IDAHO
Water Resource Board

Henrys Fork (Teton) Basin Study

Interim legislative Committee on Natural Resources

September 27, 2012

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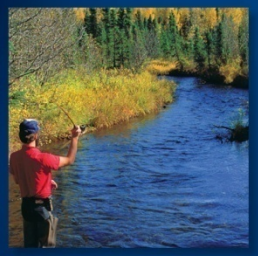
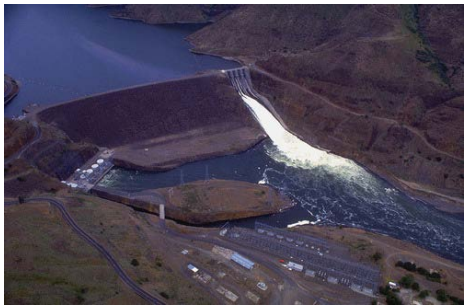


Why investigate new water storage?

Adequate water supplies are critical to all aspects of Idaho's economy:

- Agricultural economy
- Agricultural products industry
- Cities and towns
- Businesses and industries
- Recreational and environmental amenities
- Hydro-electric power



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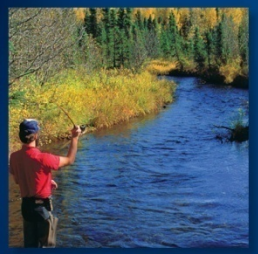

Why investigate new water storage?

"Water use conflicts, population growth, continued unprecedented drought, urban development, conjunctive administration, Endangered Species Act requirements and other additional demands are being placed on the already scarce water resources of the state" (House Joint Memorial No. 8, 2008 Legislature)

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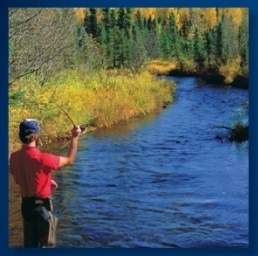

Henrys Fork (Teton) Study Background

• House Joint Memorial No. 8 (2008 Legislature) - directed the Water Resource Board to investigate and pursue new reservoir projects statewide including Teton replacement

•SB 1511 (2008 Legislature) – appropriated $400,000 to Water Resource Board to study Teton replacement

•ESPA CAMP – the ultimate CAMP goal of a 600,000 acre-foot change to the ESPA water budget can not be met without new surface water storage in the Upper Snake Basin - needed to provide a source of supply to ground water-to-surface water conversion projects that relieve demands on the ESPA

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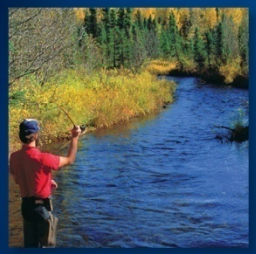

Henrys Fork (Teton) Study Background

- Water Resource Board took approach of evaluating other storage options to replace Teton, including off-stream storage and enlarging existing reservoirs, in addition to evaluation of rebuilding Teton Dam

- Water Resource Board signed cost-share agreement with U.S. Bureau of Reclamation to initiate study

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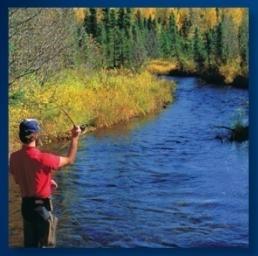

Henrys Fork (Teton) Study Background

•Reclamation provided its share of study funds through its "Basin Study" program

•The Basin Study program requires that non-storage alternatives also be evaluated – also requires public process

•Water Board agreed to this approach – had just completed ESPA CAMP where other alternatives were evaluated and Board felt that CAMP information would be incorporated into basin Study to meet those requirements

•List of alternatives reduced to 7 storage alternatives and 3 non-storage alternatives to be carried forward to Phase II of the study

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HENRYS FORK BASIN STUDY - ALTERNATIVES CARRIED FORWARD FOR FURTHER STUDY

(not listed in order of priority)

No. *	Dam Site	Type	Tributary	Storage Volume (af)	Total Estimated Construction Cost	Cost/af
Surface Water Storage						
1	Spring Creek	On stream - Spring Ck	Canyon Ck, Teton River	10,800	$42,120,000	$3,900
2	Moody Creek	On stream - Moody Ck	Teton River	15,000	$55,500,000	$3,700
3	Upper Badger	On stream - Badger Ck	Teton River	47,000	$126,900,000	$2,700
4	Lane Lake - Off-stream	Off stream	Off Stream (off Teton R.)	68,000	$312,800,000	$4,600
5	Teton **					
	Teton (RCC, no flood control)	On stream - Teton River	Henrys Fork River	288,000	$315,996,000	$1,097
	Teton Small Dam - B	On stream - Teton River	Henrys Fork River	100,000	$83,874,000	$839
6	Island Park Raise (1 ft)	On stream - Henrys Fk	Snake River	8,000	$800,000	$100
7	Ashton Dam Raise (43 ft)	On stream - Henrys Fk	Snake River	24,000	$45,600,000	$1,900
Agricultural Conservation and Management						
8	Canal Automation					
9	Piping and Lining (North Fremont irrigated region only)					
Market Based Alternatives						
10	Evaluate Existing and Potential Market Based Mechanisms - Investigate use of water market in conjunction with other alternatives evaluated)					

* Multiple concepts under each alternative may be studied. Altnernatives are not listed in order of priority.

** Teton Dam studies referenced in evaluation: Bureau of Reclamation, 1991. *Teton Dam Reappraisal Working Document*; HDR Engineering, Inc. 1995. *Teton Dam Reconnaissance Study*

*** Interest in additional analysis of ground water recharge and demand reduction alternatives is desired by certain stakeholders.

HENRYS FORK BASIN STUDY BUDGET

Phase I & II	Federal (Basin Study) Funds	State Funds	Totals
Appropriated Funds	$400,000	$400,000	$800,000
Expended to date	$339,401	$154,972	$494,373
Remaining Phase I Tasks *	($15,000)	($15,000)	($30,000)
**Remaining per Budget ** **	**$45,599**	**$230,028**	**$275,627**

* Phase I = Reconnaisance Analysis. Remaining Phase I tasks include draft/publish Interim Report ($25,000) and estimated August expenditures ($5,000). Split 50/50 between State and Federal funds. Phase II = Appraisal Analysis.

** Information from other technical studies will be leveraged throughout the Basin Study process (e.g. Phase I - utilized a quantitative ground-surface water model developed for the Henrys Fork basin by Dr. Rob Van Kirk; Phase II - may utilize an analysis of flood flow capacities of the Island Park spillway - scheduled by Reclamation for 2013).

09/04/12

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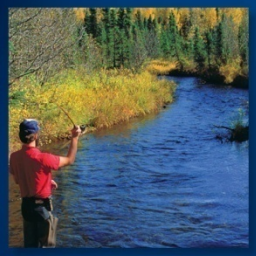

Henrys Fork (Teton) Study

•It has been challenging to manage this study because the State's interests and Reclamation's interests are not completely aligned

•Public process has also contributed to the challenging aspects of this study

•However, we are getting good analysis of storage options in Henrys Fork and Teton Rivers

•Some storage options, including Island Park raise and Ashton raise, appear to be cost effective and may be easier to accomplish than rebuilding Teton Dam

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Managing Water in the West

Henrys Fork Basin Study Update September 2012

In Cooperation with:

Idaho Water Resource Board

and

Henrys Fork Watershed Council

U.S. Department of the Interior

Bureau of Reclamation

Basin Study History

- IWRB Application for WaterSmart Basin Study
- Reclamation Approved Application and Matched State Funds
- MOA for Basin Study between Reclamation and IWRB – March 2011

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MOA

- Background – ESPA CAMP
- Balance in-basin needs with external basin needs

Study Framework

1. Water Supply
2. Water Management
3. Sustain Environmental Quality

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Henrys Fork Watershed Council

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Needs

ESPA – 600,000 ac-feet annually

In Basin Agricultural Needs

Egin Bench, Lower Watershed, North Fremont, Teton Valley

Environmental → Fisheries/YCT

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40+ Brainstorm Ideas

17 Reconnaissance Alternatives

We are here →

Appraisal Alternative(s)

Recommendation(s)

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Reconnaissance Alternatives

- ✓ Existing and New Surface Storage
- ✓ Managed Ground Water Recharge
- ✓ Agricultural Conservation
- ✓ Municipal & Industrial Conservation
- ✓ Market Based Alternatives

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Managing Water in the West

DRAFT Henrys Fork Basin Study
Teton Dam Storage Alternative

Technical Series No. PN-HFS-005

U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Regional Office
Snake River Area Office
Boise, Idaho

July 2012

Teton Dam Alternative

Previous Studies

- Bureau of Reclamation. 1991. *Teton Dam Reappraisal Working Document*.
- HDR Engineering, Inc. 1995. *Teton Dam Reconnaissance Study*.

