



FDM 24-15-1 Introduction

December 8, 1995

The purpose of this section is to discuss potential impacts on wildlife. The scope, location, and design of a proposed project determine these impacts and the extent to which they have an effect on wildlife.

For the purposes of this section, it is assumed that there are four phases of development: design, construction, operation, and maintenance. Each phase can present specific problems to wildlife. Basically, primary impacts are those associated with the construction phase and secondary impacts, with the operation and maintenance of the completed facility.

FDM 24-15-5 Impacts-Design

December 8, 1995

The location of a highway and its extent (both length and breadth) are very important factors in determining wildlife impacts. The impacts of land acquisition for a highway cannot be thought of solely in terms of the strip that will be used for the roadbed itself. Among the many activities that require secondary acquisition of land are auxiliary lanes, frontage and access roads for local users, intersections and interchanges, medians or other barriers, rest areas, waysides, and weigh stations. This partial list does not include secondary development that may be spurred by the existence of new access.

Of primary concern is the identification of wildlife species and the habitats upon which they depend. These inventories should be developed at an early stage, with natural or critical areas being avoided. Location studies refine the information necessary for selecting a particular route within the selected corridor and present that information for public review. During this phase, specific fisheries and game requirements should be determined. The information needed to define potential wildlife problems, such as the removal of food or cover within critical habitats, the bisection of ranges and territories, and the obstruction or alteration of movement corridors can be obtained from the Department of Natural Resources (DNR) or the U.S. Fish and Wildlife Service.

Under certain circumstances, WisDOT projects may be in conflict with the terms of the Migratory Bird Treaty Act of 1918. This Act regulates the taking of migratory birds, their nests, eggs, parts, or products. For example, the demolition or maintenance of bridges may destroy the nests, eggs, or unfledged young of cliff and barn swallows, which are protected under the Act.

It is also during the design phase that forethought should be given to what the agency is willing to do about impacts once they are identified. Mitigation should be planned from the early phases of project development; it is difficult to incorporate changes into a project that has already been designed and is ready for construction.

FDM 24-15-10 Impacts - Construction

December 8, 1995

The construction phase is very critical to wildlife. It is during this phase that the majority of physical and biological changes of the environment occur, or the stage is set for further impacts of other phases. There are specific stages within this phase for which potential impacts can be identified and evaluated.

10.1 Clearing and Grubbing

The primary impact of this stage is the removal of existing vegetation and habitat. The degree of impact on wildlife would depend on the extent of vegetation removed, whether it supplied critical cover or a critical food source, and the probability of wildlife successfully relocating to a similar, nearby habitat. There is also a potential for erosion and sedimentation if adequate measures are not taken to protect the soil and nearby water bodies.

10.2 Stripping Top Soil

A high potential for erosion exists wherever topsoil is removed and stockpiled. If near watercourses, erosion can impact aquatic life. The exposed subsoil is less fertile than topsoil and will not readily support vegetation. Also, soil fertility is decreased and can be reestablished only when topsoil is replaced. This complete removal of vegetation eliminates the area's use by wildlife. In addition, the roadbed core becomes a permanent barrier

10.3 Earthmoving

There is often a need for borrow pits and disposal areas. Those borrow pits that contain standing water may create breeding and resting ponds for waterfowl if they are properly finished. They may provide a basin that is:

1) entirely water, 2) water and wetland, or 3) entirely wetland. Types incorporating wetland and water with gradual slopes are suitable habitats for waterfowl. Size and proximity to the roadway will determine the extent of usage, especially for breeding nesting, and rearing areas. Additionally, depth, shape, extent of shoreline, soils, and water quality determine the extent to which a borrow pit will be a productive resource.

Disposal of unsuitable material can cause an additional loss of habitat, depending on where it is placed. If not adequately removed or if protection is not provided for nearby waterways, overburden material can be a source of siltation and pollution.

10.4 Construction Noise

Most studies on the potential impacts of construction noise on wildlife have been done with laboratory animals. However, it is likely that some of these conclusions could apply to natural populations. In particular, construction in previously remote areas relatively free from noise would have a potential for disrupting wildlife. Since construction normally occurs from early spring until late fall, there is a potential for noise impacts during the time period when most wildlife species are breeding.

