Environmental Evaluation
Whitney Environmental Study Team Recommendations

Recommendations from "Lake Whitney Water Treatment Plant Environmental Evaluation – Environmental Evaluation Team Final Report", January 1999.

The environmental study team has concluded that without mitigation the Authority's proposal to build and operate a 15-mgd water treatment plant at Lake Whitney has the potential to cause significant adverse impacts on the environment, especially on the downstream Mill River corridor. Even though the projected impacts are unlikely to be significantly greater than those during operation of the former treatment plant, study findings indicate a potentially serious environmental problem, particularly during dry years. We therefore believe it is necessary to establish procedures and standards for reducing the likelihood of unacceptable environmental impacts. We have defined a series of measurable performance standards that should be met in the lower Mill River to mitigate adverse environmental impacts, and we recommend that the Authority develop a management plan for the Whitney water treatment plant that implements the following recommendations to the extent feasible:

Minimum Spillway Flow: The most effective and desirable way to protect the downstream environment is to maintain adequate flows over the spillway. The Authority should adopt a goal of managing withdrawals from Lake Whitney to maintain the lake level at least 0.1 foot above the spillway, equivalent to a downstream flow of about 20 cfs or 13 mgd. During dry periods when it is not feasible to maintain this lake level, performance standards for minimum flow releases and dissolved oxygen, as described below, should be met to maintain acceptable environmental conditions in the lower Mill River.

Minimum Flow Releases: Minimum flow releases equivalent to the median August flow of 0.2 cfs per square mile of watershed should be made at the Whitney dam, even though there is no regulatory requirement for such releases to tidal rivers. This will provide a minimum flow of 7 cfs (4.5 mgd) in the Mill River below the dam during the summer months. In the winter, the minimum flow release should be doubled to 14 cfs (9 mgd), and during the fish spawning season, April to mid-May, flows of at least 56 cfs (36 mgd) should be maintained. These flow releases would be reduced during dry periods when the inflow to Lake Whitney falls below the recommended minimum and would in no case exceed the natural inflow to the lake.

Dissolved Oxygen: To maintain adequate aquatic habitat and prevent fish kills during low-flow conditions, dissolved oxygen concentrations in the plunge pool below the dam should be at least 5 mg/L at all times. When there is no flow over the spillway, flow releases should be made in a manner that will provide oxygenated water to the plunge pool. Measures to ensure adequate oxygen in the river may include releasing water from a height to permit aeration, in-lake

aeration of Lake Whitney to improve water quality, release of treated backwash water from the proposed plant, or in-river aeration of the plunge pool.

Spring Flood Releases: To ensure annual channel scouring and spring inundation of the high marsh along the Mill River, the "mean March inflow" of 157 cfs (101 mgd) for Lake Whitney should be released at the Whitney dam for 1-5 days between February 15 and March 15.

Salinity Monitoring: Insufficient information is available to predict the impact of water-supply withdrawals on salinity in the Mill River tidal marshes or to develop a quantitative performance standard for salinity levels in the river. Maintaining the recommended flow releases will help to mitigate salinity impacts to an unknown extent. The Authority should develop a salinity monitoring program that includes determination of maximum salinity levels in the river during extended periods of low flow and monitoring of soil salinities in the marsh. This monitoring should be initiated prior to construction of the plant to provide baseline data and continued after the plant becomes operational.

Vegetation Monitoring: Quantitative sampling of the freshwater tidal marsh community should be continued before and after the plant is constructed. If critical trends are observed, such as loss of species diversity or an increase in the rate of shrub succession, and can be correlated with changes in soil salinity, river flow, or inundation frequency, the use of additional mitigative measures should be evaluated, including adjustment of downstream flow releases.

Aquatic Habitat Monitoring: Monitoring of fish and other aquatic organisms and habitat conditions, including dissolved oxygen, flow, and water levels, should be continued before and after plant operation begins. Adequate flow should be maintained to allow fish passage between the plunge pool and downstream areas.

Wildlife: Measures that protect aquatic life and marsh vegetation will help to prevent adverse impacts on wildlife. Because most existing information on wildlife in the area is anecdotal, a systematic baseline survey of wildlife would be a valuable addition to understanding of the Mill River ecosystem and provide a basis for evaluating future changes in wildlife populations. The Authority should consider a cooperative effort with East Rock Park management to develop and implement a wildlife monitoring plan for the area.

