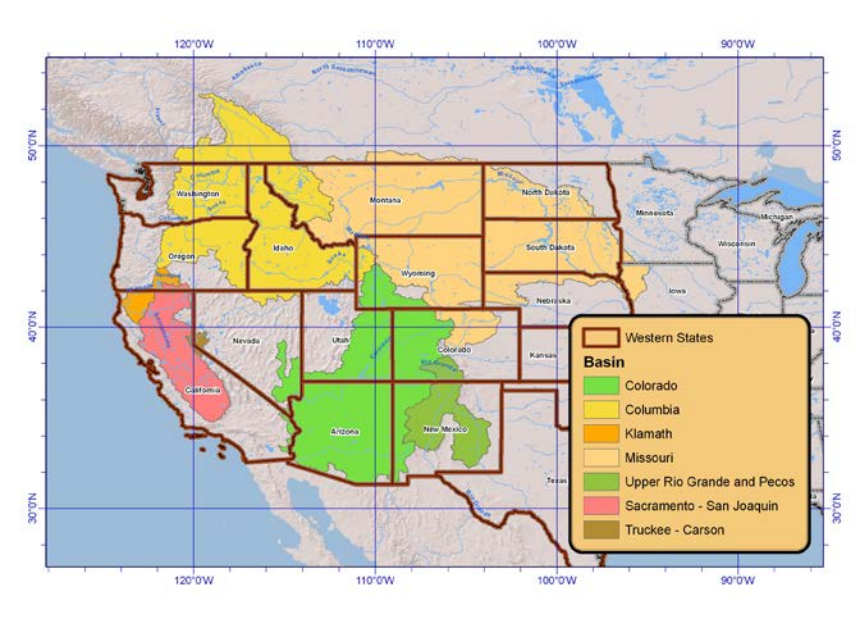
Missouri Headwaters Basin Study

WaterSMART Basin Studies Program

- Public Law 111-11, Subtitle F (SECURE Water Act, SWA, 2009) § 9503.
- Climate change risks for water and environmental resources in "major Reclamation river basins."
- Reclamation's WaterSMART (Sustain and Manage America's Resources for Tomorrow) Basin Study Program
  1. West-Wide Climate Risk Assessments (WWCRAs)
  2. Basin Studies
  3. Landscape Conservation Cooperatives (LCCs)



