

RECLAMATION

Managing Water in the West

Henry's Fork Basin Study Workgroup Meeting April 10, 2012

In Cooperation with:
Idaho Water Resource Board



and



U.S. Department of the Interior
Bureau of Reclamation

Henry's Fork Watershed Council

Basin Study Schedule

- ✓ **March 1st** Draft Needs Assessment –
 - Comments due by March 31st - Extended
- ✓ **March 13th** HFWC Meeting:
 - Update on CH2M HILL alternatives
 - Introduction – Reconnaissance Screening Process

Basin Study Schedule, cont.

➤ April 10th HFWC Meeting:

- New Surface Storage & Water Markets
- Further Discussion of Decision Analysis
- Comments on TMs and Needs Assessment

➤ May 8th HFWC Meeting:

- Discuss Conservation, M&I, Dam Raise, Managed Recharge TMs
- Describe and Discuss Proposed Scenarios

Basin Study Schedule, cont.

- **May – August** Small Group Meetings – Agencies, Irrigators, Municipalities, NGOs, IWRB - Evaluation and discussion of scenarios
** level of acceptability
- **September** HFWC meeting – “WIRE” process of Appraisal Scenario
- **September** IWRB presentation – complete Interim Report
- **September 2013** - Appraisal Report

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Today's Agenda

- Basin Study Status & Schedule, Status of TMs, Review Guidance
- Alternatives Evaluation
 - New Surface Storage Evaluation Highlights
 - Market Mechanisms Evaluation Highlights
- Decision Analysis Process
- Facilitated Discussion to Receive “Factual Feedback”
 - Needs Assessment
 - New Surface Storage TM
 - Market Mechanisms TM

Draft Technical Memo Status & Schedule

- New Surface Storage & Water Markets – posted to web
- M&I Conservation – Internal & City Review – to be posted 4/16
- Dam Raise – Internal Review – to be posted 4/20
- Managed Recharge – Internal Review (Egin) – to be posted 4/27

Draft Technical Memo Status & Schedule

- Conservation Alternatives – Received Dr. Van Kirk's complete model, Draft for Internal Review 4/30 – to be posted 5/8
- Teton Dam – Draft for Internal Review 4/30 – to be posted 5/8

Review Guidance

- Factual Feedback - initial
- Forthcoming in May to August small group meetings, discussion of how alternative:
 - Meets Needs
 - Is Acceptable
 - Etc.

New Storage Alternatives - Workgroup Review

Recommended Areas of Focus for Review:

- Part I – Introduction & Methodology
 - Chapter 1 - Alternatives Introduction
 - Chapter 2 – Evaluation Approaches, Assumptions, and Limitations

- Part II – Alternative Evaluation Results
 - Chapters 3 – 7
 - Section 2 – Key Findings
 - Exhibits, especially those presenting impacts-related information (Exhibits 10-12 in each chapter)

New Storage Alternatives – Evaluation Highlights

- Alternatives Overview
- Introduction of Sub-Alternatives
- Storage Volumes
- Water Needs
- Cost Estimates
- Environmental Impacts

