

Wetland Wildlife Habitat Management - 644 DESIGN AND INSTALLATION GUIDE

This document provides conservation planners with the parameters, procedures, and requirements for developing site-specific for designing and installation of wetland wildlife habitat management for a variety of species or wetland types. Where appropriate, specific references are noted and hot linked to provide detailed information needed for a successful design.

Wetlands and adjacent uplands provide habitat for many wildlife species. Wetlands associated with cropland, pastureland, woodland, and rangeland all produce and support wildlife by providing some or all of the basic habitat elements. Habitat value depends on the quality, quantity, and interspersions of food, water, cover, and living space. To provide complete habitat, all requirements for the wildlife species must be found within its home range.

Planning alternatives for wildlife will be based on a habitat appraisal. The NRCS Wildlife Habitat Appraisal Guides will generally be used. These guides evaluate habitat for wetland wildlife species diversity and are found in Section I of the NRCS Field Office Technical Guide. When a habitat appraisal for a particular wildlife species is desired, the USDI, Fish and Wildlife Service Habitat Evaluation Procedure (HEP), or other NRCS approved methods may be used. Contact the state biologist for the appropriate model and training as needed.

NRCS planning assistance generally involves wetland wildlife habitat appraisal and recommendations for habitat development and management. Request assistance for direct wildlife population management from local North Dakota Game and Fish Department (NDGFD) biologists, or for migratory birds and Threatened or Endangered Species, USDI, Fish and Wildlife Service (FWS) biologists. NRCS can help landowners monitor population trends for some wildlife species. Contact the state biologist for population trend survey methods if the landowner is interested in more intensive management of these species.

NRCS wetland wildlife habitat planning assistance shall not adversely impact a federally listed Threatened, Endangered, or Candidate species or its habitat.

Wetland habitat manipulation for a given species may adversely affect other wildlife species. Evaluate each planning unit holistically, in the light of the larger landscape. Determine how management of the unit can benefit regional wildlife populations. It may not be beneficial to maximize habitat diversity on each planning unit. Ground nesting birds associated with wetlands, for example, often need minimum edge with larger blocks of uniform herbaceous nesting cover to escape predation.

This document provides minimum habitat requirements for a variety of North Dakota wildlife species and for specific land uses. To satisfactorily implement this practice, the habitat requirements for the planned kind(s) of wildlife must be available or created according to a planned management system or the landuse managed for general wildlife requirements.

Wetland Wildlife Habitat Management is a resource management system - not a single practice. In order to accomplish the goals of the resource management system, a variety of NRCS practices can be employed to maintain and enhance wetland wildlife habitat.

Planning assistance may apply to two levels of wildlife habitat management. The first is for situations where wildlife production is the primary goal of the land unit. The second applies to planning units where wetland wildlife is secondary.

All habitats will be planned and managed according to soil capabilities.

***NOTE:**

Underlined items are required for meeting the FOTG Practice Standard 644 Wetland Wildlife Habitat Management

Each species of wildlife has a daily and seasonal home range. All of an animal's habitat requests (i.e. food, shelter, water, and living space) must be found within this home range. Vegetative habitat components must be interspersed in a way to provide feeding areas near escape, nesting, and thermal cover.

Wetland Functions:

Wetland functions are based on three main components, water (hydrology), vegetation, and soils. The NRCS conservationist's primary wildlife management tool is the manipulation of vegetative habitat and hydrology components. Wetland soils are not usually manipulated except to restore wetland hydrology or to remove sediments. Use conservation practice 658 Wetland Restoration for sediment removal from wetlands.

Information in this section provides guidance to evaluate existing wetland habitat and for planning improvements on existing cover and hydrology.

Hydrology

Shallow and deep-water areas on agricultural land provide vital habitat for wetland wildlife. A diversity of water regimes provides ideal wetland complexes for wetland wildlife. A complex of temporarily flooded, seasonally flooded, and semi-permanently flooded wetlands are common on the prairie landscape east and north of the Missouri River. These prairie wetlands maintain hydrology in one of three ways, through groundwater recharge, flow-through systems, and groundwater discharge. The water regime is determined by several factors, including climate, landscape position, configuration of the associated water table, and the type of underlying geological substrate (Euliss et al. 1999). The wetland complexes that provide a combination of small and shallow wetlands along with larger and deeper wetlands provide varying hydrology for wildlife at vital stages throughout their life cycle (Johnson et al. 1997). The water regime will ultimately determine the plant community that will be supported in a wetland complex.