8 major Reclamation River Basin

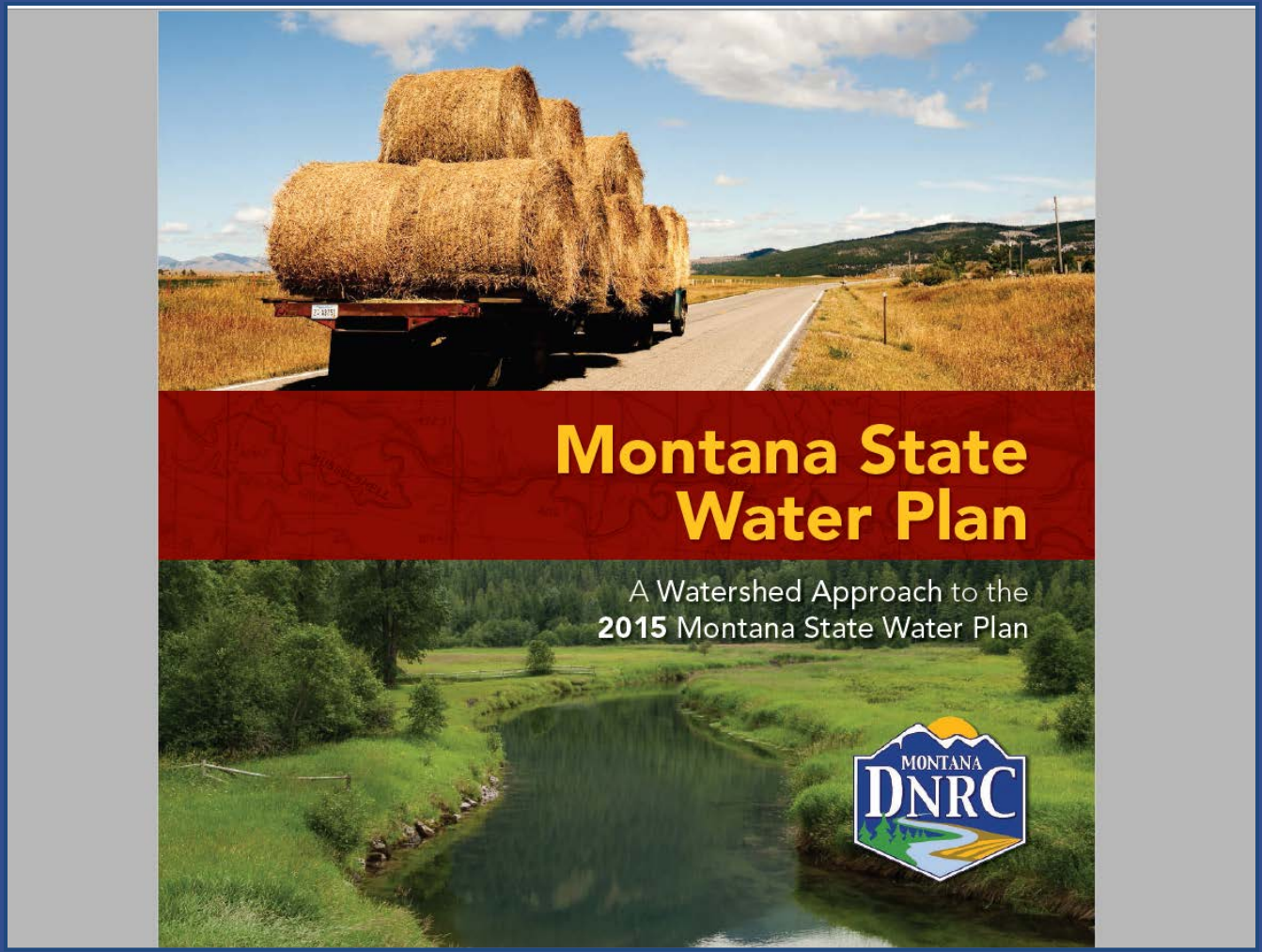
SECURE – Science and Engineering to Comprehensively Understand and Responsibly Enhance