New Storage Alternatives Overview

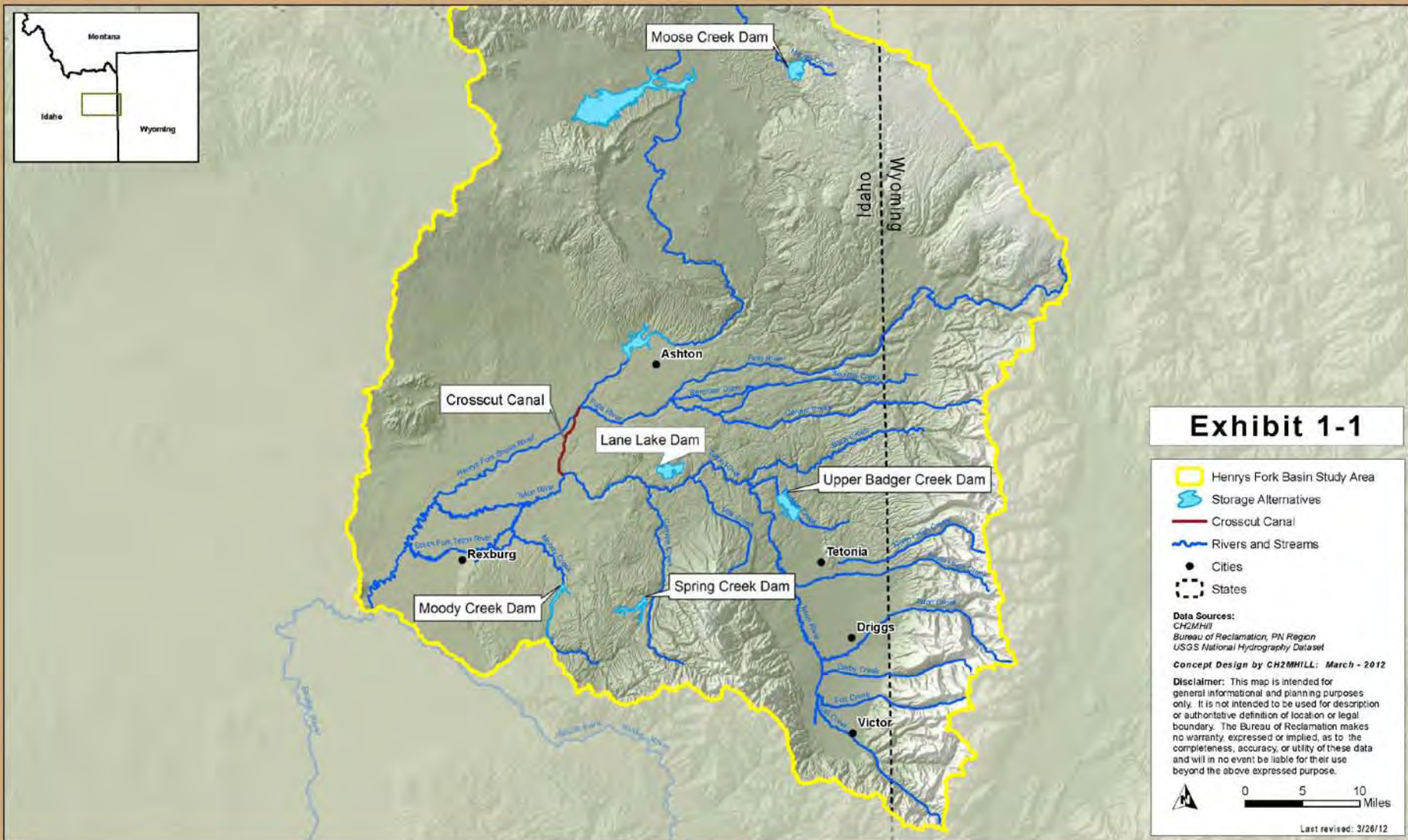


Exhibit 1-1

- Henry's Fork Basin Study Area
- Storage Alternatives
- Crosscut Canal
- Rivers and Streams
- Cities
- States

Data Sources:
CH2MHill
Bureau of Reclamation, PN Region
USGS National Hydrography Dataset

Concept Design by CH2MHILL: March - 2012

Disclaimer: This map is intended for general informational and planning purposes only. It is not intended to be used for description or authoritative definition of local or legal boundary. The Bureau of Reclamation makes no warranty, expressed or implied, as to the completeness, accuracy, or utility of these data and will in no event be liable for their use beyond the above expressed purpose.



