



Palouse Ground Water Basin Water Supply Alternatives Project

Spokane River Forum

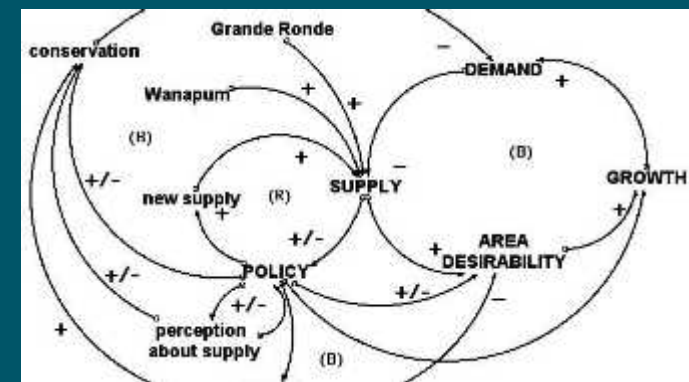
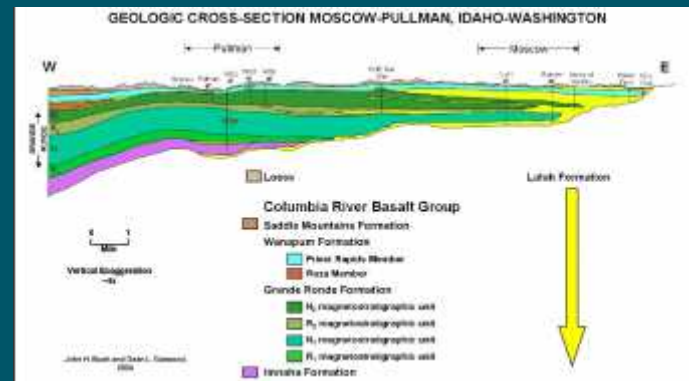
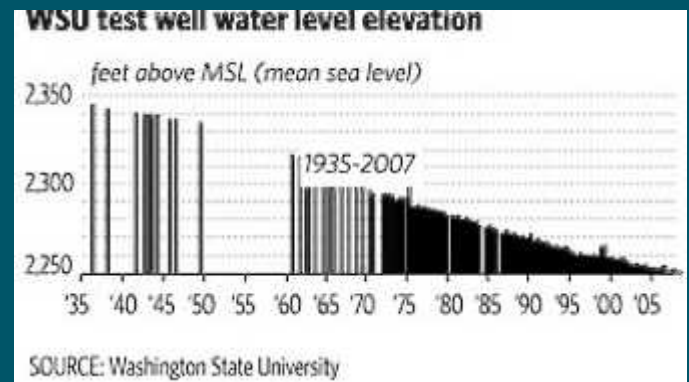
Presented by Ben Floyd, Anchor QEA

March 23, 2016



Project Purpose

- Compare supply and demand management actions
- Common water supply, limited recharge
- Limited surface water
- PBAC is leading the effort to understand, manage, conserve:
 - GWMP of 1992
 - Framework Project



From Beall et al 2011

Approach Overview

- Kickoff/discuss goals
- Confirm actions to evaluate
- Synthesize Existing Information
- Confirm data gaps; quantify risk and uncertainty
- Conduct benefit/cost analysis
- Summarize findings
- Implementation strategies
- Document results
- Complete by end of 2016

