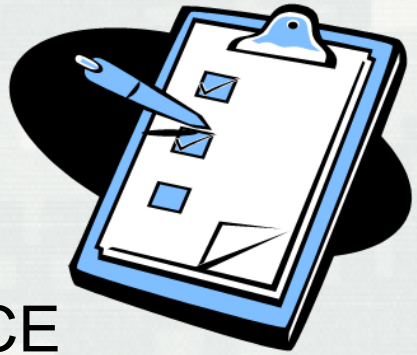
LOWER BOISE RIVER INTERIM FEASIBILITY STUDY

Public Information Meetings

June 29, 2010
June 30, 2010
July 1, 2010

US Army Corps of Engineers
BUILDING STRONG®

Agenda



- **Introductions / Meeting Objectives**
  Greg Graham, Planning Branch Chief, USACE
- **Study Background**
  Ellen Berggren, Project Manager, USACE
- **Boise River Basin Storage and Future Water Demand**
  Helen Harrington, Planning Section Manager, IDWR
- **Lower Boise River Flood Risk**
  Keith Duffy, Hydraulic Engineer, USACE
- **Water Storage Assessment**
  Ellen Berggren, Project Manager, USACE
- **Questions**
- **Large Group Exercise**

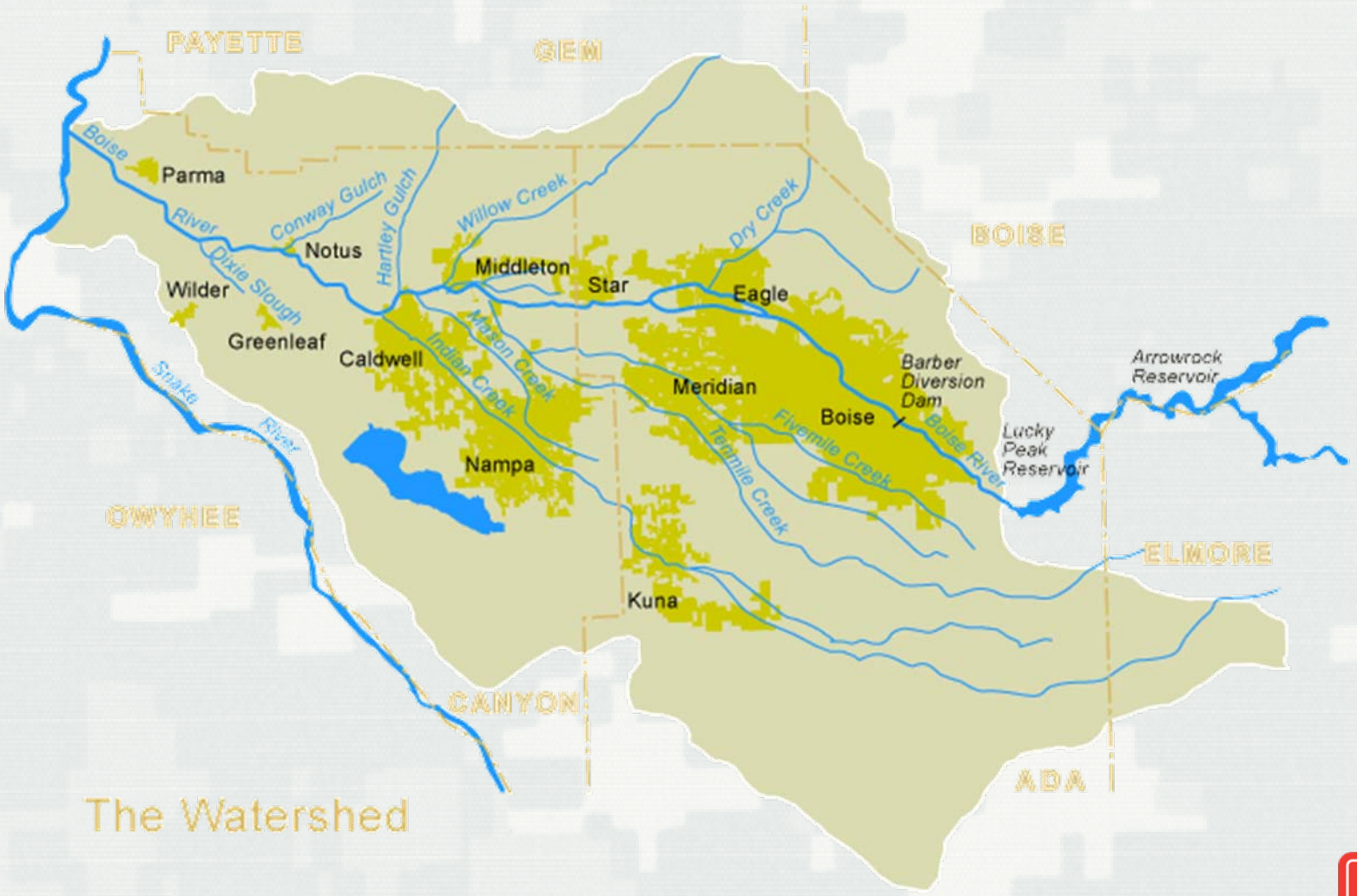
Lower Boise River Interim Feasibility Study Background

Ellen Berggren, USACE

Study Authority

- Water Resources Development Act (WRDA) 1999, Section 414
  - ► Flood control
- WRDA 2007, Section 4038
  - ► Ecosystem restoration & water supply

