

Surplus Marketing: **Hedging & Risk Management Strategies**

July 8, 2013

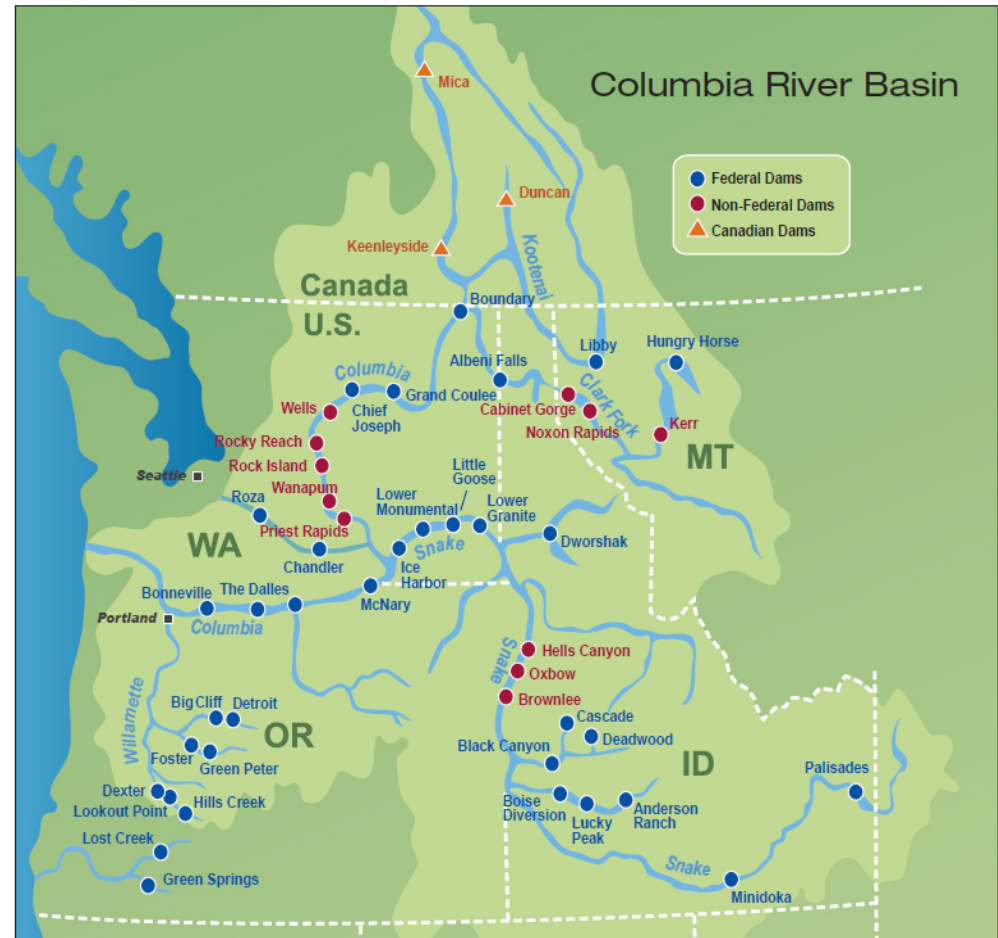
Northwest Power & Conservation Council
Pacific Northwest Power Markets Symposium

About BPA

- Part of the US Department of Energy
- Non-profit - - power rates set to recover costs
- To keep rates as low as possible, manage costs and maximize net secondary revenue
- Net Secondary Revenue = Surplus sales *minus* Balancing purchases
- Forecast NSR is credited to power rates

