RESTORE LAKE PEDDER

INFORMATION SHEET

Understanding the engineering

Coordinated by
Lake Pedder Restoration Inc.
www.lakepedder.org

Information Sheet – Potential Engineering Works

The purpose of this summary document is to provide basic information on the potential engineering works required for controlled release of flows and draining the Huon-Serpentine impoundment. This information was initially prepared to assist specialists undertaking impact assessments for ecological values and determining the potential legal and planning requirements.

Detailed engineering technical works and feasibility are not considered or assessed in this brief; however, they are anticipated to be part of an additional, subsequent research 'stream' undertaken for Lake Pedder Restoration in the future. Such studies would need to consider the required engineering works, most importantly, how a revised system could continue to provide flood protection for Lake Gordon which is currently provided by reversed flow through McPartlan Pass Canal and the Serpentine outlet.

Dewatering through existing dam structures

The Huon-Serpentine Impoundment has three water outlets: McPartlan Pass Canal, Edgar Dam riparian outlet and Serpentine Dam outlet. The usefulness of the first two outlets is limited and the major drainage outlet is through Serpentine Dam. This outlet cannot drain the Huon section of the storage below the level of the saddle connecting the Huon and Serpentine catchments, therefore Scotts Peak dam must be breached to drain the Huon storage.

Pumping stations would be required to deal with Huon flows because the Huon impoundment will not fully drain through Serpentine (only upper level waters). The Huon impoundment will need to drain through a newly constructed Scotts Peak outlet.

Simulations of drainage options by Livingston for the Pedder 2000 investigation showed that Lake Pedder can be drained in about 12 months but it is not possible to keep the level behind Serpentine Dam below the level of the old Lake Pedder unless the dams are breached.

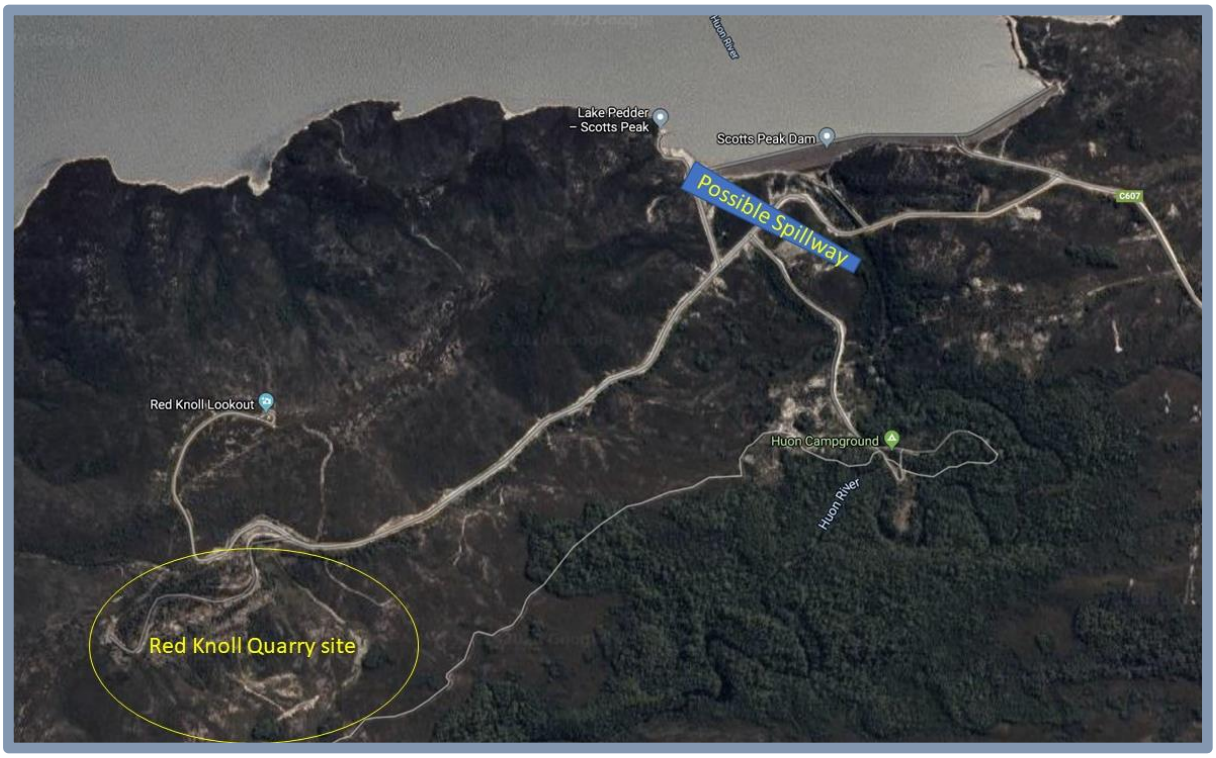
Downstream ecological considerations

Draining the impoundment would result in increased flows in the Serpentine, Gordon and/or Huon Rivers (and potential impacts on downstream areas within the Tasmanian Wilderness World Heritage Area (TWWHA); some flood flows may be possible, however, flood flows can have a positive impact on downstream rivers (sediment flows etc.) and are a general requirement for healthy rivers.