Manipulation of the wetland water regime is not a part of the specification and in most cases not necessary to provide additional wetland habitat. However, restoration of drained wetlands to their pre-existing state is recommended when possible. Changes in wetland hydrology that cause a change in wetland class or subclass should only be done with a specific management goal. Conservation practice 658 - Wetland Creation, 659 - Wetland Enhancement and 657 - Wetland Restoration are used for hydrology restoration or creation.

Wetland Vegetation

Herbaceous and woody plants adapted to moist or wet sites provide wetland obligate species cover and food sources. Wetland vegetation also provides winter food and cover for upland wildlife (refer to 645-Upland Wildlife Habitat Management).

- Wetland plant communities can be manipulated for wildlife using fire, grazing, mowing, or water level control.
- Establishment of wetland plants often occurs naturally from seed reserves and seed transported by wildlife and livestock. Seed is commercially available for some species. Establishment using sprigs or using plugs collected near the site is usually very successful.
- Plant wetland species according to water regime zones. Recommended seedings include: Temporary zone: 30% prairie cordgrass (*Spartina pectinata*), 10% fowl bluegrass (*Poa palustris*), 20% western sloughgrass (*Beckmannia syzigachne*), 10% fox sedge (*Carex vulpinoides*), 10% Canada wildrye (*Elymus canadensis*) 10% switchgrass (*Panicum virgatum*), 5% forbs swamp verbena (*Verbena hastata*), etc. Seasonal Zone: 40% whitetop (*Scolochloa festucacea*), 30% slough sedge (*Carex atheroides*), 10% western sloughgrass (*Beckmannia syzigachne*), 20% American mannagrass (*Glyceria grandis*). Other plantings may be developed which may include woody and forb species.

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- Reed canary grass, phragmites and creeping foxtail are to be avoided due to their tendency to create a monoculture, suppressing native plant succession.
- Any wetland manipulation for wetland wildlife must be done after careful consideration to impacts to wetland dependent species.

Upland Vegetation:

Upland vegetation plays an important role in wetland function. Not only does it provide habitat for wetland wildlife that use associate uplands for part of their life requests, but upland vegetation also protects the wetland from sedimentation, nutrient loading and from encroachment of farming practices. Installation of conservation practices that protect or install a wetland buffer will benefit overall wetland function.

Rangeland

Rangeland (native prairie) provides many wetland wildlife species a portion or all of the necessary life requests. However prairie habitats have been significantly fragmented. Species dependent upon large blocks of grassland such as grassland nesting birds, have shown steep and more consistent declines than any other bird group in North America (Knopf 1994). See conservation practice 645 - Upland Wildlife Habitat Management for more details on managing rangeland for wildlife habitat.

- Conservation practice 528A -Prescribed Grazing and/or 472 - Livestock Exclusion provides high quality grass and riparian habitat. Grazing systems need to be designed to provide residual cover in order to be attractive to waterfowl and other grassland nesting birds.
- Planting woody cover on native prairie requires prior approval by a NRCS biologist. If woody species are desired plant native shrubs in areas that would mimic natural habitat such as woody wetland fringes. Native prairie shall not be converted to a shelterbelt type planting in order to provide winter cover for resident wildlife species.

Introduced Grasses and Legumes

Introduced grasses and legumes provide habitat for many species of wildlife associated with wetlands as well as providing effective buffers around wetlands. Tame grasses and legumes such as tall wheatgrass, intermediate and pubescent wheatgrass, alfalfa, white and red clover, and sweetclover provide cover and nesting habitat for waterfowl and other grassland nesting birds. Avoid using any species considered invasive in North Dakota or at the county level.

- See conservation practice 645 - Upland Wildlife Habitat Management for more details for establishing and managing introduced grass and legumes for wetland wildlife habitat.
- See conservation practice 390 - Riparian Herbaceous Cover for more details for establishing protective vegetative buffers around wetlands.

Planted Native Herbaceous Cover

Planted native herbaceous species can provide habitat for a variety of wetland wildlife species as well as providing effective buffers around wetlands. Native plant materials are adapted to the local soils and climate and may persist longer than their non-native counterparts. Natives may take longer to establish from seed than introduced species, but generally require less maintenance over time.

