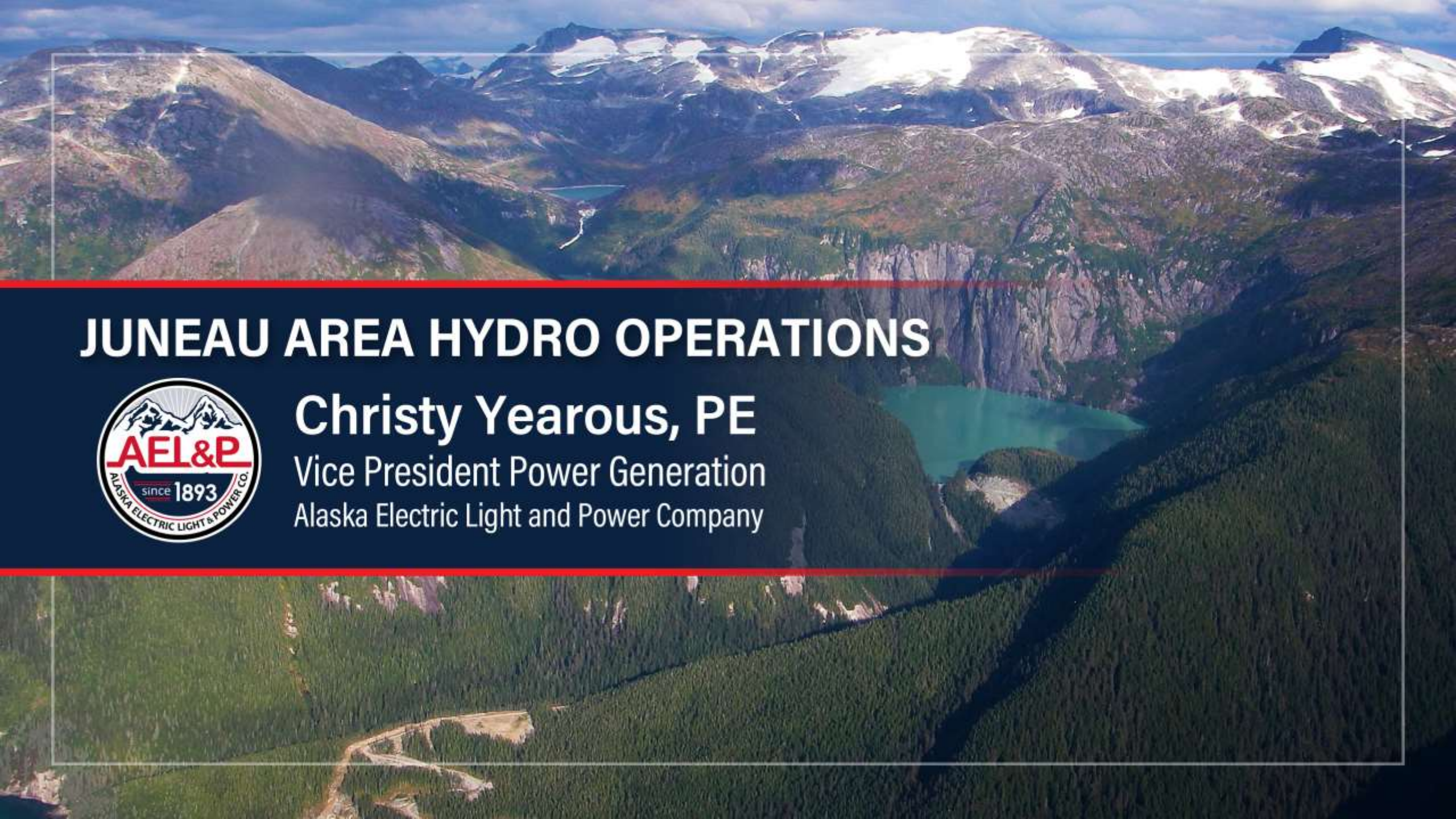

JUNEAU AREA HYDRO OPERATIONS

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Juneau Area Hydro Operations