Laboratory studies have shown various effects on animals when noise levels are within the range of 72 dBA to 101 dBA. It is recognized that parameters, such as duration of exposure, whether the noise is intermittent or continuous, and its source affect the results of such studies. This information is provided to give an idea of the types of effects that can occur when noise is at levels normally produced by construction equipment.

Experiments with fowl showed cessation of brooding altogether or a reduction in the number of eggs hatched when brooding continued. Mice exposed to noise at various stages of pregnancy showed effects ranging from resorption of the fetuses, aborting, and giving birth to young that weighed less than offspring of control group animals not exposed to noise. Effects on adult animal populations have demonstrated behavioral changes, such as decreased activity, increased aggression, refusal to eat, and weakened reflexes.

Animals likely to be affected by noise are those that are capable of responding to sound energy, especially those that rely on auditory signals to find mates, stake out territories, recognize young, detect and locate prey, and evade predators. Species that are not responsive to or do not rely on sound signals for important functions could be indirectly affected if noise affects their prey.

Details on noise related impacts on specific species of wildlife may be available from the Department of Natural Resources (DNR) Wildlife Manager or the U.S. Fish and Wildlife Service.

10.5 Structures in Waterways

Construction of bridge piers and footings can modify the hydrologic regime of a river, which in turn can affect aquatic life. Scour at bridge piers or upstream and downstream from a structure can create pools and riffle areas that were not part of the natural characteristics of the river. There is a potential for either an increase or decrease in species diversity depending upon the type of stream involved and the extent of hydrologic modification.

Culverts, depending upon type, size, and length, can present passage problems for fish and small mammals. In general, shorter culverts with open bottoms provide the best passage for fish. Access to spawning and rearing areas can be eliminated if location and design of culverts is not done considering the natural use of a stream. Small mammals that have established movement routes along stream banks might be forced to cross the roadway if their normal paths are altered.

10.6 Roadway Barrier and Rights-of-Way

The most obvious effect of highway construction occurs when the roadway acts as a berm that remains as a permanent severance. This berm can act as a deterrent to the normal movement of wildlife as they travel among resting, feeding, mating, and nesting sites throughout the course of a day, week, or season.

Precise wildlife movement patterns are not usually known. This is due in part to the lack of, or short observation times (i.e., one season preceding construction is not adequate), or to natural changes in activity patterns, such as those observed during the mating season of many species. This adds to the difficulty of predicting whether a particular roadway location will affect movement patterns. If a project warrants it, this information might have to be determined through study and observation.

Trapping and road mortality information indicates that small forest mammals are reluctant to venture onto road surfaces where the distance between forest margins exceeds 65.5 feet; wider roads are crossed almost exclusively by medium to large sized mammals. Four-lane divided highways are as effective a barrier to the dispersal of small forest mammals as a body of water twice as wide.

Another possible effect on animal movement is that animals might adjust their movement patterns to utilize the roadway corridor because of the ease of travel along the cleared areas, thus expanding their ranges.

The movement of deer across roadways is largely dependent upon surrounding land use. In forested areas, deer utilize the right-of-way primarily for grazing. Generally, they are attracted to grazing areas that have wooded cover available within 25 yards on either side of the roadway. In agricultural areas, use of the right-of-way decreases and there is an increased tendency for deer to cross the roadway for access to fields.

FDM 24-15-15 Impacts - Operations

December 8, 1995

Operation is defined here to include daily or seasonally routine activities that occur after the highway is built. Traffic movement, automobile pollutants, and application of de-icing chemicals can affect wildlife throughout the life of the roadway. The most observable effect on wildlife is injury and mortality associated with animal/vehicle collisions.

Some general circumstances contributing to traffic hazards for wildlife have been identified. At high speeds, drafts from autofans may reduce songbirds' ability to fly clear of the vehicle. Animals have been observed to dart from cover close to the roadway into the path of cars. After dark, the glare of approaching headlights may blind or confuse an animal adjacent to or crossing the roadway. Seasonal and climatic conditions may influence wildlife mortality rates. Increased activity during breeding season and during favorable weather conditions may result in higher mortality rates. The mortality of cottontails, fox squirrels, muskrats, opossums, skunks and raccoons has been associated with increased activity during the breeding season and normal periods of dispersal. Scavengers and other predators are at increased risk of being hit by vehicles when attracted to the remains of road killed animals on the roadway.