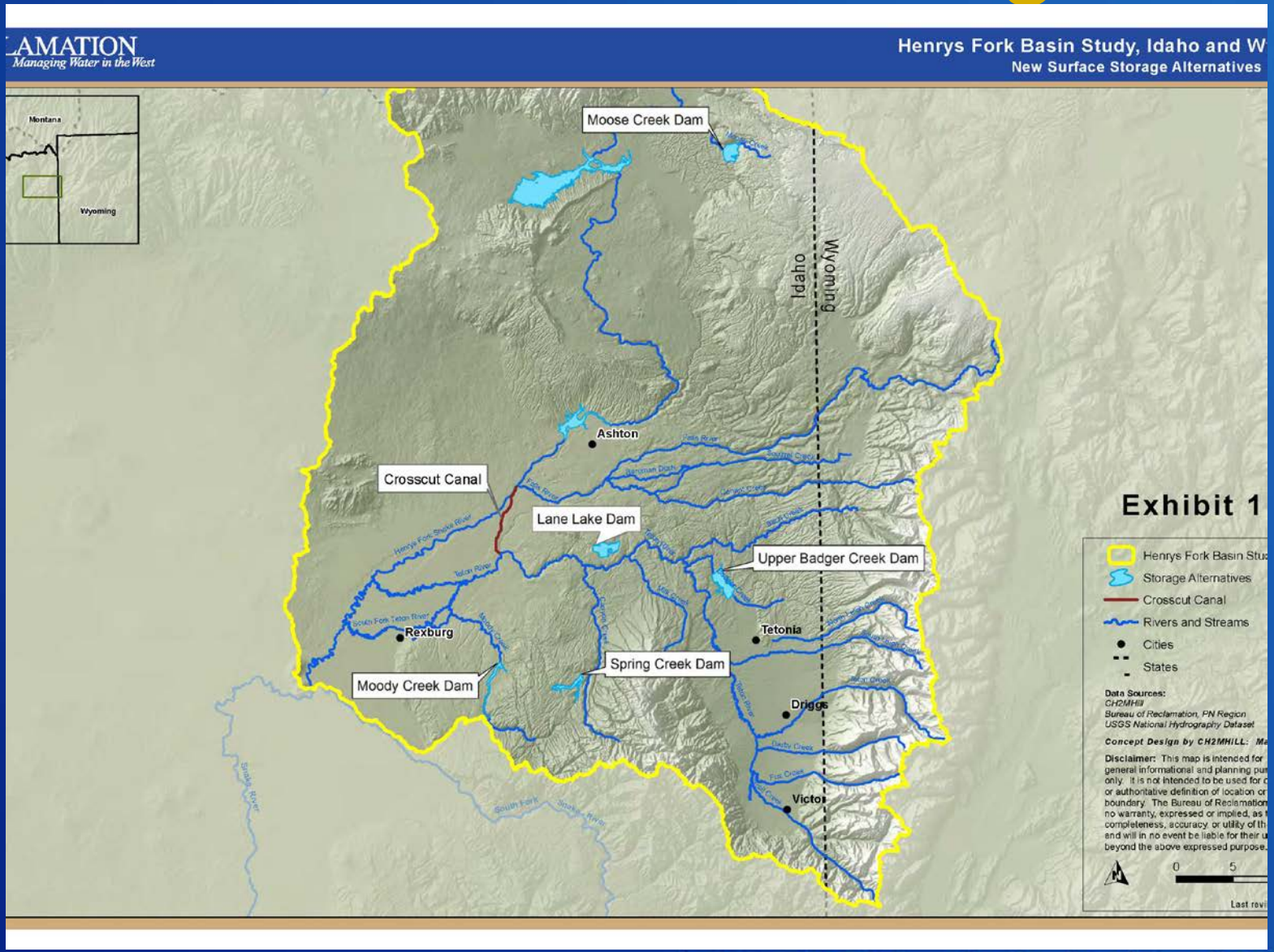
Teton Dam – Estimated Costs

Alterrnative	Total Storage Volume (acre-feet)	Water Supply Volume (acre-feet)	Field Construction Costs	Cost $/ac-ft Total	Cost $/ac-ft Water Supply
Teton Dam - Rockfill	288,000	55,000	$159,329,000	$553	$2,897
Teton Dam - roller compacted concrete	288,000	55,000	$315,996,000	$1,097	$5,745
Teton Small Dam - A	50,000	50,000	$65,680,000	$1,314	$1,314
Teton Small Dam -B	100,000	100,000	$83,874,000	$839	$839