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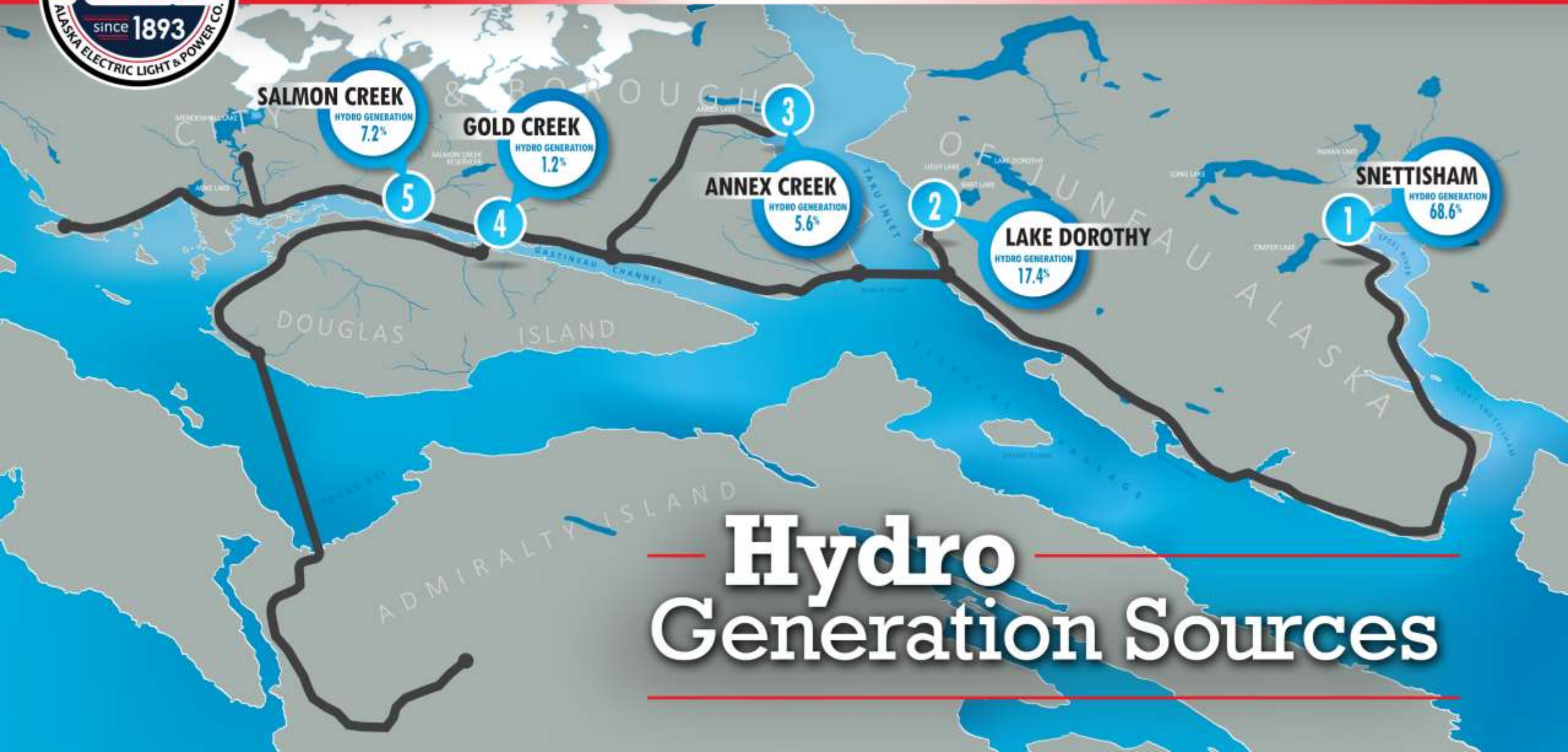

