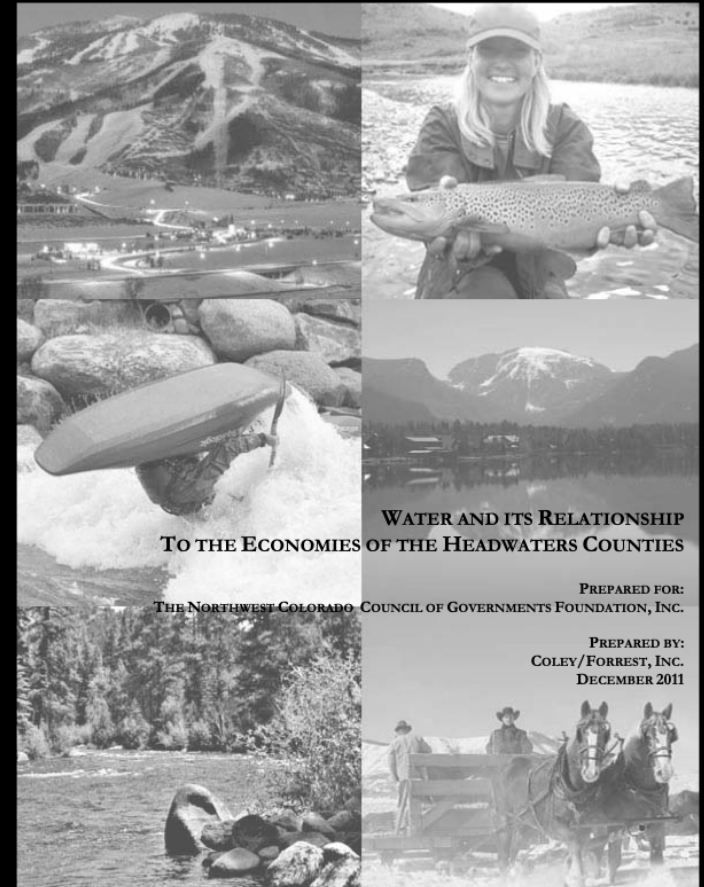


WATER & ITS RELATIONSHIP TO THE ECONOMIES OF THE HEADWATERS COUNTIES



Colorado River – Photo by USGS



QQ MEMBERSHIP



UNIQUE CHARACTERISTICS

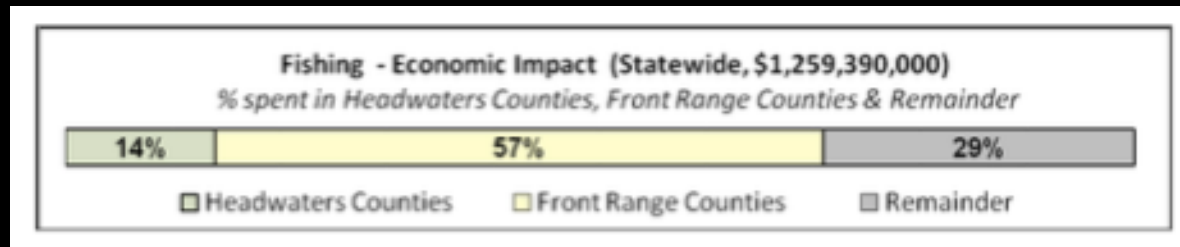
- Headwaters of the Colorado River Basin: Water for Colorado + 6 states + Mexico
- Contain primarily public land (70%)



- World class recreation venues that attract national and international visitors and require minimal consumptive water

UNIQUE CHARACTERISTICS, Continued

- Region of statewide economic value.