Further Teton Dam Study Needs

- ✓ Compare Teton Dam alternative with other storage alternatives

New Surface Storage



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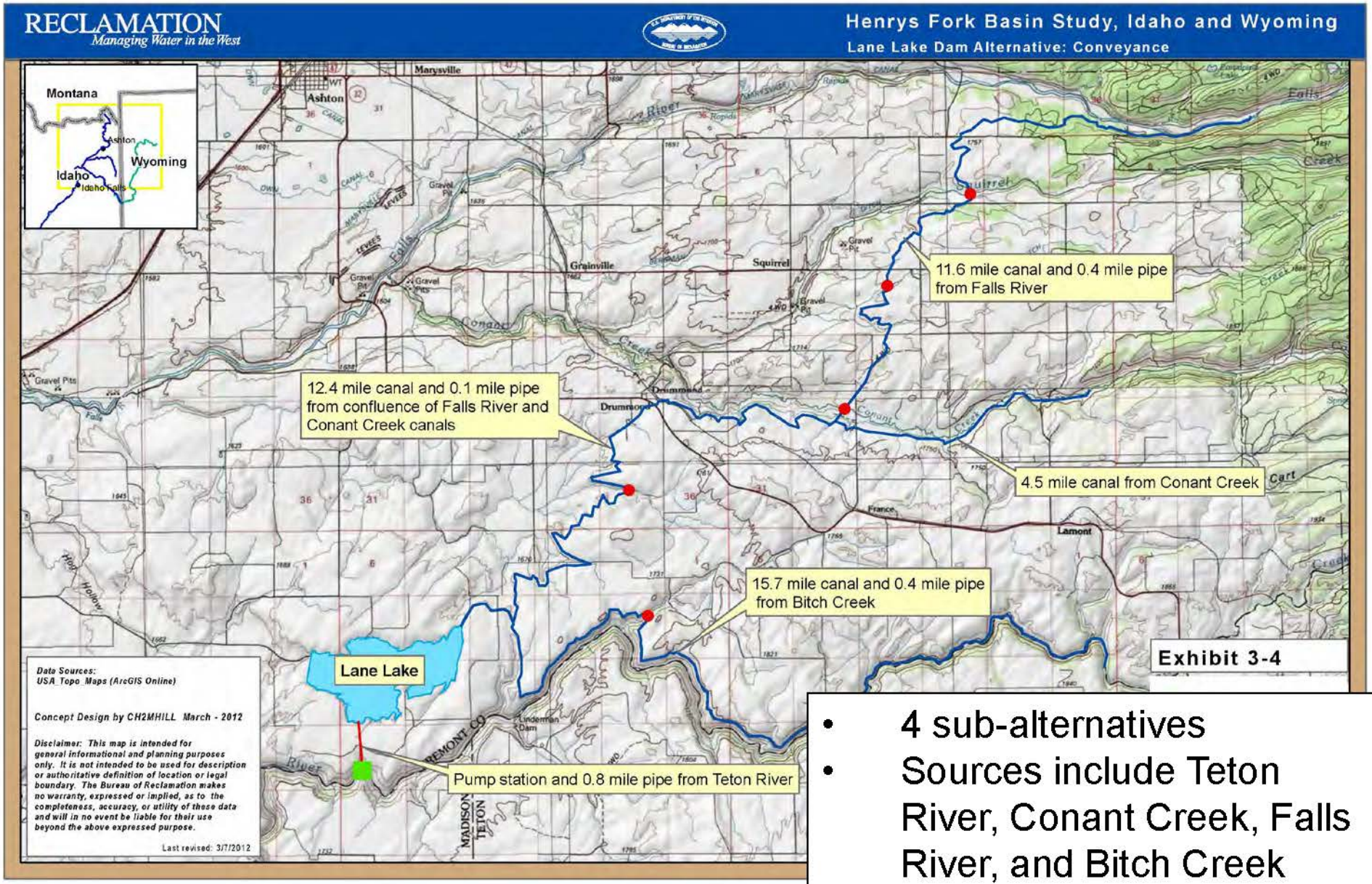
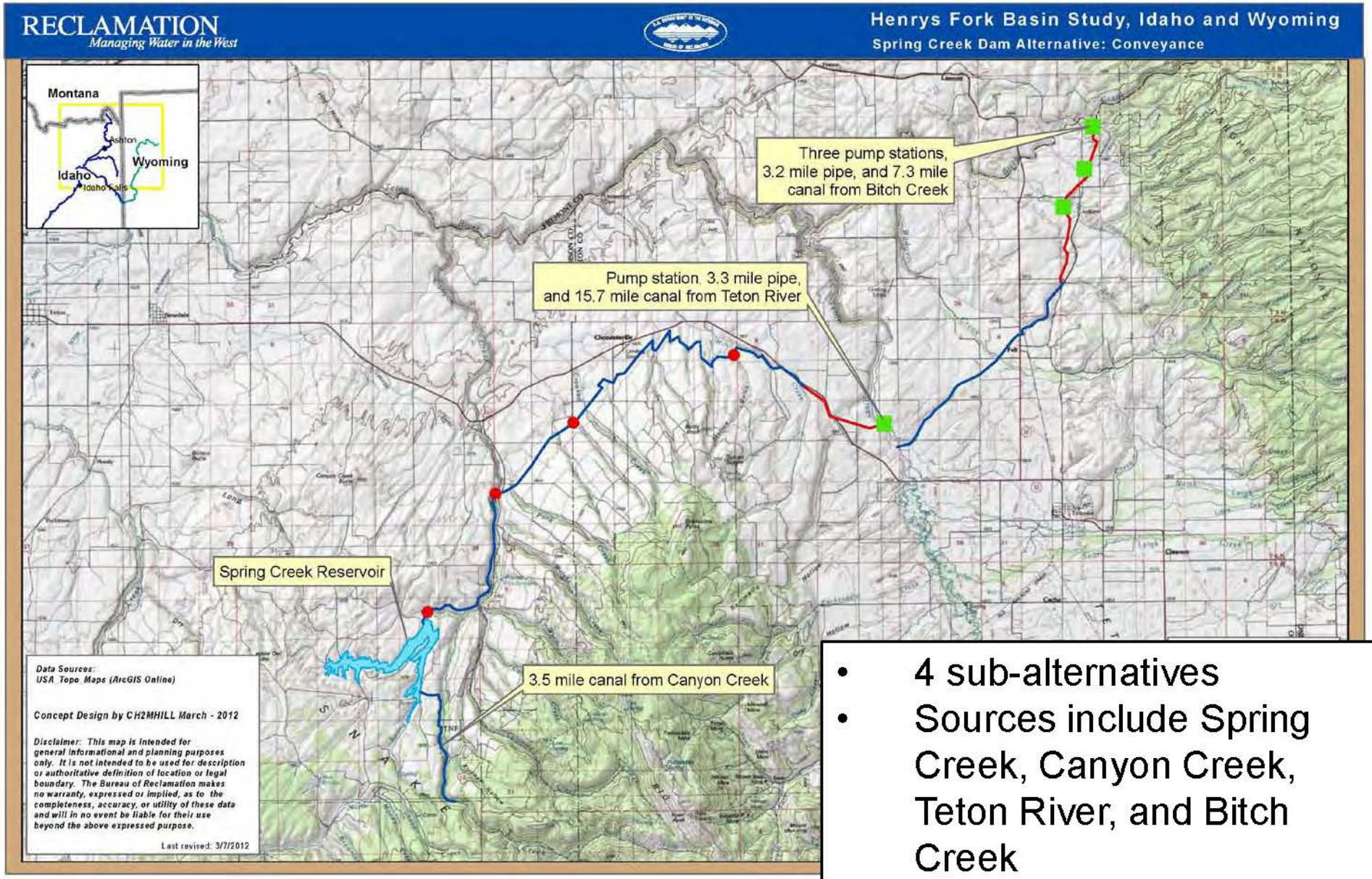
Lane Lake Dam



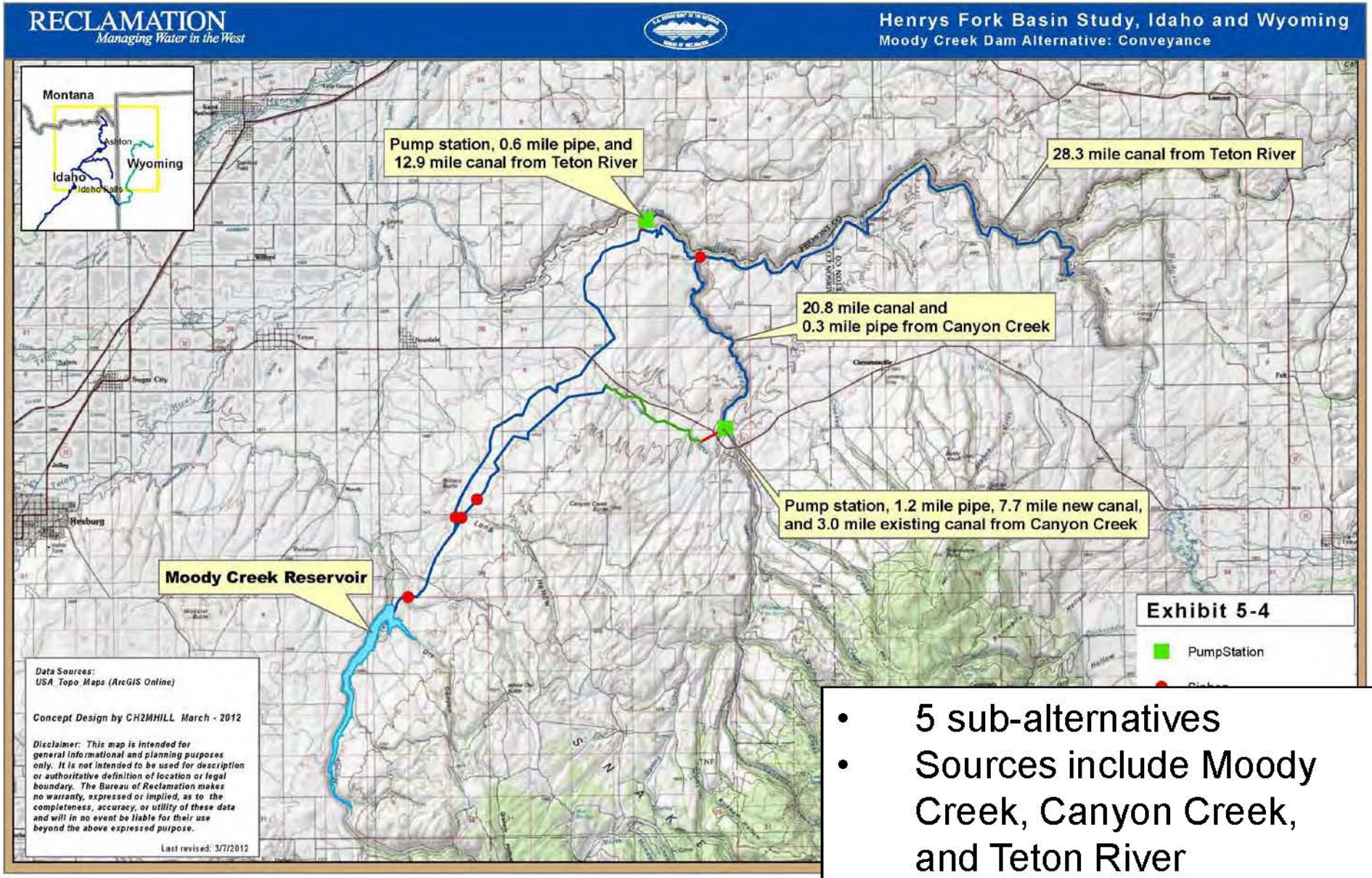
- 4 sub-alternatives
- Sources include Teton River, Conant Creek, Falls River, and Bitch Creek

