Need Power? Time to Look Up! Finding Storage Hydro Sites Fast With GIS

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Rapid Hydro Assessment Model (RHAM)

- GIS tool built in 2007 to quickly assess the run-of-river hydro potential in BC (with BC Hydro)
- Found ~8200 locations with BC that were economically feasible to build (based on output and economics)
  - Since then, RHAM has been run in areas all over the world
- Run-of-river projects don’t always coincide with the actual demand throughout the year
  - Need to solve the “2 week cold snap sometime in December/January/February” issue
- Designed and built the Hydropower Storage Locator Tool in 2017 to solve that problem
BC Hydro – Total Monthly Load vs. Supply (Estimated)
Typical Small Hydro Project

Weir:
Small pond required to keep penstock submerged

Penstock:
Steel pipe (usually buried) drops water to the powerhouse

Powerhouse:
House turbines and power generation unit

Tailrace:
Water returned to source

Intake Weir

Penstock

Powerhouse
Stream Power

\[ \text{Power} = \gamma_w Q H \eta \]

- \( \gamma_w \) unit weight of water
- \( Q \) (flow) from regional hydrologic model
- \( H \) (head) from digital elevation model
- \( \eta \) efficiency
Why Storage?

- Increases dependable capacity
- Increases energy delivered when needed by customers
- Increases energy production
- Increases flow for aquatic habitat
- Reduces downstream flood risks
Evolution of RHAM

92 lines for RHAM

164 lines for Storage RHAM
High Alpine Lakes (Existing)
High Alpine Lakes (Dam)
High Alpine Lakes (Dam)
High Alpine Lakes (Existing)
High Alpine Lakes (New Lake Surface)
## Tabular Output

<table>
<thead>
<tr>
<th>DamID</th>
<th>COUNT</th>
<th>AREA</th>
<th>MIN</th>
<th>MAX</th>
<th>RANGE</th>
<th>MEAN</th>
<th>STD</th>
<th>SUM</th>
<th>VARIETY</th>
<th>MAJORITY</th>
<th>MINORITY</th>
<th>MEDIAN</th>
<th>Cell Area (m²)</th>
<th>Surface Area (m²)</th>
<th>Storage Volume (m³)</th>
<th>Maximum Depth (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAM1</td>
<td>5,142</td>
<td>1,810,474</td>
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</tbody>
</table>
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