FDEP Kirkpatrick Dam and Buckman Lock Safety Assessments

Key Findings in the Assessment Package

1. Changed the dam's hazard classification from low hazard to high hazard and listed the Buckman Lock's hazard classification as "unknown."

- "According to FEMA standards, the Kirkpatrick Dam should be classified as a high hazard dam. Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life (Pg.128 and 152 of 261)."
- A list of approximately 538 occupied homes at risk downstream in the event of a dam failure or mis-operation was provided. This list could change based on water levels in the reservoir.
- Other items that could be impacted and were part of the modeling include two bridges on SR19, one over the Ocklawaha River main channel and one over the north channel, and Caravelle Ranch Management Area.

2. Several critical structures were not thoroughly assessed. Although the report gave the dam and lock a satisfactory condition ranking, engineers admitted they lacked data to assess the condition of important structures such as the spillway, foundation apron and ogee, and dam and lock gates.

The Coalition questions whether the true dam and lock conditions can be determined without these inspections and assessments. In addition, most of the completed assessments were based on low hazard dam inspection standards, not those for high hazard dams. Excerpts from engineers in the report:

Upstream Spillway and Dam Foundation: "Wood debris was present along the upstream side of the spillway. As a result, the divers were unable to inspect the upstream face of the ogee and upstream apron (Pg. 1 or 261)." An ogee is the doubly-curved shape of a spillway. "Downstream apron undermined with approximately 18-inches of downstream sheet piling cut-off wall exposed. Material has also eroded beneath the apron (Pg. 1 of 261)."
"This debris could clog the spillway bays reducing the discharge capacity of the Project. If discharge capacity is restricted, the reservoir could surcharge and overtop the embankments during a heavy rain event. In addition, the logs may prevent the vertical lift gates from opening or closing as intended. It is recommended that the debris in front of the spillway be removed to maintain discharge capacity (Pg. 10 o 261)."

Dam Gates: "To document the amount of corrosion and overall condition of the gates, a detailed, hands-on inspection which includes climbing the gates along with taking thickness measurements should be performed and the results reviewed by a qualified hydraulic steel structural engineer." "The findings should be reviewed by a qualified hydraulic steel structural engineer by December 2023 (Note: This date is Dec. 2022 in another place). (Pg. 11 of 261)."

Lock Gates: "We understand that a detailed gate inspection has not been performed within the last ten plus years. To document the amount of corrosion and overall condition of the gates, the gates should be cleaned and a detailed, hands-on inspection which includes climbing the gates, along with taking thickness measurements be performed and the results reviewed by a qualified hydraulic steel structural engineer (Pg. 78 of 261)."

3. Items not fully evaluated are often the cause of dam failures. Between January 1975 and January 2011, flood or overtopping was responsible for 71 percent of dam failures, followed by 14 percent for piping or seepage. Overtopping and seepage are most common with earthen dams like the Rodman/Kirkpatrick. Overtopping happens when the reservoir water flows over or around the dam. It can be caused by an extreme storm event, faulty lift gates, blocked spillways, overstressed dam components, and other conditions. Seepage under the dam can be caused by cracks in the earthen dam or its foundation causing internal erosion or piping. (Source: Sec. 4 in Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures, First Edition, FEMA P-946/July 2013.)

4. Redacted water level modeling holds key to downstream impacts to people, property, and natural resources. The dam can be stressed by reservoir water levels that are maintained too high. The risk assessment data that state agencies modeled using different water heights in the pool was blacked out in the report. Beneath those redactions is evidence about how downstream impacts will vary at different water levels in the event of a dam failure or mis-operation.

Coalition recommendations:

1. FDEP should complete the additional inspections and assessments as recommended in the report by Dec. 2022 and update the report based on the results and high hazard dam standards. Remove log and other debris on the upstream side needed to complete some assessments.

2. FDEP should disclose information about both dam hazard and condition to citizens and businesses in harms way. That should include differences in risk based on water levels behind the reservoir. Sound and safe decisions can not be made without this information.

3. FDEP should draw down the pool according to their plan to an appropriate level to avoid the risk of downstream flooding and protect the lives and property of downstream citizens. This would be the most practical and cost-effective short-term tool for avoiding a disaster. A drawdown removes pressure off the structure and is very important to do prior to peak storm season.

4. Long-term, the economically prudent decision is to breach the Rodman/Kirkpatrick Dam to achieve all the safety, environmental and economic benefits. Breaching the dam will eliminate the potential flood risk posed by the dam. It will make the natural system whole again - reuniting and helping restore the St. Johns and Ocklawaha Rivers and Silver Springs for people, fish, manatees, and other wildlife. It provides significant economic benefits in the region, particularly to Putnam County and east Marion County and Silver Springs.

Florida Defenders of the Environment, one of the Coalition's member organizations, has asked an engineer specializing in dam safety to review the full redacted report and provide feedback on its contents. Additional recommendations may be added after that review is concluded.

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