Spring Creek Dam



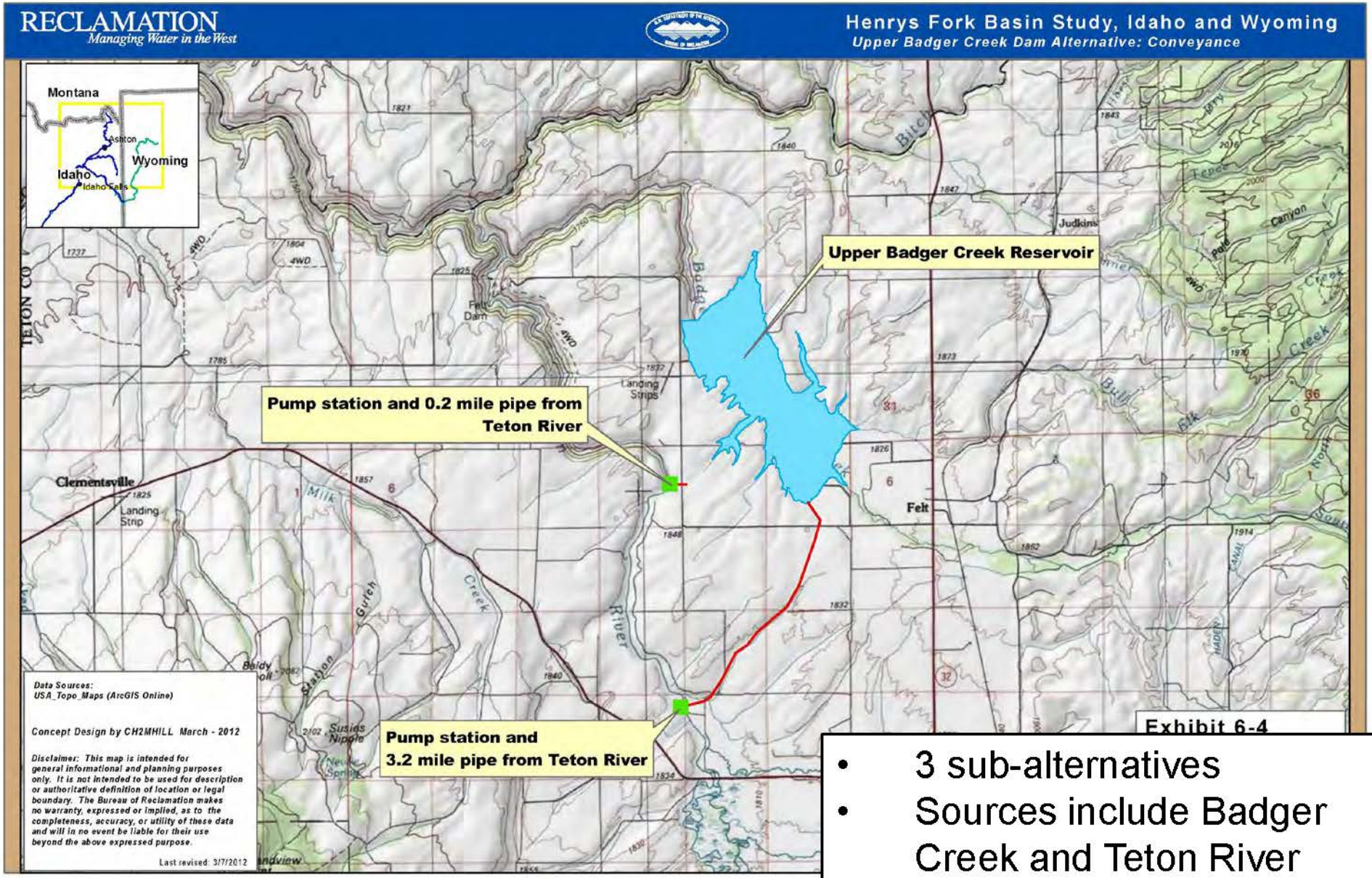
- 4 sub-alternatives
- Sources include Spring Creek, Canyon Creek, Teton River, and Bitch Creek

Moody Creek Dam



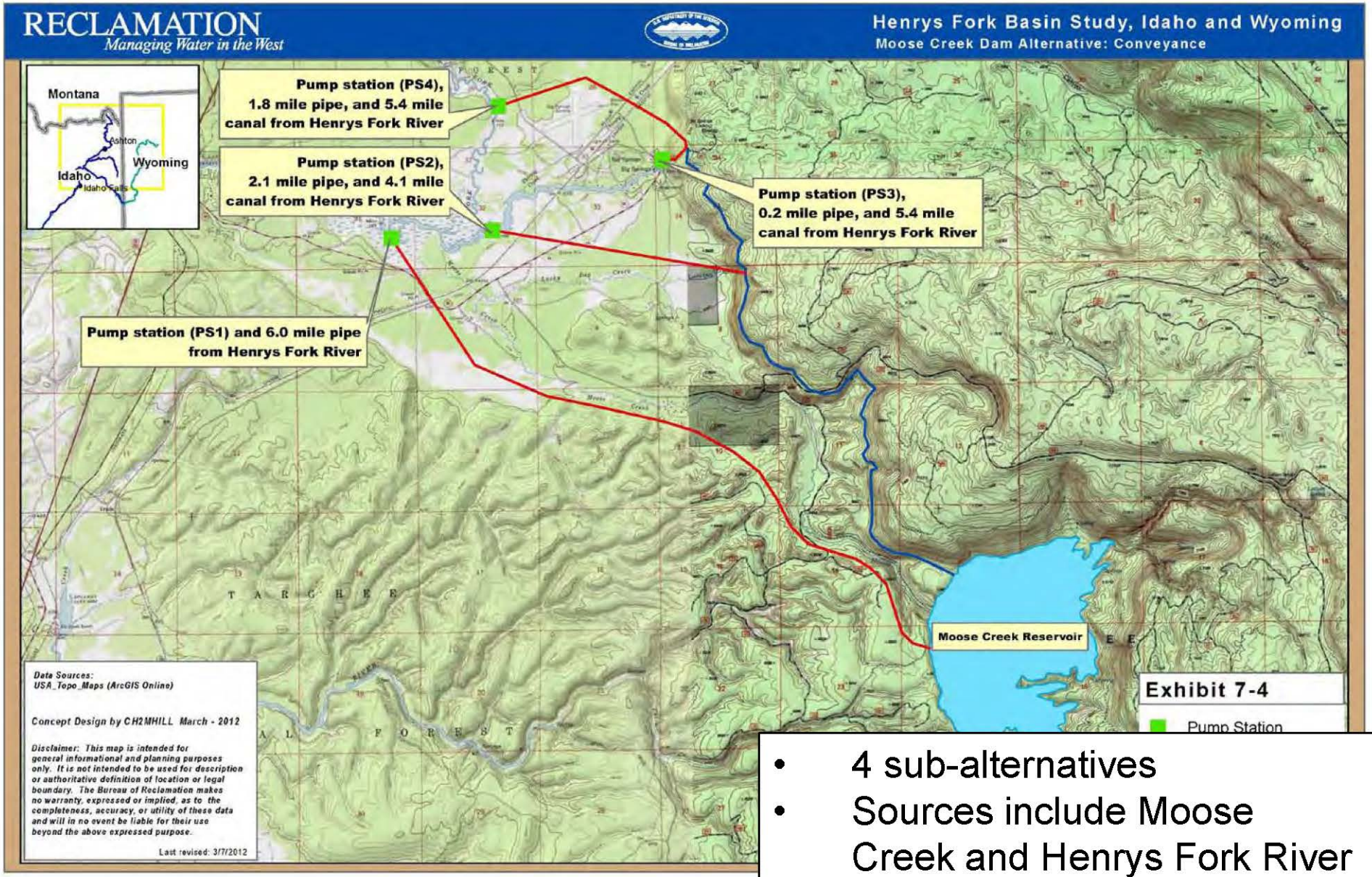
- 5 sub-alternatives
- Sources include Moody Creek, Canyon Creek, and Teton River

