

Lake Drawdown

The committee has investigated the benefits of a drawdown, and they are listed below:

- Shallow water weed root systems are exposed to the drying and freezing of the winter weather
- Community members are able to work on their docks
- The possibility of winter flooding is decreased

However, there are also several principle disadvantages to drawdowns.

- Drawdowns will promote either algae blooms or aquatic plant growth due to the increase in nutrients from dead biomass
- Slower moving organisms such as snails, insects, and crayfish are killed in the drawdown, highly disrupting the lower end of the food web
- All other organisms higher up on the food web will feel negative impacts
- Winter drawdowns undermine the LMC's Weed Management Program

In the short run winter drawdowns may alleviate weed conditions, but over the long-term frequent drawdowns may undermine our Weed Management Program. According to EnviroScience, since the drawdowns are not selective in plant control, native plant species that compete with the invasive plants are wiped out in the drawdowns as well. The resulting conditions favor the invasive species (mainly Eurasian Milfoil) since it grows back much more quickly than the native plants and gives it a stronger opportunity to take our lake over since there is less competition. The LMC feels we should explore other options and drawdowns should be considered as part of the weed management program.

LMC Recommendation:

Given the above information on lake drawdowns, the LMC recommends that the board drawdown the lake no more than once every three years.

June 17, 2010

Mr. Fred Innamorato
Chairman, Lake Management Committee
Roam Rock Association, Inc.
P.O. Box 8
Roam, Ohio 44085

Dear Fred:

You requested that I review available literature regarding the ecological effects of winter drawdown and make a recommendation to the Lake Management Committee of the Roam Rock Association regarding the frequency of drawdown. The following paragraphs present the pros and cons of drawdown as I see them.

A principal benefit of winter drawdown is the low-cost removal of aquatic plants that grow in shallow water by exposing the root systems to drying and freezing. Other benefits of frequent, periodic drawdown include allowing access to the shoreline and docks for structural maintenance, protection of shoreline structures from ice damage, and increasing flood storage capacity of the lake.

Unfortunately, though, there are a number of well-documented adverse impacts associated with periodic water level drawdown in lakes and reservoirs.

Most water bodies, including Roaming Rock maintain a balance between macrophytes (rooted aquatic plants) and algal growth. Despite a tendency toward balance, oftentimes one or the other will dominate. A given lake may even shift from one condition toward the other. This is the 'something is going to grow' principal.

In the case of drawdown, as the macrophytes are killed, rotting biomass releases nutrients to the water column. The excess nutrient problem in Lake Roaming Rock is compounded because there is less standing plant material the following year to make use of this suddenly higher than normal nutrient supply. Overall, the degree of nutrient competition in the lake favors increased algal populations due to their ability to quickly uptake the available nutrients. This can produce algal blooms of the type you are all too familiar with. Small lakes frequently have been seen to shift from clear, plant-dominated conditions to turbid, algal dominated systems following a drawdown.

Impacts, including mortality, to aquatic animals is also a big risk during drawdown. Faster moving organisms like fish may be able to move to unimpacted areas during a drawdown; still, these fish may be confined to smaller, shallower areas where they fall prey to other fish or suffer from low oxygen conditions. Slower moving, more sedentary organisms like mussels, snails, insects, crayfish and



amphibians, often can't move or are unable to find suitable habitat and may succumb to the drawdown. Overall, drawdown can have significant and long-lasting impacts on non-target organisms like snails, macroinvertebrates, the fishery and waterfowl.

Even though these impacts may seem small and be difficult to measure, they may produce undesirable shifts in the entire aquatic food web in a lake like Roaming Rock. Impacts to organisms lower in the food web (such as plants and insects) will have negative impacts on organisms higher in the food web (such as fish and waterfowl). Additionally, removal of the shelter provided by these plants can reduce young of the year survival in fish populations.

Finally, although drawdown can produce relatively weed free conditions for short periods of time, over the long-term, frequent drawdown may result in the plant community shifting from a diverse assemblage of desirable native species toward monocultures or invasive nuisance species. Drawdown is not a selective method of plant control. Desirable native species are removed along with the exotic invasive species. The resulting bare sediment is a condition which favors those species that colonize the fastest. Not surprisingly, these tend to be non-native nuisance species such as Eurasian watermilfoil and Curlyleaf Pondweed. Over time then, drawdown can promote the replacement of a diverse native plant assemblage by monocultures of invasive exotic species.

For these reasons, if the Roam Rock Association is going to do scheduled winter drawdowns, I recommend that they be done no more frequently than every three years.

Please don't hesitate to contact me should you require clarification or have further questions.

Sincerely;



Martin A. Hilovsky
President

The following references were utilized in preparing this recommendation:

Cooke, G.D., E. B Welch, S.A. Peterson, and S.A. Nichols. 2005. *Restoration and Management of Lakes and Reservoirs*. 3rd Ed. Boca Raton, FL: CRC Press.

Holdren, C.W. Jones, and J. Taffart. 2001. *Managing Lakes and Reservoirs*. N. Am Lake Manage. Soc. and Terrene Inst., in coop/ with Off. Water Assess. Watershed Prot. Div. U.S. Environ. Prot. Agency, Madison, WI.

McComas, S. 2003. *Lake and Pond Management Guidebook*. Boca Raton, FL: CRC Press

NYSFOLA. 2009. *Diet for a Small Lake: The Expanded Guide to New York State Lake and Watershed Management*. New York State Federation of Lake Associations, Inc.

Winter Drawdown- Pros and Cons

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In the case of drawdown, as the macrophytes are killed, the rotting biomass releases nutrients to the lake. The excess nutrient problem is compounded because there is less standing plant material the following year to make use of this suddenly higher than normal nutrient supply. Overall, the degree of nutrient competition in the lake favors increased algal populations due to their ability to quickly uptake the available nutrients. Small lakes frequently have been seen to shift from clear, plant-dominated conditions to turbid, algal dominated systems following a drawdown.

Impacts, including mortality, to aquatic animals is also a big risk during drawdown. Faster moving organisms like fish may be able to move to unimpacted areas during a drawdown; still, these fish may be confined to smaller, shallower areas where they fall prey to other fish or suffer from low oxygen conditions. Slower moving, more sedentary organisms like mussels, snails, insects, crayfish and amphibians, often can't move or are unable to find suitable habitat and may succumb to the drawdown. Overall, drawdown can have significant and long-lasting impacts on non-target organisms like snails, macroinvertebrates, the fishery and waterfowl.

Even though these impacts may seem small and be difficult to measure, they may produce undesirable shifts in the entire aquatic food web in a lake like Roaming Rock. Impacts to organisms lower in the food web (such as plants and insects) will have negative impacts on organisms higher in the food web (such as fish and waterfowl). Additionally, removal of the shelter provided by these plants can reduce young of the year survival in fish populations.

Finally, although drawdown can produce relatively weed free conditions for short periods of time, over the long-term, frequent drawdown may result in the plant community shifting from a diverse assemblage of desirable native species toward monocultures or invasive nuisance species. Drawdown is generally not selective as a plant control mechanism. Desirable native species are removed along with the exotic invasive species. The resulting bare sediment is a condition which favors those species that colonize the fastest. Not surprisingly, these tend to be non-native nuisance species such as Eurasian watermilfoil, Curlyleaf Pondweed and Coontail. Over time then, drawdown can promote the replacement of a diverse native plant assemblage by monocultures of invasive exotic species.

For these reasons, I recommend that if the Roam Rock Association is going to do scheduled winter drawdowns at all, they be done no more frequently than every three years.