The intensity, frequency and seasonality of the flows would require management to mitigate downstream impacts and optimise environmental flows. Potential impacts would include downstream erosion and channel adjustment on Huon and Serpentine Rivers and TWWHA values would require assessment and monitoring).

Dam-specific engineering:

Scotts Peak Dam



- New/upgraded roads and access tracks (existing and already revegetated tracks may also used)
- Build a new outflow valve on Scotts Peak Dam. Potentially it would need a coffer dam on upstream side in order to work on the concrete plug in the original diversion tunnel. Alternatively construct siphons to dewater.
- Removal of boat ramp
- If dam is kept in place - penstock or outlet valve is required to pass Huon River flows.
- Could also form a side spillway on the right abutment at the appropriate Full Supply Level (FSL) for a future Scotts Peak impoundment. This would be safer than siphon or valve.
- If dam is removed completely - disposal of dam rockfill and concrete/bitumen face material would be required, possibly into the existing original Red Knoll quarry. However, additional disposal areas are likely to be needed.
- Reshaping and revegetation of dam footprint and material disposal sites.

Edgar Dam

- There is a 1.2m diameter riparian outlet in Edgar Dam what could be used to partially drain Pedder Impoundment.
- Disposal area for dam fill and concrete. This may go back into the original Red Knoll quarry or a closer location
- Reshaping and revegetation of dam footprint
- Removal of boat ramp
- Revegetation of the riparian/drainage ditch from the lagoon downstream of Edgar Dam

Serpentine Dam

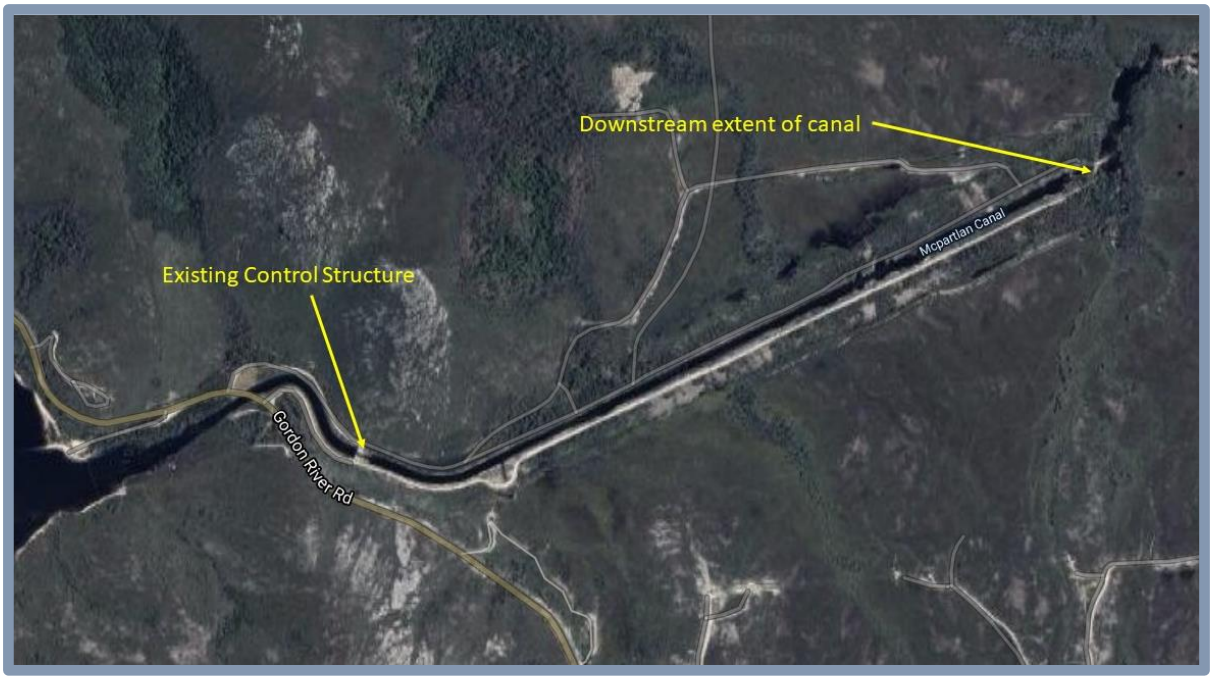
Serpentine Dam has an existing gated outlet for spill from Pedder Impoundment and could be used to dewater that section of the impoundment. Its maximum capacity is 243m3/s which is sufficient for current spill operations of the reservoir in conjunction with McPartlan Pass Canal but an assessment would need to be done should Serpentine Dam remain with a lower FSL as this will be the only outlet.