Upper Badger Creek Dam



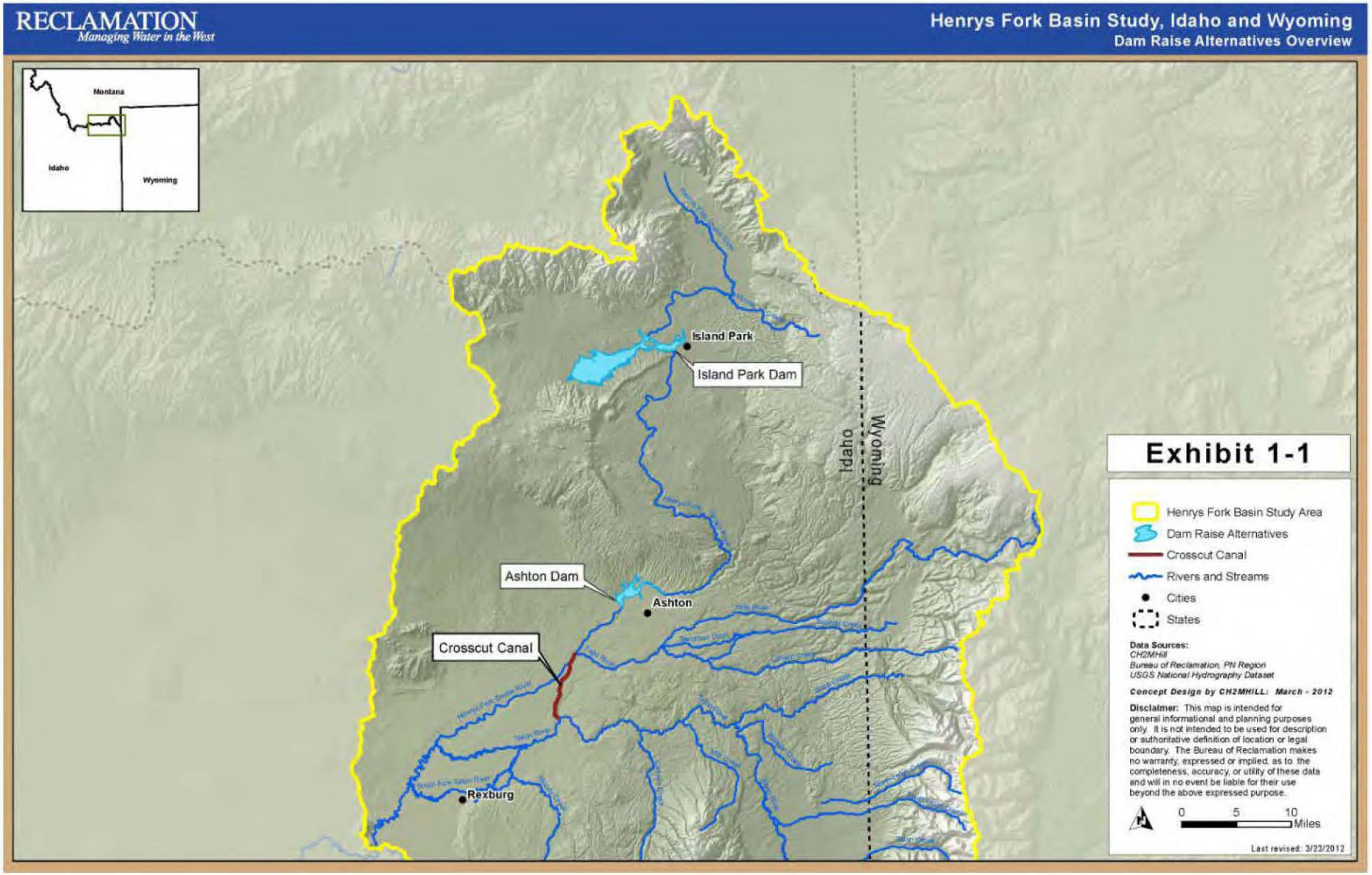
- 3 sub-alternatives
- Sources include Badger Creek and Teton River