- Provides iconic image of economic development initiatives

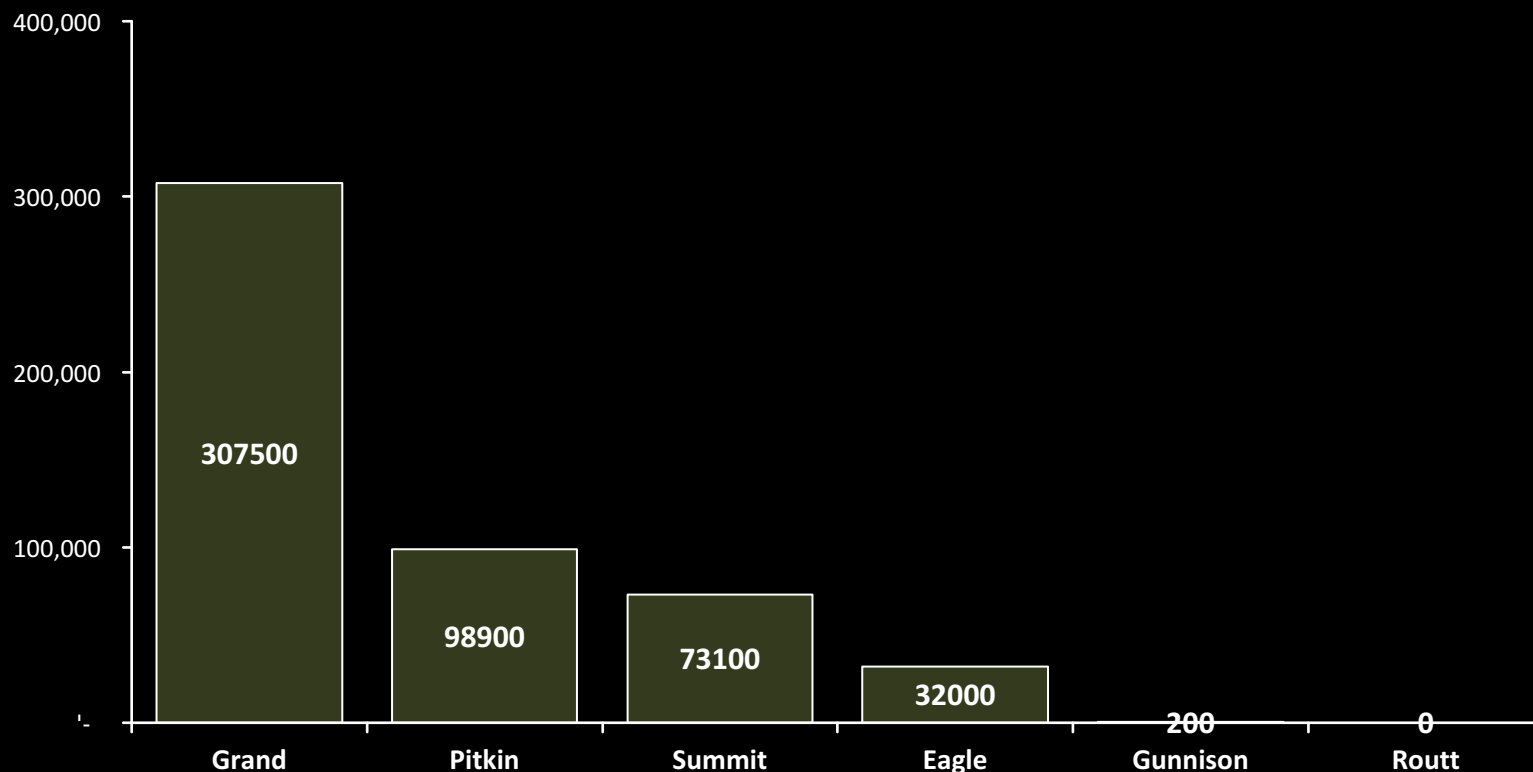


*"For Denver to do well,
we have to have
thriving mountain
communities."
(Former) Mayor
Hickenlooper*