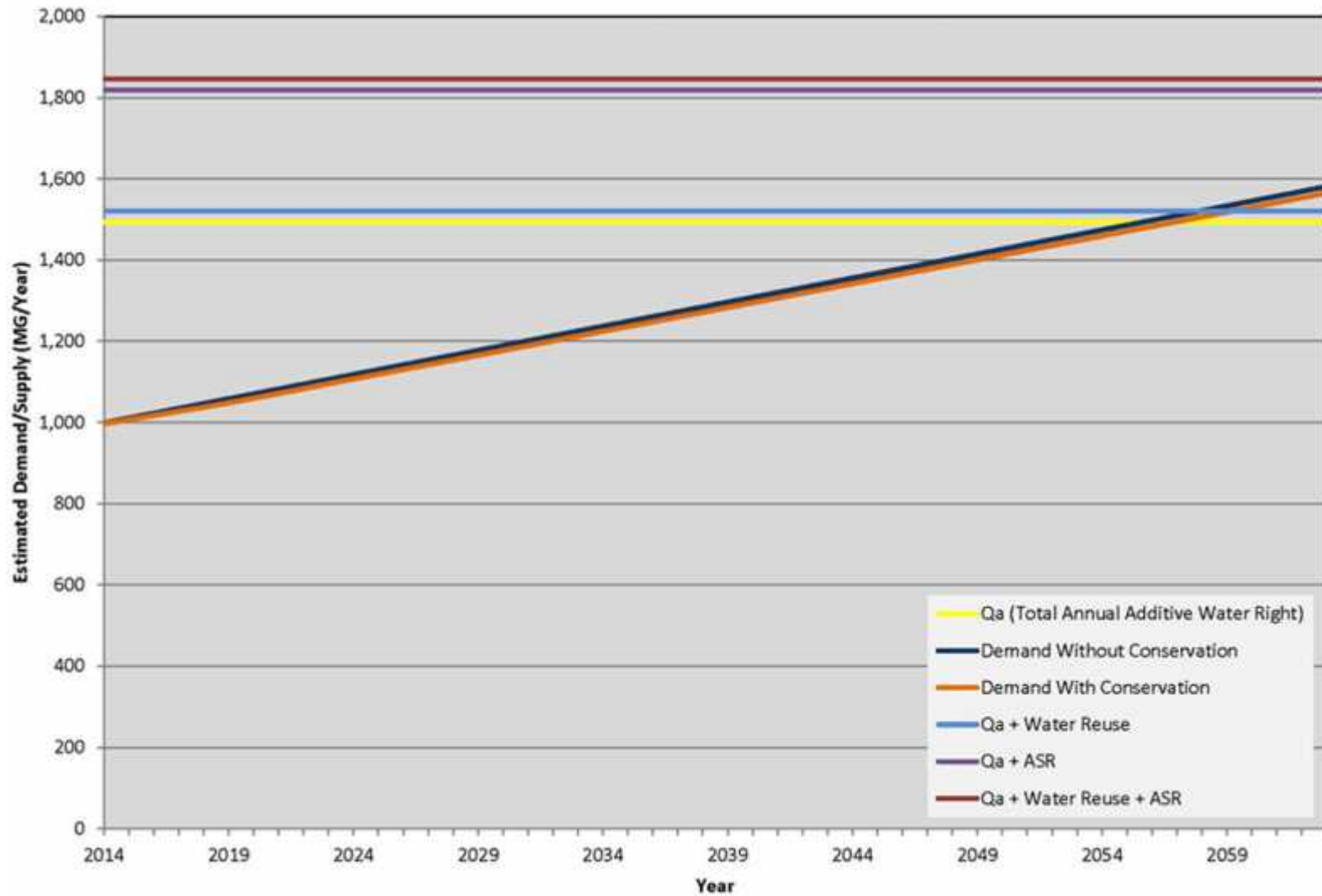


Potential Actions to Evaluate

- Surface water storage
- Water reuse/reclamation
- Aquifer storage and recovery
- Other supply options
- Demand management
 - Household conservation measures
 - Irrigation practices
 - Xeriscape landscaping
 - Other conservation measures

