1980. Habitat Evaluation Procedures (HEP) Manual. USFWS Washington D.C.
- USDA Natural Resources Conservation Service 1995. National Planning Procedures Handbook.
- USDA Soil Conservation Service 1982. Wildlife habitat appraisal guide for Missouri.
- USDA Soil Conservation Service 1993. Evaluating wildlife habitat for conservation planning in Michigan.

APPENDIX 1

Glossary of Terms

Cavity trees (snags) - Hollow cavities in dead trees or limbs which provides concealment cover.

CMS - Conservation Management System, a combination of conservation practices and management measures that achieves the desired level of treatment for the five resources as specified by the planning quality criteria for each resource concern.

Concealment Cover - Concealment cover is a broad term used to identify various types of land cover such as woody and herbaceous vegetation, wetlands, rock piles and burrows as examples, also known as shelter. Cover can be further defined as: **Nesting Cover**; shelter which is suitable for the establishment of nests for the production of offspring. **Brood Cover**; herbaceous and woody vegetation providing food and shelter for new offspring. **Escape Cover**; shelter or cover suitable for hiding from or avoiding predators. **Winter Cover**; herbaceous or woody cover providing protective shelter from cold temperatures and snow deposition.

Cropland - Land use designation for land used primarily for the production of field crops alone, or in short rotation with forages.

CRP - Conservation Reserve Program, a land retirement and restoration program administered by USDA.

DBH - Diameter Breast Height, diameter of a tree at 4.5' above average ground level.

Farmstead Shelterbelt - A belt of trees or shrubs established next to a farmstead or feedlot to control snow deposition, provide shelter for livestock, or improve an area for wildlife.

Field Border - A strip of perennial vegetation established at the edge of a field by planting to herbaceous vegetation of shrubs.

Field Windbreak - A strip or belt of trees or shrubs established in or adjacent to a field, to reduce soil blowing, control snow deposition, or enhance wildlife.

FOTG - Field Office Technical Guide, the official NRCS guidelines, and standards for planning and applying conservation treatments.

FSA - Farm Service Agency, an agency of the US Department of Agriculture.

FWS - Fish and Wildlife Service, an agency of the Department of Interior.

HSI - Habitat Suitability Index, a qualitative measure of the condition of a particular habitat. HSI ranges from 0.0 (poor) to 1.0 (excellent).

Hayland - Land use designation for land on which perennial plants are managed for hay production by mechanical means.

Hedgerow - Establishing a living fence of shrubs or trees, in, across, or around a field. Its purpose is to delineate field boundaries, serve as fences, or provide wildlife food and cover.

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Hemi marsh - A palustrine wetland which is composed of approximately 50% open water and 50% emergent vegetation.

Juxtaposition - The location of the wetland being evaluated in relation to other wetlands within the planning unit.

Lacustrine - Wetlands or deep water habitats 20 acres or more in size, and greater than 2 meters (6.0') in depth.

Mast producer - Trees and shrubs which produce nuts or fruit preferred by wildlife. Example include but are not limited to: Trees; Oak, Hickory, Walnut, Hackberry, Maple, Ash, Elm, Black Cherry, Red Cedar. Shrubs; Hazelnut, Blackberry, Raspberry, Crabapple, Am. Plum, Dogwood, Sumac, Viburnum etc.

MDNR - Minnesota Department of Natural Resources.

Monotypic - A wetland dominated by a single to very few species of vegetation, typically invasive or exotic species. Low plant diversity.

NRCS - Natural Resources Conservation Service, an agency of the US Department of Agriculture.

NWI - National Wetlands Inventory developed by the US Fish and Wildlife Service.

Pasture - Land use designation for grazing lands comprised of introduced or domesticated native forage species that are use primarily for the production of domestic livestock.

Palustrine - All nontidal wetlands dominated by trees, shrubs, persistent grasses, forbs etc. Less than 20 acres in size and less than 2 meters (6') in depth.

Quality Criteria - A quantitative or qualitative statement of treatment level required to achieve a CMS for identified resource considerations for a particular land area.

RIM - Reinvest in Minnesota, a land retirement and restoration program administered by the MN Board of Water and Soil Resources.

Riparian corridor - An area of trees, shrubs located adjacent to or immediately upgradient of perennial or intermittent streams, or rivers.

Riverine - Systems contained in natural or artificial channels periodically or continuously containing flowing water.