- See conservation practice 645 - Upland Wildlife Habitat Management for more details for establishing and managing native herbaceous cover for wildlife habitat.
- See conservation practice 390 - Riparian Herbaceous Cover for more details for establishing protective vegetative buffers around wetlands.

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Planted Woody Cover*

Planted woody cover can provide some wetland wildlife species thermal, reproductive, and escape cover as well as food in the form of seeds, fruits, nuts, buds, catkins, twigs, and leaves. However, planting of woody habitats nearby or within wetland complexes can and does have a negative impact on grassland nesting birds including waterfowl. Planted woody cover can have a significant positive impact on winter habitat for ring-necked pheasant and year round white-tailed deer habitat. Wetland woody shrub species such as sandbar willow and false indigo should be considered over tall trees.

Woody plantings will be planned and applied according to conservation practice 380 - Windbreak/Shelterbelt Establishment, 612 - Tree/Shrub Establishment or 422 - Hedgerow Planting. Use tree and shrub species recommended for the desired wildlife species. Refer to Tree and Shrub Characteristics for recommended wildlife trees and shrubs. For adaptation of woody plants to specific soils and climate, refer to the FOTG, Section II, Windbreak Suitability Groups.

Grain and Seed Crops

Where wetland wildlife is a secondary land use, grain and seed crops can provide food and cover for some wetland species, particularly geese, if management of crop residue is adequate to minimize destruction of winter and nesting cover. Waste grain may serve as a valuable food source for migratory species that will be nesting in that area or species that are using the area as a migration resting site. Fall seeded crops, such as winter wheat; provide more opportunity for nesting waterfowl than spring seed crops. (Duebbert).

To provide wildlife habitat on cropland:

- Leave grain stubble standing using conservation tillage.
- Eliminate fall plowing of crop residue.
- Plant winter wheat instead of spring grains when feasible.
- Leave strips of unharvested grain adjacent to winter cover.
- Delay spring tillage of fallow fields as long as possible (after July 15). Substituting herbicides for the first spring tillage saves bird nests as well as soil moisture.
- Implement contour strip cropping.
- Leave at least 4 weeks between tillage passes to allow ground-nesting birds to raise a brood.

Native Shrublands

Native shrublands can provide some wetland wildlife species thermal, reproductive, and escape cover as well as food in the form of seeds, fruits, nuts, buds, catkins, twigs, and leaves. Western snowberry and prairie rose provide nesting sites for waterfowl, while sandbar willow, dogwood and false indigo, are important covers for resident wildlife species.

- Implementation of conservation practice 528A - Prescribed grazing will be done considering the effects on upland nesting cover and wet meadow shrub communities and target wildlife species.
- Brush control for improved wildlife habitat should only be done after review from an NRCS biologist or after consulting with a North Dakota Game and Fish biologist.
- Brush control for increased forage production needs to be planned with wildlife habitat impacts in mind.

Native Forestland

Forestland that is adjacent to wetland complexes provides nesting cover for cavity nesting species (wood duck, mergansers). Riparian forest communities occurring on the floodplains of the North Dakota river systems are rich in resident wildlife species and provide excellent habitat for various breeding birds.

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- Uneven-aged, mixed species forests maximize habitat diversity for the greatest number of wildlife species. Selection harvest methods can maintain this diversity.
- Lack of forest management can result in low habitat diversity, although over mature trees, snags, and downed logs provide important habitat for cavity nesting birds such as wood ducks and a variety of mammals.

Interspersion of Habitat Elements: Edges, Ecotones, Corridors, and Habitat Fragmentation

“Edge” refers to the interface or point where two or more vegetation or cover types meet or where structural conditions within plant communities come together. The area influenced by this transition between communities or conditions is called an “ecotone.” Edges and their ecotones are usually richer in wildlife than are the adjoining plant communities or structural conditions. As a result, they are an important consideration in the management of habitat. Examples of wildlife species that thrive along habitat edges include the dabbling ducks, white-tailed deer, and red-tailed hawk.

Too much habitat edge can be detrimental for some “area sensitive” wildlife species. For example, since predators often concentrate their activities along edges, some species avoid predation by nesting in the relative safety of larger blocks of uniform habitat. Fragmentation of large patches of habitat into small, isolated patches, characterized by abundant edge, can modify the microclimate required by a given animal or plant, make a species more vulnerable to predation or nest parasitism, and split a wildlife population into isolated segments which may not be viable. Habitat fragmentation of native grasslands has had a significant impact to populations of grassland birds.

