Seattle City Light

PREPARING SEATTLE CITY LIGHT FOR CLIMATE CHANGE

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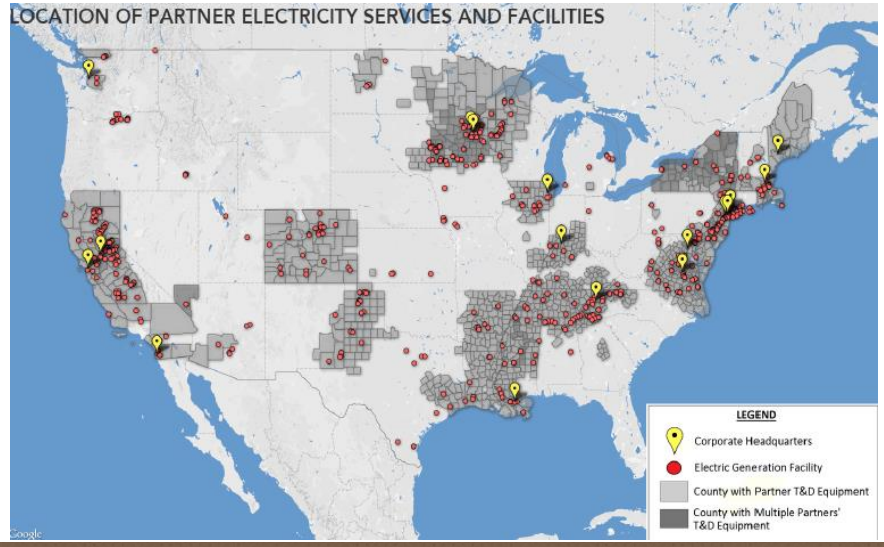
Strategic Plan: Climate Initiative

1. Climate change adaptation strategic advisor position
2. Research climate change impacts on the utility
3. Develop a utility-wide adaptation plan

Department of Energy Partnership for Energy Sector Climate Resilience

1. Established between DOE and 18 electric utilities (April 2015)
2. Submit Climate Change Vulnerability Assessment (February 2016)
3. Submit Resilience Strategy (October 2016)