New Storage Sub-Alternatives

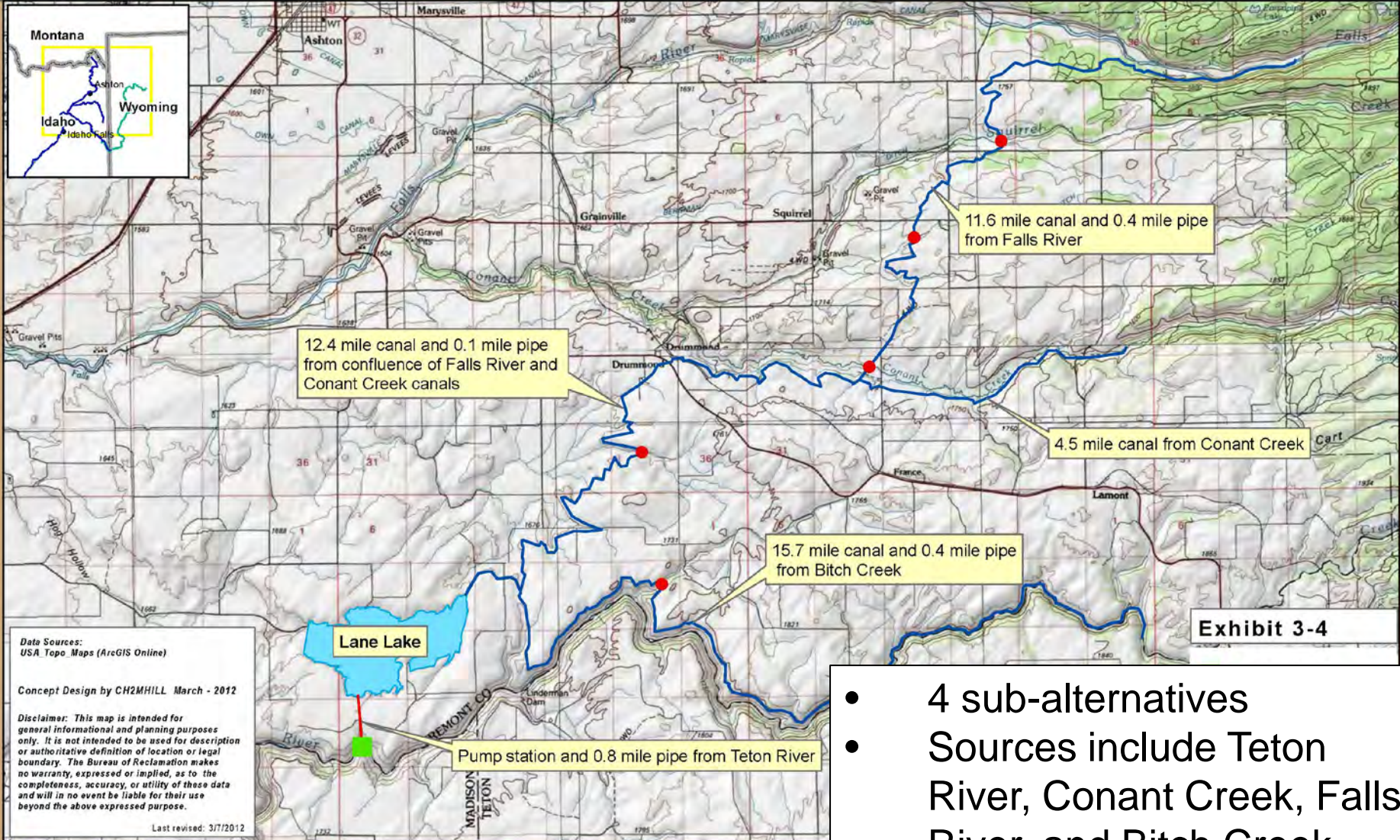
- Sub-alternatives were identified to utilize different potential water sources.
- A preliminary network of canals and pipelines was identified to convey water to the reservoirs.
- Costs and impacts were assessed for each sub-alternative.

