ANIMAL CONTROL

TECHNICAL GUIDANCE DOCUMENT

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INTRODUCTION

The presence of animals in restored and created wetlands is often a desired goal and suggests a healthy ecosystem. However, certain animal species can present management problems, especially if their populations become high. Muskrat, beaver, other ground burrowing animals, geese, and certain fish species can cause significant damage and problems to wetland vegetation, water quality, outlet structure performance, and neighboring properties. Methods to address these potential problems and control populations of these nuisance animal species are discussed in this technical guidance document.

APPLICATION

Certain animal species, if left unchecked, can cause significant damage to the components of a wetland restoration. Population control or in some cases, elimination of these species from restored and created wetland habitats is often a long-term management goal or need. The process or strategies used to control populations vary depending on the animal species and can include but may not be limited to trapping, vegetation management, and management of wetland water levels.

Muskrat

Muskrats are common in many of Minnesota's wetlands. Muskrat foraging of aquatic plants such as cattail often helps to create a diverse community of aquatic vegetation and their houses or huts provide nesting and loafing sites for other animal species such as waterfowl and turtles. The presence of muskrats in a wetland can help in maintaining a proportional balance of open water and emergent wetland vegetation , which is often a desired project goal. Muskrat populations can be dynamic however and too many of them can severely impact the quality and extent of wetland vegetation and overall integrity of the wetland ecosystem.

Muskrats also have a tendency to plug with vegetation and mud the entrance of unprotected small diameter pipes used as outlet structures for some projects. In addition, muskrats are burrowing animals and they will

tunnel and create dens within constructed embankments or other shoreline areas if given the opportunity. Earthen embankments are particularly attractive to muskrats for den habitat due to their heights and relatively steep front slopes in comparison to other shoreline areas. For new projects, constructed earthen embankments may provide the only opportunity for den habitat as emergent vegetation to construct houses with is yet to establish.

Efforts to control muskrat populations in a wetland are best accomplished through trapping. Trapping will not eliminate muskrats from a wetland as the reproduce quickly and do travel from one wetland to another in search of food and habitat. Trapping can be an effective strategy at controlling muskrat populations however, depending on the wetland setting it may be a long term commitment. Even with trapping, small muskrat populations can still create problems for restored wetlands.

Tunnels and dens that are dug within embankments can cause surface collapse, possible piping and eventually can lead to embankment failure. Fluctuating wetland water levels create the greatest concern as muskrats will continually dig new dens to keep them above wetland water levels. In addition, dens that were dug during low water level conditions will likely become inundated as water levels return to normal. This condition weakens the embankment structure and often leads to blowouts on the downstream side of the embankment (**Figure 4-4.28**). Embankment repair work as a result of muskrat activity is absolutely necessary and can become a costly, annual event for many projects. Burrows and dens that are observed must be filled in and compacted as soon as they are noticed. In critical areas where muskrat burrowing and repair becomes an annual event, a few strategies for additional embankment protection do exist. These strategies are best incorporated into the original design and construction of an embankment but can, in many cases be incorporated later as problems with muskrat burrowing develop.

One of the embankment protection strategies to consider is adding additional fill to the front of the embankment to create a wide wave berm or an extremely flat front slope. Another strategy to consider is to construct a blanket of rock riprap on the front slope of the embankment. Smaller rock with an even gradation from 4 inch to 12 inch diameter rock typically works well to prevent muskrat access. Neither of these two strategies will completely prevent borrowing but they can limit and make repairs more manageable. Their construction though will likely require a drawdown of wetland water levels and possibly a source of fill or borrow material to use both of which can be problematic for wetlands that have already been restored. Another more secure strategy does exist and includes the installation of fence material in the front portion of the embankment to act as barrier preventing burrowing. A variety of fencing materials can be considered with the selection somewhat dictated by construction conditions. For example, where draw down can occur, the entire front slope of the embankment can be stripped away providing for the use of more rigid, durable fence material placed along the embankment slope and then covered. In contrast, where standing water exists, a more flexible fence material may be needed with the bottom portion of it installed in a vertical trench close to the water's edge with the remaining portion bent over to match the upper portion of the embankment front slope. More detailed discussion of these strategies for preventing muskrat damage to constructed embankments occurs in Section 4-4, Engineering Design and Construction, Earthen Embankments - Other Design Considerations.