- When general wetland wildlife habitat diversity is the goal, attempt to join fragmented wetland habitats by planting herbaceous cover connecting the wetland with contiguous herbaceous habitat. Avoid planting woody corridors. These types of corridors attract predators' negatively impacting grassland nesting birds associated with wetland habitats.
- Corridors can be used to connect wetland habitats and reduce the impact of habitat fragmentation. Restoration of wetland complexes within the area that support the lifecycle of species such as waterfowl, in combination with herbaceous and shrub (western snowberry) cover on surrounding uplands, provides corridors for optimum wetland wildlife habitat. The wider the corridor the more habitat it will provide. Refer to Part 614.4 Conservation Corridor Planning at the Landscape Level, National Biology Handbook for more information.
- Look at the conservation-planning unit from a large scales perspective. Evaluate the unit in the context of the surrounding landscape. Obtain input from local state and federal game management biologists to determine the effects of proposed alternatives on various wildlife species. Inform the landowner of the potential effects of alternatives under consideration.
- When establishing nest cover for waterfowl, gamebirds, and other ground-nesting birds, minimize edge effect by planting in large rectangular blocks as opposed to narrow, irregularly shaped strips.

Aquatic Invertebrates

Aquatic invertebrates are especially important to wildlife because of the dietary nutrients they supply. Breeding female waterfowl especially rely on the rich sources of aquatic invertebrates in temporary and seasonal wetlands for nutrition (protein and calcium) to produce eggs (Johnson, *et. al*, 1997). In addition shorebirds and wading birds rely on aquatic invertebrate resources for much of their diet. Also, reptiles and amphibians prey on aquatic invertebrates as a major food source.

Because of the dynamic and harsh environment of North Dakota, aquatic invertebrates tend to be ecological generalists, meaning the diversity in each wetland is low (Euliss, *et. al*, 1999). Because the species are limited, it is imperative that the natural conditions are maintained to encourage the propagation of the aquatic invertebrates. Practices such as drainage, chemical applications, nutrient run-off, and sediment deposition must be limited to maximize aquatic invertebrate production in wetlands.

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- Implementation of certain conservation practices will improve habitat for aquatic invertebrates: 329 Conservation Tillage, 393 Filter Strip, 412 Grassed Waterway, 590 Nutrient Management, 595 Pest Management, 655 Upland Wildlife Habitat Management, 657 Wetland Restoration, 659 Wetland Enhancement and 390 Riparian Herbaceous Cover.

Individual Wildlife Habitat Considerations:

Waterfowl

General Habitat Requirements

A combination of all wetland types provides optimum habitat for waterfowl. Temporary wetlands may pond 6 - 12 inches for about a month in the spring, and provide feeding and breeding territories for dabbling ducks. Seasonal wetlands pond 6–18 inches from spring to mid-summer, allowing for dabbling duck feeding and breeding territories, and limited brood rearing. Diving ducks may also utilize seasonal wetlands for feeding. Semi-permanent wetlands pond 12-36 inches throughout the year, and provide excellent waterfowl habitat especially when the vegetative composition is one-third emergent vegetation. Dabbling and diving ducks feed, breed, nest (mainly diving ducks), rear broods, and rest during migration on semi-permanent wetlands. On permanent wetlands (36 inches and deeper throughout the year) open water is used during resting and feeding, and especially by diving ducks during migration.

In addition, upland nesting cover is required by many dabbling duck species including mallards, pintails, teal, widgeon, shovelers, gadwalls, and others. Tall, very dense vegetation is necessary to optimize nest cover for these species, especially where the acreage of cover is limited (pintails and teal tend to nest in somewhat shorter, more open cover). Fallen-over vegetation and abundant litter are prerequisites for quality dense nesting cover. The stand should be dense enough to make walking difficult. Nesting hens should be so concealed by the vegetation and litter as to not be visible at distances of two to three feet. Blocks of cover at least 40 acres in size are recommended to reduce excessive nest predation. Nests in cover patches smaller than this will probably suffer heavy losses by red fox, raccoons, skunks, and other predators. An exception to this may occur in large blocks of rangeland where human-adapted predator populations are relatively low. Here, native nest cover may be sparse compared to that described above, but patch size is large enough and predator populations low enough to allow high nest success. Studies also show that ducks will use winter wheat especially in areas containing high densities of wetlands but limited nesting cover. (Duebbert).