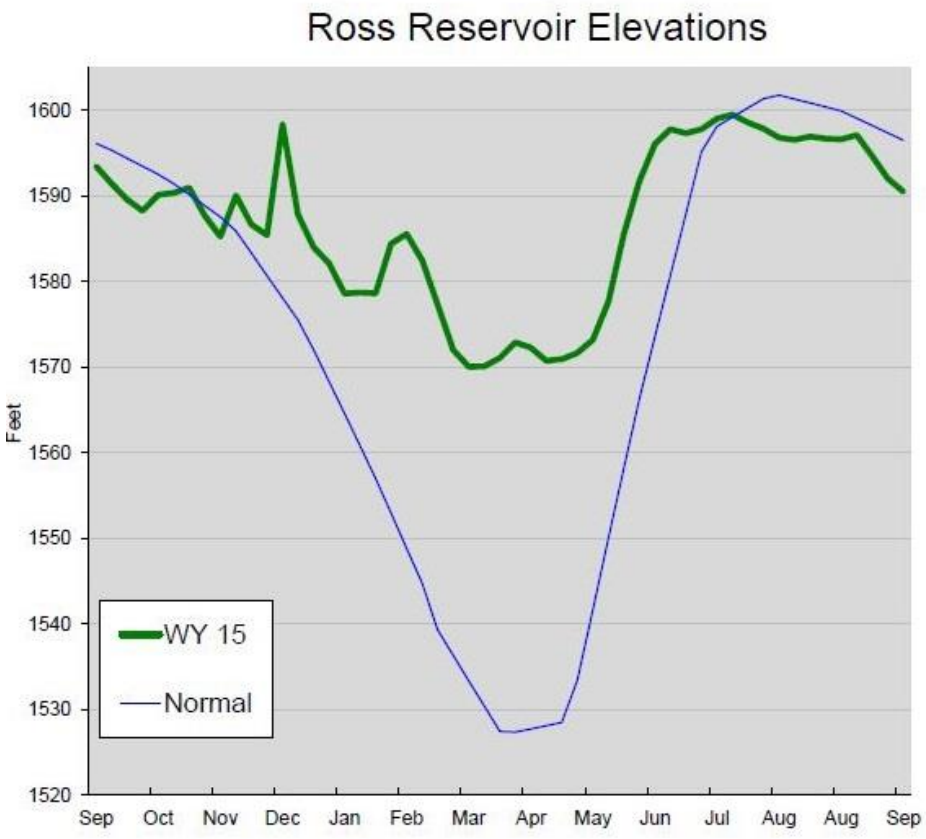


Why Plan For Climate Change Now?

- Climate change is happening now. Impacts of warmer temperatures on snowpack, heat waves and extreme weather have been seen in NW
- These impacts are expected to intensify
- Decisions made today will shape resources and infrastructure of City Light for decades
- Easier and more cost-effective to plan for the impacts of climate change in the design of new infrastructure and selection of new resources than to retrofit later

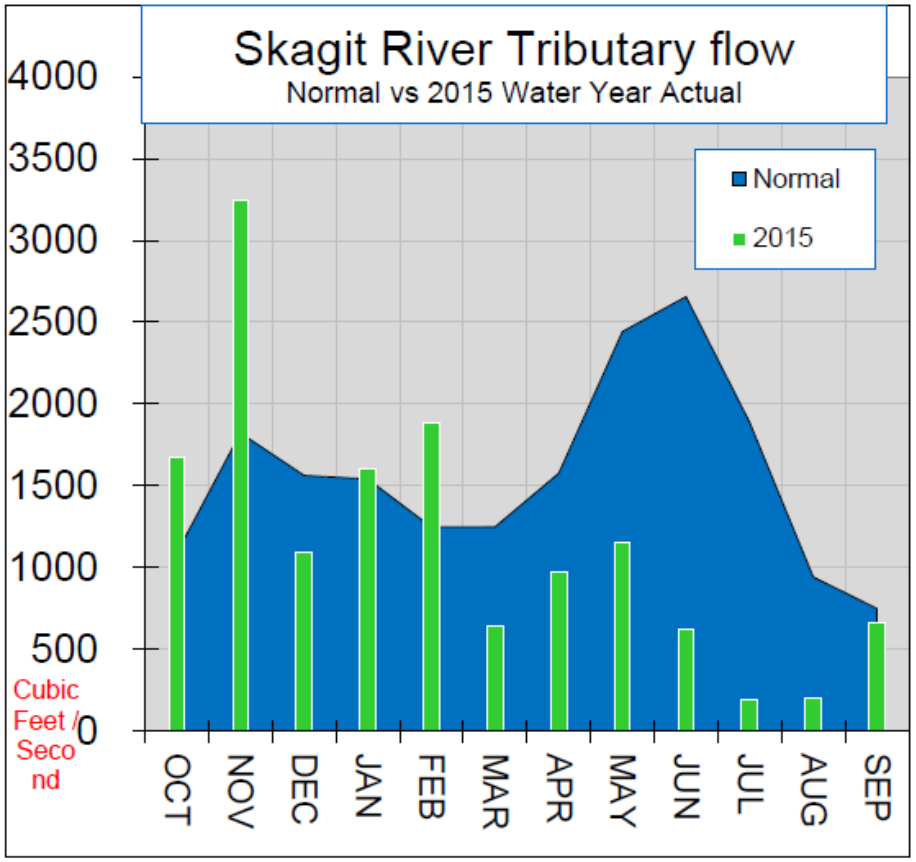
Ross Operations: Water Year 2015

- High winter inflows and Fishery operations kept Ross Lake above normal elevations
- Reservoir fell 2’ short of full and began drafting to protect Steelhead nests 2 months early
- Warmer temperatures, lower electricity demand in winter