Lane Lake Dam

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Henry's Fork Basin Study, Idaho and Wyoming
Lane Lake Dam Alternative: Conveyance

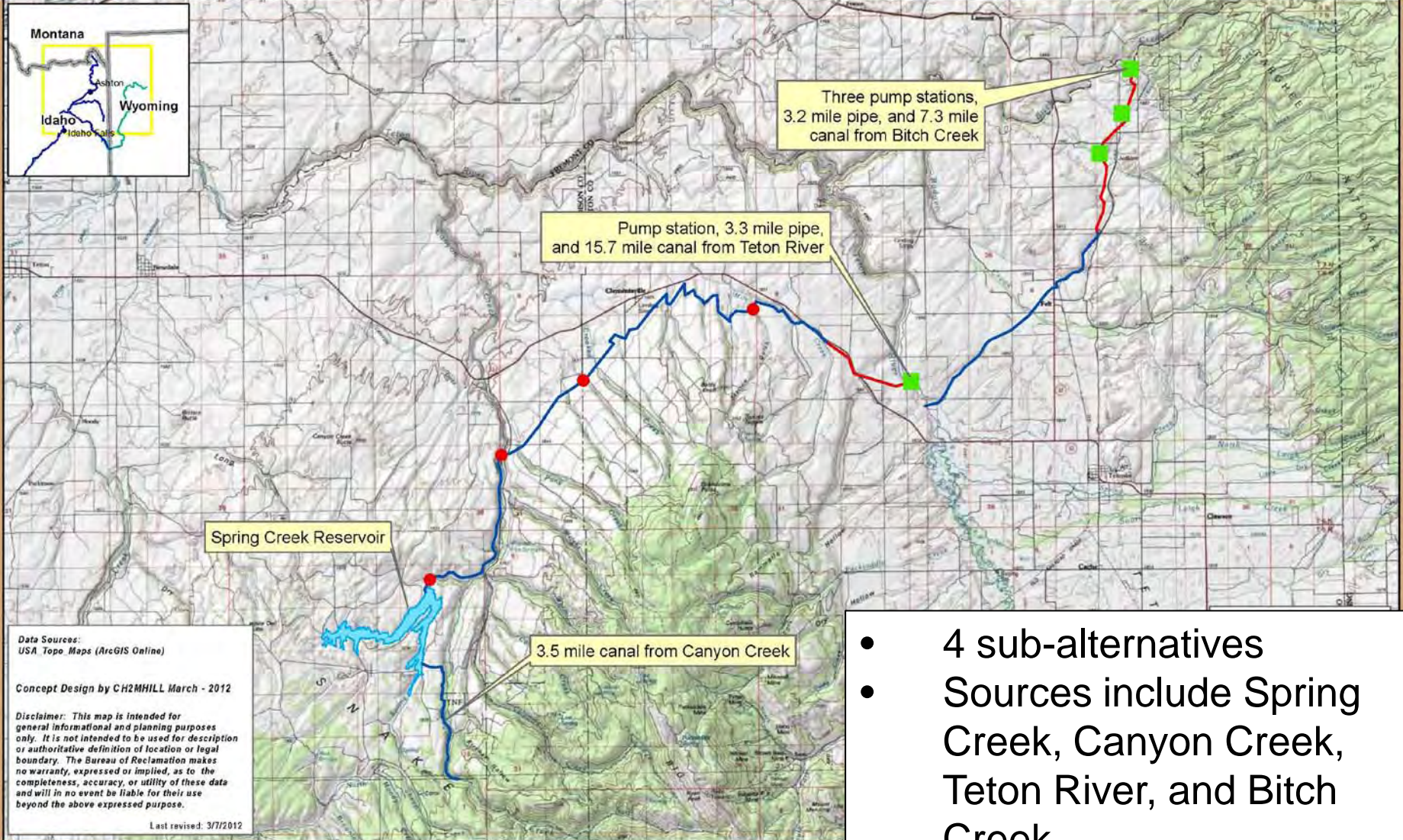


Spring Creek Dam

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Henry's Fork Basin Study, Idaho and Wyoming
Spring Creek Dam Alternative: Conveyance