Dabbling Ducks (Teal, Mallard, Pintail, Shoveler, Gadwall, etc.)

- Management for dabbling ducks requires both upland and wetland habitats.
- Shallow water areas provided by temporary and seasonal wetlands are needed to attract dabbling ducks for breeding pair habitat in the spring and provide an early food source.
- Waterfowl pair and brood habitat will be located within one mile of nest cover.

Nest Cover

- Nesting cover consists of residual herbaceous material that will provide new growth and/or standing residue at least eight inches tall from mid-April through July 15.
- Recommended seed mixtures for introduced dense nesting cover and native nesting covers are included in the **General Specification and Planning Implementation Guide** section of this document.
- Implement grassland management on adjacent wetland areas after the nesting season to allow for adequate cover (delay mowing, tilling, and cutting until after July 15).

Conservation practice 645 - Upland Wildlife Habitat Management General Specifications and Planning/Implementation Guide for establishment of upland nesting areas.

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Brood Cover

- Deep-water areas that normally retain water throughout the summer are provided by deeper seasonal wetlands and semi-permanent wetlands or by shallow dugouts with emergent vegetation, including bulrushes, cattails, rivergrass, smartweeds, cordgrass, and slough sedge.
- If water control structures are installed, water levels will be manipulated to achieve a long-term vegetation to open water ratio of 50:50.

Food Supply

- Preferred foods are seeds, tubers, or stems of water milfoils, smartweeds, wild millets, pondweeds, bulrushes, spikesedge, and coontail; waste grains, snails, insects and various other invertebrates.
- Upland field feeding may occur on agricultural crops by some dabbling duck species.
- Improve water quality through nutrient, pesticide, and sediment management to maintain invertebrate and aquatic plant populations.

Habitat Management

- Incorporation of practice 528A Prescribed Grazing and/or practice 472 Use Exclusion on wetland areas within grazing land will help to maintain waterfowl habitat.
- Wetland restoration through sediment control, buffer planting or hydrologic manipulation will maintain the habitat. Practices that can be utilized are 329 Conservation Tillage, 393 Filter Strip, 657 Wetland Restoration, 412 Grassed Waterway, and 390 Riparian Herbaceous Cover.
- Maintenance of emergent vegetation can be accomplished through occasional emergent vegetation maintenance to avoid monotypic stands. Potential practices include 338 Prescribed Burning, and 525A Prescribed Grazing. Consideration should be given to occasional haying of the wetlands in order to manage monotypic stands of cattail.
- Management of infestations of weeds, insects, and disease are required to maintain the intended habitat (595 Pest Management).

Diving Ducks (Canvasback, Redhead, Ruddy Duck, Lesser Scaup)

- Waterfowl pair and brood habitat will provide at least 1 wetland basin that is either seasonal or semi-permanent, with 30 to 50 percent emergent vegetation. Wetlands with cattail margins and open water centers are preferred.

Nest Cover

- Provide dense emergent vegetation (i.e. bulrushes, cattails, whitetop, slough sedge other emergent vegetation associated with cattails) on seasonal and semi-permanent wetlands. Redheads will parasitize other over-water waterfowl nests and occasionally upland waterfowl nests. Redheads will occasionally nest in upland associated with seasonal and semi-permanent wetlands.

Brood Cover

- Open water areas, with some emergent vegetation (cattails, bulrushes, etc).

Food Supply

- Preferred foods are water milfoils, wild celery, widgeongrass, muskgrasses, pondweeds, coontail, duck potato, smartweeds, bulrushes; snails; and aquatic larvae and insects. Temporary and seasonal wetlands are important for feeding and loafing areas.
- Improve water quality through nutrient, pesticide, and sediment management to maintain invertebrate and aquatic plant populations.

Habitat Management

- Incorporation of practice 528A Prescribed Grazing and/or practice 472 Use Exclusion on wetland areas within grazing land will help to maintain waterfowl habitat.

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- Management of infestations of weeds, insects, and disease are required to maintain the intended habitat (595 Pest Management).

Cavity Nesting Ducks (Wood Ducks, Mergansers, etc.)

- Cavity nesting ducks nest in woodland areas along lakes, rivers, and vegetated wetland areas.
- At least 10 acres of wetland or other aquatic habitat should be available in a contiguous unit or in an isolated parcel separated by no more than 100 feet of upland in close proximity to nesting habitat.