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Hydroelectric Project Type

- Run of the River

- Storage

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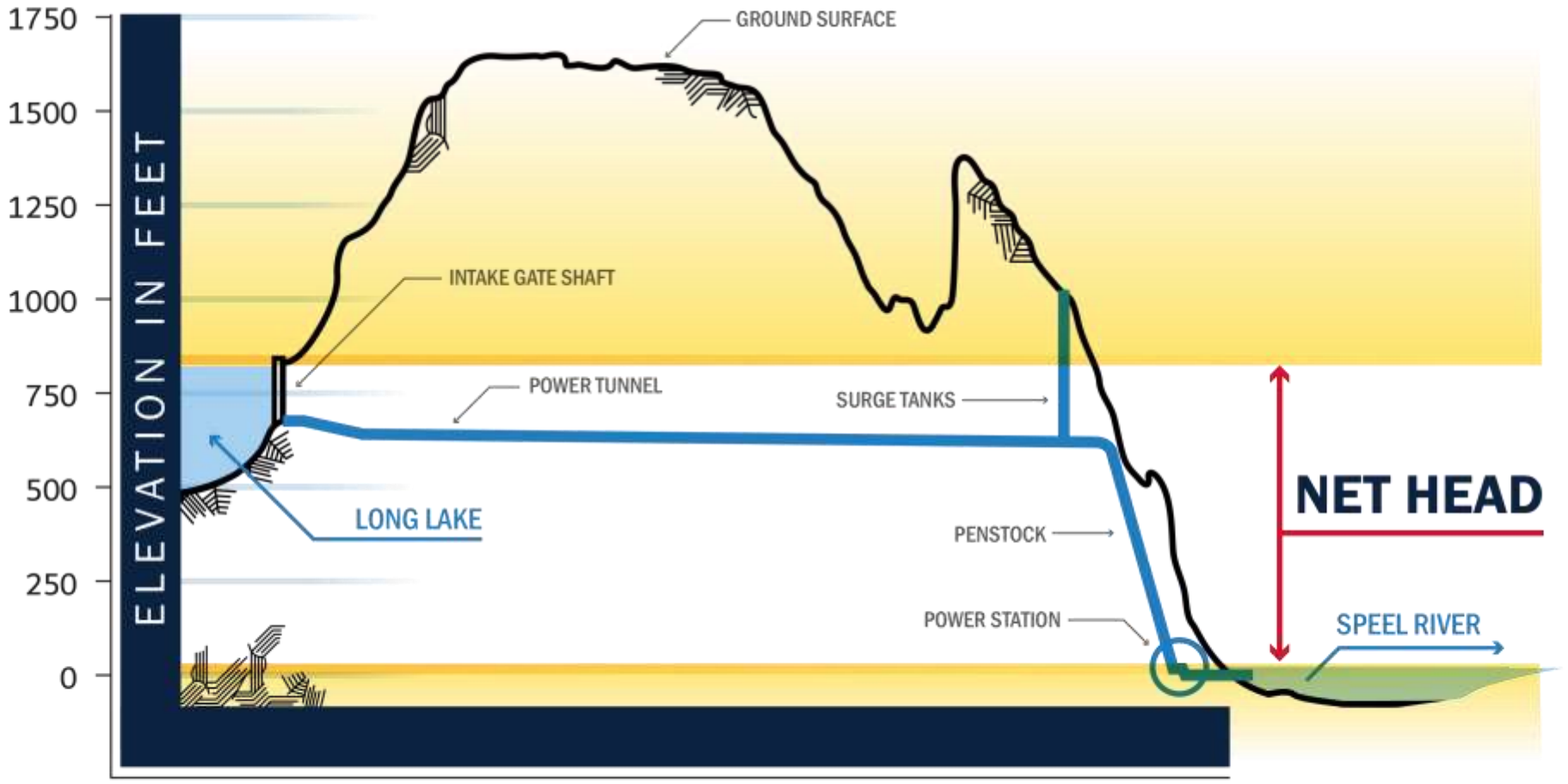
Power = Flow*Net Head



Juneau Area Hydro Operations

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Power = Flow*Net Head

Flow = Precipitation*Watershed Area
8760 hours*60 minutes* 60 seconds

Snettisham Hydro Project

- Long Lake Watershed • *30.2 sq miles*
- Crater Lake Watershed • *11.4 sq miles*

Dorothy Lake Hydro Project

- Lake Dorothy & Bart Lake Watershed • *13.4 sq miles*

Southern Hydro Generation Watersheds

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Capacity vs. Energy

- Capacity is how many kilowatts (kW) you can generate at any instant
- Energy is how many kW-Hours (kWh) you can generate over a time period
- 1 kWh equals generating 1kW for one hour

