MINNESOTA WETLAND RESTORATION GUIDE

WATER LEVEL MANAGEMENT - FLOODING

TECHNICAL GUIDANCE DOCUMENT

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INTRODUCTION

The design of a planned outlet structure for a restored or created wetland will influence the size and type of wetland, as well as its depth, area, and duration of flooding after runoff events. The amount and frequency of flooding will have some affect on the type and diversity of plant and animal communities found in and around the wetland, and also the flood control benefits provided by the project.

In addition to normal water level fluctuations that result from seasonal hydrology changes or specific runoff events, there is often a desire to periodically manage water levels after a wetland is restored or created. While only applicable in limited situations, the intentional flooding of a restored or created wetland can provide relatively low cost management opportunities for the project.

APPLICATION

Flooding, as management strategy is generally used to control vegetation in a wetland. Specially designed outlet structures will typically be needed for this strategy.

When applicable, flooding can control reed canary grass, cattail, and other invasive or undesired species that cannot tolerate prolonged inundation or submersion. For effective control of most vegetative species, it will typically be necessary that sufficient water levels are available to sustain prolonged inundation. Consistent flooding may be required for one to two years for most species to achieve sufficient removal.

Reed Canary Grass

Reed canary grass requires flooding to the top of plant stems for effective control. Flooding should be initiated when winter snowmelt can be retained in a wetland, or after herbicide or mowing is conducted to remove above ground growth. Inundation may be needed for a full growing season for sufficient control. Wetland managers are also experimenting with winter flooding as a means of control. Reed canary grass

that exists in the margins of open water areas likely will not be sufficiently controlled by flooding, as it will likely remain above the flooded water levels. Repeated herbicide application with aquatically certified glyphosate will likely be needed to gain sufficient control in these areas.

Re-seeding will likely be needed in all areas where reed canary grass is removed to ensure that it doesn't re-establish. The planting of aggressive native species will be desirable to provide long-term competition with reed canary grass.

CATTAILS

In some situations, cattails can also be effectively controlled by flooding. The best control occurs if the cattails are mowed, treated with herbicide, or burned before inundation. A common strategy involves mowing cattails on the ice during late winter during periods of low water levels either from seasonal conditions or an intentional drawdown; then taking advantage of snow melt and spring rains to flood the wetland and submerge the plant stems.

As with Reed canary grass, cattail that exists on the margins of open water areas likely will not be sufficiently controlled by flooding, as it will likely remain above the flooded water levels. Repeated herbicide application with aquatically certified glyphosate will likely be needed to gain sufficient control in these areas.

Areas where cattails are removed will likely require re-planting to create competition for new cattail growth. Emergent species are often established through a combination of seeding and planting containerized plants or pre-vegetated mats. In some situations, the ability to manage wetland water levels to a specific elevation or condition can provide ideal hydrology conditions for new plant establishment.

TREES

Flooding can also be used as a means to control some woody plants such as seedling cottonwood, Siberian elm, and boxelder. Many trees are somewhat flood tolerant, so flooding may need to be combined with herbicide application, mowing or prescribed burning.

OTHER CONSIDERATIONS

Mowing, herbicide application and prescribed fire is recommended before flooding to aid in removal of tall vegetation. If water levels are decreased after flooding it is common that invasive species will re-colonize the exposed area. In some cases native seed bank may be released. Planting can also be conducted in areas of bare soils after water levels are decreased; invasive species in surrounding areas should be controlled before planting.

With the added management benefits of being able to temporarily flood a basin comes the additional cost to design and construct outlet structures that allow water level management, additional maintenance issues, the potential for increased vandalism, and the possibility of undesired or unauthorized management of water levels. The benefits of being able to manage water levels with a control structure should be weighed against the additional cost and these potential issues.

Consideration is also needed with respect to potential off-site impacts of the flooding activity. If adequate land rights are needed for the offsite impacts temporary easements or permissions may need to be secured.

COSTS

The potential costs of flooding as management activity will vary. For many projects, the only cost will be the time or resources necessary to adjust or operate an outlet structure to raise wetland water levels. For other projects, additional activities that will be conducted as part of this management strategy will affect overall time and cost. These can include, but are not limited to the following items:

- Draw down of water levels to allow pre-flooding vegetation management (cutting/spraying/fire)
- Herbicide treatment – pre and post flooding
- Mowing – pre flooding
- Fire – pre flooding
- Acquisition of temporary flowage easements
- Seeding/Planting

ADDITIONAL REFERENCES

Biology and Management of Reed Canary Grass and Implications for Ecological Restoration, Antieau, C.J.

Minnesota Wetland Restoration Guide, Section 5, Vegetation Establishment