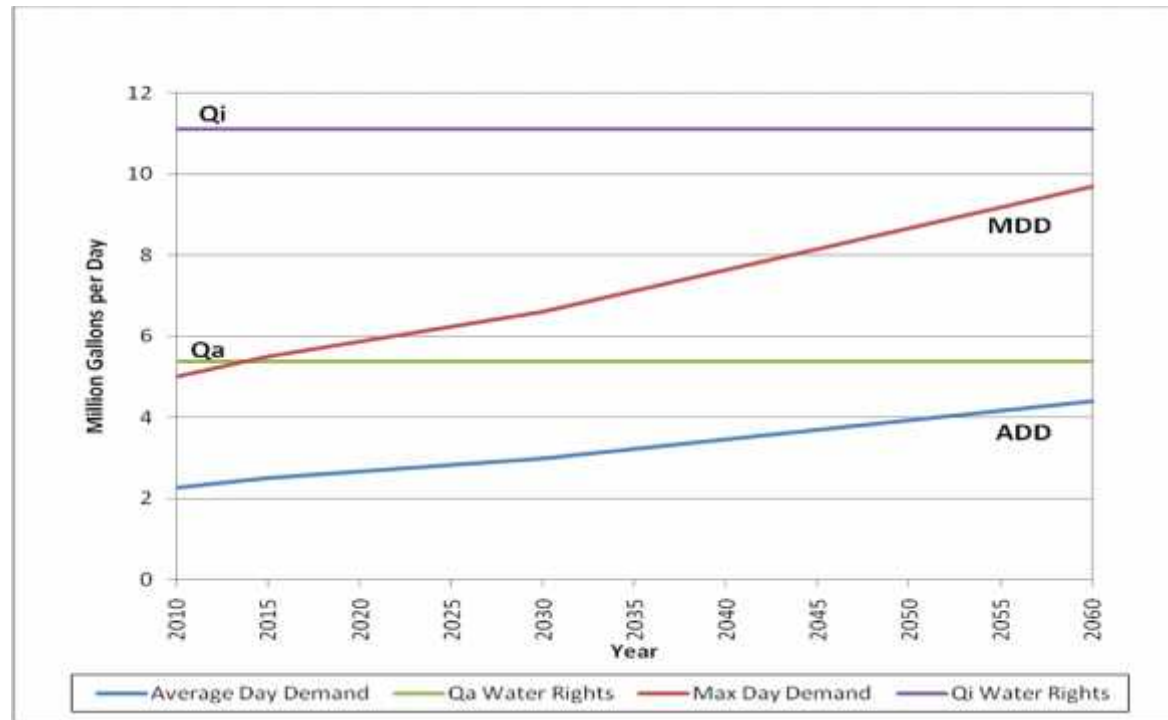
Assemble and Summarize Existing Information

Pullman Water Demand



Moscow Comprehensive Water System Plan Future Water Supply Alternatives

- Cost-effectiveness evaluation
- Supply and demand management options



Pullman Conservation Measures

Conservation Measure	Unit Water Savings (gpd/Unit)	Unit	2014-2019 Water Conservation Program Savings							
			Projected Quantities		Projected Savings		Projected Costs			Cost per Water Savings (\$/gpd)
			Total Devices/ Rebates	Average Annual Devices/ Rebates	Total (gpd)	Percent of Total	Unit Cost (\$)	Total (\$)	Percent of Total	
Free Toilet Leak Detection Dye Tablets	0.43	Per Device	9,000	1,500	3,902	9%	\$0.22	\$1,980	1%	\$0.51
Free Bathroom Faucet Aerators	2.41	Per Device	2,400	400	5,777	13%	\$1.20	\$2,880	1%	\$0.50
Free Showerheads	2.02	Per Device	1,200	200	2,427	6%	\$6.00	\$7,200	3%	\$2.97
Toilet Rebates	12.21	Per Rebate	720	120	8,792	20%	\$120.00	\$86,400	36%	\$9.83
Washing Machine Rebates (SF)	16.80	Per Rebate	130	22	2,184	5%	\$150.00	\$19,500	8%	\$8.93
Water Use Surveys (ICI)	80.20	Per Survey	25	4	2,005	5%	\$1,000.00	\$25,000	10%	\$12.47
Rain Barrels	2.26	Per Device	200	33	452	1%	\$27.50	\$5,500	2%	\$12.17
Lawn Removal Credits	35.12	Per Participant	30	5	1,053	2%	\$150.00	\$4,500	2%	\$4.27
Irrigation Controllers - ET Type (MF)	72.23	Per Rebate	14	2	1,011	2%	\$150.00	\$2,100	1%	\$2.08

Moscow Comprehensive Water System Plan Future Water Supply Alternatives (cont.)