Nest Cover

- Provide woody cover within 20 feet of the wetland or water edge with cavity trees or nesting structure.
- Artificial nesting structures can be constructed. Plans for structures can be found at <http://www.ms.nrcs.usda.gov/whmi/pdf/woodduck.pdf>.

Brood Cover

- Provide seasonal and semi-permanent wetlands, streams, ponds, and/or lakes. Adequate cover for broods consists of dense emergent herbaceous vegetation, emergent shrubs with crowns about 3-4 feet above the water surface, or fallen woody debris that covers up to 60 percent of the water surface.
- A ratio of 50-75 percent emergent cover to 25-50 percent open water is preferred.
- Reliance on permanent, deeper water bodies should be avoided to minimize duckling mortality from aquatic predators such as snapping turtles and large fish.

Food Supply

- Preferred foods include seeds from trees, aquatic insects, aquatic plants, and small fish.
- Improve water quality through nutrient, pesticide, and sediment management to maintain invertebrate and aquatic plant populations.

Habitat Management

- Incorporation of practice 528A Prescribed Grazing and/or practice 472 Use Exclusion on wetland areas within grazing land will help to maintain waterfowl habitat.
- Wetland restoration through sediment control, buffer planting or hydrologic manipulation will maintain the habitat. Practices that can be utilized are 329 Conservation Tillage, 393 Filter Strip, 657 Wetland Restoration, 412 Grass Waterway and 390 Riparian Herbaceous Cover.
- Maintaining or restoring area of trees adjacent to wetlands will improve habitat for cavity nesting ducks. Practice 391 Riparian Forest Buffer can be incorporated.
- Maintenance of emergent vegetation can be accomplished through occasional emergent vegetation maintenance to avoid monotypic stands. Potential practices include 338 Prescribed Burning, and 525A Prescribed Grazing. Consideration should be given to occasional haying of the wetlands in order to manage monotypic stands of cattail.
- Management of infestations of weeds, insects, and disease are required to maintain the intended habitat (595 Pest Management).

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Canada Goose

Provide semi-permanent and permanent wetlands that are at least 10 acres or more in size, with 5-20 percent tall emergent vegetation.

- Geese will utilize upland areas that contain succulent greens and waste grains.

Nest Cover

- Provide dense emergent vegetation or shrubby vegetation on seasonal and semi-permanent wetlands. Such vegetation may include bulrushes, cattails, whitetop, slough sedge, or cordgrass.
- Artificial nest structures may be constructed within a seasonal or semi-permanent wetland to decrease predation. Plans for artificial structure can be found at <http://www.npwrc.usgs.gov/resource/tools/neststru/pics/fig5.htm>.

Brood Cover

- Open water areas.

Food Supply

- Preferred foods are water milfoils, wild celery, widgeongrass, muskgrasses, pondweeds, coontail, duck potato, smartweeds, bulrushes; snails; and aquatic larvae and insects.
- Grazing on grassland vegetation such as Kentucky Bluegrass is a desired food source.
- Grain crops and stubble on uplands are another viable food source.

Habitat Management

- Incorporation of practice 528A Prescribed Grazing and/or practice 472 Use Exclusion on wetland areas within grazing land will help to maintain goose habitat.
- Wetland restoration through sediment control, buffer planting or hydrologic manipulation will improve the habitat. Practices that can be utilized are 329 Conservation Tillage, 393 Filter Strip, 657 Wetland Restoration, 412 Grassed Waterway, and 390 Riparian Herbaceous Cover.
- Management of infestations of weeds, insects, and disease are required to maintain the intended habitat (595 Pest Management).

Shorebirds or Wading Birds

General Habitat Requirements

- For many breeding shorebirds, landscape context of varying wetland complexes and habitats is important. Management of adjacent grasslands can create essential upland habitat for breeding shorebirds through practices such as prescribed grazing, mowing, or prescribed burning at appropriate times of the year.
- A key to managing habitat for migrating shorebirds is to encourage invertebrate production and then make invertebrates available to birds throughout the spring and summer/fall migratory periods.
- Nesting occurs between April and early July.
- Feeding and nesting sites should be in close proximity.

Nesting Cover

- Preference is typically, open, sparsely vegetated nesting cover near shallow water, including wetland edges.