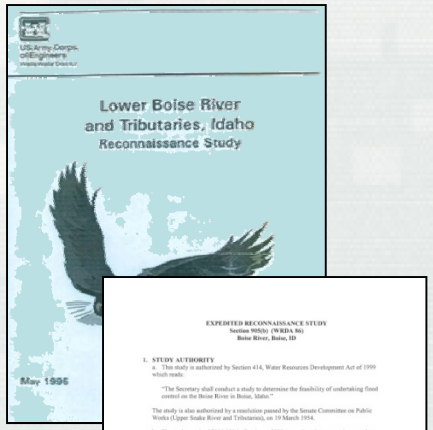
Study Area



Source: Lower Boise Watershed Council, *http://www.lowerboisewatershedcouncil.org/01_who-we-are/watershed-map.html*

General Investigation Steps

- Reconnaissance Study
  - 1995 and 2001
- Feasibility Study
  - Interim Feasibility Phase
    - June 2009 – April 2012
  - Complete Feasibility Phase
    - TBD
- Congress Authorizes Construction
- Preconstruction Engineering & Design
- Construction

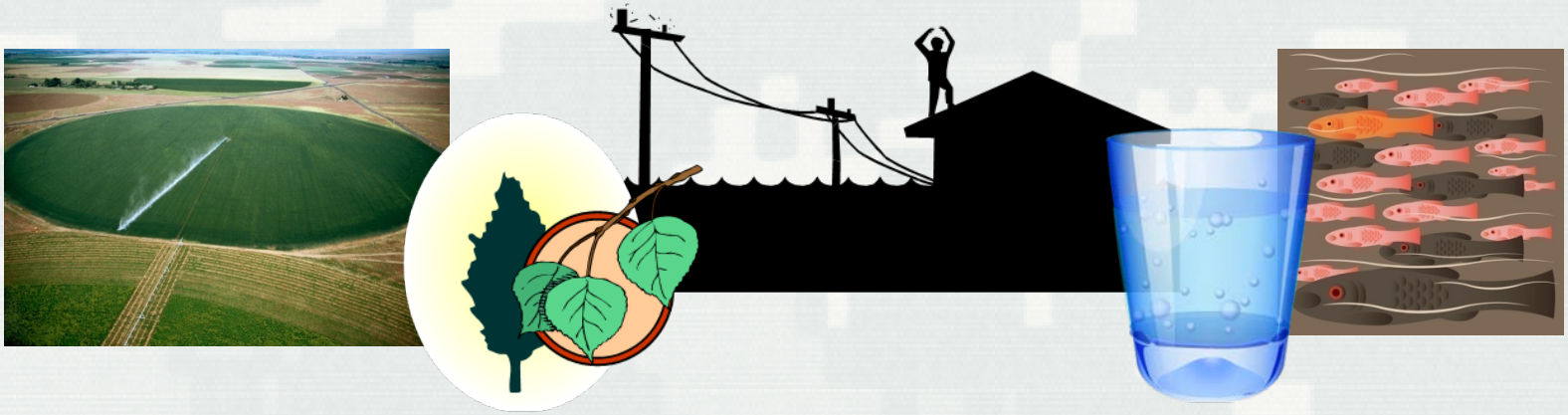


Interim Feasibility Scope

- Existing conditions
- Flood damage and economic analysis
- Water storage analysis
- Plan next study phase

Existing Conditions
Planning Objectives

- Reduce risk to public safety from flooding.
- Reduce flood damages.
- Provide additional water supply.
- Improve riparian and floodplain habitat quantity/quality.
- Improve water quality.
- Improve recreational opportunities and safety.