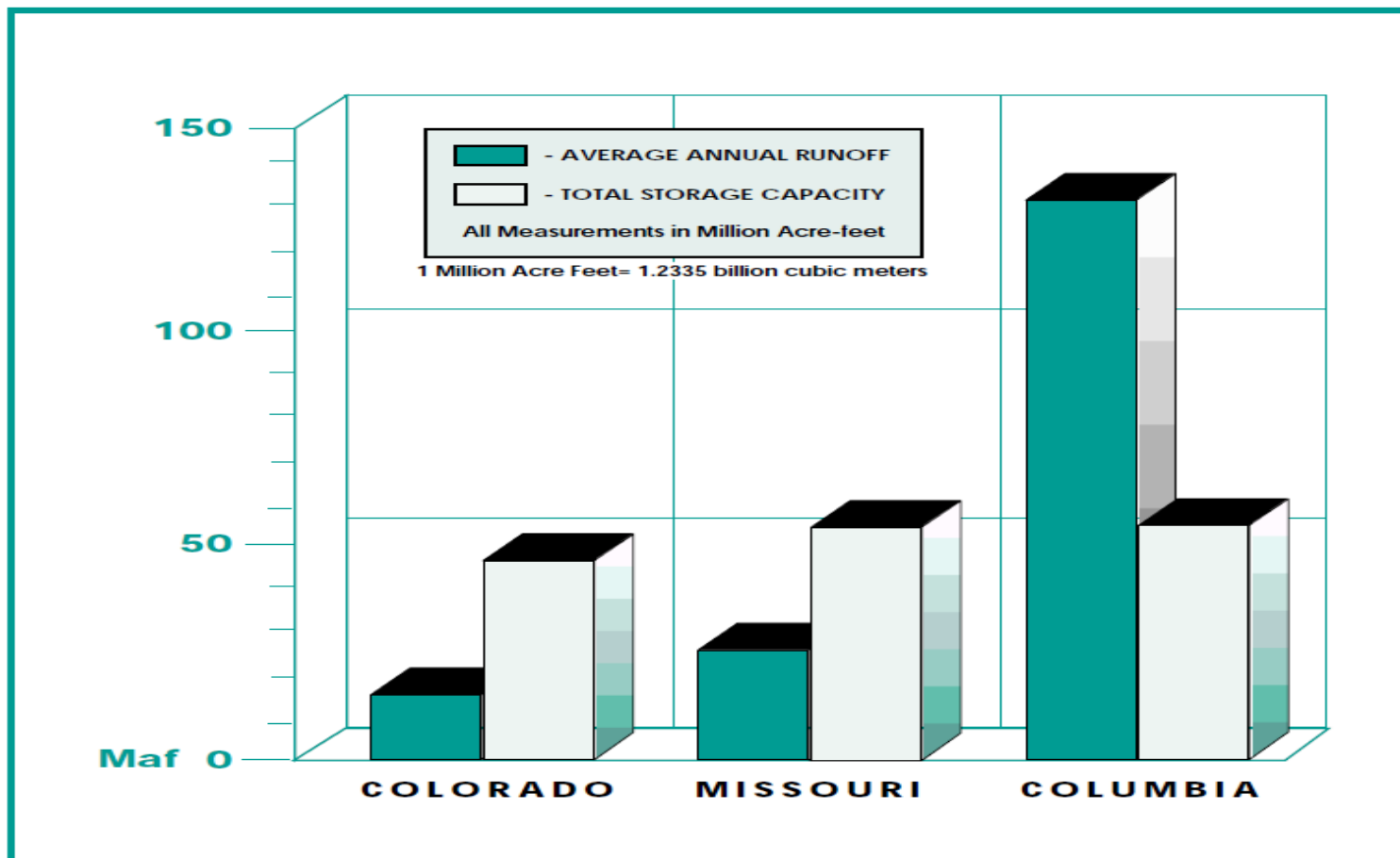
Federal Columbia River Power System (FCRPS)

- BPA markets power from 31 Federal Hydropower plants, the Columbia Generating Station Nuclear Plant, some non-Federal hydro facilities, and several wind projects.
- The US Army Corps of Engineers and the Bureau of Reclamation operate the federal dams for multiple public purposes:
 - Flood Control
 - Navigation
 - Fish protection operations (Endangered Species Act, Clean Water Act)
 - Irrigation
 - Recreation
 - Power production



