Bonneville PH2 Sea Lion Exclusion Device (SLED) Extensions

Sea Lion exclusion devices (SLEDs) were installed at Bonneville Dam fishway entrances to provide safe passage for migrating fish by preventing Pinnipeds from entering fishways. During high flows tailwater rises to a level that makes it possible for a pinniped to go over the SLEDs. There has been no observations of pinnipeds going over SLEDs in these conditions, but the potential is there.

The current SLED configuration is as follows:

- Bulkhead sill at elevation -16'
- Bulkhead height = 12' 7 7/8"
- Lower SLED section height = 18' (weight ~10,000 lbs)
- Upper SLED section height = 18' 10" (weight ~10,000 lbs)

Elevation at top of SLED= 33.5'

We have used 5' for a Sea Lions ability to jump out of the water and onto a "haul out" (per Kyle Tidwell).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Number of days in the "danger zone" (28.5'+)	15	0	2	48	10	0	0	0	0	32	24	131
>33.5'	0	0	0	0	0	0	0	0	0	0	0	0

Figure 1. The range of tailwater elevations where a Sea Lion can theoretically lump onto or over a SLED starts at 28.5, we call this range the "danger zone". The number of days were Bonn's tailwater is in the "danger zone" is shown.

SLEDS currently consist of two sections, stacked vertically on top of a section of bulkhead that fills the lower portion of the slot which does not pass water (see figure 2).

We have identified 2 options for lifting the height of the SLED. Option 1 is a short section of SLED that sits on top of the existing SLEDs. The sections are individually lifted into place with a crane. Option 2 is a solid bulkhead-like section that would sit in between the bulkhead and bottom SLED. This section would have to be no more than 4' in height in order to not obstruct water flow but would have to support the full weight of both SLEDs (in between blue and orange sections in figure 2).

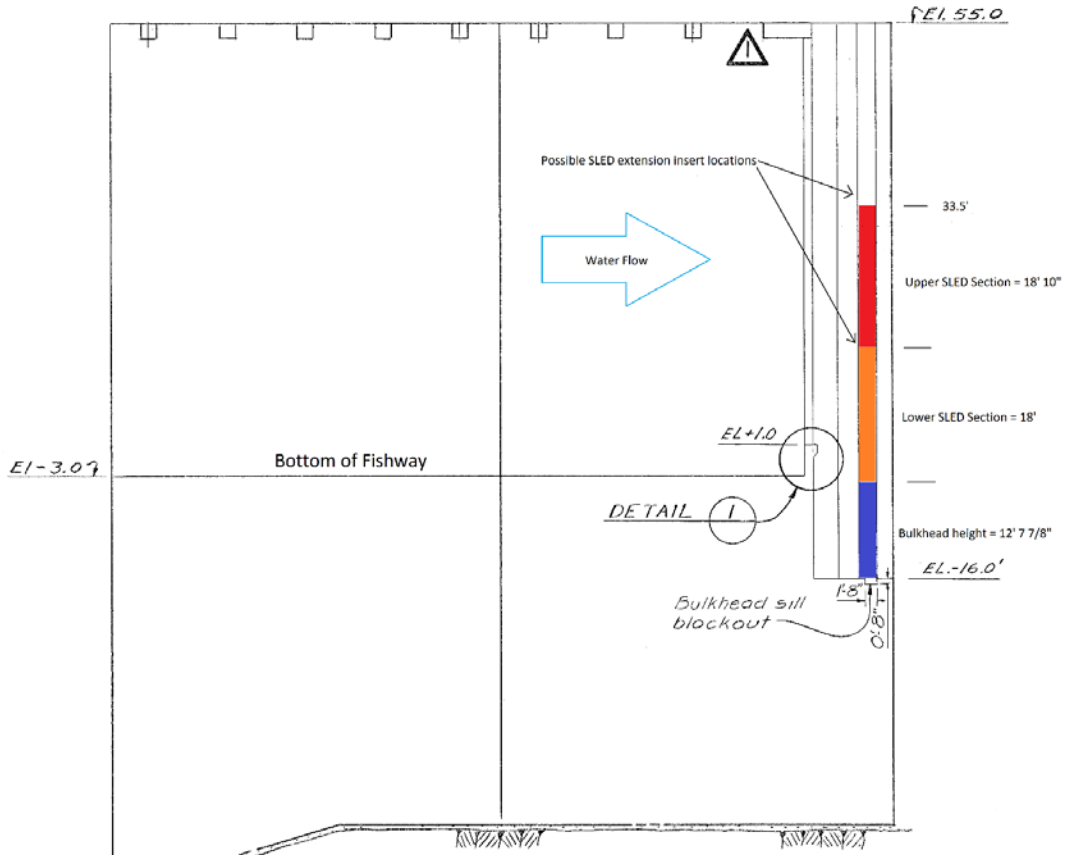

Figure 2. Side view of a PH2 downstream fishway entrance.