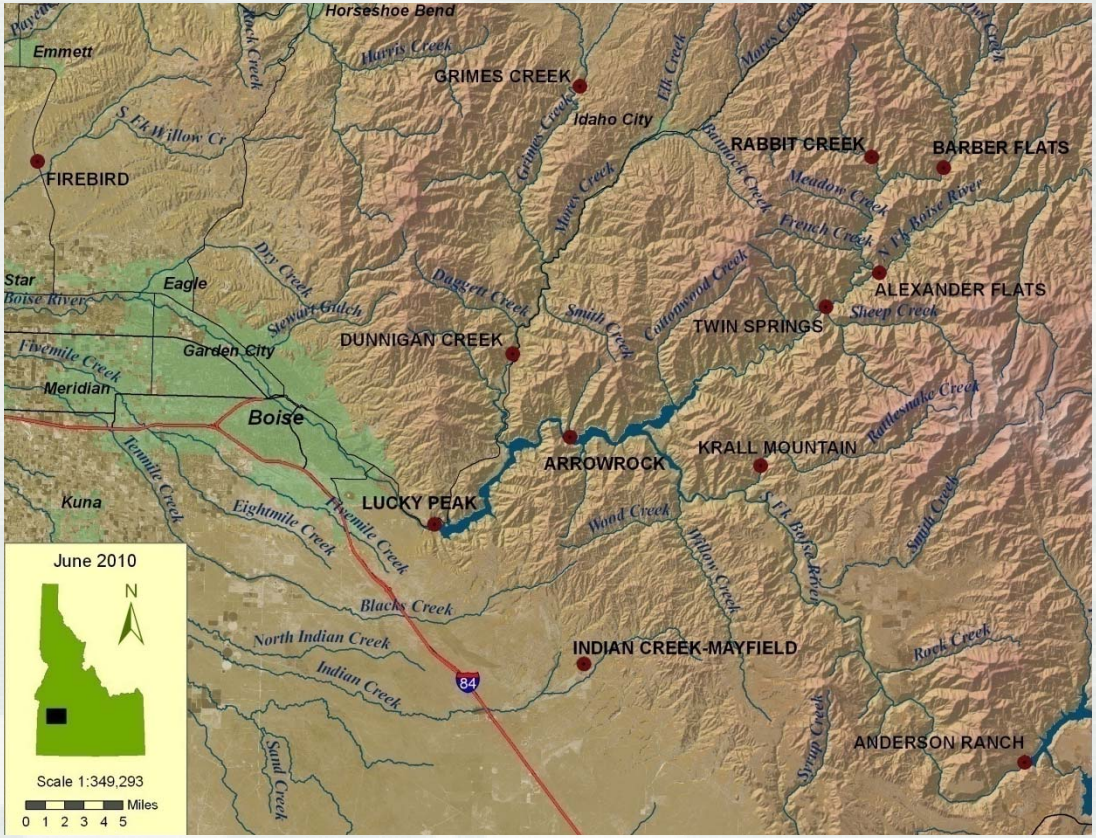


Flood Damage & Economic Analysis

- Update hydraulic models & floodplain map
- Update existing flood damage curves
- Estimate flood damages prevented

Water Storage Analysis

- **Middle Fk Boise drainage**
  - Alexander Flats
  - Twin Springs
- **North Fk Boise drainage**
  - Rabbit Creek
  - Barber Flats
- **South Fk Boise drainage**
  - Anderson Ranch Dam
  - Krall Mountain
- **Main Boise drainage**
  - Arrowrock
  - Lucky Peak
  - Grimes Creek
  - Dunnigan Creek (Mores Ck)
  - Indian Creek-Mayfield
  - Firebird (Willow Ck)



Plan Next Study Phase

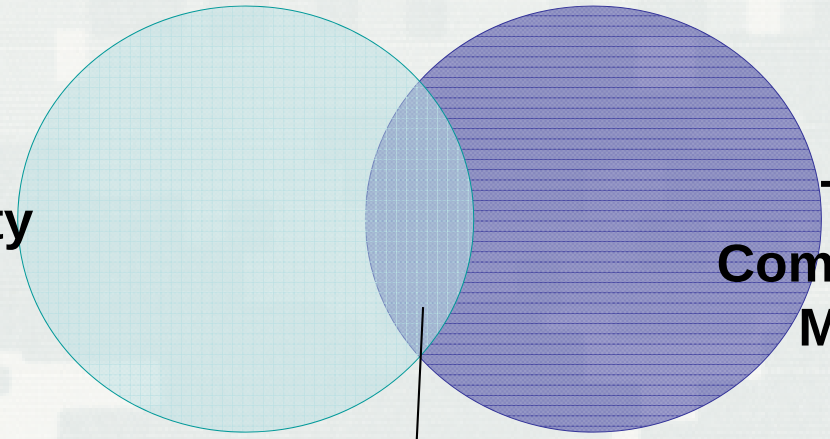
- Interim Feasibility Report
  - Existing conditions description
  - Water storage assessment results
  - Floodplain inventory
  - Scope of work to complete feasibility study
- Amend existing agreement with IWRB and/or identify additional partners

Interim Feasibility Study Time Line

- Water Storage Assessment
  - Screening Analysis: August 31, 2010
  - Engineering Design/Cost Estimates: July 2011*
- Economic Analysis / Flood Damages: May 2011*
- Draft Interim Feasibility Report: December 2011*
- Final Interim Feasibility Report: April 2012*

* Contingent on Congressional appropriations in FY 2011 and FY 2012.