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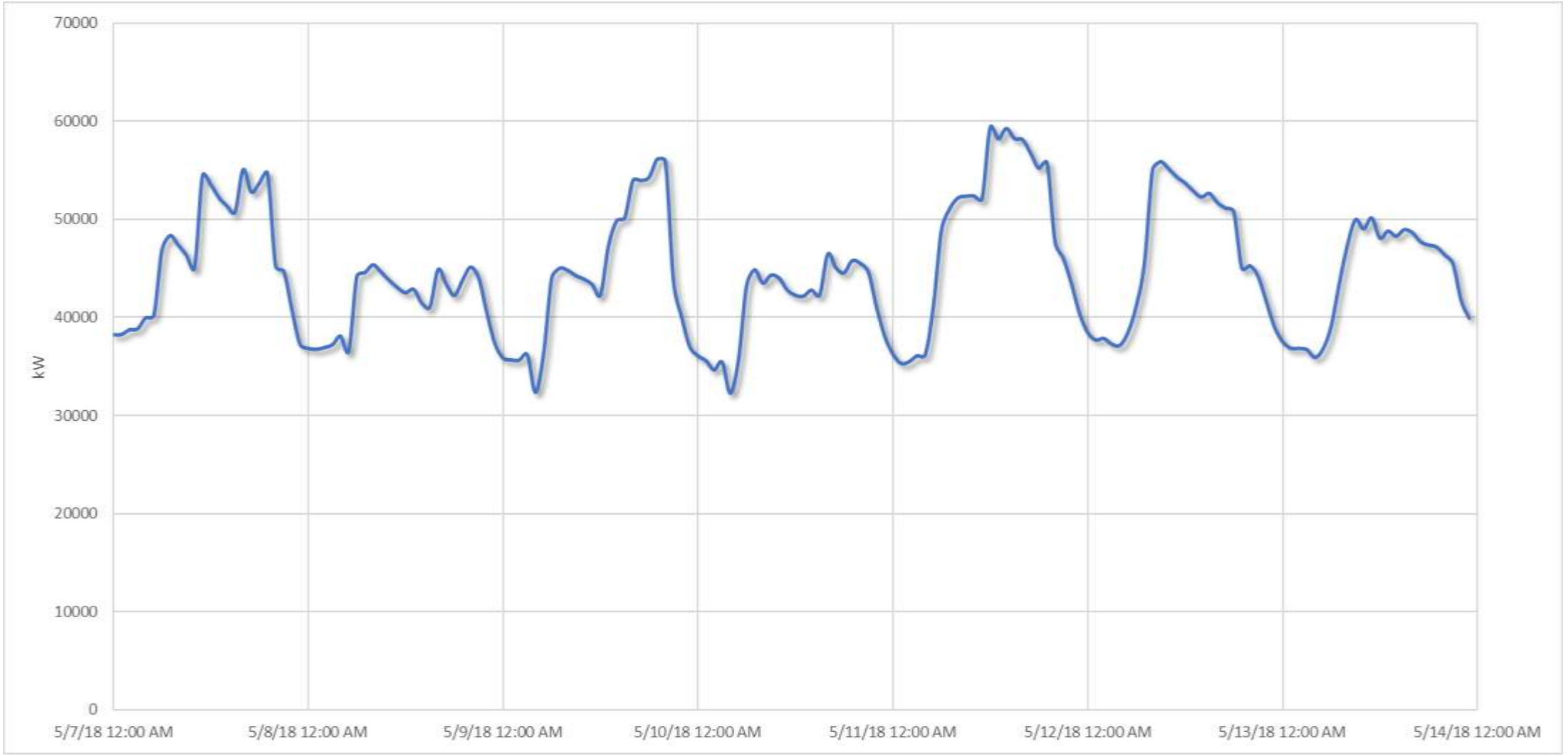
Juneau's Electrical Usage



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Juneau's Hydroelectric Capacity

Plant	Capacity (KW)
Snettisham – Long Lake	47,160
Snettisham – Crater Lake	31,050
Lake Dorothy – Bart Lake	14,300
Salmon Creek	5,000
Annex Creek	3,600
Gold Creek	1,600
Total	102,710

