Summary
Multiple Benefit Water Storage

Chelan County PUD

5/25/2011

Office of Columbia River

Purpose

- Answer the question-”Can it make sense to build a multiple benefit storage project? ”
- Conceptual sites and configurations
- Reconnaissance level cost and revenue estimates
- Do combined social and economic benefits increase value/viability of a project?
- Identify different cost/benefit allocation methodologies

Study Area

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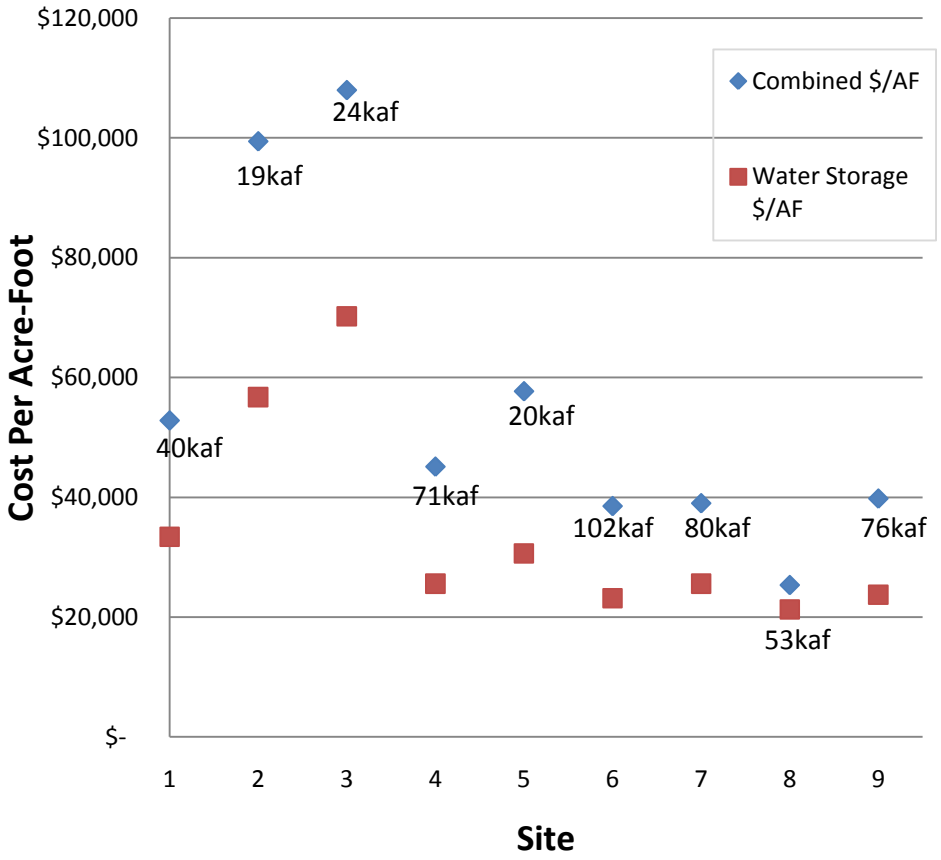
How it was done

- Site identification
- Recon level analysis of fatal flaws
- Recon level cost estimates
- Revenue estimates
- Value social and environmental
- 2-phase economic analysis

More on the economic analysis…

- 1st Phase
  - 3 Release Alternatives
  - All sites
  - Metrics were total project NPV, combined $/AF, and water component only $/AF
- 2nd Phase
  - Two sites
  - 1 release alternative per site
  - Focused on different benefit allocation alternatives
- Sensitivities Conducted

Phase 1 Results



Storage Volume	19kaf to 102kaf
Total Cost	$1.1B to 3.9B
Total Cost/AF	$25k to$107k
Water Cost/AF	$21k to $70k
Total NPV	-$2.8B to $758M

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Phase 2 Results

Allocation Number	Allocation Description
1	OCR and utility share the profits
2	OCR pays for de-optimization due to water release
3	OCR pays $5,500/AF
4	OCR pays 100% storage costs, 50% O&M and gets 50% profits
5	OCR pays 100% storage costs, 0% O&M and no profits
6	OCR pays 100% storage costs and 50% O&M