Coordinated Planning Efforts



Lower Boise Interim Feasibility Study

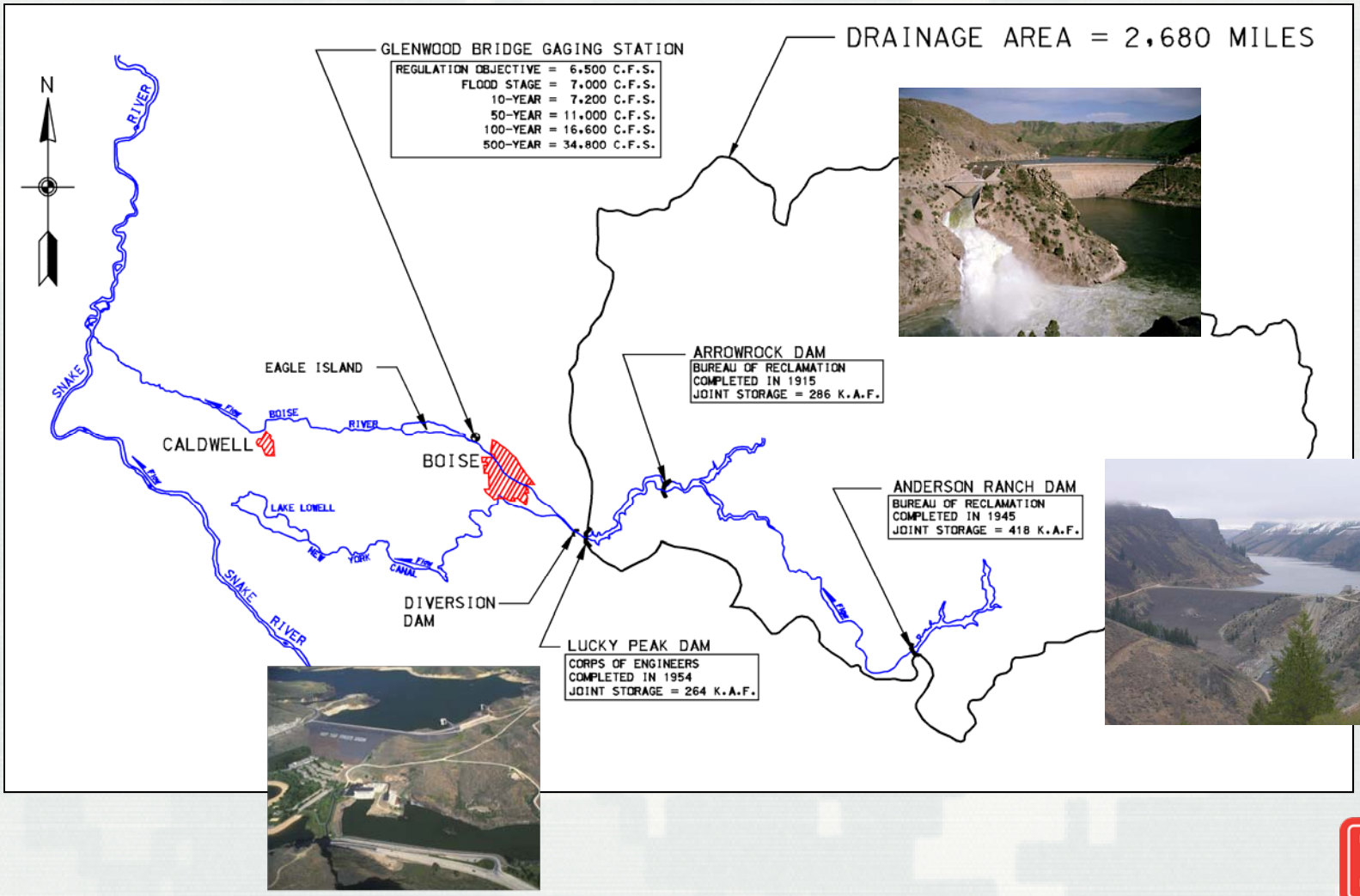
Treasure Valley Comprehensive Aquifer Management Plan