Moose Creek Dam

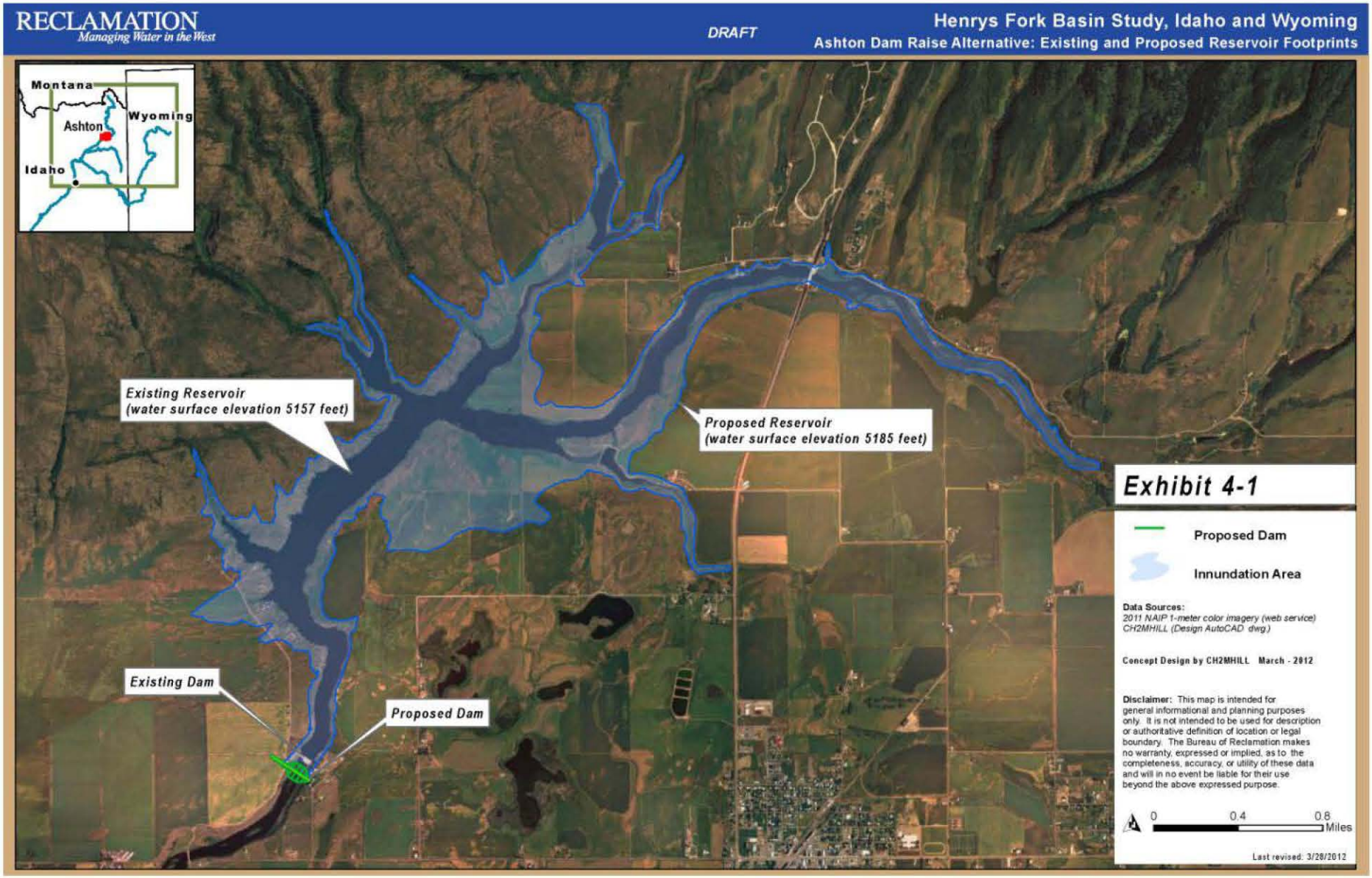


- 4 sub-alternatives
- Sources include Moose Creek and Henrys Fork River

Locations of Dam Raise Alternatives



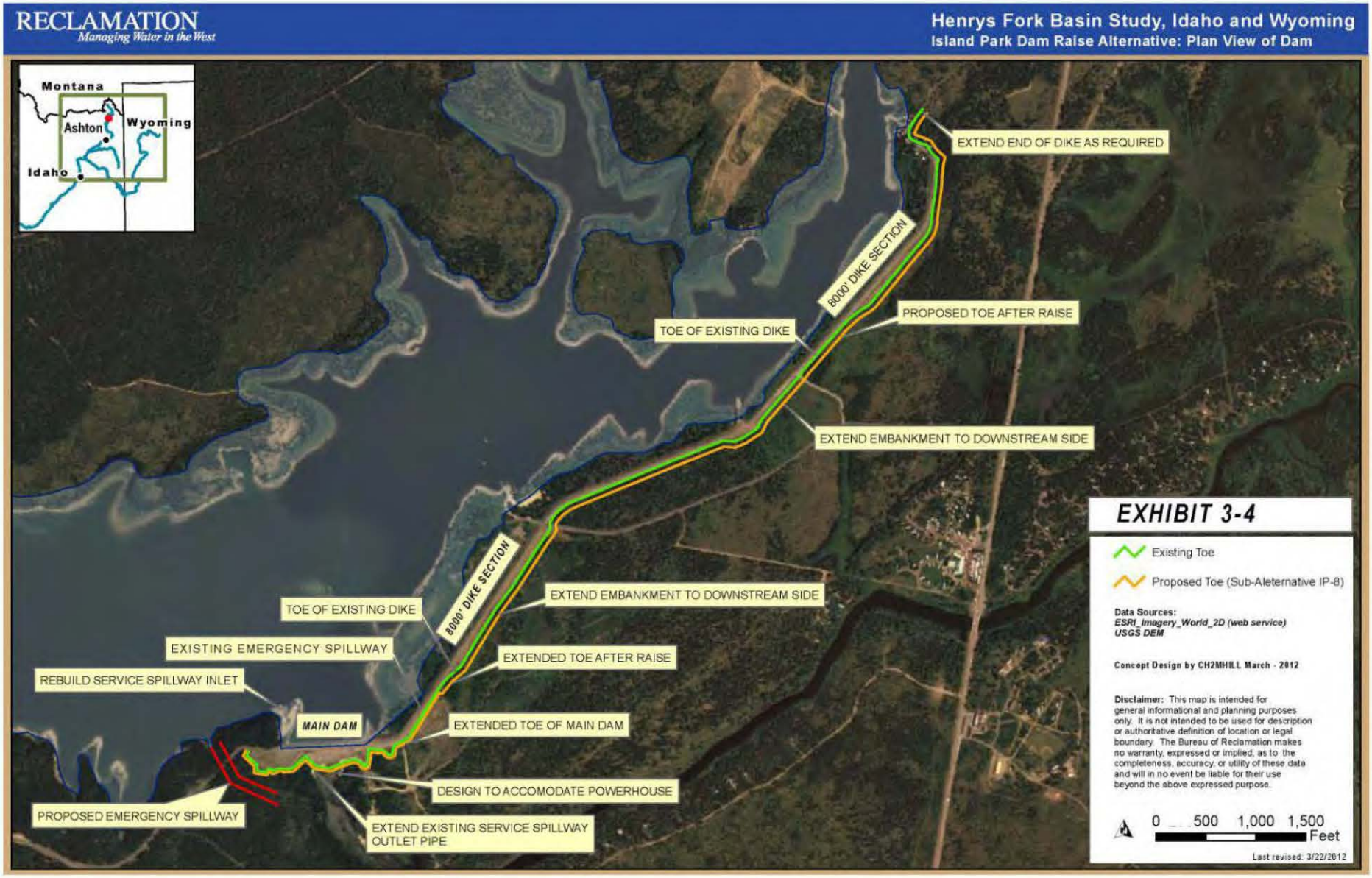
Ashton Dam
Dam Reconstruction



Island Park Dam
1-foot Bladder Raise Sub-Alternative

Island Park Dam

8-foot Embankment Raise Sub-Alternative, cont.



Eliminate - Moose Creek and Bitch Creek Source

Site	Source			ac-ft	$/ac-ft	project cost
Spring creek	Spring	Canyon		10,800	3,900	$ 42,120,000
Moody creek	Moody			15,000	3,700	$ 55,500,000
Upper Badger	Badger	Teton		47,000	2,700	$ 126,900,000
Lane Lake	Conant	Fall		68,000	4,600	$ 312,800,000
Island Park - raise	Henrys Fork			8,000	100	$ 800,000
Ashton Dam - raise	Henrys Fork			24,000	1,900	$ 45,600,000
			total	172,800	$ 3,378	$ 583,720,000

Further Storage Study Needs

- ✓ Reconfigure Lane Lake – Design/Costs
- ✓ Optimize Island Park Raise
- ✓ Hydrologic Impacts
- ✓ Environmental Impacts
- ✓ Water Availability
  - flows past Milner
  - frequency analysis

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Draft Report

Henrys Fork Basin Study
Managed Recharge Alternatives

Technical Series No. PN-HFS-004

Prepared by

CH2MHILL®

For

Bureau of Reclamation, Idaho Water Resource Board,
and Henrys Fork Watershed Council

May 2012

Managed Recharge Alternatives

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West Egin Lakes
Recharge Modeling