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Firm-Average-Wet Energy

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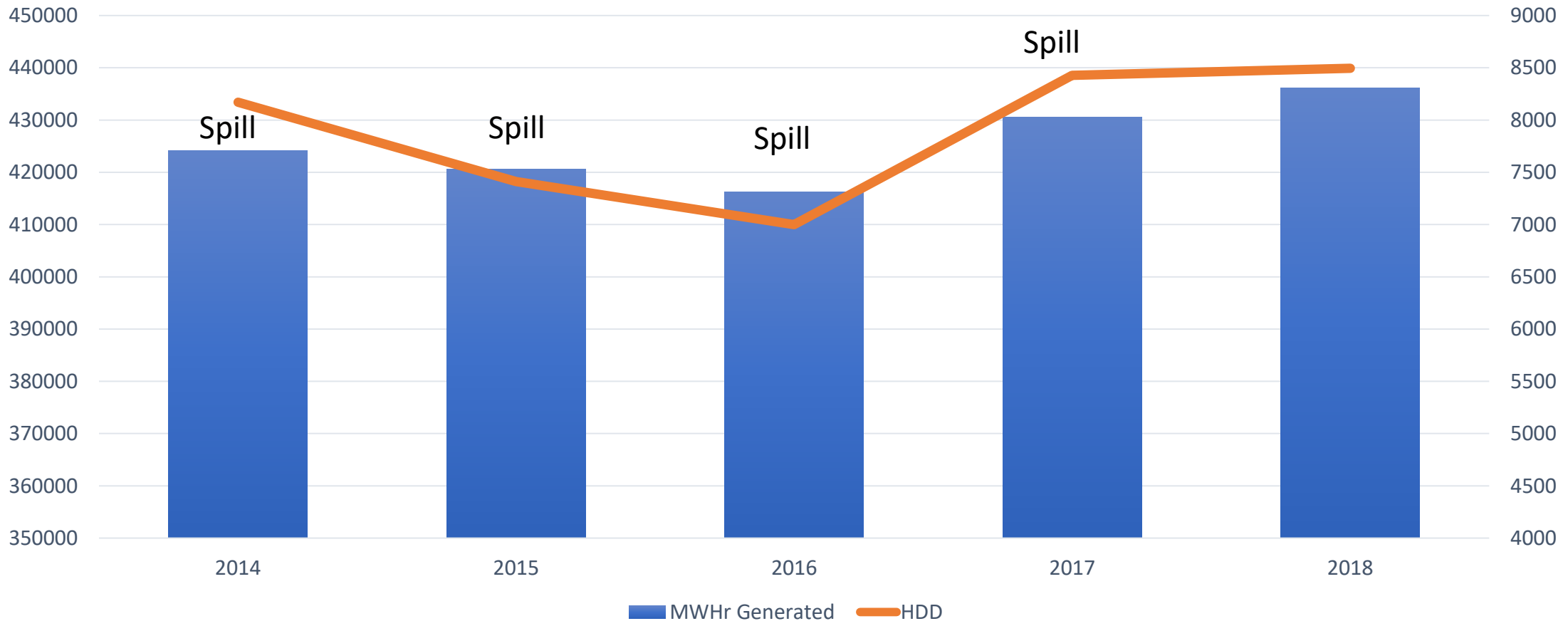
Water Year Area Energy Generation (October 1 – September 30)