Beaver

Beavers if present can have a major influence on restored and created wetland areas. As was the case with muskrats, too many beavers or beavers in the wrong areas can cause problems. Aside from damaging vegetation including trees in and around a wetland, they will also perform extensive bank burrowing.

Burrowing within constructed embankments creates problems similar to those caused by muskrats, except on a larger scale. Beavers also have a great ability and desire to block or plug wetland outlet structures with sticks and mud. Maintenance and repair work as a result of beaver activity is absolutely necessary and can become a costly, annual event with some projects.

Beaver are most likely to inhabit wetlands that are restored or created adjacent to their primary habitat like wooded river and stream corridors or other flowages and lakes. Wetland restorations or creations done on open land with little or no adjacent tree growth may at first be less appealing habitat to a beaver. But as the site matures over time, the natural regeneration of trees such as willow and cottonwood within and along the edges of the wetland restoration could eventually create desirable beaver habitat.

Removal of beaver by trapping or other methods is usually the most effective method of control, especially in areas of the state where their populations are relatively low. In addition, beaver colonies are usually not permanent and depending on the wetland type and setting, they will likely abandon a wetland site if woody food sources within or adjacent to the wetland can be eliminated or managed at low levels. In areas of the state where beaver populations are high, trapping and other measures may not be as effective and should only be considered a short-term solution.

Where beaver activity is expected, the design of a wetland restoration or creation project should have been as "beaver proof" as possible. This should have included measures to appropriately limit or prevent beaver access to any necessary outlet structures and embankments. There are certain outlet structures that are fairly effective at preventing or limiting plugging by beaver. However, making an outlet structures completely beaver proof is difficult and even more so where greater flows and flow durations exist. More on this is discussed in Section 4-4, Engineering Design and Construction, Spillways and Outlet Structures - Other Design Considerations. Regardless of the type of outlet, regular inspection and maintenance will be necessary where beaver are present.

While beaver activity in embankments is limited, the possibility of burrowing still exists and therefore strategies may be needed to address this problem. The same general strategies for addressing muskrat burrowing as discussed above will apply to beaver as well.

Other Ground Burrowing Animals

Earthen embankments, when constructed are also appealing to other den living animals such as gophers, fox, coyote and badger. If discovered in an embankment, burrows and dens from these animals should also be addressed immediately. This will likely include trapping to remove the animal followed by repairing the damaged section of the embankment.

Geese

While Canada geese in limited numbers are generally acceptable to a project, problems develop as local flocks grow in numbers. While they will feed on a variety of wetland plants, their primary food source is upland plants and grasses. Towards late summer and into the fall, seed from site vegetation becomes a more regular part of their diet. In high numbers, grazing geese can affect the quality and numbers of desirable plant species and they can induce excessive nutrient loading to wetland areas. The real problem with geese however tends to be with problems they cause on areas adjacent to a restoration project. These include over-grazed lawns, accumulations of droppings and feathers on lawns, play areas and walkways, aggressive behavior by nesting birds, and safety hazards near roads. In addition, flocks of geese can cause significant crop damage to adjacent agricultural fields. This occurs primarily in the spring and early summer as new crop growth, in particular soy beans, becomes a desired part of their diet.

Project managers and landowners should attempt to achieve a balance between maintaining healthy, natural populations of all wetland animal species including Canada geese without adversely impacting other human uses, particularly agricultural interests. In some situations this will include strategies to control goose populations within a project area or limit their access to feeding areas adjacent to a project.