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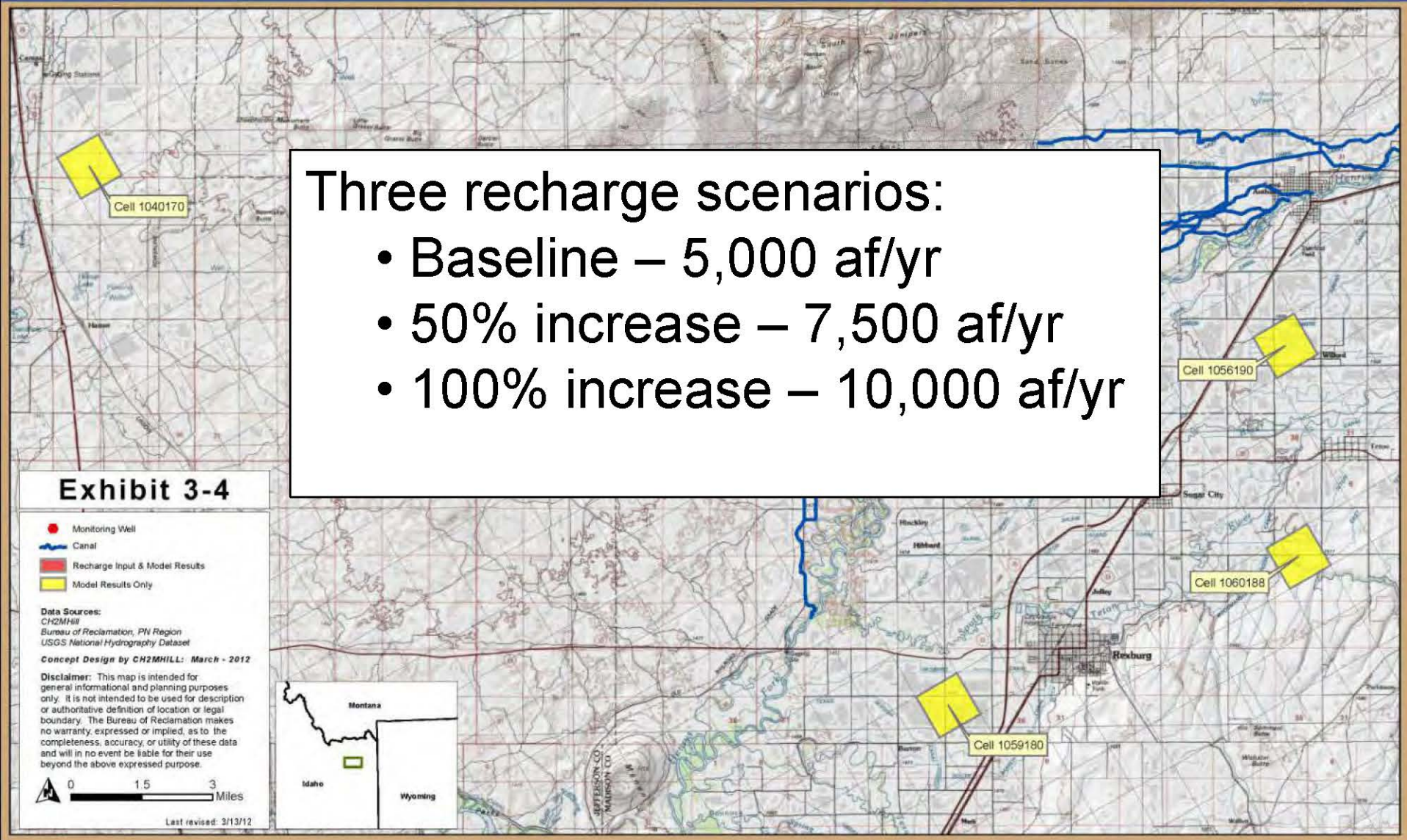
Managing Water in the West

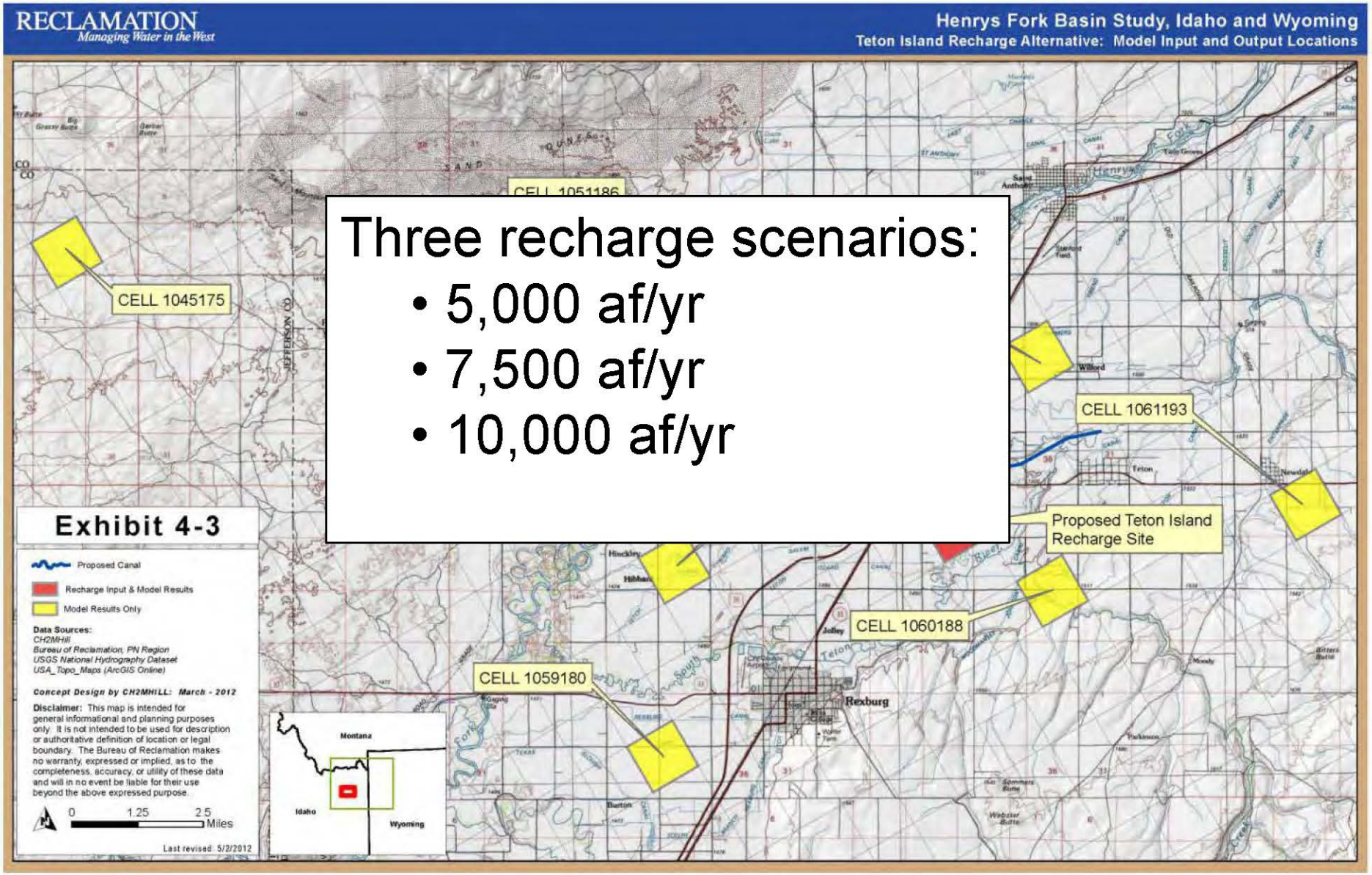
Henrys Fork Basin Study, Idaho and Wyoming
Egin Lakes Recharge Alternative: Model Input and Output Locations



Three recharge scenarios:

- Baseline – 5,000 af/yr
- 50% increase – 7,500 af/yr
- 100% increase – 10,000 af/yr

Teton Island
Recharge Modeling



Further Managed Recharge Study Needs

- ✓ State of Idaho to pursue current recharge program
- ✓ Basin Study to incorporate State findings.

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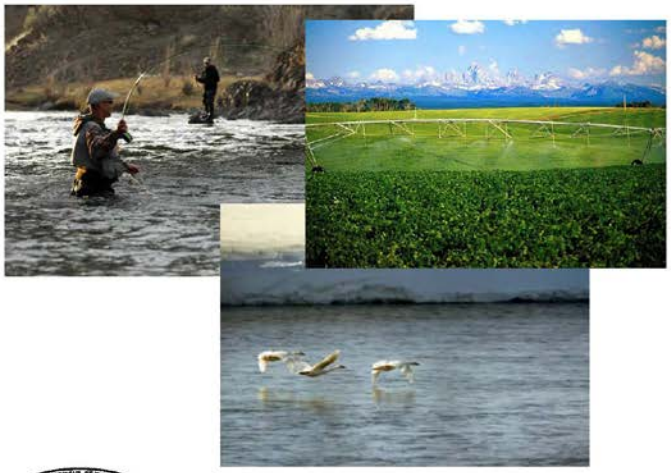
Managing Water in the West

DRAFT Henrys Fork Basin Study
Conservation Alternatives
Technical Series Report No. PN-HFS-006



U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Boise, Idaho

July 2012

Conservation Alternatives

Conservation Alternatives

1. Canal Automation
2. Demand Reduction
3. Lining and Piping of Canals
4. Recharge Using Existing Canals
5. Conversion from Flood to Sprinkler (not done)