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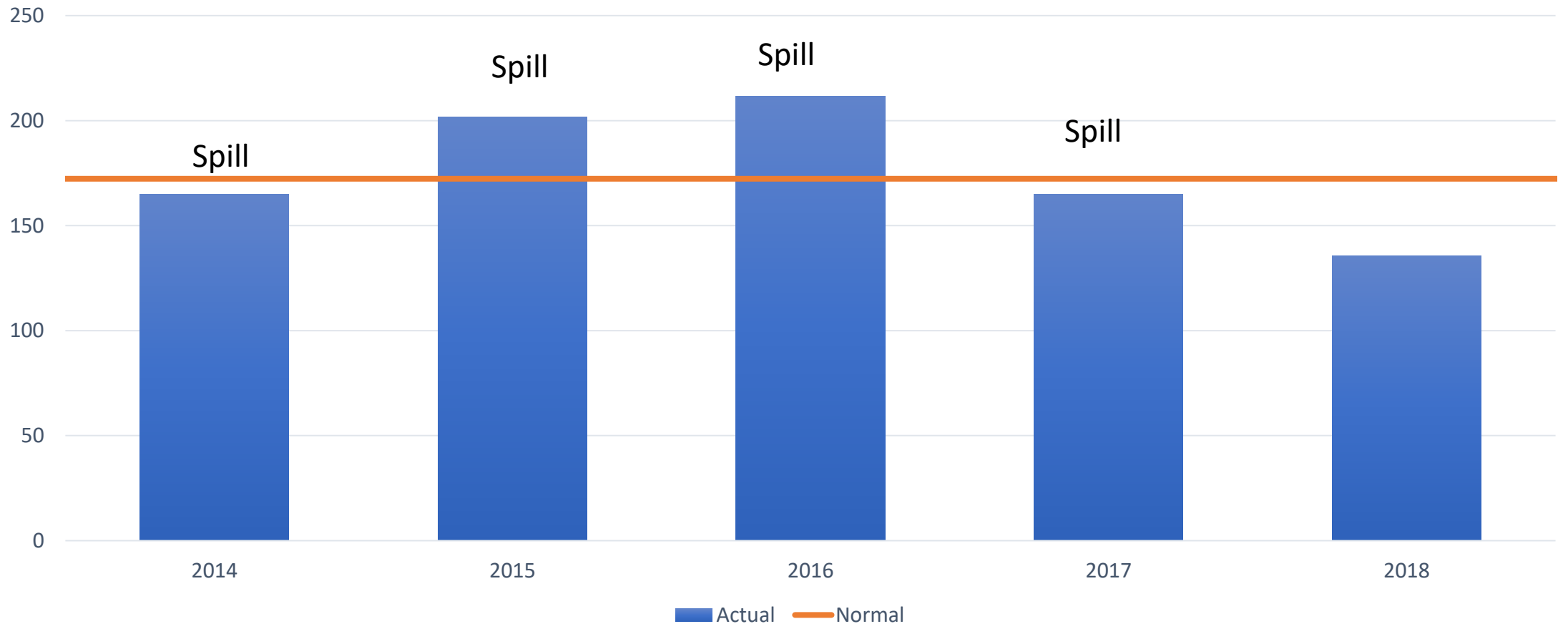
Snettisham Water Year Precipitation (October 1 – September 30)



Juneau Area Hydro Operations

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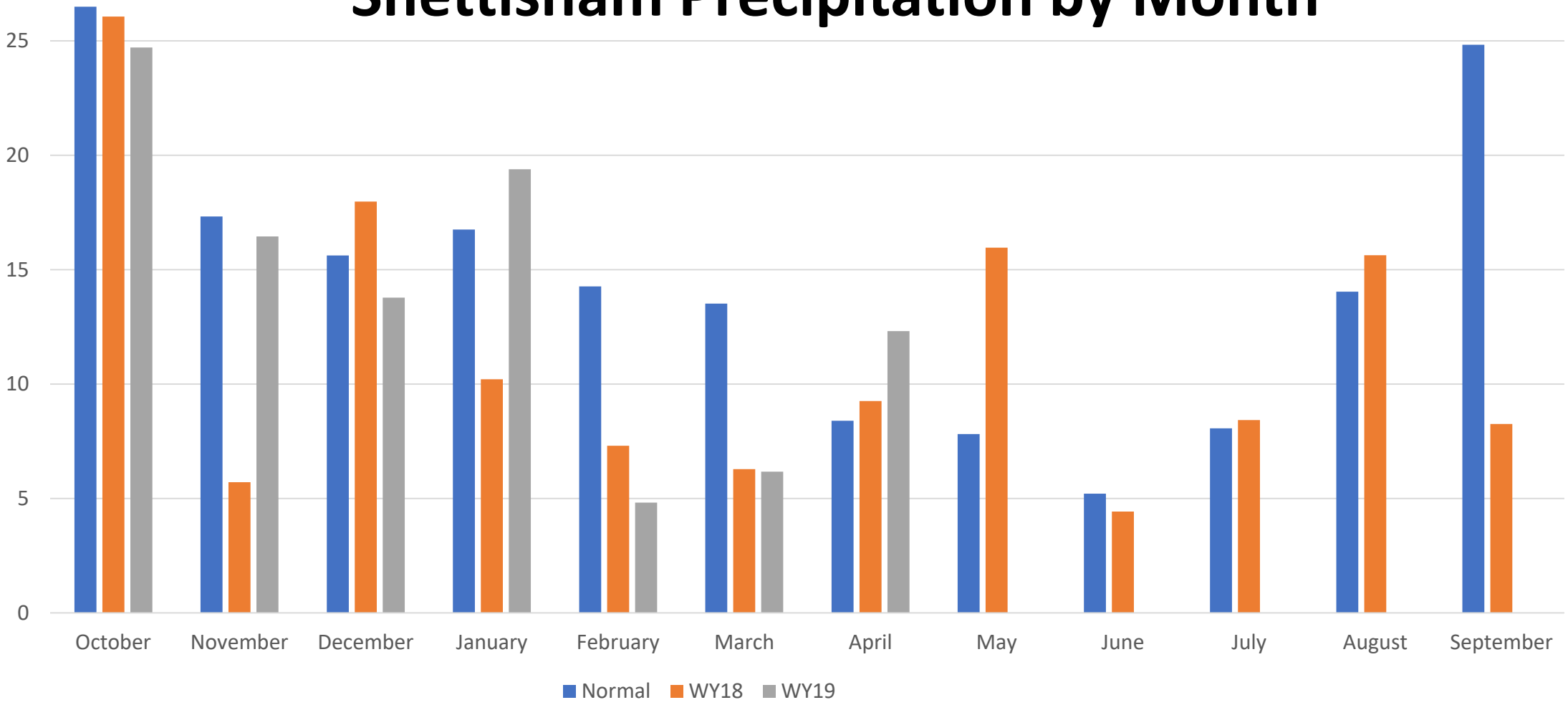
Snettisham Precipitation by Month