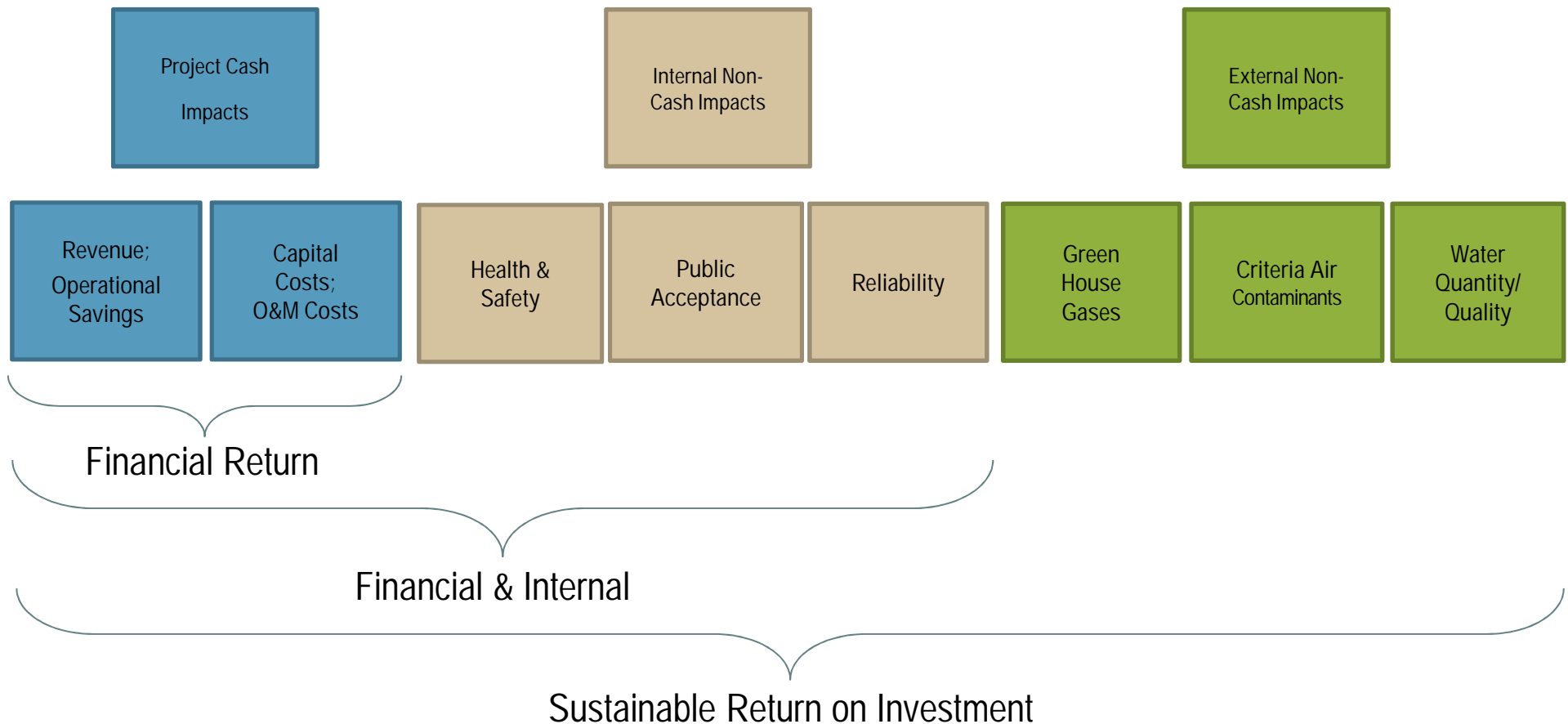
Alternative	Estimated Yearly Water Savings/ Supply (MG)	Estimated Yearly Water Savings/ Supply (AF)	Estimated Water Savings/ Supply 2020–2060 (MG) ¹	Estimated Water Savings/ Supply 2020-2060 (AF) ¹	Capital Cost to Implement (\$) ²	Annual Operating Cost (\$) ²	Present Worth Cost (\$) ³	PW Cost per 1,000 gallons ³	PW Cost per AF ³
New Well ⁴	578	1,774	23,126	70,977	\$1,500,000	\$88,200	\$3,163,000	\$0.14	\$45
Conservation ⁵					\$0				
Package A	43.6	134	1,744	5,354	-	\$22,600	\$509,000	\$0.29	\$95
Package C	87.5	268	3,499	10,739	-	\$126,800	\$2,853,000	\$0.82	\$266
Reuse – Irrigation ⁶	44.4	136	1,774	5,446	\$7,100,000	\$35,000	\$6,366,000	\$3.59	\$1,169
ASR ⁷	360	1,105	14,400	44,195	\$12,000,000	\$58,000	\$10,734,000	\$0.75	\$243
Surface Water Storage ⁸	1,433	4,400	57,329	176,000	\$53,664,000	\$2,340,000	\$94,821,000	\$0.65	\$210
Regional Water Supply ⁹	8,150	25,000	326,000	1,000,000	\$92,318,000	\$17,351,000	\$462,969,000	\$1.42	\$463