Summer 2015

- Ross inflow second driest in 106 years of history
- Newhalem to Marblemount Tributary flow was the lowest ever recorded



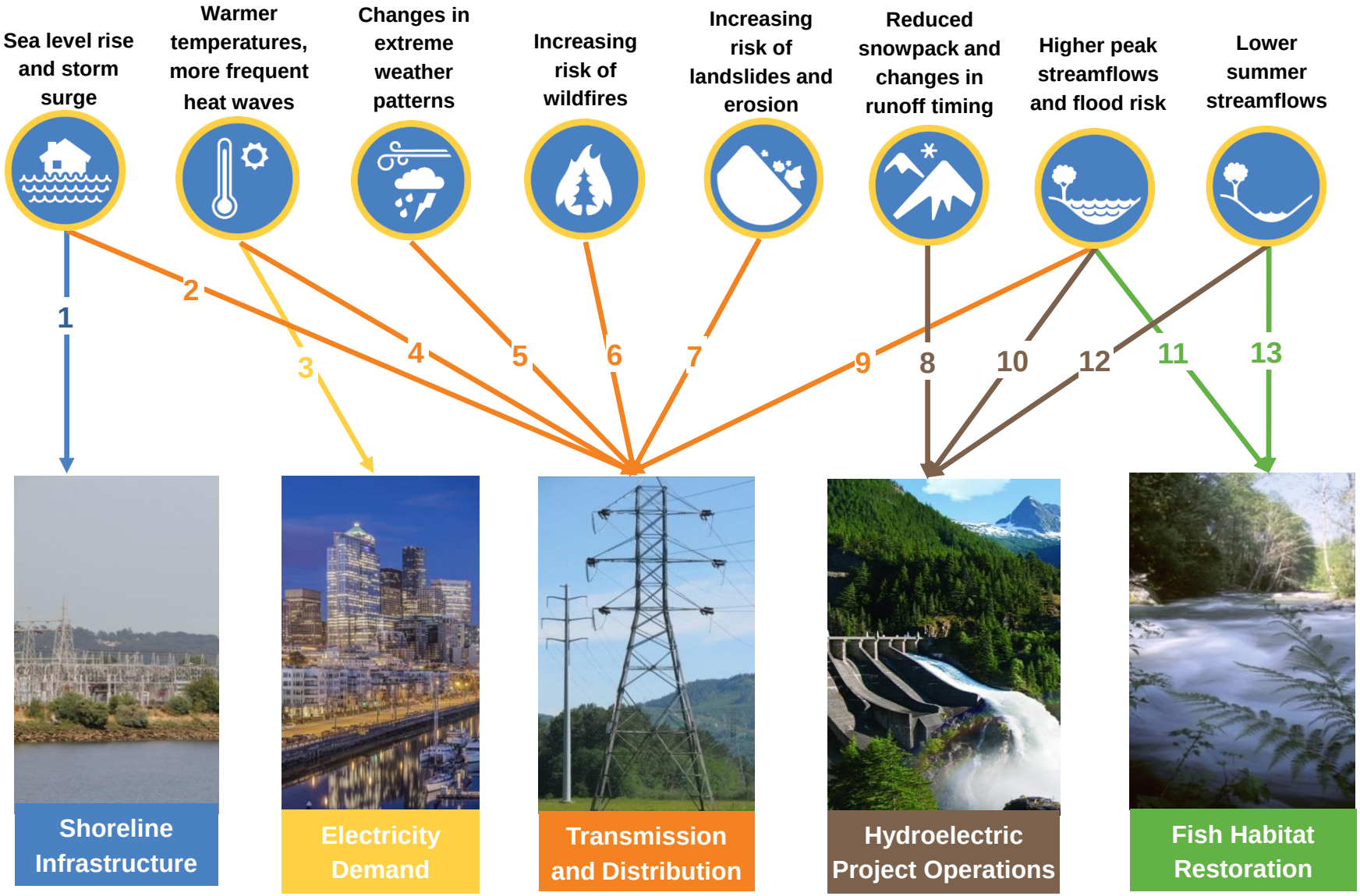
Then this happened….