RECLAMATION

SECURE Water Act, 2009

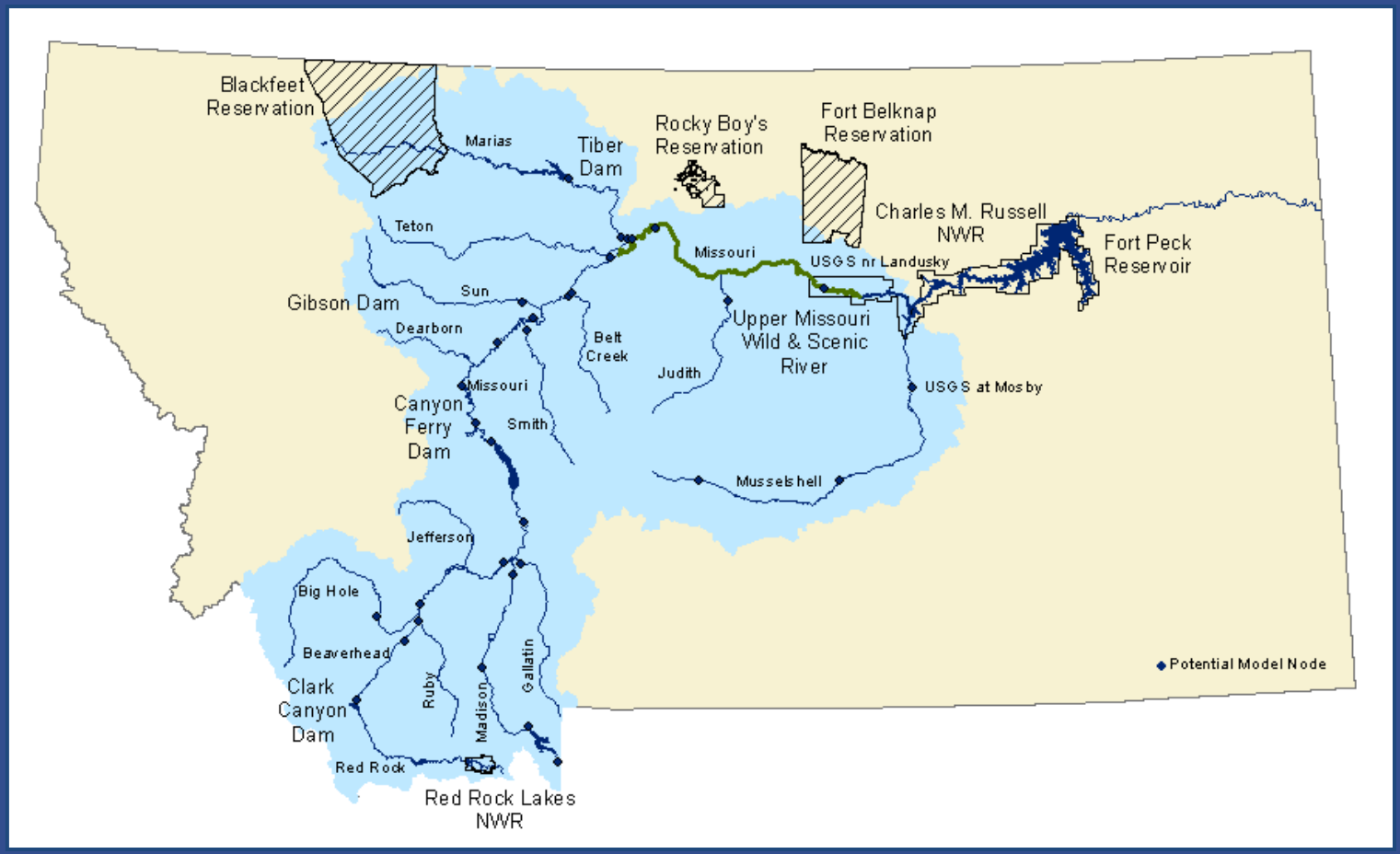
- Risks
  - Change in snowpack
  - Groundwater recharge and discharge
  - Increases in water demand or reservoir evaporation as result of increasing temperature
- Impacts
  - Ability to deliver water
  - Hydroelectric power generation
  - Recreation at Reclamation facilities
  - Fish and wildlife habitat
  - Endangered, threatened, candidate species
  - Water quality issues
  - Flow dependent ecological resiliency
  - Flood control management

RECLAMATION



Recommendation: DNRC will work with local water users and other government agencies to conduct a basin-wide physical water availability and water management assessment in the Upper Missouri Basin. The study will assess and analyze how the basin's existing water and power operations and infrastructure will perform under different water supply scenarios. The study will also analyze the effectiveness of adaptation and mitigation strategies for meeting the challenges of supplying adequate water in the future.

Missouri River Headwaters Basin Study Area



- Drains an area of about 50,000 square miles
- Close to 1,100,000 acres of irrigation served
- Reclamation projects include four Pick-Sloan multi-purpose Missouri Basin Program Units

Study Participants and Supporters

Ruby Watershed Council | Ruby Valley Conservation District

P.O. Box 295
Sheridan, MT 59749
(406) 842-5741

Ruby Valley Conservation District

Broadwater Conservation District

Friends of the Missouri Breaks Monument

DEQ
Montana Department of Environmental Quality

TETON RIVER WATERSHED GROUP
816 Grizzly Drive - Great Falls, Montana 59404 ~ (406)727-4437

