

PERFORMANCE MEASURE INFORMATION SHEET #21
SOFT CONSTRAINTS FOR ARROW LAKES RESERVOIR: VEGETATION

Objective / Location	Performance Measure	Units	Description
Vegetation Soft Constraint/Arrow Reservoir	Vegetation Establishment & Survival	# days elevation at or above 1424 ft between 1 May and 31 July, and 1 August and 30 September	Sum of # days reservoir water level is at or above 1424 ft over the early and latter part of the growing season

Description

During the Columbia WUP process, it was noted that riparian vegetation in Arrow Lakes Reservoir, and in particular Revelstoke Reach, extends over an elevation range of 1411 to 1444 ft. Prior to 2001, the distribution of vegetation was predominantly at 1424 ft and above. It was hypothesized that expansion of vegetation into the lower elevations was largely the result of:

- the fall rye seeding program that began in early 1990s, which facilitated the spread of natural sedges and grasses, and
- low water years, which made establishment of natural vegetation possible by allowing the seedlings sufficient growing time to develop into mature plants capable of tolerating subsequent extended inundation.

These factors worked in concert to allow the establishment and persistence of the extensive areas of natural vegetation currently dominating the drawdown zone of Revelstoke Reach and smaller locations in the main body of the reservoir.

The Consultative Committee felt that establishment of vegetation down to an elevation of 1411 ft was an anomaly and that it would not be reasonable to target operations to maintain these levels. There was a general consensus that protecting vegetation at and above 1424 ft would be a more practical objective for the reservoir. The Committee articulated this as a soft constraint for Arrow Reservoir operations, where preservation of current (2004) levels of vegetation in the drawdown zone at and above 1424 ft should be a priority. It was acknowledged that vegetation areas below this elevation would be addressed through BC Hydro's Arrow dust control program.

Calculations

For each scenario:

1. Assemble the simulated results for Arrow Reservoir elevations over 60 years (1940-2000; Figure 1).
2. Count the number of days over the early (1 May to 31 July) and latter part (1 August to 30 September) of the growing season that the reservoir is above 1424 ft in each of the 60 years.
3. Summarize all statistics (Figures 2 and 3).

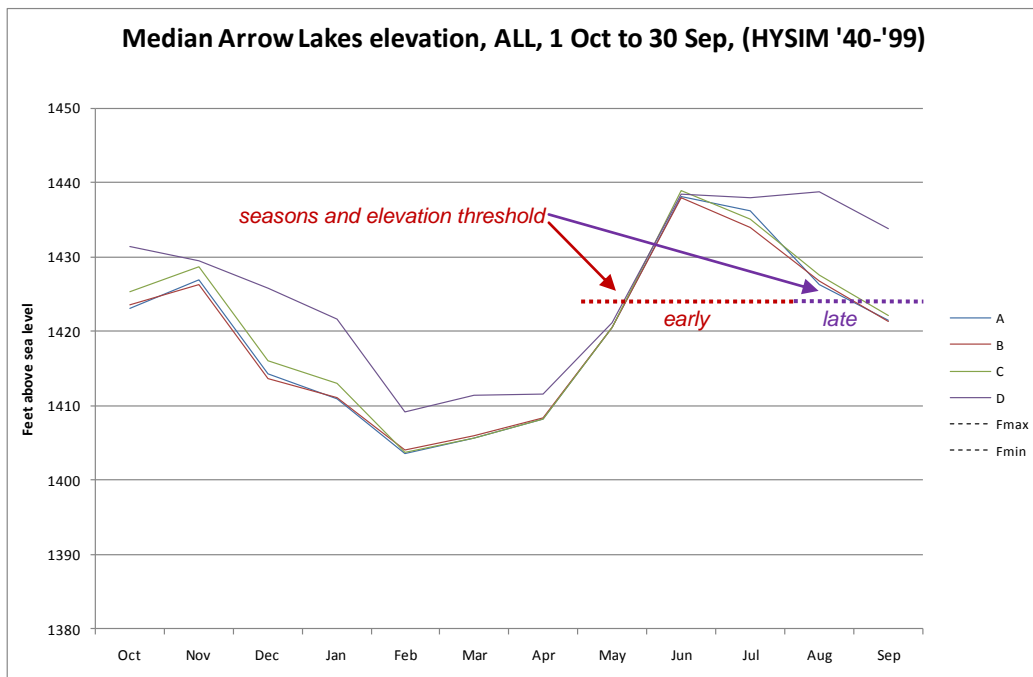


Figure 1. HYSIM Simulated Arrow Lakes Reservoir Elevations. Median result over 60 years showing the important elevation threshold and seasons for riparian vegetation.

Key Assumptions and Uncertainties

- Each scenario is simulated using the same set of system constraints, input assumptions (e.g., load forecasts) and historic basin inflows (1940 – 2000).
- Uncertain how much exposure is required during growing season to maintain vegetation and the relative importance of this exposure in the spring versus the fall.

Results

On average, none of the scenarios would perform better or worse for vegetation above 1424 ft during the early part of the growing season. However, there would be greater variability under Scenario B due to a deeper draft and slow refill in dry water years.

Scenario D (no NTS) would cause the reservoir water levels to exceed 1424 ft over a greater number of days in the fall than the “with NTS” scenarios and therefore would perform worse for vegetation.

Figure 2. Vegetation: Early Growing Season – HYSIM Results for all NTS scenarios

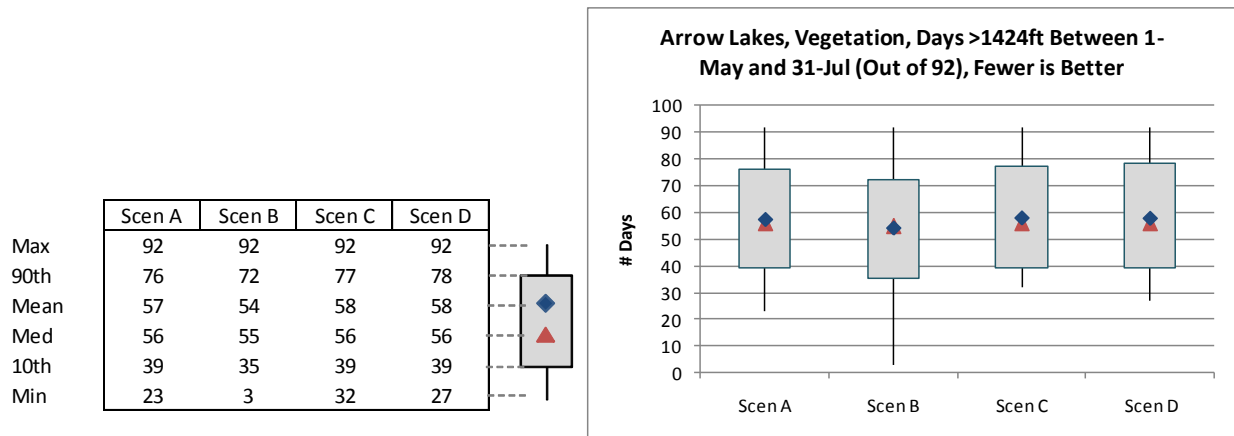


Figure 3. Vegetation: Latter Growing Season – HYSIM Results for all NTS scenarios