Develop and Evaluate Alternatives

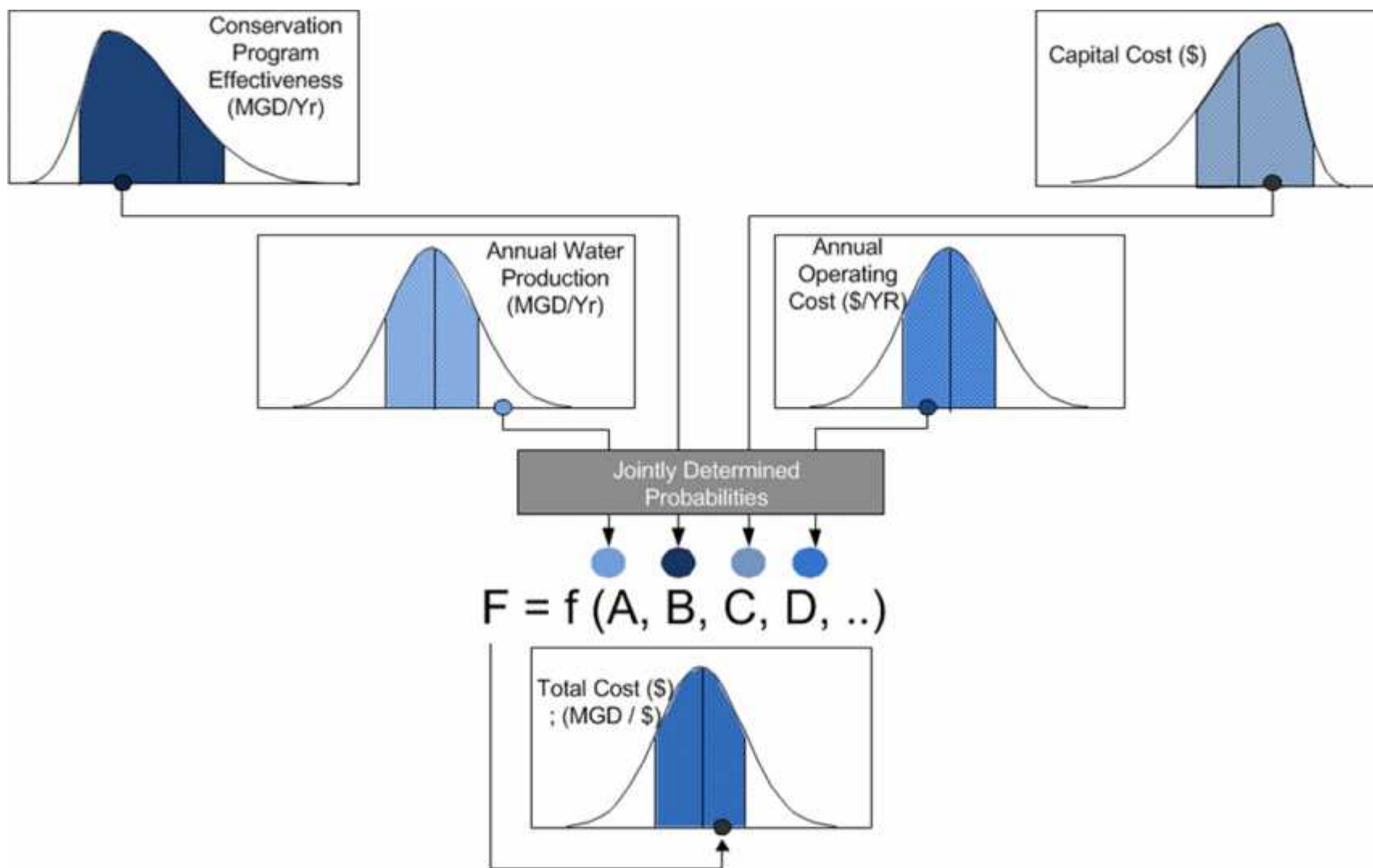
- Actions assembled into 3 or 4 alternatives to evaluate, e.g.,
 - Additional conservation measures with existing supplies
 - Additional conservation measures with existing supplies, and multiple new supply measures
- New action “concepts,” as applicable, may be added
- Data gaps and uncertainties identified
- PBAC to confirm alternatives to evaluate
- Close coordination with PBAC on each step of the project