FCRPS Storage Capability

- When empty, FCRPS can store ~30 MAF or 25% of the annual runoff.
- The Colorado or Missouri systems can store 200-300%

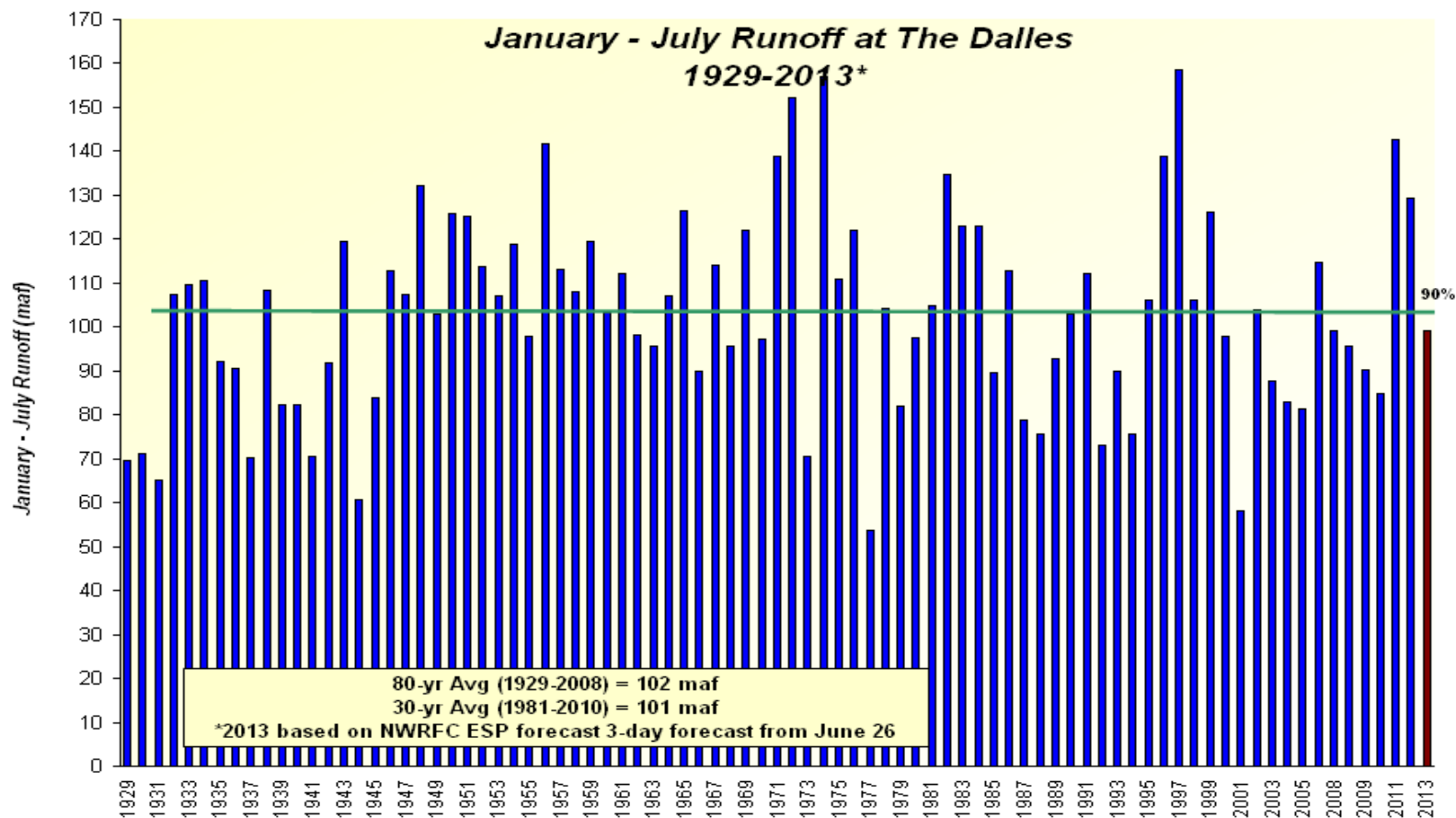


Uncertainty

There is a tremendous amount of uncertainty in the power business:

- Streamflows, water supply, and hydro generation
- Weather and temperature departures
- Wind generation levels
- Thermal generation and thermal unit outages
- Available transmission and system congestion
- Demand for energy
- Coal, natural gas, and electricity prices
- Market liquidity

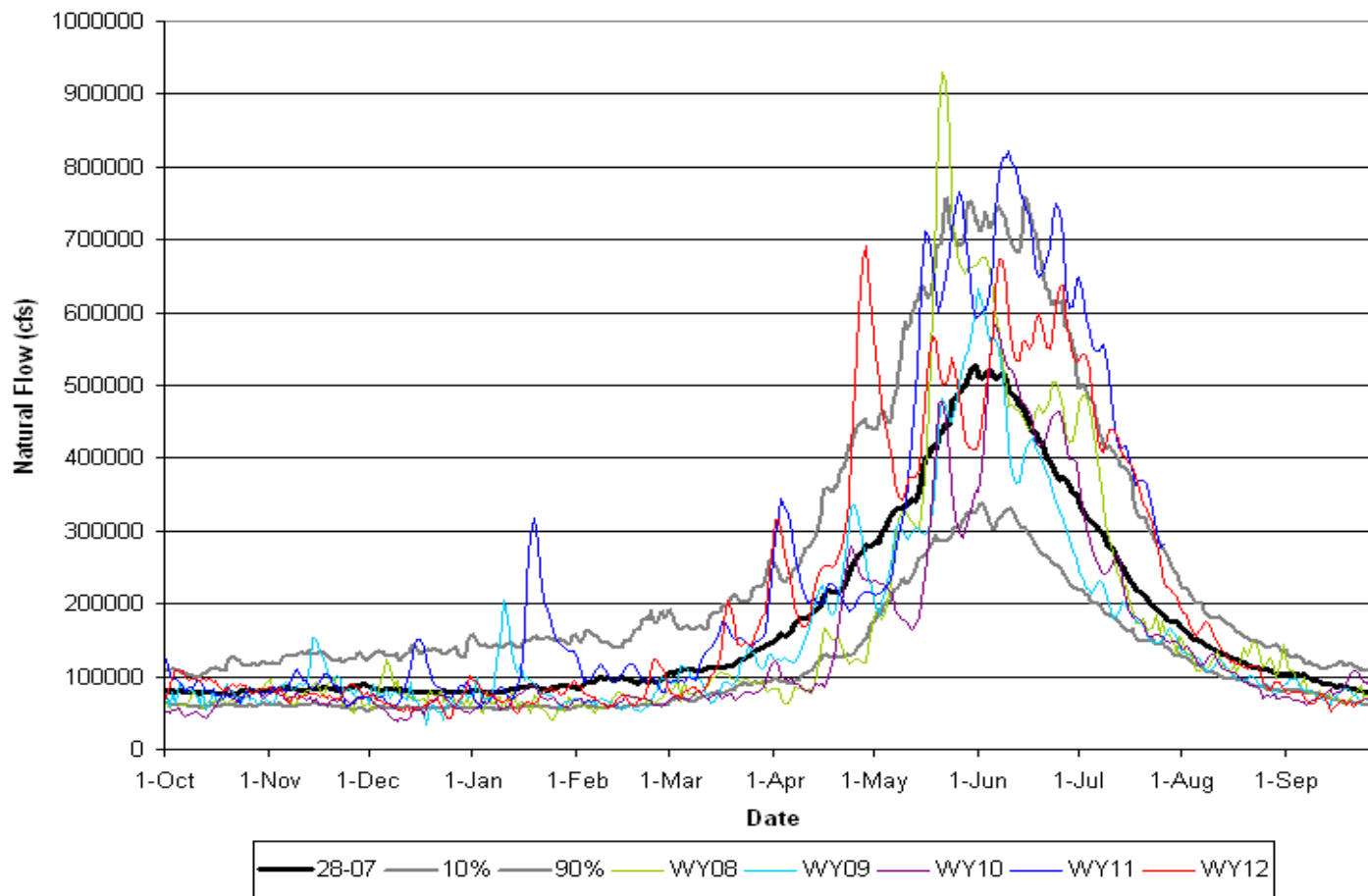
Columbia River Runoff Varies Widely



- Large range of potential runoff volumes (53-159 MAF for January-July)