Madison Conservation District

Greater Gallatin Watershed Council

USGS
science for a changing world

Montana Fish, Wildlife & Parks

Montana Bureau of Mines and Geology
Montana Tech of The University of Montana
MBMG

Musselshell Watershed Coalition

... benefiting water users and the river by practicing basin-wide cooperative management

Deadman's Basin Water Users Association	Mosby-Musselshell Watershed Group	MT DEQ
Delphia-Melstone Canal Water Users	Petroleum County Conservation District	MT FWP
Garfield County Conservation District	Upper Musselshell Conservation District	MT DNRC
Lower Musselshell Conservation District	Upper Musselshell Water Users Association	NRCS

Cascade Conservation District

Centennial Valley Association

Sun River Watershed

Lower Musselshell Conservation District
109 Railway East
Roundup, Montana 59072

Big Hole Watershed Committee

Funded Basin Studies

24 Basin Studies funded since 2009

2009
- Colorado River Basin
- Milk/St. Mary River Basins
- Yakima River Basin

2010
- Niobrara River Basin
- Truckee River Basin
- Santa Ana River Basin
- Henrys Fork of Snake River
- S.E. California Regional Basin

2011
- Lower Rio Grande River Basin
- Santa Fe Basin
- Klamath River Basin
- Hood River Basin

2012
- Upper Washita River Basin
- Sacramento-San Joaquin Rivers
- Republican River Basin
- Pecos River Basin
- L.A. Basin

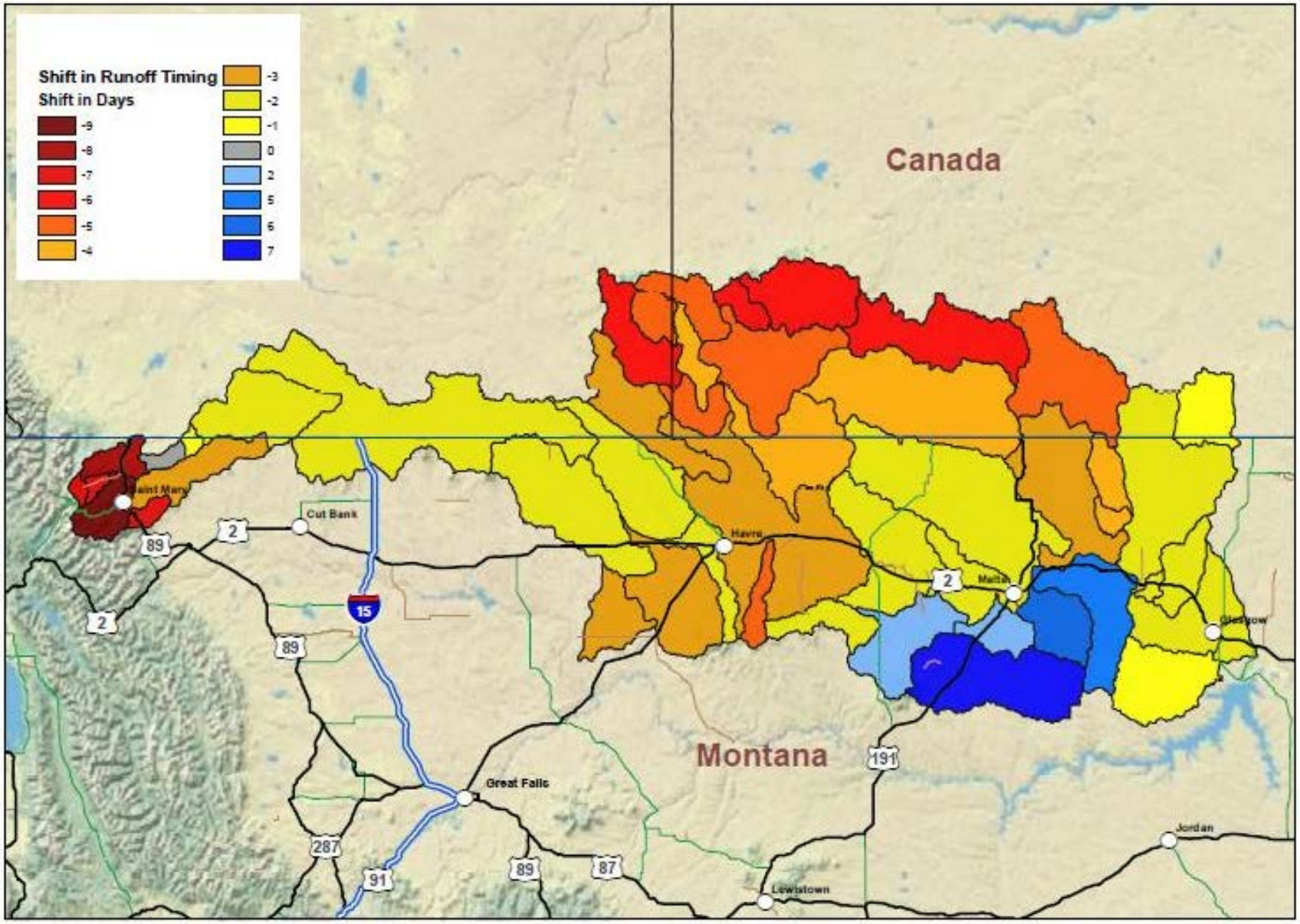
2013
- San Diego Watershed
- West Salt River Valley