Address Uncertainty through Decision Analysis

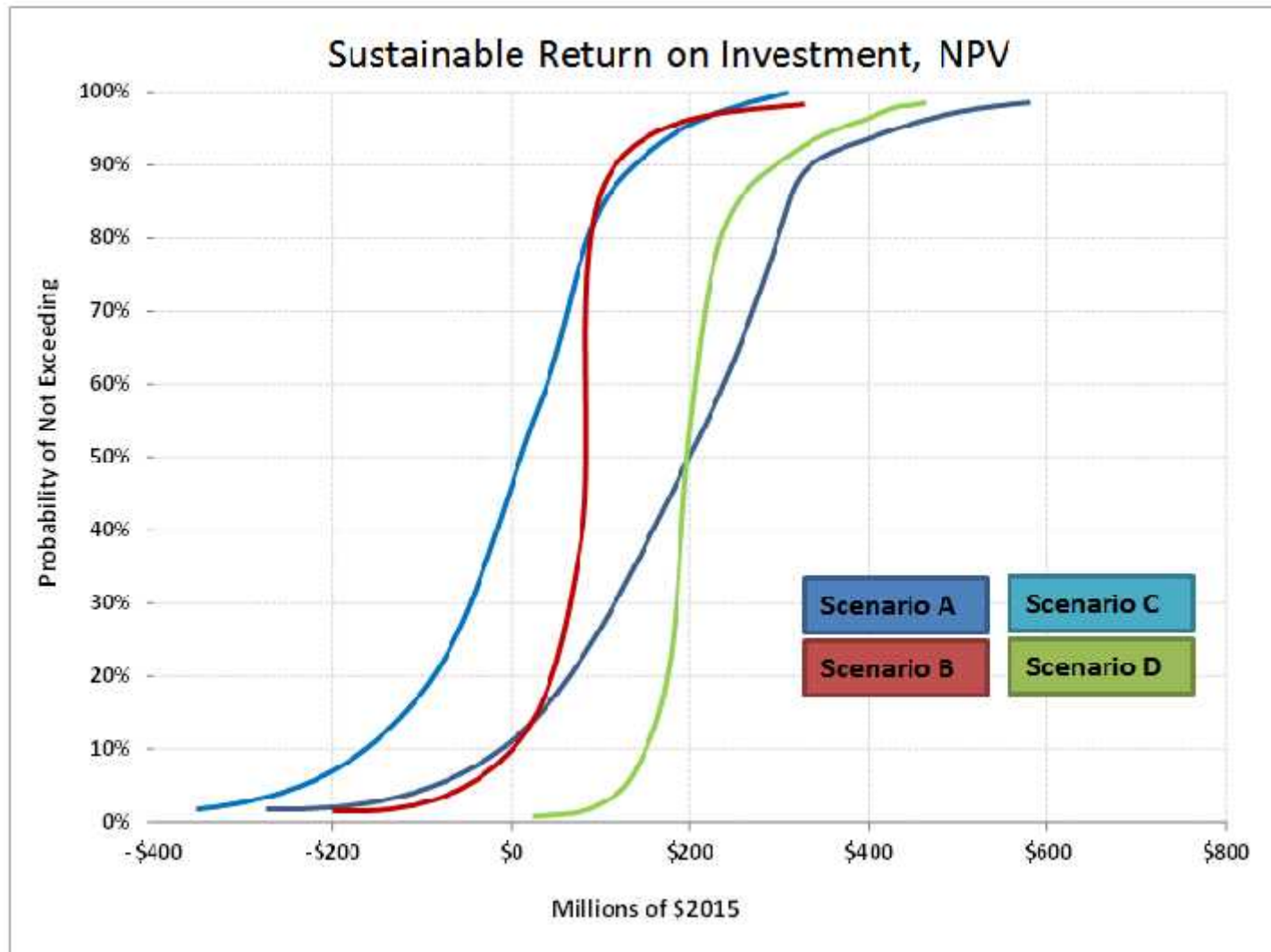
Confirm Evaluation Criteria with PBAC. For example...