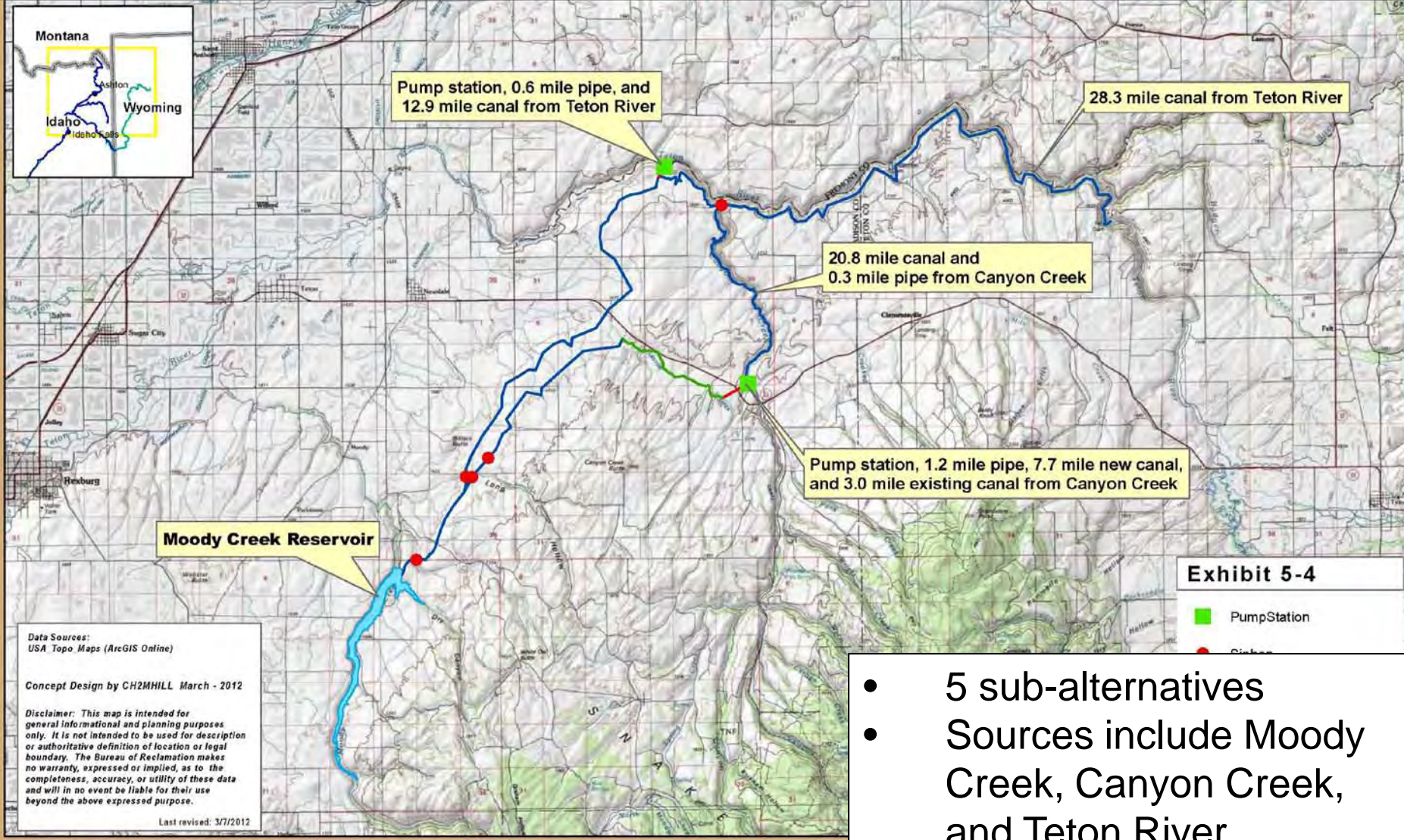
- 4 sub-alternatives
- Sources include Spring Creek, Canyon Creek, Teton River, and Bitch Creek