Traffic generated noise can also have an impact on wildlife. The degree of impact would depend upon whether the alignment was new or an alteration of the existing one, and the extent and value of wildlife habitat adjacent to the roadway. Noise impacts are further discussed in [FDM 24-15-10](#).

Considerable literature is available on pollutants generated by the operation of automotive vehicles. Most of these reports, however, do not include information on the effects on wildlife. Some of the potentially hazardous substances resulting from auto operation are grease, petroleum, and n-paraffins resulting from spills or leaks of lubricants, antifreeze, and hydraulic fluids. Traffic related lead is deposited principally through the use of leaded fuels, however, this source will diminish with greater use of unleaded fuels in new vehicles. Some lead results from the wear of tires, in which lead oxide is used as filler material. Zinc is used as a filler in tires and at high concentrations in motor oil as a stabilizing additive. Copper, nickel, and chromium are wear metals from metal plating, bearings, bushings, and other moving parts within the engine. Wildlife that consume vegetation or other food chain components from roadsides could be adversely affected by these substances.

Although it is usually considered to be a maintenance practice, roadway de-icing is included under this section because it is an ongoing seasonal practice involving vehicle movement. Sodium chloride and calcium chloride are used almost exclusively as de-icing agents because of their efficiency in melting ice and snow, availability, and relatively low cost.

Two common additives to highway salts are ferric ferrocyanide (Prussian blue) and sodium ferrocyanide, both used as anti-caking agents. Of these, sodium ferrocyanide is soluble in water and will liberate cyanide in the presence of sunlight. Cyanide is lethal to fish and aquatic life in small concentrations. Salt poisoning of wildlife has also been reported. In one Wisconsin study, cottontails, quail, and pheasant were diagnosed as having been poisoned by sodium chloride. Some wildlife species are attracted to the roadway in winter to lick the salt, jeopardizing both the motorist and wildlife.

There is a considerable amount of literature available on the use of de-icing salts, including effects on vegetation and economic considerations. If it is necessary to evaluate salt impacts in detail, the search for the appropriate literature can be coordinated through the Office of Environmental Analysis (OEA).

FDM 24-15-20 Impacts - Maintenance

December 8, 1995

One of the most extensive maintenance tasks is the upkeep of highway rights-of-way. Depending upon the extent to which they are managed, highway rights-of-way have the potential for providing new habitat for wildlife. Studies on interstate interchanges have shown that although most use is observed in the zone just beyond the right-of-way fence, with moderate mowing practices and shrub plantings, interchanges can provide excellent habitat for songbirds and small mammals. Keeping a diversity of natural plant communities in various successional stages has a positive impact on wildlife food and cover. Extensive mowing and clear-cutting of trees or shrubs eliminates use of the right-of-way except by small grass dwelling species. Such practices also encourage the invasion of noxious weeds and increase the potential for erosion.

Another maintenance activity that can adversely affect wildlife is bridge painting. In the past, bridges were painted with red lead paint for all coats. A process is now utilized that minimizes application of lead paint.

Maintenance repainting involves sandblasting and removal of all scale and other substances to bare metal. The amount of lead entering a stream from this process can be significant. Although not soluble in water, lead particles can be ingested by fish, waterfowl and other wildlife, thus accumulating in the food chain. Sandblast scums on the surface of the water have been found to contain concentrations as high as 240,000 parts per million lead. If this floating scum deposits along the shoreline or on vegetation, it can be consumed in lethal amounts by wildlife or domestic livestock.

Depending upon the availability of funds, the best approach to minimizing adverse impacts is a continuous repainting program to eliminate the need for sandblasting. In addition, it is WisDOT practice to require contractors to contain paint chips with boom devices or to prevent these from falling into the water at all. More information may be obtained from the WisDOT Maintenance Section and the Standard Special Provisions.

20.1 Factor Sheets

Questions on Factor Sheets F1, G, H1, and H2 pertain to impacts on wildlife and need to be addressed when preparing an environmental document.

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/environment/formsandtools.aspx>

20.2 References

Jackson, H.H.T. 1961. Mammals of Wisconsin. University of Wisconsin Press, Madison, WI.

Vogt, R.C. 1981. Natural History of Amphibians and Reptiles of Wisconsin. Milwaukee Public Museum, Milwaukee, WI.