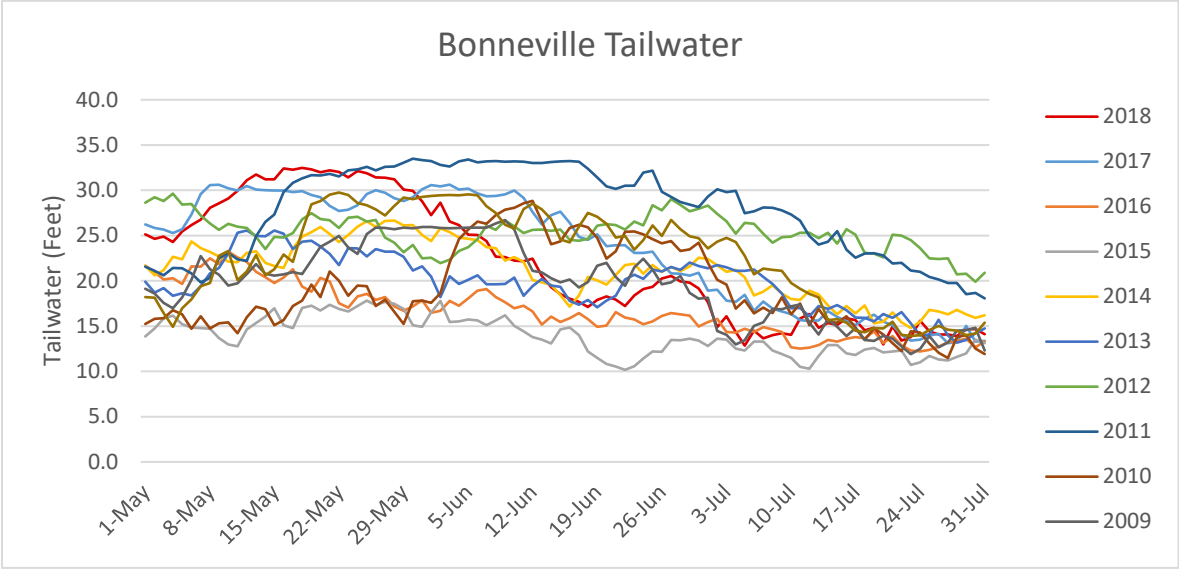

Figure 3. Daily average project tailwater May – July, 2008 – 2018.