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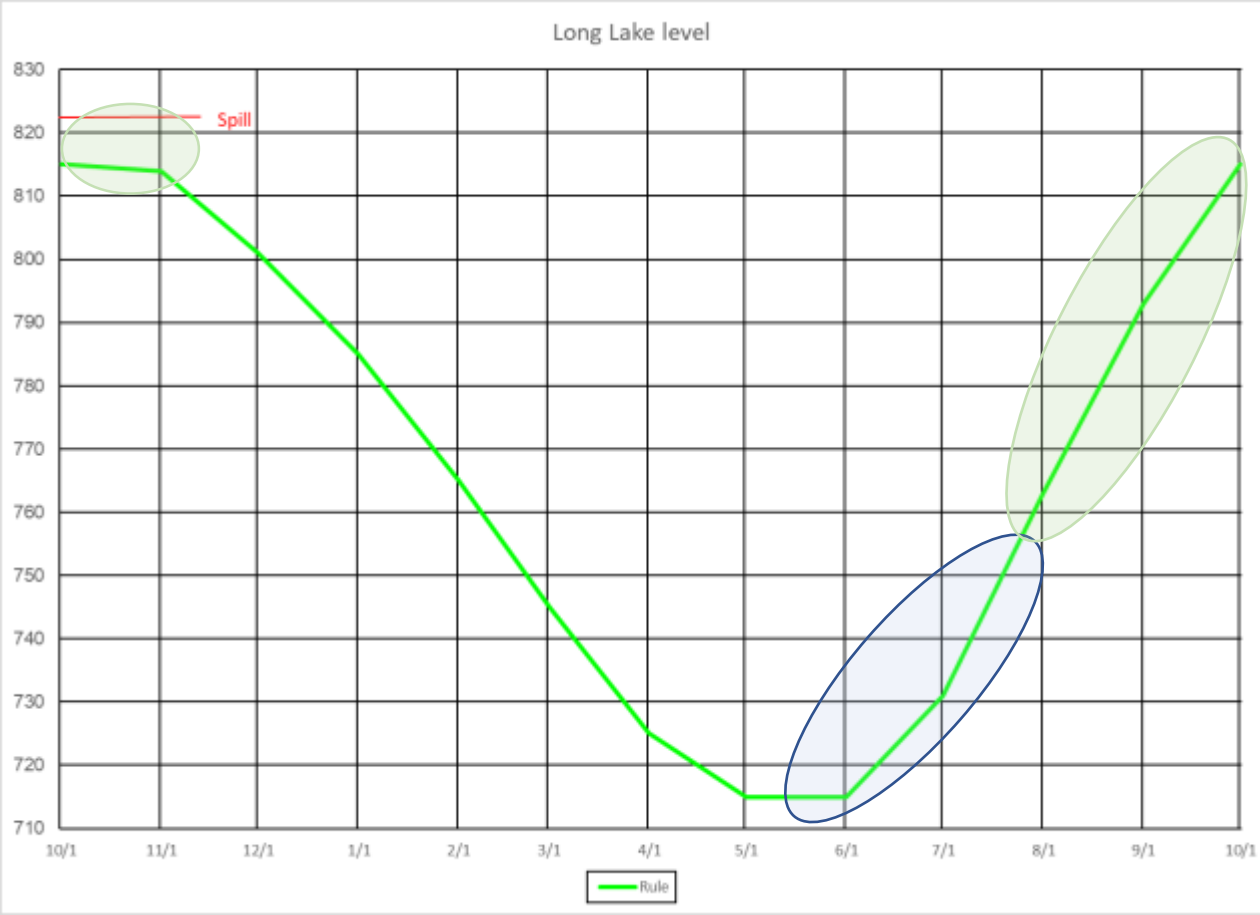
Storage Project in SE Alaska