Moody Creek Dam

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Henrys Fork Basin Study, Idaho and Wyoming
Moody Creek Dam Alternative: Conveyance



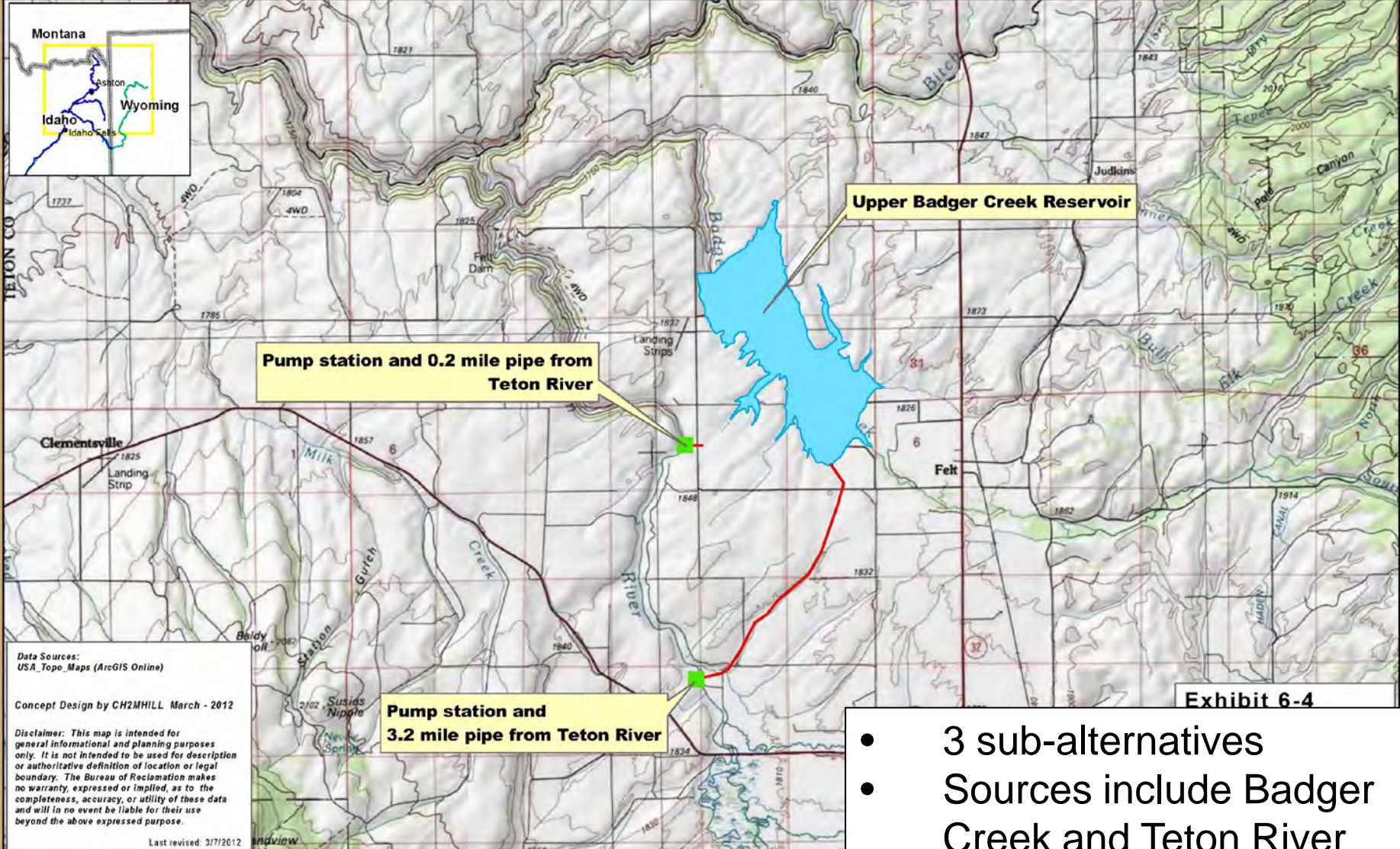
- 5 sub-alternatives
- Sources include Moody Creek, Canyon Creek, and Teton River