Size class - Age and size of woody vegetation present. (1) Tree >5.0" DBH and >20' tall; (2) Sapling <5.0" DBH and >20' tall; (3) Shrub usually 3-20' tall including small trees and saplings; (4) Vines; (5) Herbaceous plants including tree seedlings <3.0' tall.

Species richness - Management of habitat for a number of different species within an area or community.

Species specific - Management of habitat for one or a few species where other species in the same habitat remain of minor concern.

Stripcropping, Contour - Growing crops in a systematic arrangement of strips on the contour so that a strip of grass or close grown crop is alternated with a strip of clean tilled crop. The purpose is to reduce water erosion.

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Stripcropping, Wind - Growing wind resistant crops in strips alternating with row crops arranged at angles to offset adverse wind effects.

SWCD - Soil and Water Conservation District.

TSI - Timber Stand Improvement, all cutting not part of a major harvest, for the general purpose of improving the stand composition, condition, and growth.

Wetland complex - Wetland clusters composed of a variety of wetland sizes, classes and water regimes.

Woodland - Land use designation for land on which the primary vegetation is forest (climax, natural or introduced plant community) and use is primarily for production of wood products and wildlife habitat.

Appendix 2

**MINNESOTA WILDLIFE HABITAT EVALUATION SYSTEM
SUMMARY WORKHEET**

Landuser _____ Planner _____

Location _____ Farm/Tract # _____ Date _____

HABITAT TYPE	HSI	ACRES	WEIGHTED HSI	PLAN. UNIT HSI ^{1/}
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EXISTING CONDITION

Cropland	<u>.80</u>	X	<u>80</u> =	<u>64.0</u>	$\left[\left(\frac{A}{B} \right) + \left(\frac{C}{2} \right) \right] \times .5$
Shelterbelt	<u>.24</u>	X	<u>3</u> =	<u>0.7</u>	
Field Wndbrk.	<u>.45</u>	X	<u>3</u> =	<u>1.4</u>	
Grassland	<u>.48</u>	X	<u>20</u> =	<u>9.6</u>	
Woodland (D)	<u>.77</u>	X	<u>25</u> =	<u>19.3</u>	
Woodland (C)	<u>.50</u>	X	<u>75</u> =	<u>37.5</u>	
Wetland (H)	<u>.77</u>	X	<u>5</u> =	<u>3.9</u>	
Wetland (W)	<u>.64</u>	X	<u>10</u> =	<u>6.4</u>	
Diversity	<u>.50</u>	(C)			

SUM 221 (B) = 142.8 (A) 0.45

ALTERNATIVE 1

Cropland	_____	X	_____ =	_____	$\left[\left(\frac{A}{B} \right) + \left(\frac{C}{2} \right) \right] \times .5$
Shelterbelt	_____	X	_____ =	_____	
Field Wndbrk.	_____	X	_____ =	_____	
Grassland	_____	X	_____ =	_____	
Woodland (D)	_____	X	_____ =	_____	
Woodland (C)	_____	X	_____ =	_____	
Wetland (H)	_____	X	_____ =	_____	
Wetland (W)	_____	X	_____ =	_____	
Diversity	_____	(C)			

SUM _____ (B) = _____ (A) _____

ALTERNATIVE 2

Cropland	_____	X	_____ =	_____	$\left[\left(\frac{A}{B} \right) + \left(\frac{C}{2} \right) \right] \times .5$
Shelterbelt	_____	X	_____ =	_____	
Field Wndbrk.	_____	X	_____ =	_____	
Grassland	_____	X	_____ =	_____	
Woodland (D)	_____	X	_____ =	_____	
Woodland (C)	_____	X	_____ =	_____	
Wetland (H)	_____	X	_____ =	_____	
Wetland (W)	_____	X	_____ =	_____	
Diversity	_____	(C)			

SUM _____ (B) = _____ (A) _____

QUALITY CRITERIA

^{1/} In order to meet the Field Office Technical Guide Quality Criteria for Animal (Wildlife), the Habitat Suitability Index (HSI) for the entire planning unit must be greater than or equal to 0.50, and **any habitat type comprising more than 25 percent of the planning unit acreage must have a HSI greater than or equal to 0.50 for than habitat type.** In general, a HSI below 0.25 indicates poor habitat, between 0.25 and 0.5 is fair habitat, 0.5 to 0.75 is good, and above 0.75 is excellent habitat.

FIGURE 1

