



MassWildlife

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

Division of Fisheries and Wildlife

Drawdown Performance Standards for the Protection of Fish and Wildlife Resources

Approved by the Fisheries and Wildlife Board on September 23, 2002

The Wetlands Protection Act requires that the Division of Fisheries and Wildlife be notified of any proposed drawdown where rare species habitat is involved. To identify areas of rare species habitat, consult the most recent edition of the "Massachusetts Natural Heritage Atlas" which contains maps of Estimated Habitats and Priority Habitats of rare wildlife.

Drawdowns are commonly used as a technique to control aquatic vegetation in many Massachusetts waterbodies. The Division has statutory authority for regulating the take of these resources under Massachusetts General Law Chapter 131 and Chapter 321 of the Code of Massachusetts Regulations. Based on the Division of Fisheries and Wildlife's knowledge and understanding of aquatic ecosystems, the following performance standards were developed to protect fish and wildlife resources when a lake drawdown is proposed.

For drawdowns exceeding 3 feet the Division of Fisheries and Wildlife must be contacted directly for a site-specific review of potential impacts to fish and wildlife resources. For drawdowns of 3 feet or less, the proponent must either 1) contact the Division of Fisheries and Wildlife for a site-specific review; or 2) meet the performance standards below:

1. Drawdowns must commence after November 1st.

Drawdowns have been documented to be effective for vegetation control in certain situations but still constitute an artificial disturbance. Consequently, any drawdown should take place for the minimum amount of time required to accomplish the lake-management goal for which the drawdown is conducted. A November 1st start date for the drawdown will allow the following conditions to be met:

- The pond can be drained at the appropriate rate.
- Sufficient time will be provided for the drawdown to be effective.

- The pond can be filled prior to the refill deadline.

Maintaining full pool elevation until this date will also minimize the risk of in-lake and downstream fish kills caused by temperature stress and low dissolved oxygen. Fish kills that occur during the warm weather months are often caused by the interaction between water temperature and oxygen depletion in shallow, heavily vegetated lakes (Bennett, 1970). These lakes tend to have elevated oxygen concentrations during the daytime while vegetation is photosynthesizing, yet experience oxygen depletions at night while live plants are respiring and large amounts of decaying organic matter create excessive biological oxygen demand (Wetzel, 1975). Low dissolved oxygen situations are common in numerous small, shallow lakes in Massachusetts. A reduction of the surface water elevation under these conditions could further exacerbate an already critical condition. Temperature-induced fish kills can also be caused by the release of large volumes of warm surface water into a coldwater fishery resource during summer or early fall. One recent example occurred in Coal Mine Brook in Worcester, resulting in a significant kill of brook trout.

Part of the Division's management responsibilities is to provide recreational opportunities. Initiating the drawdown after November 1st will minimize impacts on fall recreation by maintaining public boat ramp access and other recreational opportunities. Anglers, seeking to take advantage of stocked trout resources, or warmwater fish species that become more active in the fall, will launch boats or fish from shore. Low water levels can expose boat ramps and hinder safe boat launching. Likewise, exposed mud flats or accumulated dying vegetation can limit access to shore fishing.

2. The drawdown must be completed (reach its lowest elevation) by December 1st.

Amphibians, reptiles and other aquatic organisms need to be able to move to deeper water before ice formation and substrate freezing. Completion by December 1st will also allow aquatic mammals to locate alternate lodge sites and for beaver to relocate food caches before ice formation.

3. Lake refill must be achieved by April 1st.

This refill date will ensure that the resource is impacted for the shortest time period while still allowing the drawdown to be effective. Establishing stable pool elevations by April 1st will provide suitable spawning habitat for littoral spawning fish species. Also, spring traditionally signals the beginning of the fishing season for most Massachusetts anglers pursuing both cold and warmwater fish species. Many ponds are also scheduled for trout stocking in the early spring. For the same reasons previously described, access to public boat ramps (for boats and stocking trucks) and shoreline fishing must be maintained.

4. The drawdown rate must not exceed 4 cubic feet per second per square mile of drainage area (cfs/m), as measured at the outlet structure, or must not exceed three

inches of lake elevation change per day, whichever results in the lower downstream flow rate. Once the drawdown level has been achieved, lake outflow must equal lake inflow. During the lake refill period, 0.5 cfs must be maintained at the outflow.

A major biological concern and priority for the Division is protecting instream flows for fish and wildlife resources. Working in conjunction with researchers at Cornell University, the Division is utilizing the target fish community approach to assess stream fisheries resources and establish restoration goals in flow-stressed streams. An important component of restoration or maintenance of any stream fish community is the establishment of seasonal stream flow requirements. In the absence of site-specific stream flow data, we utilize the United States Fish and Wildlife Service Aquatic Base Flow (ABF) Policy to protect fish and wildlife resources.

The ABF Policy focuses on measuring the flows in healthy, unregulated streams and rivers in New England to determine average seasonal flows for the region. Seasonal recommendations, from typical low summer flows to typical spring runoff (referred to as the natural hydrograph) can then be applied during the appropriate time of year in regulated resources or in instances where water withdrawal or manipulation is proposed. The seasonal ABF recommendations are 0.5 cfs in the summer, 1.0 cfs in the fall/winter, and 4.0 cfs in the spring.

Most drawdowns are conducted during the winter for vegetation control. This creates flow rates that will be greater than the winter ABF recommendation during pond drawdown and less than the winter ABF recommendation during refill. The drawdown rates listed above, although outside the value for the winter ABF recommendation, will maintain stream flows within the range that would be expected in the natural hydrograph.

Providing the flows listed in the performance criteria will prevent the stream from going dry during pond refill, minimize downstream erosion and prevent fish stranding in the pond.

References

Bennet, G. W. 1970. Management of lakes and ponds. Van Nostrand Reinhold Company, New York, NY.

Wetzel, R. G. 1975. Limnology. W. B. Saunders Company, Philadelphia, PA.