Upper Badger Creek Dam

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Henry's Fork Basin Study, Idaho and Wyoming
Upper Badger Creek Dam Alternative: Conveyance



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

Moose Creek Dam

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Henrys Fork Basin Study, Idaho and Wyoming
Moose Creek Dam Alternative: Conveyance



**Pump station (PS4),
1.8 mile pipe, and 5.4 mile
canal from Henrys Fork River**

**Pump station (PS2),
2.1 mile pipe, and 4.1 mile
canal from Henrys Fork River**

**Pump station (PS3),
0.2 mile pipe, and 5.4 mile
canal from Henrys Fork River**

**Pump station (PS1) and 6.0 mile pipe
from Henrys Fork River**

Moose Creek Reservoir

Exhibit 7-4

Pump Station

Data Sources:
USA Topo Maps (ArcGIS Online)

Concept Design by CH2MHILL March - 2012

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Last revised: 3/7/2012

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

Storage Volumes

- Dam location sited in accordance with past studies.
- Potential storage volume maximized given local topographic constraints and freeboard requirements.
- Storage volume ranges reflect water supply source limitations (sub-alternatives).

Reservoir	Storage Volume Range (acre-feet)
Lane Lake	67,800 – 68,000
Spring Creek	10,800 – 20,000
Moody Creek	15,000 – 37,000
Upper Badger Creek	16,300 – 47,000
Moose Creek	60,000

Water Needs

Reservoir	Irrigated Regions Receiving Benefit	River Segments with Enhanced Environmental Flows
Lane Lake	North Freemont Lower Watershed Egin Bench	Teton River South Fork Teton Henrys Fork
Spring Creek	Lower Watershed Egin Bench	Canyon Creek Teton River South Fork Teton Henrys Fork
Moody Creek	Lower Watershed Egin Bench	Moody Creek Teton River South Fork Teton Henrys Fork
Upper Badger Creek	North Freemont Lower Watershed Egin Bench	Badger Creek Teton River South Fork Teton Henrys Fork
Moose Creek	North Freemont Lower Watershed Egin Bench	Henrys Fork Teton River South Fork Teton



Cost Estimates

➤ Costs consist of the following elements:

- Stream diversion and intake
- Pump stations
- Pressure pipe
- Canals (including Crosscut Canal enlargement for Moose Creek Dam)
- Dam embankment, spillway, and outlet works
- Hydropower – Powerhouse and penstock
- Contingency, Engineering, and Administration

Alternative	Total Estimated Construction Cost	Cost Per Acre-Foot
Lane Lake Dam	\$266M – \$345M	\$3,900 - \$5,100
Spring Creek Dam	\$42M – \$230M	\$3,900 - \$11,500
Moody Creek Dam	\$55M – \$167M	\$3,600 – \$4,500
Upper Badger Creek Dam	\$86M – \$156M	\$2,700 – \$5,300
Moose Creek Dam	\$168M - \$251M	\$2,800 – \$4,200

Environmental Impacts

- The following factors were reviewed:
 - Change in connectivity
 - Presence of Yellowstone cutthroat trout (YCT)
 - Wildlife habitat
 - Federally-listed species
 - Wetlands
 - Land ownership/management
 - Recreation/economic value
 - Infrastructure

Environmental Impacts, cont.