2014
- Deschutes River Basin
- Upper Missouri River Basin
- Upper Red River Basin

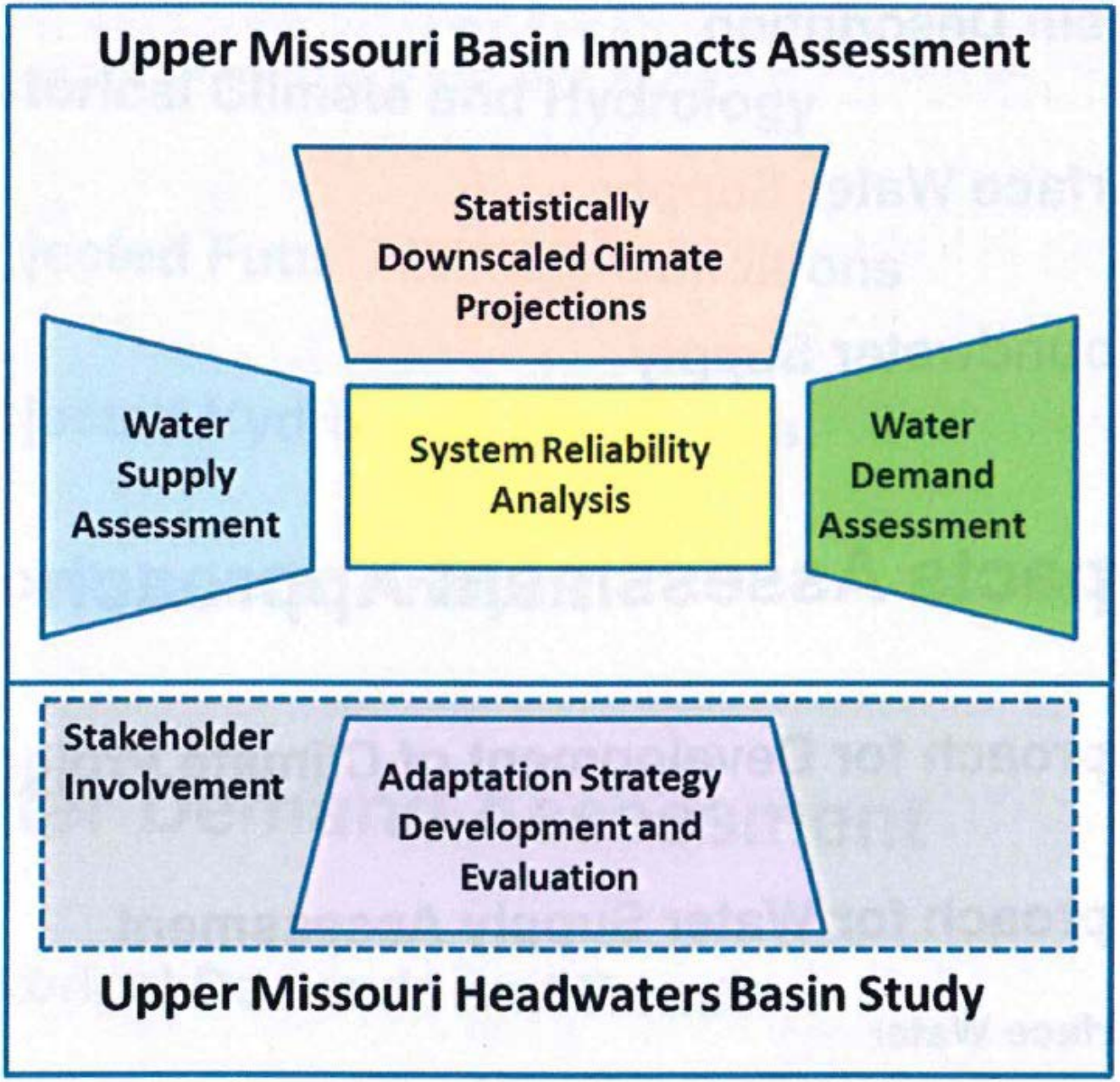
2015
- Lower Santa Cruz River Basin Study
- Salinas and Carmel Rivers Basin Study