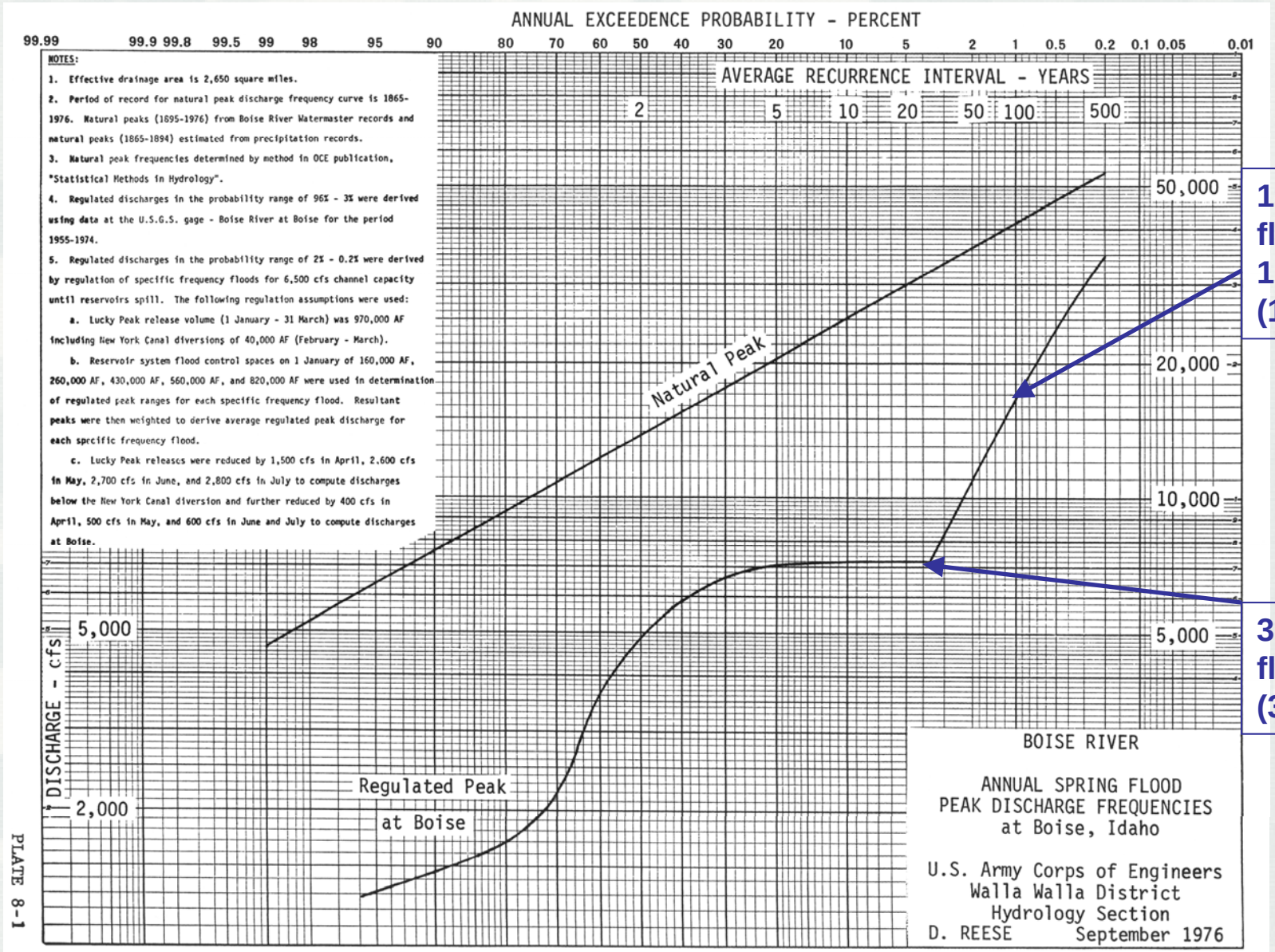
Water Storage Assessment

Lower Boise River Flood Risk

Keith Duffy, P.E., USACE

Reservoir Operation





1% chance flood of 16,600 cfs (100 Year)

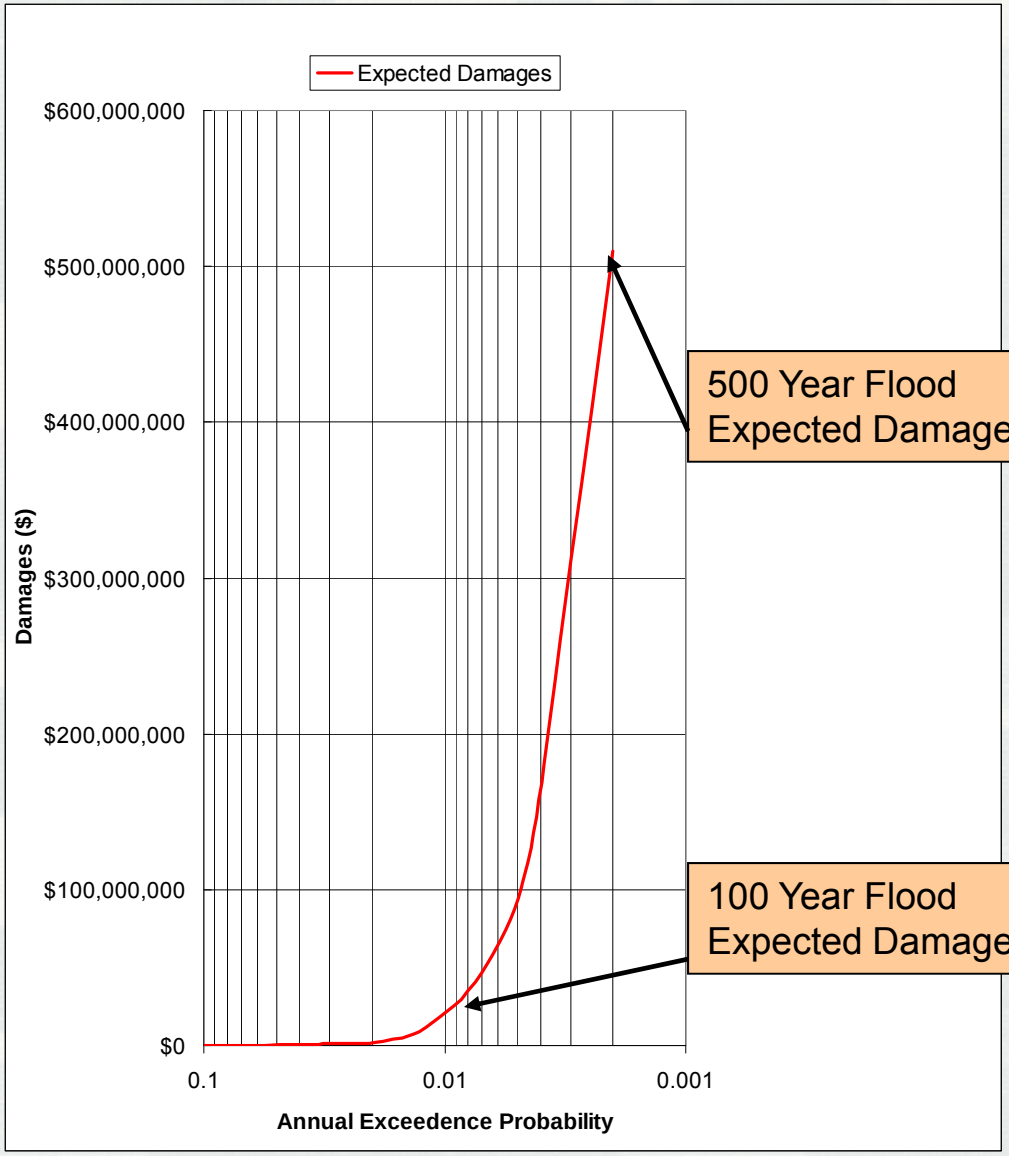
3% chance flood (35 Year)

What is the Risk of Flooding?