TRANSMOUNTAIN DIVERSIONS

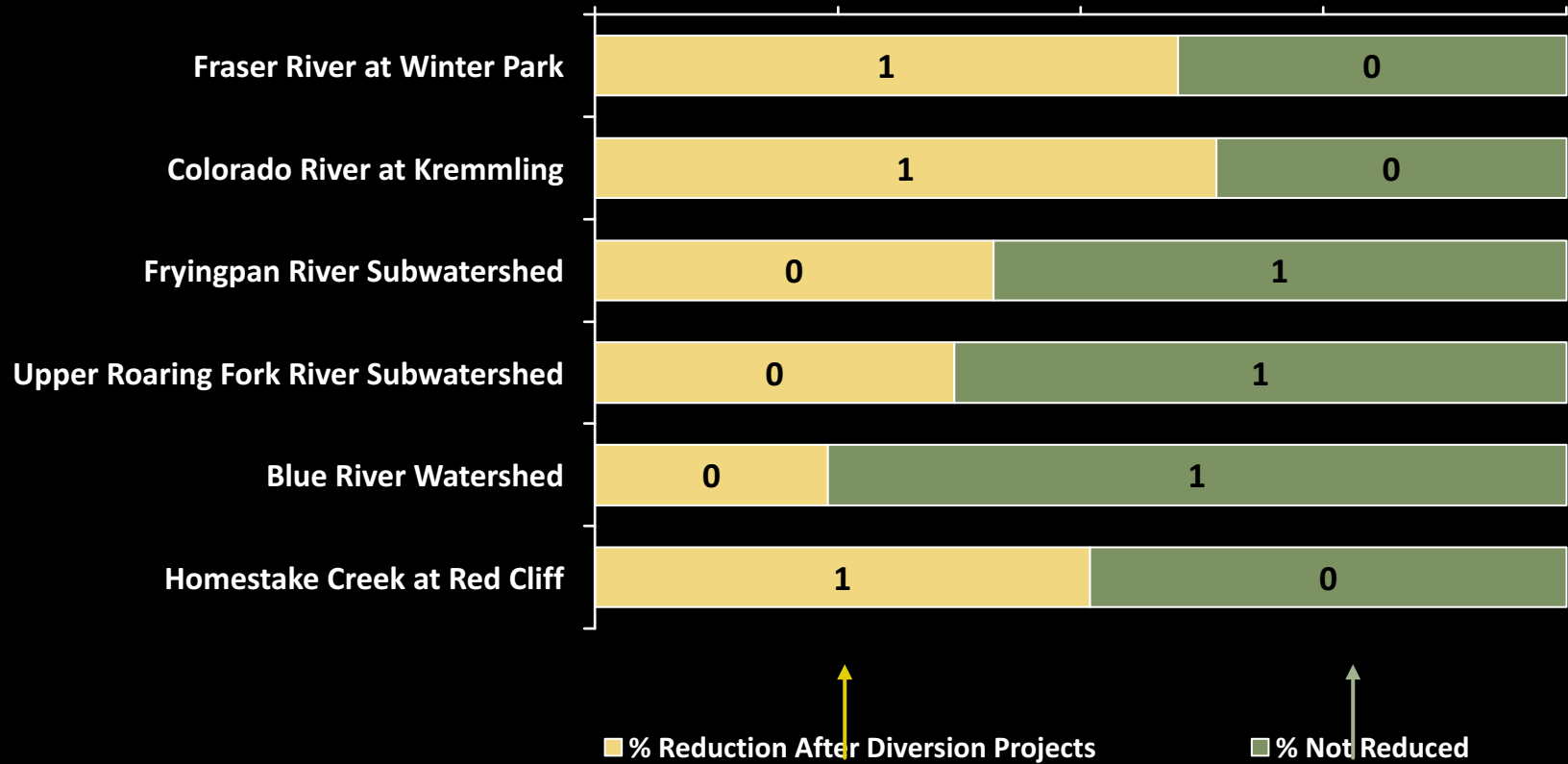


Estimated Average Annual Acre-Feet Diverted by East Slope Transmountain Diversion Projects in Headwaters Counties



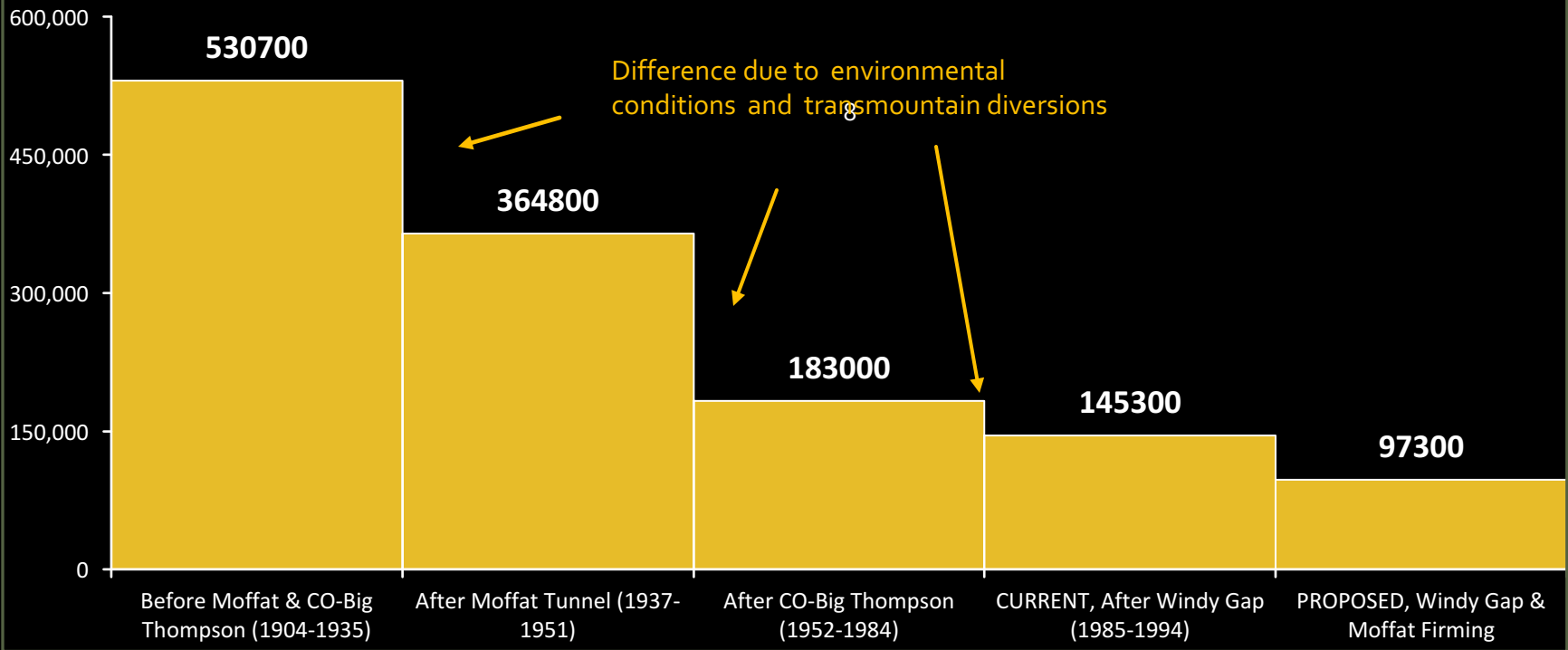
Source: Colorado Division of Water Resources, CDSS Data Base, 25 year historic average