Exhibit 3-12

Land Management Implications and Impacts to Recreation/Economic Value and Infrastructure at the Reservoir Site

Surface Storage Site	Land Management Data ^a				Recreation/Economic Value								Infrastructure ^d					
	Private	Federal	State	Conservation Easements ^b	Rating	Boating	Fishing	Yellowstone National Park	Guiding/ Outfitting	Scenic/ Natural Features ^c	Cultural/ Historic Resources ^c	Land Recreation ^c	Rating	Roads	Structures	Habitation	Additional Infrastructure Notes	Rating
Lane Lake	•				Private								Low	•		•		Few

Notes:

^aLand management data per the BLM Idaho Surface Management Agency (2010). For federal government lands, the data displays the managing agency which may or may not be the same as the agency that "owns" the land.

^bPer feedback from Trout Unlimited, Friends of the Teton River, American Rivers, and the Henry's Fork Foundation.

^cPer the Resource Evaluation (IWRB 1992)

^dPreliminary impacts based on cursory review of aerial photography.

Legend

Land Management

Federal, Conservation Easement	Federal, Conservation Easement
State	State
Private	Private

Recreation/Economic Value

High	Significant Impacts to Recreation/ Economic Values
Moderate	Moderate Impacts to Recreation/ Economic Values
Low	Minimal Impacts to Recreation/ Economic Values

Infrastructure

High	Impacts to major infrastructure/development
Moderate	Moderate impacts to human environment
Few	Few impacts to human environment

Environmental Impacts, cont.

Alternative	Environmental Considerations
Lane Lake	<ul style="list-style-type: none">• Bitch Creek has core conservation population of YCT; other sources have conservation populations.• Reservoir is in big game winter habitat.• 3 federally-listed species.• Supply sources have state designations or are eligible for federal designations.• Few impacts to wetlands, recreation, and infrastructure.
Spring Creek	Similar to Lane Lake, but only 1 federally-listed species.
Moody Creek	<ul style="list-style-type: none">• Conservation populations of YCT.• Supply sources are eligible for federal designations.• Moderate wetlands impacts.• No federally-listed species.• Few impacts to big game habitat, wetlands, recreation, and infrastructure.

Environmental Impacts, cont.

Alternative	Environmental Considerations
Upper Badger Creek	<ul style="list-style-type: none">• Badger Creek has core conservation population of YCT; Teton has conservation population.• Badger Creek does not have designated status.• Reservoir is in big game winter habitat.• 3 federally-listed species.• Moderate wetlands impacts.• High recreation value.• Few impacts to infrastructure.
Moose Creek	<ul style="list-style-type: none">• No YCT impacts.• Moose Creek is eligible for federal designation.• Moderate recreation value.• 2 federally-listed species.• Few impacts to big game habitat, wetlands, and infrastructure.

Water Market Mechanisms – Evaluation Highlights

- Existing Idaho Water Market Conditions
- Comparative Water Markets Analysis
- Common Water Market Themes
- Conclusions

Existing Idaho Water Market Conditions

- Water Supply Bank
- Regional Rental Pools

Comparative Water Markets Analysis

- Single Purpose Programs
 - Case Studies: Newlands Project, NV; Palo Verde Irrigation District, CA
- Competitive Markets
 - Case Studies: Yakima Basin, WA; South Platte, CO
- Mitigation/Credit Markets
 - Case Studies: Deschutes Basin, OR; Active Management Areas, AZ

Common Water Market Themes

- Regulatory Environment
- Economic Conditions
- Efficient Approval Process
- Units of Exchange
- Pricing

Water Market Conclusions

- Price of water in the Basin is low → may be limited demand at higher prices.
- To meet State ESPA needs (600 kaf), participating agricultural producers may have to reduce irrigation.
- High levels of private trading would be required for markets in the Basin to be successful, but there is no current framework in place.
- A combination of public and private funding would be necessary.

Decision Support

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