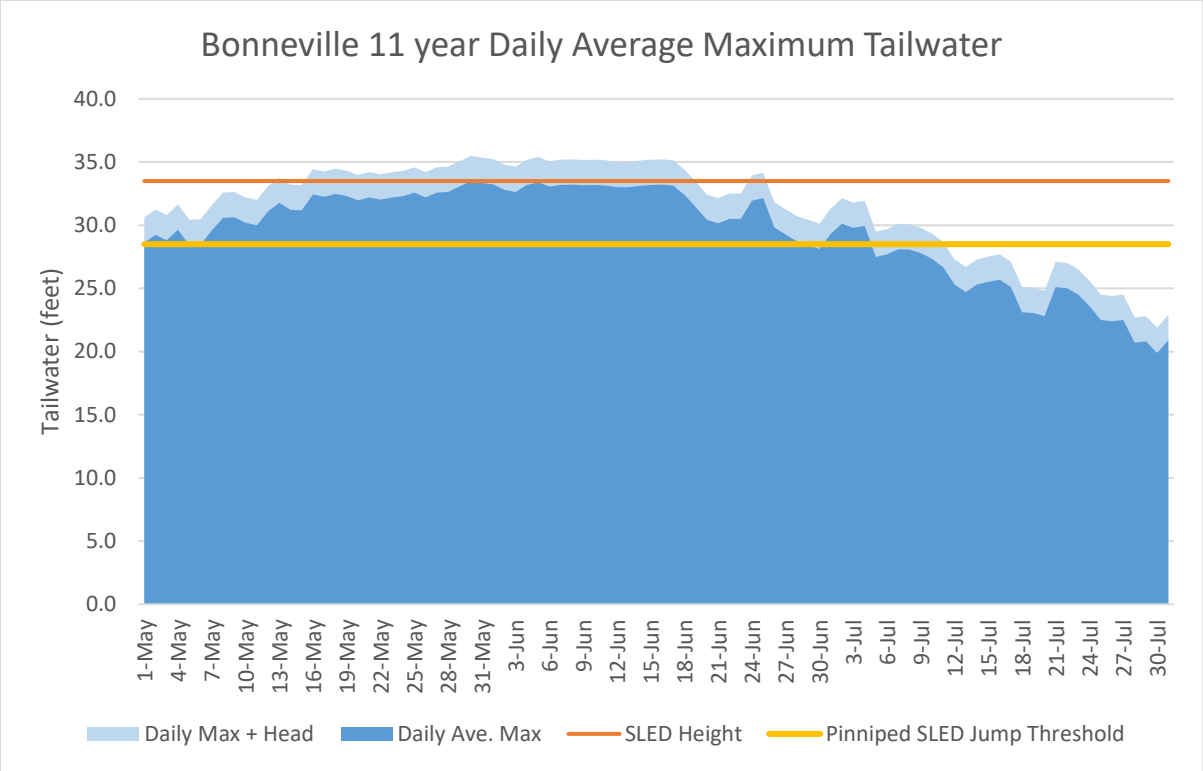

Figure 4. Daily Average Maximum Tailwater is the highest recorded daily average tailwater for that date from 2008 – 2018. Average + Head is the Average daily project tailwater plus the maximum differential flowing out of the fish entrance (2'). SLED Height is the elevation of the top of the SLED configuration(33.5'). Pinniped SLED Jump Threshold is the minimum tailwater level required for a Sea Lion to jump over the SLED (elevation 28.5').

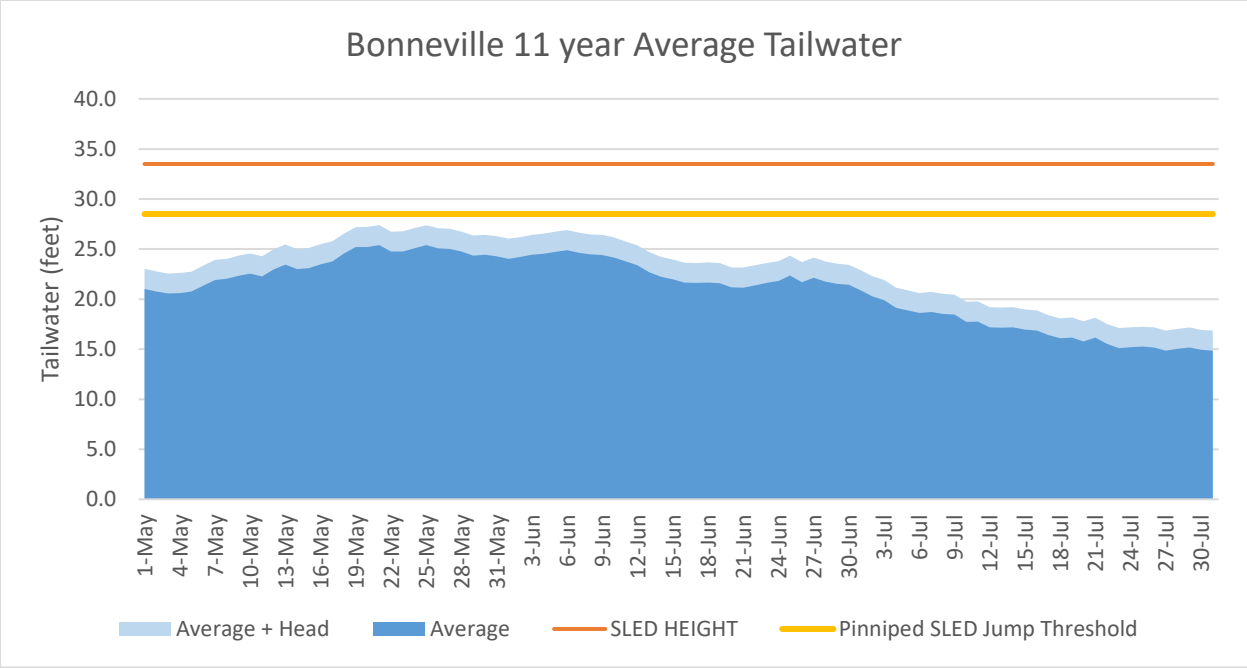

Figure 5. Average daily Tailwater 2008 – 2018. Average + Head is the Average daily project tailwater plus the maximum differential flowing out of the fish entrance (2'). SLED Height is the elevation of the top of the SLED configuration(33.5'). Pinniped SLED Jump Threshold is the minimum tailwater level required for a Sea Lion to jump over the SLED(28.5').