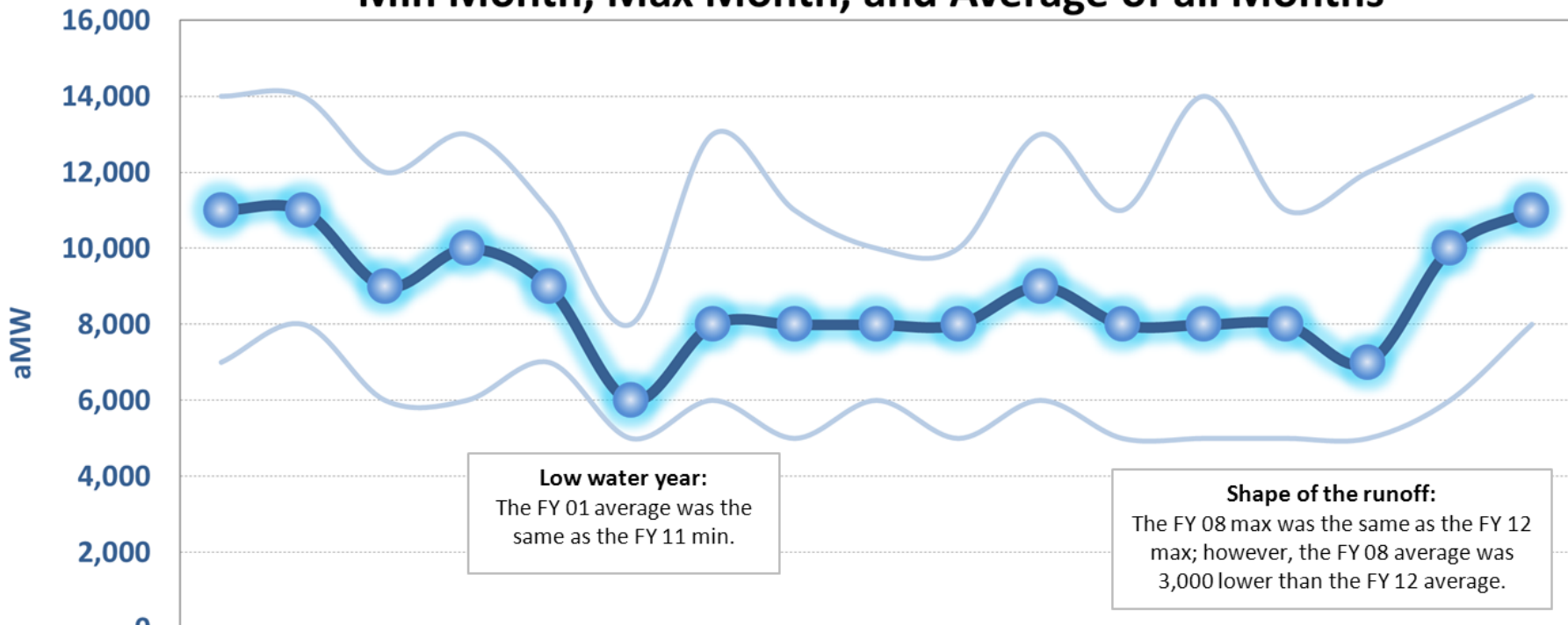
Daily Variability

The Dalles
Daily Variability in Natural Flows



Federal Hydro Generation (aMW) by Fiscal Year

Min Month, Max Month, and Average of all Months

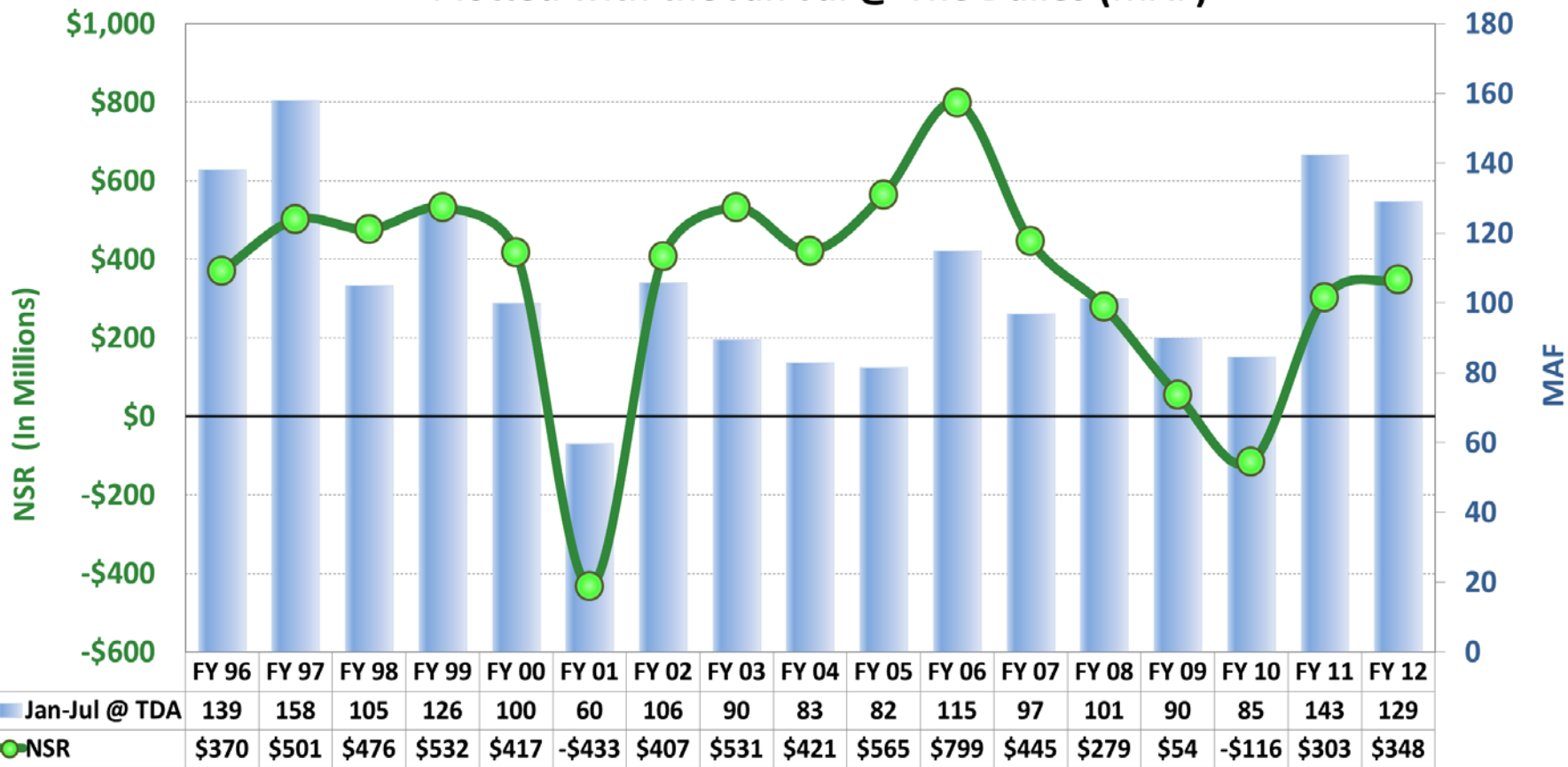


	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12
● Average	11,000	11,000	9,000	10,000	9,000	6,000	8,000	8,000	8,000	8,000	9,000	8,000	8,000	8,000	7,000	10,000	11,000
— Min	7,000	8,000	6,000	6,000	7,000	5,000	6,000	5,000	6,000	5,000	6,000	5,000	5,000	5,000	5,000	6,000	8,000
— Max	14,000	14,000	12,000	13,000	11,000	8,000	13,000	11,000	10,000	10,000	13,000	11,000	14,000	11,000	12,000	13,000	14,000

