

5.20 Dam Safety

5.20.1 Introduction

This assessment of environmental consequences focuses on whether implementation of a new reservoir operations policy would change reservoir elevations in a manner that would affect the structural stability of the dams and their appurtenant structures.

5.20.2 Impact Assessment Methods

An assessment of the effect of the alternatives on reservoir levels was performed. Maximum simulated reservoir levels were reviewed and the reservoir levels under the alternatives were compared to those seen in the Base Case. Simulated maximum levels predicted to exceed those under the Base Case were evaluated. If the increase was small relative to the total head or if the duration of higher head was limited, the alternatives were considered to not result in an adverse effect on dam safety. Maximum design flood levels for each alternative were determined as a part of the flood risk studies and were compared with the design flood elevations under the Base Case.

Limits on reservoir drawdown rates were included in each alternative and were not violated.

For those reservoirs where leakage is a function of reservoir levels, the review of the reservoir levels described above was also applied to evaluate the impact of the alternatives on leakage. If the increase in reservoir levels was small relative to the total head and/or the duration of higher head was limited, the effect on leakage would be considered acceptable.

5.20.3 Base Case

With respect to dam safety, the Base Case is the existing condition. Geology and seismology, reservoir levels, reservoir drawdown rates, and leakage would not be affected under the Base Case.

5.20.4 All Action Alternatives

The simulated peak reservoir levels for 99 years of historical inflows indicated that no reservoir operations policy alternative would pose an adverse affect on dam safety relative to the Base Case. The flood risk studies indicated that, for all alternatives, design flood maximum pool levels would increase only slightly with respect to the Base Case, and would not adversely affect the stability of the dams and their appurtenant structures.

Reservoir Drawdown Rates

Because limits on reservoir drawdown rates would be included in each alternative and would not be violated, no impacts are associated with reservoir drawdown rates under the policy alternatives. Table 4.20-01 provides the reservoir rate drawdown limits.

5.20 Dam Safety

Leakage

Table 4.20-03 lists the projects where leakage is monitored. For those reservoirs where leakage is a function of reservoir levels, the range of reservoir levels would not be affected by any of the policy alternatives.

5.20.5 Summary of Impacts

Reservoir-triggered seismicity does not appear to be a primary factor for TVA dams. The simulated peak reservoir levels for 99 years of historical inflows indicated that no reservoir operations policy alternative would adversely affect dam safety relative to the Base Case. The flood risk studies indicated that, for all alternatives, design flood maximum pool levels would increase only slightly with respect to the Base Case, and would not adversely affect the stability of the dams and their appurtenant structures.

Because the reservoir drawdown rates under the alternatives would not exceed those under the Base Case, a determination of no impact can be made without additional review.

The future effects on leakage at TVA dams and rims due to proposed changes in the operation of its reservoirs would vary. Leakage and seepage at most reservoirs vary with headwater, but not at all reservoirs. Those dams with leaks that vary with headwater and without trends would probably not be affected by reservoirs being maintained at elevations for normal summer pool for longer periods of time than under the Base Case. Also, the dams with leakage that does not fluctuate with headwater elevations should not be affected by extended periods of summer pool.

Dams with leakage that fluctuates with headwater and with existing increasing trends may, over time, be affected by pools being held at summer levels longer. Most likely, the effects would be either a change in the rate of the trends, or some sudden increases with or without a change in the discharge rate.

Table 5.20-01 provides a summary of impacts on dam safety by policy alternative.

Table 5.20-01 Summary of Impacts on Dam Safety by Policy Alternative

Alternative	Description of Impacts
Base Case	Current seismic conditions, leakage, and reservoir levels would continue.
Reservoir Recreation A	Alternative reservoir operations would not affect the range of normal reservoir levels, leakage, or seismicity; design flood maximum pool levels would increase only slightly with respect to the Base Case, and would not adversely affect the stability of the dams and their appurtenant structures.
Reservoir Recreation B	Impacts would be the same as those described for Reservoir Recreation Alternative A.
Summer Hydropower	Impacts would be the same as those described for Reservoir Recreation Alternative A.
Equalized Summer/Winter Flood Risk	Impacts would be the same as those described for Reservoir Recreation Alternative A.
Commercial Navigation	Impacts would be similar to those described for the Base Case.
Tailwater Recreation	Impacts would be the same as those described for Reservoir Recreation Alternative A.
Tailwater Habitat	Impacts would be the same as those described for Reservoir Recreation Alternative A.
Preferred	Impacts would be the same as those described for Reservoir Recreation Alternative A.

This page intentionally left blank.