Years in Floodplain	Chance[1] of at least one 10-yr flood	Chance[1] of at least one 50-yr flood	Chance[1] of at least one 100-yr flood	Chance[1] of at least one 500-yr flood
1	10%	2%	1%	<1%
2	19%	4%	2%	<1%
3	27%	6%	3%	1%
4	34%	8%	4%	1%
5	41%	10%	5%	1%
10	65%	18%	10%	2%
15	79%	26%	14%	3%
20	88%	33%	18%	4%
25	93%	40%	22%	5%
30	96%	45%	26%	6%

Note:

1) Pe = 1 - [1 – (1/recurrance interval)]^(elapsed period in years)



Boise River Flood Damages

Flood Risk Management
Buying Down Risk

Residual Flood Risk

- Significant risk despite three large reservoirs upstream (Lucky Peak, Arrowrock, and Anderson Ranch Dams)
- Large runoff volumes
- Volume forecast errors
- Abnormal runoff timing
- Late season rainstorms
- Irrigation withdrawals may not be significant during peak flood flows

Residual Flood Risk (continued)

- Tributary flooding
- Streambank or levee failures
- Channel capacities
- Bridge/culvert capacities

River overwhelms dike, floods homes along Eagle Road

Residents, volunteers fight rising waters with sandbag walls

Levee breaks in Eagle

Swift floodwaters, downed trees remain a threat

6/4/98

DEVELOPMENT NEAR RIVER CONTINUES

NEXT FLOODS COULD ENDANGER MORE VALLEY HOMES, BUSINESSES

Final Remarks

- Large Flood
  - Limited System
  - “Not if but When”
- Risk Average Year
  - Volume Forecast Error
  - Late Season Rainstorm
  - Debris Plugs
- Increased Development near River
  - High Consequences

1983 Flood at upstream head of Eagle Island

Water Storage Screening Analysis

Ellen Berggren, USACE

Water Storage Sites

- **Middle Fk Boise drainage**
  - Alexander Flats
  - Twin Springs
- **North Fk Boise drainage**
  - Rabbit Creek
  - Barber Flats
- **South Fk Boise drainage**
  - Anderson Ranch Dam
  - Krall Mountain
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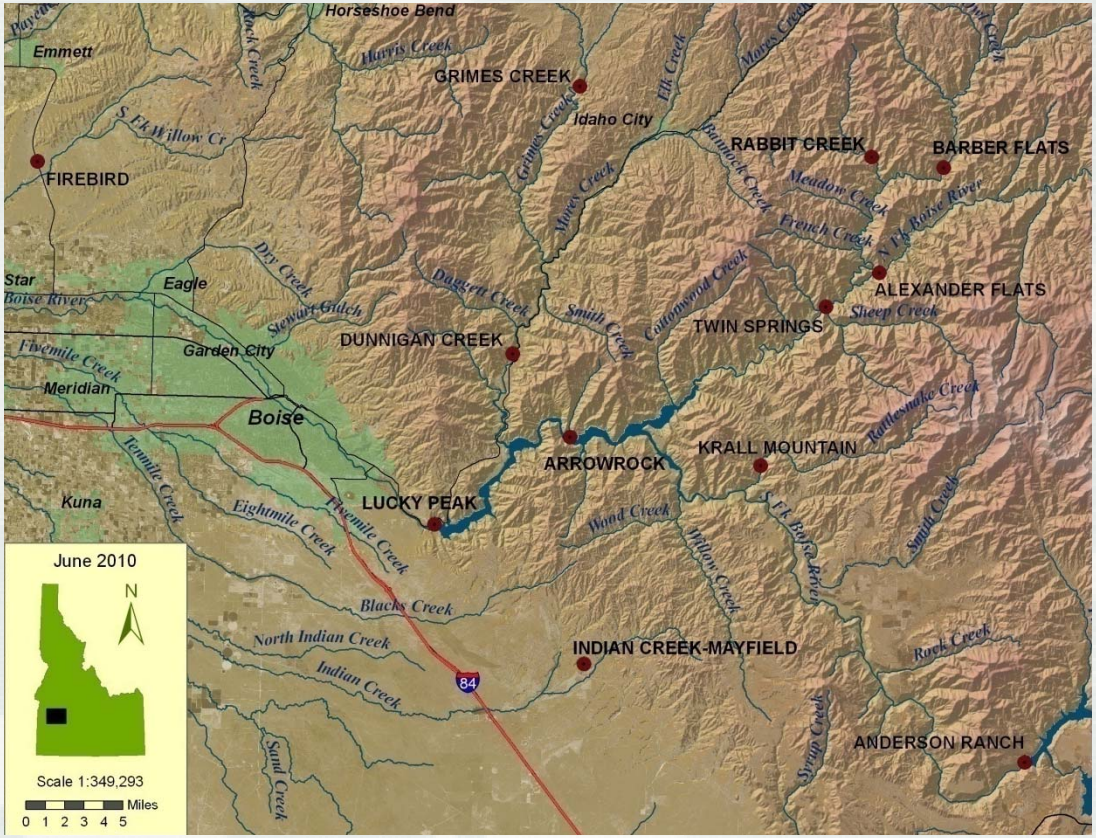
  - Firebird (Willow Ck)



Source: Boise/Payette Water Storage Assessment Report, Reclamation 2006, www.usbr.gov/pn/

Screening Analysis

- First-level Screening
  - Assessed ability to provide additional water supply and reduce flood risk
  - Select 6 top scoring sites
- Second-level Screening
  - Assessed performance for 7 criteria categories