Food Supply

- Shorebirds feed predominantly on insects, aquatic invertebrates, mollusks, and small fish found in very shallow water areas (4 inches deep or less). Managed shallow water areas can be a very important source of food for shorebirds during their spring migration.

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- Food diversity can be enhanced through creation of different habitat types within a wetland complex through drawdown and flooding management.

Habitat Management

- In artificial wetland settings, water control structures can be used to regulate water levels (reflooding and drawing down) to provide productive shorebird foraging habitat. Practice 335 Controlled Drainage.
- Maintenance of favorable shorebird habitat can be achieved by shallow disking the moist soil areas every 2-3 years, removing thick, emergent vegetation. Disking removes this vegetation and reconditions the wet soil by mixing in organic plant material, which attracts invertebrates.
- Natural wetland areas without water control structures should function in natural hydrologic cycles, and periodically provide shorebird habitat.
- Avoid pesticide and herbicide use around shorebird habitat to reduce degradation on food and cover.

For more information on management of habitat for grassland nesting birds see Fish and Wildlife Habitat Management Leaflet Number 17 Shorebirds @ <http://www.ms.nrcs.usda.gov/whmi/pdf/shorebird.pdf>

Amphibians and Reptiles

General Habitat Requirements

- Amphibians and reptiles have small home ranges, thus appropriate terrestrial habitat and diversity of wetland habitats of differing hydroperiods must be available in relatively close proximity.
- A wetland with a diverse topography that supports a variety of mud flat, emergent, and submergent vegetational zones can support abundant populations.
- A maximum of 20 percent of the surface water area will have water depths from 3-5 feet deep, and at least 50 percent of the area will be less than 1.5 feet deep at the design level.
- Basking structures such as semi submerged logs, stumps and log piles at a rate of 5 per surface acre will be installed if needed.
- Establishment of corridors connecting natural areas within agricultural environments provides safe movement patterns for reproductive activities and food foraging.
- Amphibians and reptiles are very sensitive to pesticides, therefore utilize Grass Filter Strips (393) and 390 Riparian Herbaceous Cover to provide a buffer between the wetland and area where Pest Management (595) will be applied.
- Mowing activities around wetlands and drainage ditches must be avoided mid-spring through mid-fall.
- Livestock should be kept out of the wetland basin, and an appropriate grazing plan should be in place on upland areas. Practices 528A Prescribed Grazing and/or practice 472 Use Exclusion should be utilized.

For more information on reptile and amphibian habitat management, refer to 'Habitat Management Guidelines for Amphibians and Reptiles of the Midwest' @ www.herpcenter.ipfw.edu.

Aquatic Furbearers

General Habitat Requirements

- Aquatic Furbearers inhabit seasonal, semi-permanent wetlands, permanent wetlands, and stream areas that provide year-round cover and food.

Cover

- Provide semi-permanent wetlands or intermittent streams with abundant emergent vegetation, or permanent wetlands or perennial streams with dense, emergent vegetation along the shore.

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- Winter cover can vary from dens to lodges constructed of matted aquatic vegetation, as long as access to water is available (i.e. under ice, running streams).

Food Supply

- At least 50 percent of the water area should have dense emergent vegetation consisting of cattails and/or bulrush species.
- Invertebrates and other small mammals that share the same habitat are a source of food for aquatic furbearers.

Other Wildlife

- Wetland habitat is often important for white-tailed deer, raccoon, wrens, pheasant, prairie chicken, gray partridge, and fox, depending on vegetation height, density, and management.
- Emergent aquatic vegetation is a significant winter cover for several species including the ring-necked pheasant, gray partridge, sharp-tailed grouse and deer,

References:

Duebbert, H. F. and Kantrud, H. A. Use of no-till winter wheat by nesting ducks in North Dakota. *J. Soil Water Conserv.* 42(1):50-53

Euliss, Ned H., Jr., David M. Mushet, and Ddale A. Wrubleski. 1999. Wetlands of the Prairie Pothole Region: Invertebrate Species Composition, Ecology, and Management. Pages 471-514 in D. P. Batzer, R. B. Rader and S. A. Wissinger, eds. *Invertebrates in Freshwater Wetlands of North America: Ecology and Management*, Chapter 21. John Wiley and Sons, New York.

Johnson, R.R., K.F. Higgins, M.L. Kjellsen, and C.R. Elliott. 1997. *Eastern South Dakota Wetlands*. Brookings: South Dakota State University.

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