RECLAMATION

St. Mary River – Milk River Basin Study Example



Source: St. Mary River Milk River Basin Study Technical Report


Upper Missouri Basin Impacts Assessment
Statistically Downscaled Climate Projections
Water Supply Assessment
System Reliability Analysis
Water Demand Assessment
Stakeholder Involvement
Adaptation Strategy Development and Evaluation
Upper Missouri Headwaters Basin Study

Phases of a Basin Study

Basin Study Elements

Phase 1: Water Supply and Demand Assessment	**Assess current and projected water supply and demand in a changing climate**
Phase 2: System Reliability Analysis	**Analyze how the basin will respond to water supply and demand projections according to identified measures**
Phase 3: Development of Adaptation Strategies	**Develop adaptation strategies to reduce any identified gaps in supply and demand**
Phase 4: Evaluation of Adaptation Strategies	**Evaluate adaptation strategies, findings, and recommendations as appropriate**

RECLAMATION

Missouri Headwater Basin Study Objectives

- Project basin future water supplies and demands, including water supply risks relating to climate change
- Develop a river system management model to simulate operations under existing and future conditions
- Integrate groundwater modeling into the management model for alluvial aquifers in high-demand areas, such as the Gallatin and Beaverhead valleys
- Analyze the water and power infrastructure performance under climate change and future growth scenarios

Missouri Headwater Basin Study Objectives (Continued)

- Develop and model adaptive management strategies
- Conduct a trade-off analysis of the identified strategies with findings and recommendations
- Conduct outreach to involve stakeholders in the development of the alternative adaptation measures and trade-off analysis

Missouri Headwaters Basin Study and Impact Assessment Schedule

Task	2014	2015				2016				2017		
	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul
1. Study Kick-Off and Historic Data Collection	■	■										
2. Climate Change and Future Water Supply Analysis		■	■	■	■	■	■					
3. River System Model Development and Calibration				■	■	■	■	■	■			
4. System Reliability and Impact Analysis						■	■	■	■	■		
5. Identification of Adaptation Strategies; Public Outreach									■	■	■	
6. Modeling of Adaptation Strategies										■	■	
7. Trade-Off Analysis and Recommendations										■	■	
8. Draft Report Compilation and Review											■	■
9. Finalize Report												■

Transition from Impact Assessment to Basin Study