- Water Demands
- Flood Risk
- Hydropower Potential
- Cost Index
- Social Effects
- Environmental Effects
- Resource Mgmt Conflicts

  - Select 3 top scoring sites

First-Level Screening Analysis

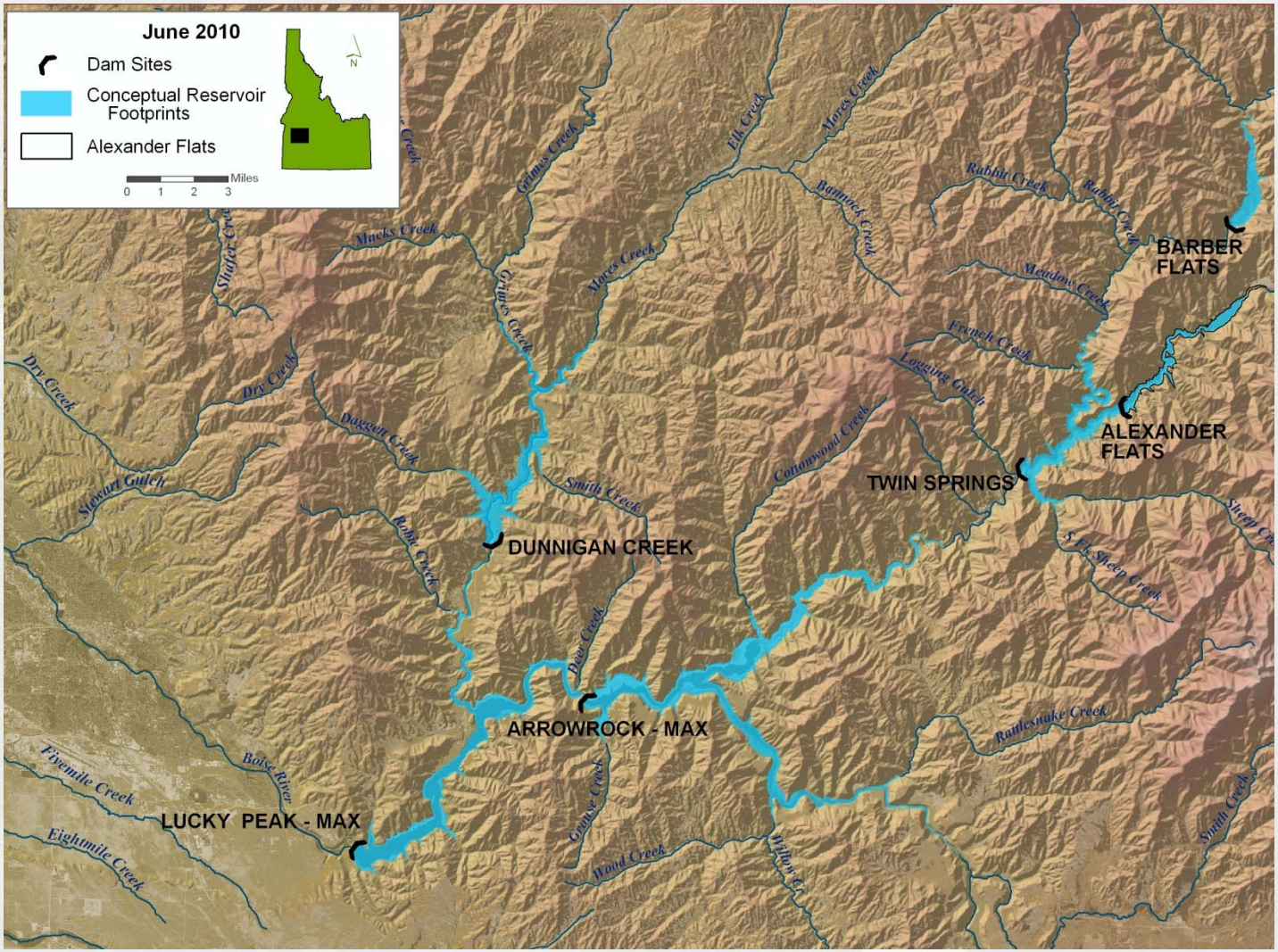
SITES	Basin Ave. Annual Inflow Volume		Relative Residual Volume			Reduction of System Ave. Runoff Volume		Annual Refill Volume		COMPOSITE SCORE
	kAF	Score	Max Storage Potential	kAF	Score	kAF	Score	kAF	Score	
Arrowrock – Max	1733	12	317	0	14	317	14	60	11	**12.8**
Lucky Peak – Max	2047	14	96	0	14	96	11	60	11	**12.5**
Twin Springs	846	10	304	0	14	304	13	50	7	**11.0**
Alexander Flats	376	8	68	0	14	68	10	50	7	**9.8**
Dunnigan Creek	179	6	227	58	5	169	12	225	14	**9.3**
Lucky Peak - Min	2047	14	12	0	14	12	6	12	3	**9.3**
Barber Flats	324	7	58	0	14	58	9	50	7	**9.3**
Anderson	721	9	30	0	14	30	8	10	2	**8.3**
Arrowrock – Min	1733	12	9	0	14	9	5	9	1	**8.0**
Krall	18	5	121	103	3	18	7	60	11	**6.5**
Grimes	7	3	1500	1493	1	7	3	225	14	**5.3**
Firebird	5	1	67	62	4	5	1	67	12	**4.5**
Indian-Mayfield	5	1	52	47	6	5	2	52	8	**4.3**
Rabbit	8	4	152	144	2	8	4	50	7	**4.3**