The data displayed above is Federal Hydro Generation (FHG). The text values have been rounded:

- The average FHG of all the months of the fiscal year has been plotted as the “average”.
- The minimum FHG month of the fiscal year has been plotted as the “Min”.
- The maximum FHG month of the fiscal year has been plotted as “Max”.

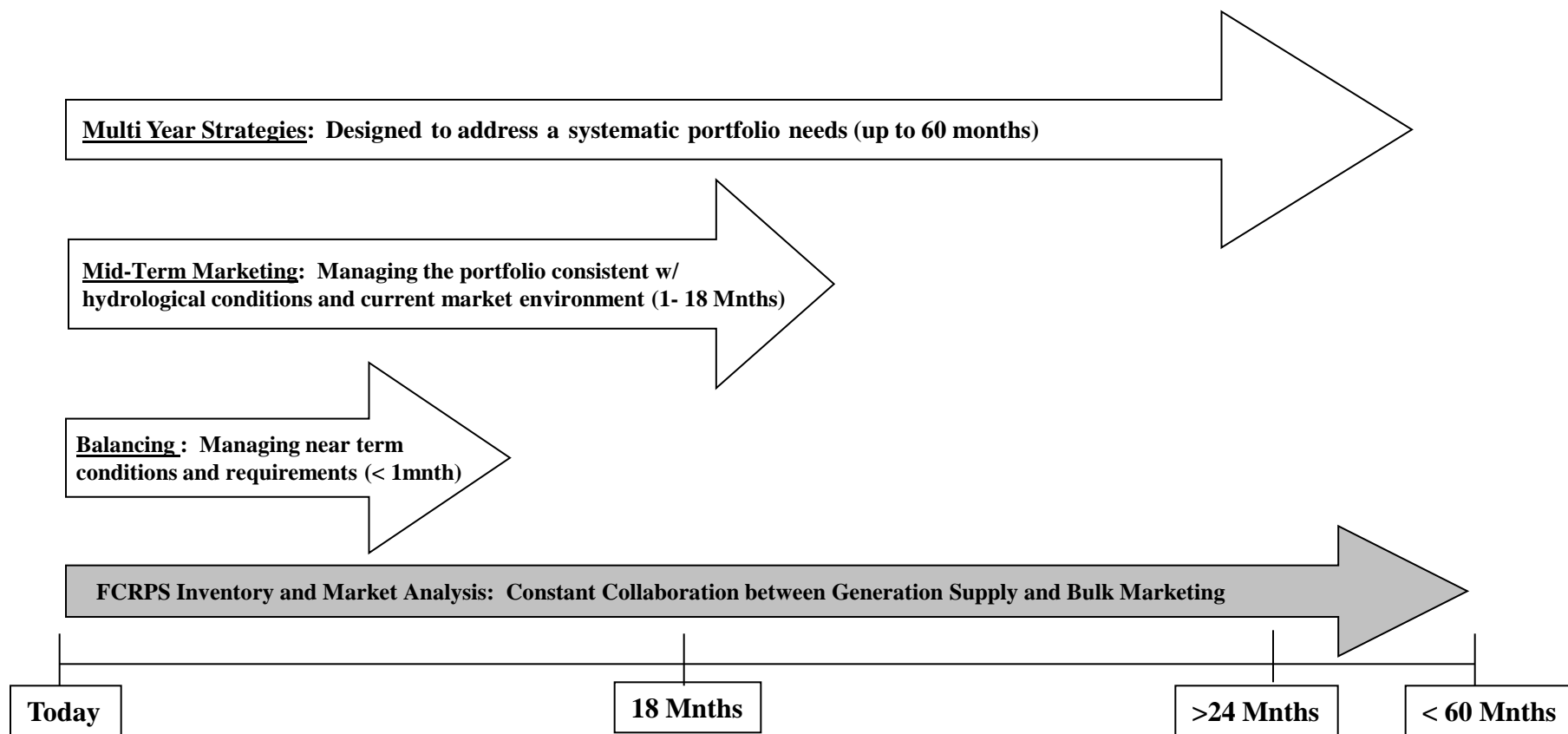
Nominal Net Secondary Revenue (NSR) Plotted with the Jan-Jul @ The Dalles (MAF)