In more rural areas, the most effective strategy to protect adjacent areas from grazing geese is through the use of native buffers or fencing. Most grazing problems with geese occurs in spring and early summer as new vegetation and crop growth will be vulnerable to families of geese with their goslings. During this time, goslings will be limited to feeding areas that are within walking distance from their brooding areas as they are yet unable to fly. This condition also occurs during the summer molt, when adult geese are also unable to fly and must walk between feeding and resting areas. A barrier or buffer of dense, tall native vegetation between wetland areas and adjacent food sources is the simplest and probably most effective strategy at limiting offsite impacts of grazing geese. Where an adequate vegetative buffer is not possible or is yet to establish, a fencing system installed close the wetland edge can be an effective temporary strategy at controlling their movements. A variety of fencing material can be used with a minimum height of 30 inches needed for effective control.

In urban areas, Canada goose depredation control is most effective when a combination of management techniques is used in an integrated approach. No single strategy is universally effective or socially acceptable. The use a variety or combination of strategies is usually necessary for effective control. Control strategies can include native buffers and fencing as discusses earlier but also, nest and egg destruction, non-lethal treatment methods like hazing and harassment, and lethal alternatives when necessary.

Fish

An overpopulation of certain kinds of fish in any wetland can be detrimental to the functional benefits it provides. Bottom feeding fish such as carp and bullhead are often considered as nuisance fish species whose presence in certain wetlands often needs to be managed. These fish species can reproduce quickly and their bottom feeding characteristic s uproots aquatic plants and disturbs wetland bottom sediments and nutrients. This increase in water turbidity usually results in increased algal blooms which prevent sunlight from penetrating the wetland further affecting the growth of wetland vegetation. Carp and bullheads are not the only aquatic species that cause problems in wetlands. Recent studies have shown that fathead minnows can have a significant impact on invertebrate communities and biological health of a wetland.

Nuisance fish are introduced to many shallow wetlands each year via their annual upstream migration from other, more permanent downstream wetlands, lakes and rivers. So, isolated wetlands with no direct connection to a lake, river, stream, or ditch that supports fish migration will generally be void of fish unless they are introduced some other way. Under certain conditions, fish kills within wetland systems can happen naturally. Oxygen being depleted from the water without being replenished can eventually get to a low enough point and fish will die. This condition is most common in winter in shallow wetland systems but can also occur in the summer. A fall drawdown of water levels in deeper wetland systems can certainly aide in the effectiveness of an over winter fish kill. While achieving a fish kill may be desirable, it is usually not a reliable strategy for controlling nuisance fish populations especially for deeper wetlands where drawdown is not available. In addition, wetland impacts from these nuisance fish species will likely have occurred throughout the entire growing season. Therefore, to maintain a healthy, functional wetland it will often more important to keep nuisance fish other undesirable aquatic species out of the wetland than to rely on annual drawdowns in combination with overwinter fish kills for their control.

To some extent, the introduction of these nuisance fish and other undesirable aquatic species to restored wetland systems may also be managed or controlled by the operation of the wetland's outlet. In many cases,

the outlet will serve as a natural barrier to fish passage. The exception may be sites that occasionally become inundated due to downstream flooding where the outlet becomes less effective at preventing fish passage. Even sites that utilize subsurface tile drainage system as their outlet have potential problems with fish access. In many situations, the outlet may have been specifically designed to function as a barrier that prevents the upstream movement of nuisance fish and other aquatic organisms from entering a restored or created wetland. The use of barriers as a management strategy is not uncommon in the design of wetland restoration projects in Minnesota, although their use has primarily been limited to larger sites where protection of the resource is more highly valued. Barriers, if properly maintained, can be effective at keeping fish from entering restored wetlands. More discussion on the types and use of fish barriers occurs in Section 4-4, Engineering Design and Construction, Spillways and Outlet Structures - Other Design Considerations.

Other Animals

Domestic livestock should be kept from embankments and outlet structures. When access across an embankment is needed as a travel lane, it should be fenced to keep access across the top only. If grass cover becomes worn from travel, other protection such as gravel may be needed. Preventing damage to vegetated spillways that may be located around embankments is also important.

OTHER CONSIDERATIONS

When dealing with nuisance animals, all trapping and furbearer laws along with other laws and local ordinances must be adhered to. In Minnesota, it is unlawful to disturb the burrow or den of a wild animal, including muskrats between November 1st and April 1st without a DNR permit.