Preliminary Storage Concepts

SITES	DESCRIPTION				
	Bottom Elevation	Top Elevation	Structure Height (feet)	Type	Additional Storage (kaf)
Lucky Peak Dam – 4' raise	3077	3081	4[1]	RCC	12
Lucky Peak Dam – 30' raise	3077	3107	30[1]	RCC	96
Arrowrock Dam – 74' raise	3216	3290	232[2]	RCC	317
Twin Springs	3440	3811	371	RCC	304
Alexander Flats	3560	3831	271	Rockfill	68
Barber Flats	4140	4321	181	Rockfill	58
Dunnigan Creek	3120	3471	351	RCC	227

[1] Structure height in addition to existing structure height.
[2] New structure downstream of existing – 74' higher than existing.

Reservoir Footprint Concepts



Preliminary - subject to change.

Second-level Screening Criteria

CATEGORY	CRITERIA
Future water demand	▪ Size (acre-feet) ▪ Yield / refill capability ▪ Volume needed to meet future demands
Flood risk reduction	▪ Percent chance flood protection ▪ System-level flood protection ▪ Increase in flood protection relative to existing
Hydropower potential	▪ Average annual generation ▪ Firm energy generation ▪ Average of energy generation ▪ Proximity to transmission/distribution lines
Cost Index	▪ Ratio cost per 1000 acre feet additional storage ▪ Ration cost per percent increase in flood benefit

Second-level Screening Criteria (con'd)

CATEGORY	CRITERIA
Social effects	▪ No. of structures impacted ▪ Roads (miles & road type) ▪ Recreation facilities/sites ▪ Land ownership (acres)
Environmental effects	▪ ESA species or critical habitat ▪ State/Federal sensitive species or habitat ▪ Archaeological, cultural, or historic resources ▪ Habitat / land cover (vegetation types) ▪ Big game winter range
Resource management conflicts	▪ Federal Wild and Scenic River ▪ State protected river ▪ IDFG fisheries management classifications ▪ Roadless areas ▪ Grazing allotments ▪ Patented mining claims

Second-level Screening Results

SITES	CRITERIA CATEGORY SCORE [1]														WEIGHTED COMPOSITE SCORE[2]
	Future Water Demand		*Flood Risk Reduction*		*Hydro Potential*		*Cost Index*		*Social Effects*		*Environ Effects*		*Resource Mgmt Conflicts*		
	U[2]	W[3]	U[2]	W[3]	U[2]	W[3]	U[2]	W[3]	U[2]	W[3]	U[2]	W[3]	U[2]	W[3]	
Arrowrock Dam – Max	7	7	7	7	7	2.8	6	4.8	3	2.4	3	3	2	0.8	27.80
Twin Springs	5	5	7	7	6	2.4	4	3.2	4	3.2	1	1	1	0.4	22.20
Alexander Flats	3	3	3	3	4	1.6	5	4.0	5	4.0	5	5	3	1.2	21.80
Lucky Peak - Max	4	4	4	4	5	2.0	2	1.6	1	0.8	6	6	6	2.4	20.80
Barber Flats	2	2	3	3	2	0.8	7	5.6	6	4.8	2	2	5	2.0	20.20
Dunnigan	6	6	5	5	1	0.4	3	2.4	2	1.6	3	3	4	1.6	20.00
Lucky Peak Dam - Min	1	1	1	1	3	1.2	1	0.8	7	5.6	7	7	7	2.8	19.40

1. The higher the number, the better the site's performance for a criterion.
2. U = unweighted score
3. W = weighted score calculated using the following weight factors:
   Water =1.0; Flood = 1.0; Hydro = 0.4; Cost = 0.8; Social = 0.8; Enviro = 1.0; Resource Mgt = 0.4

Next Steps

- Screening analysis matrices revised
- Additional analysis of top 3 scoring sites

→ Phase 1: Interim Feasibility Study

  - Preliminary engineering design and cost estimates
  - Hydrology and hydraulic analysis
  - Identify environmental & social issues to address in next study phase

– Phase 2 : Complete Feasibility Study

  - Comprehensive analysis of other alternatives and measures to meet multiple purposes – flood risk, water quality and supply, ecosystem restoration, recreation opportunities
  - Meet the requirements of NEPA, ESA, and other environmental laws and regulations.

Public Comment

- Large Group Response Exercise – Comment Boards
  1. What specific water resource problems and issues should the Lower Boise River Feasibility Study address?
  2. What potential solutions and alternatives should be considered in the Lower Boise River Feasibility Study to address water resource problems and issues in the Lower Boise River Basin?
  3. Rank the seven criteria listed in level of importance from 1 to 7. Also include any other criteria or information that you believe should be considered when ranking water storage concepts.
- Comment forms to submit additional written comment.
- Written comment accepted through **July 31, 2010.**

Public Comment

Website: http://www.nww.usace.army.mil/boise/brifs/default.asp

Submit comments through comment button link on right bottom of page.

Email: Boise.Office@usace.army.mil

Mail: Boise GI Project Manager
U.S. Army Corps of Engineers
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Written comment accepted through **July 31, 2010.**

Questions