Goodell Fire, Newhalem Washington, August 2015

Water Year 2015 vs. Climate Change

	WY 2015	Climate Change
Above average winter temperatures	✓	✓
Below average snowpack	✓	✓
Lower and earlier spring runoff	✓	✓
Above average summer temperatures	✓	✓
Below average summer precipitation	✓	✓
Average August precipitation	✓	✗

Seattle City Light: Adaptation Plan Scope

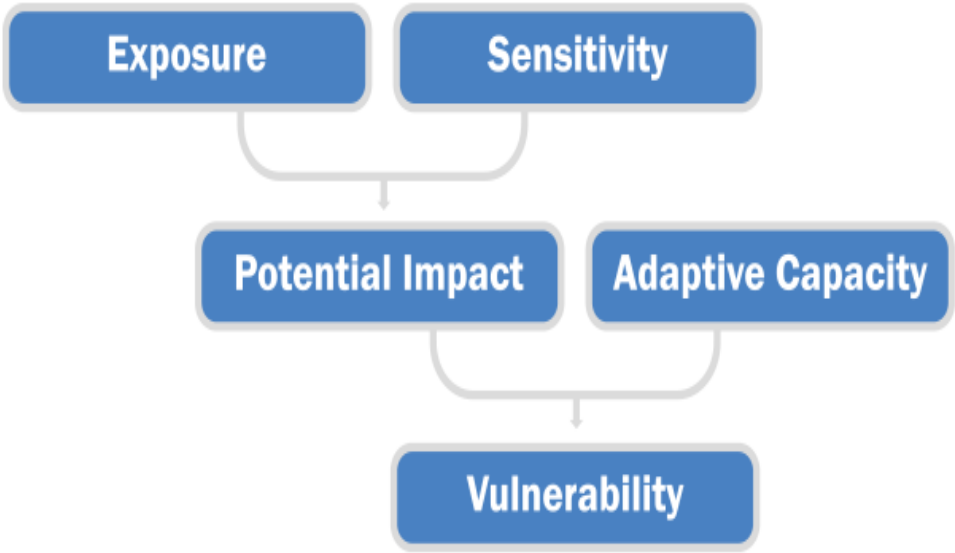


Skagit Hydroelectric Project Objectives

- Flood control (October – April)
- Instream flows for fish protection (year round)
- Hydropower generation (year round)
- Reservoir levels for recreation (July – August)

Vulnerability Assessment: How is the Utility at Risk?

Mission: Seattle City Light is dedicated to exceeding our customers' expectations in producing and delivering environmentally responsible, safe, low-cost, and reliable power.



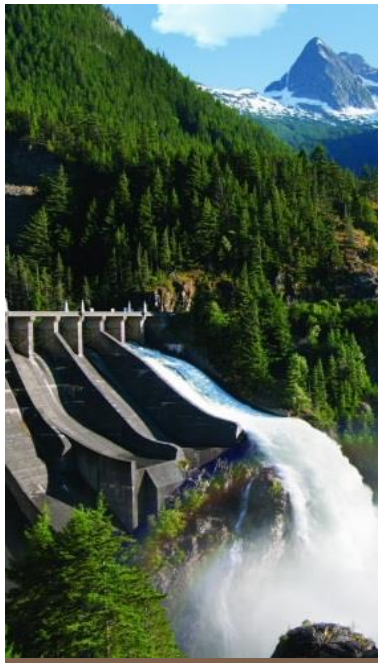
Example of Vulnerability Assessment

Table 5.2 Summary of vulnerability and potential magnitude of climate change impacts to Seattle City Light