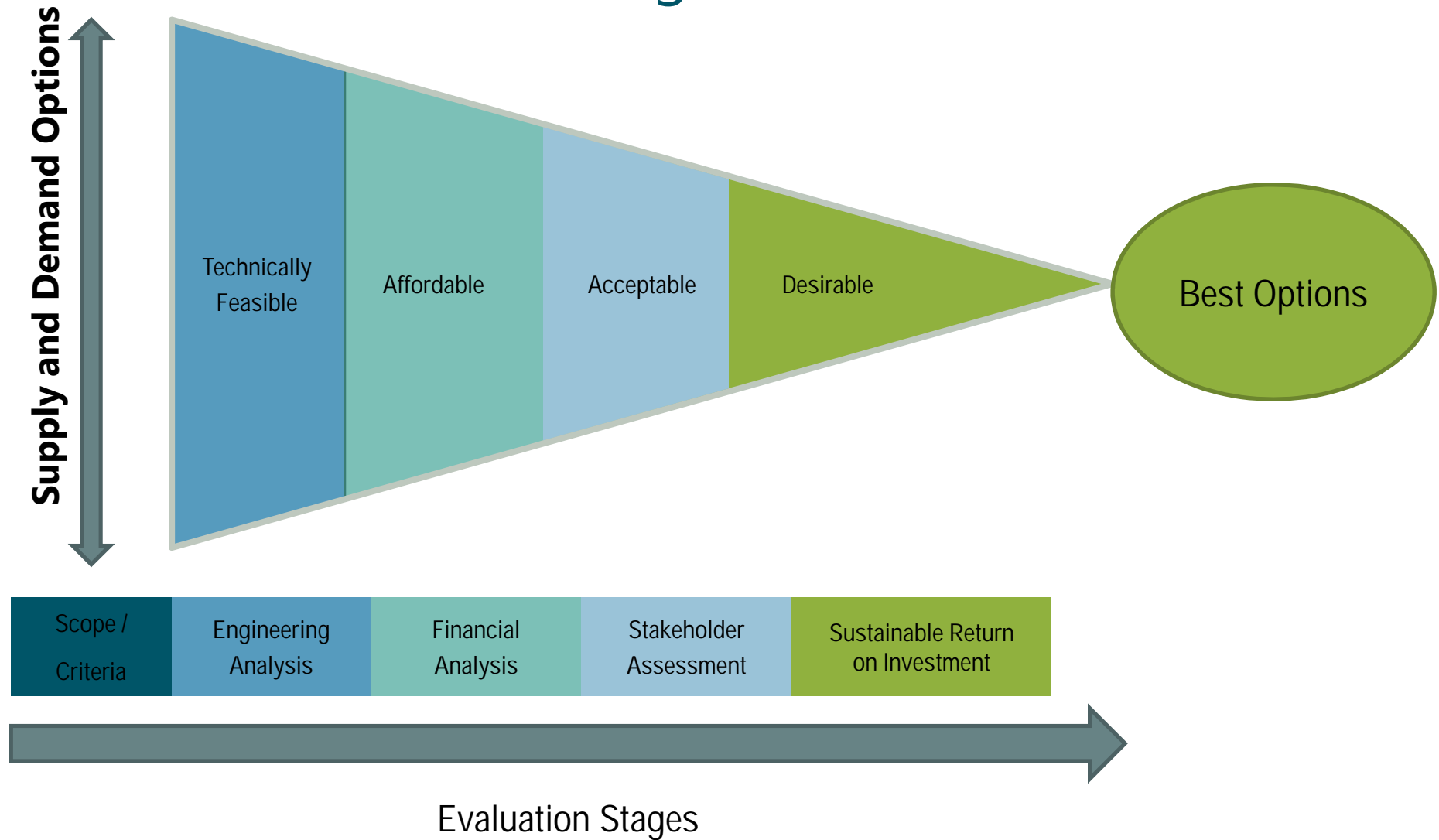
Modeling Uncertainty in Alternatives Evaluation



Accounting for Uncertainty in Outcomes to Prioritize Projects



Selecting the Alternative/Actions that Provides the Best Value for Meeting Goals



Document Results

- Findings summarized in a report
- Recommended next steps
- Implementation actions

Implementation Steps

- Select best alternative/actions
 - Water utilities strategies
 - Regional strategies
- Assign responsibilities
- Pursue early actions
- Pursue financing strategies
- Conduct technical work
- Environmental review and permitting

Questions/Discussion