Further Conservation Alternative Study Needs

- ✓ Automated Canals
  - develop plan for high priority installations
  - document opportunity for fish screening w/costs
  - expand concept to include benefits from increased flow measurement & marketing

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Further Conservation Alternative Study Needs

- ✓ Irrigation Pipelines – North Freemont
  - Document opportunities, benefits, costs
- ✓ Hydrologic Impacts
- ✓ Environmental Impacts

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Draft Report

Henrys Fork Basin Study Draft Municipal Water Conservation Measures and New Non-potable Water Supply Options

Technical Series PN-HFS-007

Prepared by
WestWater Research
and
CH2M HILL

For
Bureau of Reclamation, Idaho Water Resource Board, and Henrys Fork Watershed Council

April 2012

Municipal & Industrial Conservation Alternatives

RECLAMATION

Further Municipal and Industrial Conservation Study Needs

- ✓ Individual cities to pursue as applicable

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Draft Report

Henrys Fork Basin Study
Preliminary Water Market Analysis

Technical Series PN-HFS-008

Prepared by
WestWater Research
and
CH2M HILL

For
Bureau of Reclamation, Idaho Water Resource Board,
and Henrys Fork Watershed Council

April 2012

Market Based Alternatives

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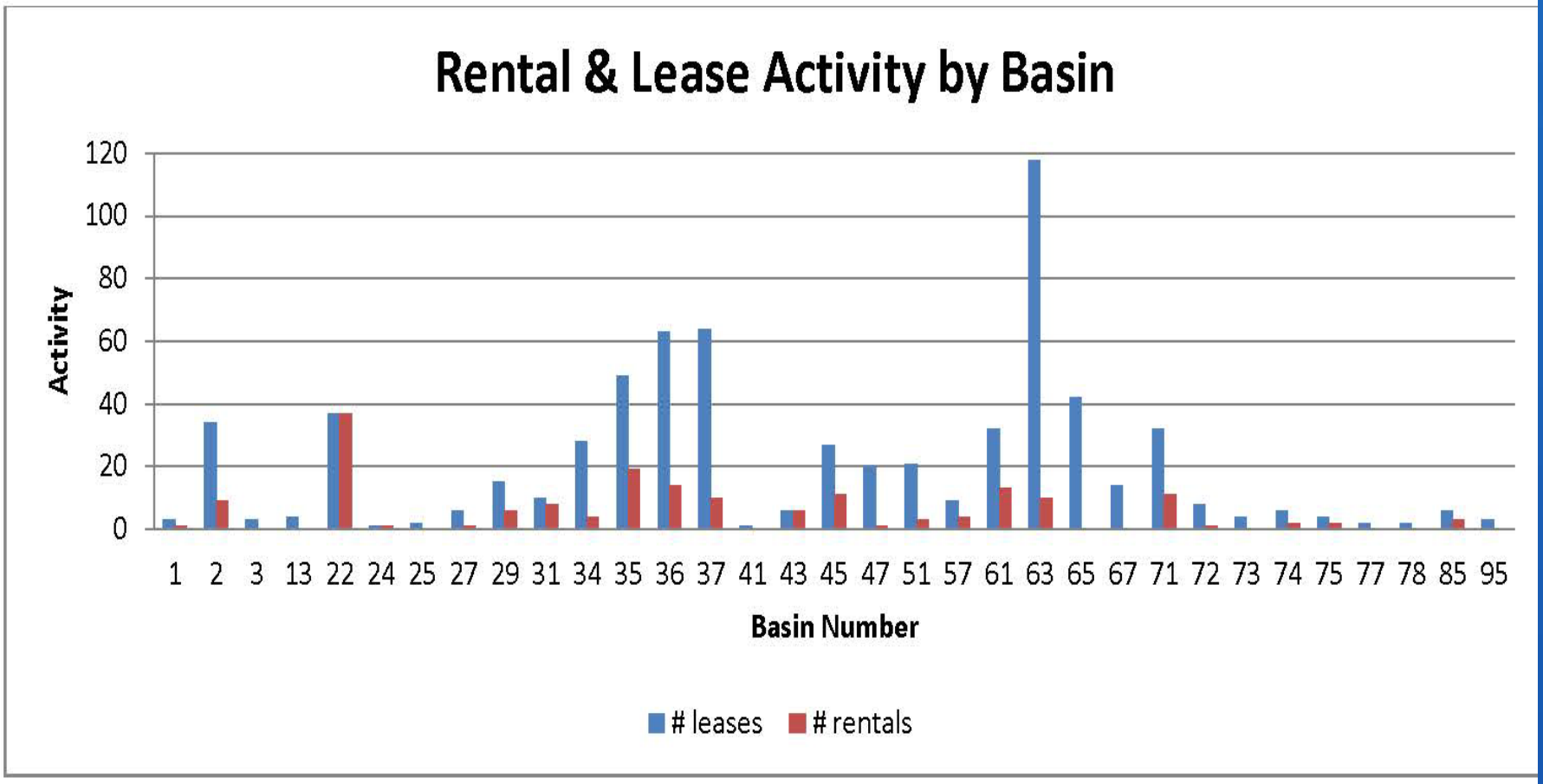
Current Market

Regional Rental Pool – Water District 1

- one of the most active in Idaho, 350,000 acre feet leased in 2012 (flow augmentation, irrigation, mitigation, etc.)

Water Supply Bank – Basin 22



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Further Water Market Study Needs

- ✓ Investigate Use of Water Markets In Conjunction with Alternatives Evaluated
- ✓ Willingness to Pay
- ✓ Demand Reduction - Deficit Irrigation

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Managing Water in the West

Henrys Fork Basin Special Study

Interim Report

U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Boise, Idaho

Fall 2012

Interim Report

- Needs Assessment
-Tech Memos
- Public Process
- Phase II Work Plan

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Carry Forward / Additional Study Storage

- ✓ Compare Teton Dam
- ✓ Reconfigure Lane Lake design – eliminate Bitch Creek as source
- ✓ Spring & Moody Creek – w/natural flows
- ✓ Upper Badger Creek
- ✓ Raise Island Park & Ashton Dam

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Carry Forward /Additional Study Water Management

- ✓ Automated Canals
- ✓ Pipelines in North Fremont
- ✓ Investigate Use of Water Markets In Conjunction with Conservation & Storage Alternatives
- ✓ Demand Reduction / Marketing

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Carry Forward / Additional Study Impacts

- ✓ Document Hydrologic Impacts of Alternatives
- ✓ Document Environmental Impacts of Alternatives
- ✓ Climate Change

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Back-up slides

HENRYS FORK BASIN STUDY BUDGET - *DRAFT*

Phase II - Appraisal Analysis		Totals	Comments
Available Funds		**$275,627**	
Common Expenditures (Apply to all alternatives)			
	Public Coordination by Study Team	**$15,000**	Includes travel, coordination of public meetings, etc.
	Technical Team Study Management	**$13,000**	
	Analysis of Technical Hydrologic & Biological Impacts	**$65,000**	Includes modeling of impacts downstream of Henrys Fork?
	Economic Analysis	**$0**	Funded through a different study.
	Writing/Publication	**$50,000**	
	Reports/Management	**$5,000**	
Alternatives			
Surface Water Storage Alternatives: Spring Creek, Moody Creek, Upper Badger, Lane Lake, Teton, Island Park Raise, Ashton Dam Raise		**$82,000**	Tech/Engineering analysis. Analysis of Island Park spillway may be funded under another study by BOR Technical Services Center.
Managed Ground Water Recharge (evaluation of local benefits - expansion of recharge on Egin Bench)		**$0**	Reference results of IDWR ESPAM V2 recharge analysis. Cost to document analysis by IDWR in Henrys Fork Basin Study Report are included under writing/publication.
Agricultural Conservation and Management			
	Canal Automation	**$20,000**	
	Piping and Lining (North Fremont irrigated region only)	**$5,000**	
	Demand Reduction	**$2,000**	
Market Based Mechanisms (in conjunction with other alternatives)		**$2,000**	
Total Planned Expenditure		**$259,000.00**	
Contingency		**$16,627.00**	

09/04/12