Utility Function	Impacts Caused by Climate Change*	Time	Vulnerability: Exposure	Vulnerability: Sensitivity	Vulnerability: Capacity to Adapt	Potential Magnitude** of Impact to: Financial Cost	Safety	Reliability	Environmental Responsibility
Shoreline Infrastructure	1. Tidal flooding due to higher storm surge and sea level rise	2030	○	●	●	Low	—	—	Low
		2050	●			Mod	—	—	Low
Transmission and distribution	2. Tidal flooding and salt water corrosion due to higher storm surge and sea level rise	2030	○	○	●	Low	—	Low	—
		2050	●			Low	—	Low	—
	4. Reduced transmission capacity due to warmer temperatures	2030	●	○	○	Low	—	Low	—
		2050	●			Low	—	Low	—
	5. More frequent outages and damage to transmission and distribution equipment due to changes in extreme weather**	2030	○	●	●	Low	Low	Low	—
		2050	○			Low	Low	Low	—
	6. More damage and interruptions of transmission and generation due to wildfire risk	2030	●	●	●	High	High	Med	—
		2050	●			High	High	Med	—

Hydroelectric Project Operations: Key Impacts

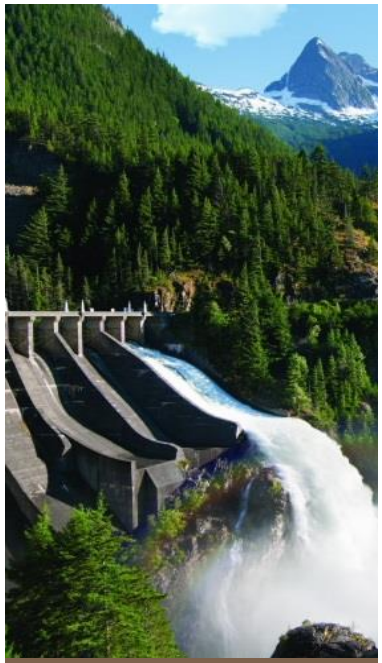
- Less snowpack and earlier snowmelt will affect seasonal operations
- Higher peak streamflow may increase spilling at hydroelectric projects – lost generation and impacts on fish
- Lower streamflow in summer may make it more difficult to meet instream flows for fish and reservoir elevations for recreation



Hydroelectric Project Operations

Hydroelectric Project Operations: Adaptation Actions

- Analyze and model climate change impacts on hydropower supply in the Integrated Resource Plan
- Collaborate with stakeholders to address climate change impacts during relicensing
- Continue to collaborate with researchers to better understand changes in streamflow and impacts on fish



Hydroelectric Project Operations

Electricity Demand: Key Impacts

- Seasonal changes in electricity demand
- Higher electricity demand for cooling could cause summer peaks to approach winter peaks in areas with high commercial loads
- Lower electricity demand for heating in winter could reduce retail revenue and have financial impacts on the utility

Electricity Demand

Electricity Demand: Adaptation Actions

- Model climate change impacts on demand in the Integrated Resource Plan
- Improve demand forecasting to better account for temperature effects
- Assess financial impacts on the utility of lower retail sales in winter
- Collaborate with researchers to understand potential changes in air-conditioning use in the residential sector

Electricity Demand

Transmission and Distribution: Key Impacts

- Slower outage restoration times due to heavy precipitation and urban flooding
- Increased risk of wildfires causing damage to and interruptions of transmission lines and generation facilities
- Increased risk of landslides damaging transmission towers and access roads
- Increased risk of riverine flood damage to transmission towers and access roads located in floodplains

Transmission and Distribution

Transmission and Distribution: Adaptation Actions

- Upgrade infrastructure after events to be more resilient or through FEMA hazard mitigation planning
- Collaborate with adjacent landowners to reduce vegetation and wildfire risk near hydroelectric projects
- Continue to collaborate with researchers to better understand the increasing risk of natural hazards

Transmission and Distribution

OUR VISION

To set the standard—to deliver the best customer service experience of any utility in the nation.

OUR MISSION

Seattle City Light is dedicated to exceeding our customers' expectations in producing and delivering environmentally responsible, safe, low-cost and reliable power.

OUR VALUES

Excellence, Accountability, Trust and Stewardship.

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