Aesthetics: Waterfall aesthetics should be preserved to the extent feasible by maintaining flow over the spillway. When this is not possible, consideration should be given to providing a scenic "artificial waterfall" through deliberate water releases, which will also contribute to maintaining a flow of oxygenated water in the river. In the remainder of the downstream corridor, human aesthetic enjoyment is primarily dependent on maintaining healthy ecological conditions in the river and the marsh and should be protected through the measures recommended above.

Lake Whitney - Drawdown Management: To protect spawning of largemouth bass and other fish in the lake, drawdowns during May and June should be limited to a maximum of one foot below spillway level. Maintaining flows over the spillway to the extent feasible will minimize impacts on the lake from drawdowns.

Lake Whitney - Water Quality: Watershed source protection and in-lake measures that the Authority may implement to improve source water quality, such as aeration of lower, oxygen-depleted water layers during the summer months, will also improve aquatic habitat in the lake and contribute to improved conditions downstream. The use of copper sulfate algicides in Lake Whitney should be avoided.

Unavoidable Adverse Impacts

The construction of a new Whitney water treatment plant will mean an essentially irretrievable diversion of a significant portion of the present downstream flow. Even with the recommended mitigation, water-supply use of the Mill River will take precedence under critical conditions over competing uses of this resource if the proposed plant is constructed.

If the Authority adopts the recommended performance standards as management goals and manages withdrawals from Lake Whitney to achieve these goals to the extent feasible, the potential for adverse downstream impacts due to flow reduction will be substantially reduced. There will, however, be an unavoidable decrease in the overall annual flow and increases in the frequency and duration of low flows endured by aquatic and marsh communities downstream, increasing the environmental stress to which these communities are subject. The reduced flow will also have some adverse impact on the aesthetics of the waterfall, especially during the summer and fall of dry years. There will also be an unavoidable increase in the frequency of drawdowns of Lake Whitney, although not necessarily in the magnitude of these drawdowns. Impacts on aquatic communities in the lake will be minor and will probably be offset by improvements in lake water quality.

Overall, construction of the proposed plant will produce some unavoidable adverse impacts, especially on the downstream corridor, as compared to present conditions. Historically, however, there was a water treatment plant operating at the Whitney dam for 85 years, up until 1991, during which period the lower Mill River corridor apparently remained a biologically diverse, ecologically resilient, and aesthetically enjoyable area. If the Authority implements the proposed performance objectives to the extent feasible, we predict that operation of the new treatment plant will not have significant adverse environmental impacts compared to the period when the former treatment plant was operating. In fact, there should be a substantial improvement in aquatic habitat compared to historical conditions, especially in critical dissolved oxygen levels, as a result of the recommended measures to maintain oxygenated downstream flows.

Long-Term and Regional Considerations

The proposed Whitney plant can produce long-term water-supply benefits to the region. The Authority's Water Supply Plan indicates that returning Lake Whitney to water-supply use will create a more adequate and flexible water-supply system, provide a secure margin of safety, and permit more efficient operation of other water sources, especially the Lake Gaillard reservoir, whose large storage volume can be more effectively used by maximizing withdrawals from Lake Whitney during high-flow periods.

We believe, however, that the ecological and human values of the lower Mill River corridor are of regional significance and warrant the protection described above even if this should necessitate minor District-wide modifications in water use. During critical periods, the Authority should consider requesting voluntary restrictions on water use as an alternative to reducing downstream flows below the recommended minimums.

The proposed Whitney water treatment plant will be designed to be expandable to 30 mgd. Expansion beyond the currently permitted diversion of 15.45 mgd would require that the Authority obtain a new diversion permit from the Connecticut Department of Environmental Protection, which will require a detailed examination of its potential environmental impacts. Before such an expansion is pursued, the Authority should monitor and analyze the impacts of operation of the proposed 15-mgd plant and should reexamine the cost effectiveness and environmental consequences of alternative sources of supply. While an additional source of water supply is needed at present to provide an adequate margin of safety within the Water District, every effort should be made in the future to control the growth of water demand through conservation.

Overall the environmental study team has concluded that the environmental quality of the Mill River corridor can be protected and unacceptable adverse impacts avoided if the Regional Water Authority constructs the proposed water treatment plant. Protection of the significant lower Mill River ecosystem and its human values, however, will require that the Authority incorporate a series of mitigating measures into the construction and operation of the proposed plant, focusing particularly upon maintaining oxygenated downstream flows as consistently as possible under critical conditions. It will also be necessary that the Authority continue to monitor the effects of plant operation on the environment and manage the facility to balance water-supply objectives and environmental goals.

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Lake Whitney Water Treatment Plant Environmental Evaluation Team

John P. Hudak

Stephen R. Kellert

James T. Maughan

J. Lee Rogers

Penelope C. Sharp