Phase 2 Results

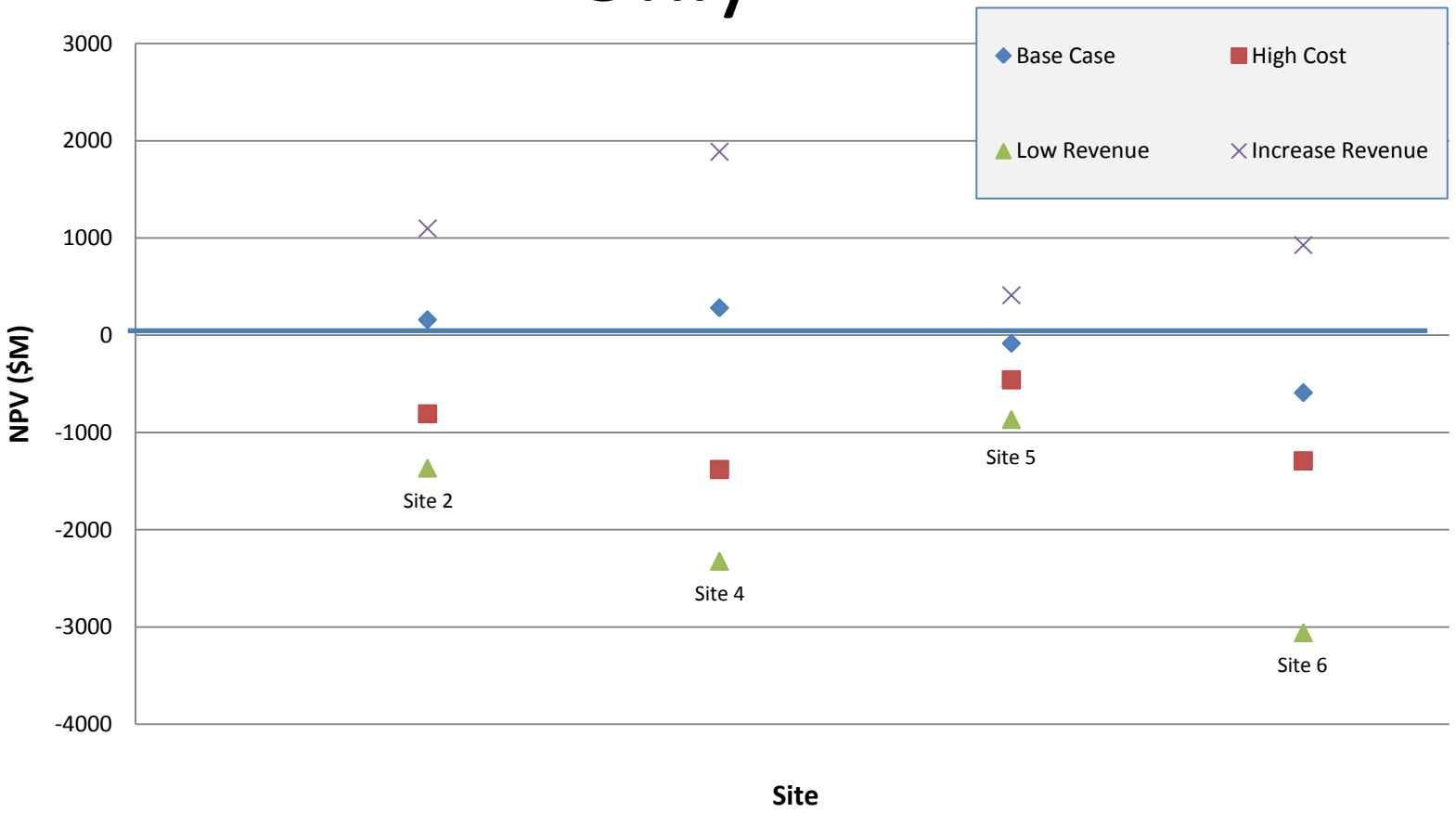
Site 4-Releases in Drought Year

Allocation Method	Combined NPV ($M)	Investor NPV ($M)	OCR NPV ($M)	OCR $/AF
1	$ 264	$ 132	$ 132	$ (1,850)
2	$ 264	$ 283	$ (20)	$ 274
3	$ 264	$ 656	$ (392)	$ 5,500
4	$ 264	$ 953	$ (689)	$ 9,670
5	$ 264	$ 1,787	$ (1,523)	$ 21,374
6	$ 264	$ 1,905	$ (1,642)	$ 23,039

Site 5-Annual Release

Allocation Method	Combined NPV ($M)	Investor NPV ($M)	OCR NPV ($M)	OCR $/AF
1	$ (241)	$ (120)	$ (120)	$ 5,945
2	$ (241)	$ (83)	$ (158)	$ 7,790
3	$ (241)	$ (129)	$ (111)	$ 5,500
4	$ (241)	$ 165	$ (406)	$ 20,061
5	$ (241)	$ 270	$ (511)	$ 25,234
6	$ (241)	$ 331	$ (572)	$ 28,232

Sensitivities-Pumped Storage Mode Only



Conclusions

- Sites 2, 4, and 5 provide the best combined project economics
- Potential for multiple benefit project to enhance the overall economics
- Social and environmental benefits are small compared to the costs of a project
- Current values for water and ancillary service markets may not capture future values