Rule Curve – Operating Guidelines for Maximum Firm Flow

Region 1 - Fill Due to Snow Melt in the Spring and early summer

Region 2 - Fill Due to Rain in the late summer and fall

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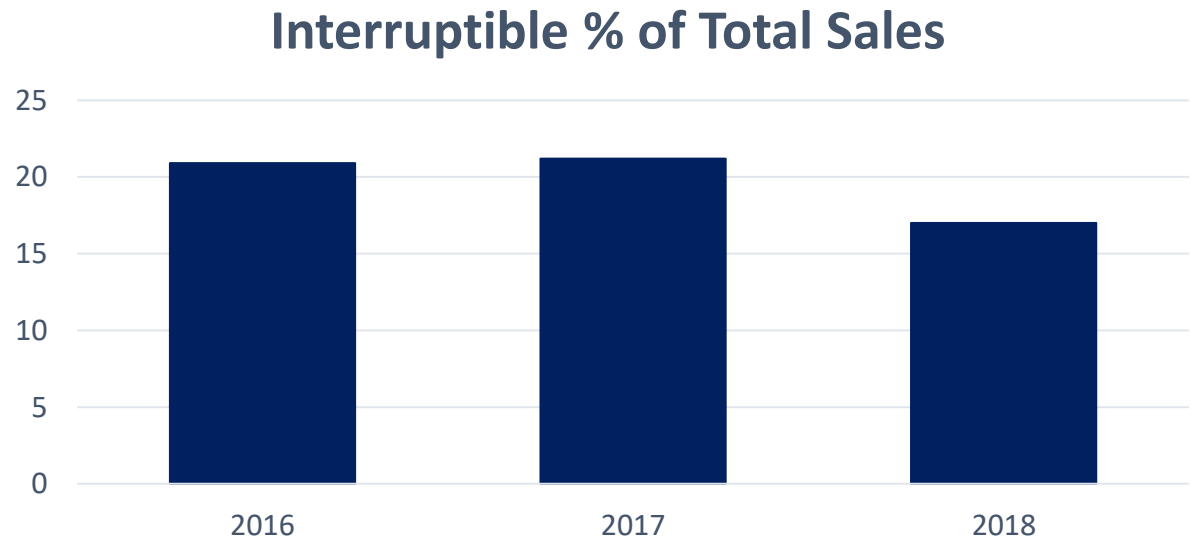
AEL&P Has Minimized Effect of Dry Water Years

- Surplus power sales
  - Customers with two heating systems receive discounted electric power but can be interrupted during a dry year.
    - Dual Fuel Program
  - Customers who have their own electrical generation can be interrupted during a dry year.
    - Princess Cruise Lines
    - Greens Creek Mine



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A Drought Without Interruptible Load

- ❑ Run diesel generation
  - Cons
    - Air Emissions
    - High fuel cost per kWH
  - Pros
    - Can match your generation to your load (minimize short term costs)
- ❑ Build more hydro
  - Cons
    - High cost of construction, fixed generation output
    - High cost per kWH, lasting impact to electric rates
  - Pros
    - Long lifetime renewable energy