Note: FY02 – FY07 NSR increased by the sales of additional power supplied under contracts that have since expired. NSR figures are not final audited values. They are derived from committed transaction data from BPA's Trade Management System, and do not reflect what was actually delivered and billed.

Hedging Strategies: A diverse portfolio approach

Objectives: to ensure system reliability, and to maximize Net Secondary Revenue



Mid-Term Marketing: Inventory Determination

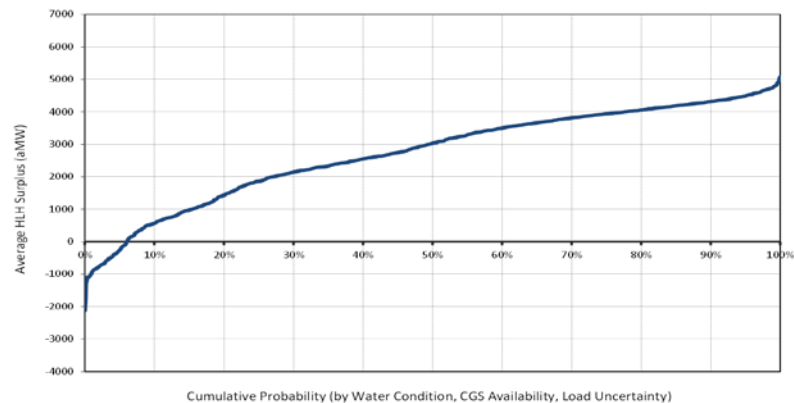
Generation Estimates:

- Use range of streamflows
- Operational Objectives and Constraints
- Apply a range of CGS Generation availability
- Hydro Unit Availability (by project)

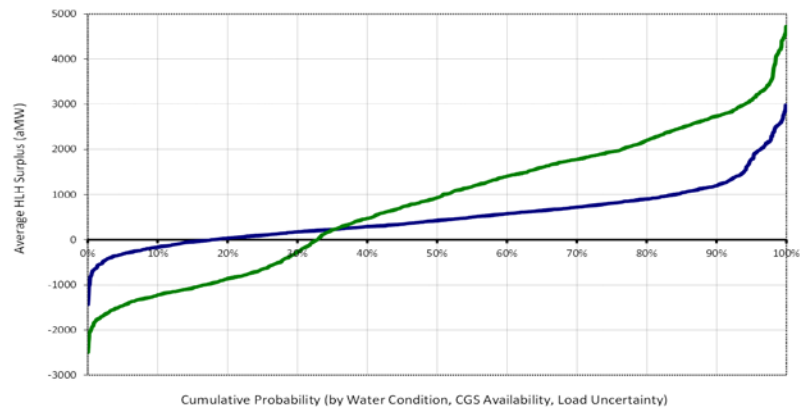
Load Estimates:

- Forecasted Loads
- Apply load variability
- Updated Market Transactions

HOSS HLH Inventory Projections - Spring Month X



HOSS HLH Inventory Projections - Q4 Months



Summary

- BPA's surplus marketing is driven by water management operations to meet multiple purposes
- Objectives of our marketing activity are to ensure system reliability and to maximize net secondary revenue
- Variability in water supply (inventory) and market prices have the largest impact on BPA's net secondary revenue
- BPA hedges its exposure to volatility through forward marketing