The simplest option is to open and keep open the outlet structure, leaving the dam in place. Analysis would need to be done to determine the flood rise during flood events to assess the safety risk on the dam partially filling with each event.

For full dam removal the following steps would be required:

- Dispose of dam rockfill and concrete face material, possibly into the existing original quarry adjacent to the dam right bank. Additional disposal areas may be needed.
- Removal of concrete and steel outlet structure
- Reshaping and revegetation of dam footprint and material disposal sites.
- Assess current dam access road which provides access to the Mt Sprent Track which starts at the dam left abutment.

McParlan Pass Canal



The engineering would need to consider a fish barrier to prevent the spread of red fin, an exotic fish species that is currently controlled by maintaining constant flow levels from the Huon-Serpentine Impoundment to Lake Gordon.

New works would replace the existing control structure with a permanent embankment / filling in of part of the canal to for the barrier. Material could potentially come from the removal of Scotts Peak Dam.

Another option would be to fill the whole of the canal (2km), reshape and revegetate.

Requirements for dam structures

All dam works and operations are regulated and controlled by the Australian National Committee On Large Dams (ANCOLD) which prescribes dam safety requirements and other features of dam engineering, management and maintenance. If the dams are retained after restoration, they would need to meet the engineering and safety requirements prescribed by this body.

Future studies required for engineering requirements

Alteration of the dam structures to facilitate de-watering would need to be modelled to understand the safety measures and engineering requirements to enable controlled release of flows.

Engineering safety measures and procedures associate with dewatering would be numerous and extensive and will include but not be limited to:

- Consideration of how flood control on the Gordon Dam would be maintained. Currently, there is no official spillway on Lake Gordon for flood protection because the engineered flood control and spillway for Lake Gordon is the reversed flow into McPartlan Pass Canal and dewatering through Serpentine outlet
- Any amendments to the Lake Gordon spill-safety measures would need to be done in accordance with ANCOLD guidelines
- Any amendments and ongoing safety of the three decommissioned dam structures would need to be done in accordance with ANCOLD guidelines
- Description of the measures associated with possible outlet failure or non-performance during dewatering or restoration
- Additional information concerning the retrofit of the other structures

The hydrological assessments would include but not be limited to:

- Total anticipated discharge associated with drawdown for each reservoir
- Strategies for managing drawdown under low, medium and high flow conditions
- Proposed duration and timing of drawdown operations
- Schedule and sequence for drawdown
- Proposed reservoir elevation change per day

Potential impacts within the dewatered impoundment would also need to be understood with surface stability studies including:

- Slope stability monitoring during and after reservoir drawdown
- Studies conducted to verify reservoir drawdown rates are protective of slope stability and potential flooding
- Stability and protection of the Lake Pedder dune system from risks of seepage erosion
- Measures to implement if slope stability issues are identified

Further Reading

Australian National Committee on Large Dams (ANCOLD) (n.d) *Dam safety liabilities and governance information*. https://www.ancold.org.au/ Accessed 8 March 2020

California Water Boards (n.d.) *Detailed plan for dam removal – Klamath River Dams*. https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/docs/lower_klamath_ferc14803/krrc_detail_1.pdf Accessed 8 March 2020

Hydro Tasmania (n.d.) *Gordon-Pedder Power Scheme*. https://www.hydro.com.au/clean-energy/our-power-stations/gordon-pedder Accessed 8 March 2020

Livingston A (2001) Hydrological and engineering issues associated with draining and restoring Lake Pedder In Sharples, C (ed.): *Lake Pedder: Values and Restoration, Occasional Paper No. 27*, Centre for Environmental Studies, University of Tasmania.

This factsheet is one of a series commissioned by Lake Pedder Restoration Inc. and prepared by Dr Anita Wild and colleagues to understand the impacts of the full ecological restoration of the original Lake Pedder and surrounding ecosystems in the Tasmanian Wilderness World Heritage Area. Released August 2020.

For more information go to www.lakepedder.org.