% Streamflow Reductions Principally due to Transmountain Diversion Projects



Various Sources – See Report for details.

Colorado River at Hot Sulphur Springs (Grand County) Average Annual Streamflow - Measured in Acre-Feet



Source: Streamflow gage maintained by USGS between 1904 & 1994

ENVIRO. & ECON. IMPACTS FROM REDUCED FLOWS

TYPES OF ENVIRONMENTAL IMPACT

- Lower streamflows
- Reductions to flushing flows
- Increases in water temperature
- Degradation in water quality
- Degradation in water clarity
- Compromised riparian corridor
- Compromised aquatic environment
- Health and variety of fish

TYPES OF ECONOMIC CONSEQUENCES

- Less reliable streamflows for kayaking and rafting that impact summer tourism.
- Potential loss of “Gold Medal” fishing status and the related benefits of attracting anglers worldwide.
- Fishing for trout that are reliant on adequate streamflow, water quality and temperature.
- Potential loss of Wild and Scenic River status and related adverse effects of fewer visitors, kayakers and rafters.
- Water quality and water clarity degradation in Grand Lake that impacts visitors and property values.
- Reductions in irrigated land that adversely impact jobs and property values.
- Devaluation or loss of real estate development that relies on healthy riparian corridors for scenic beauty and fishing.
- Higher costs for water and sewer treatment facilities that are borne by local rate payers.

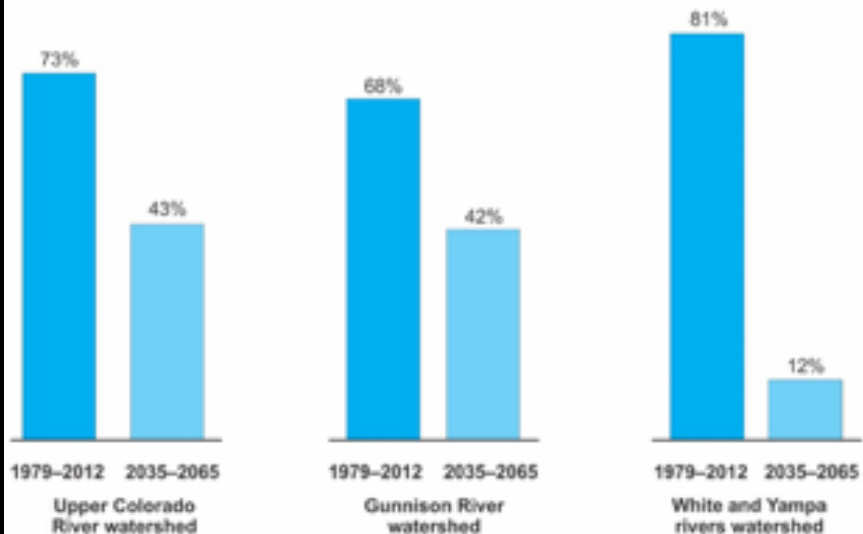
Climate change, more challenges

- This century has had seven of the state's ten hottest years on
- Little chance of enough precipitation to make up for projected temp. increases
- Less precip. as snow, more as rain.

CLIMATE CHANGE IN THE HEADWATERS WATER AND SNOW IMPACTS



Snowfall as Share of Winter Precipitation
Projections with high emissions

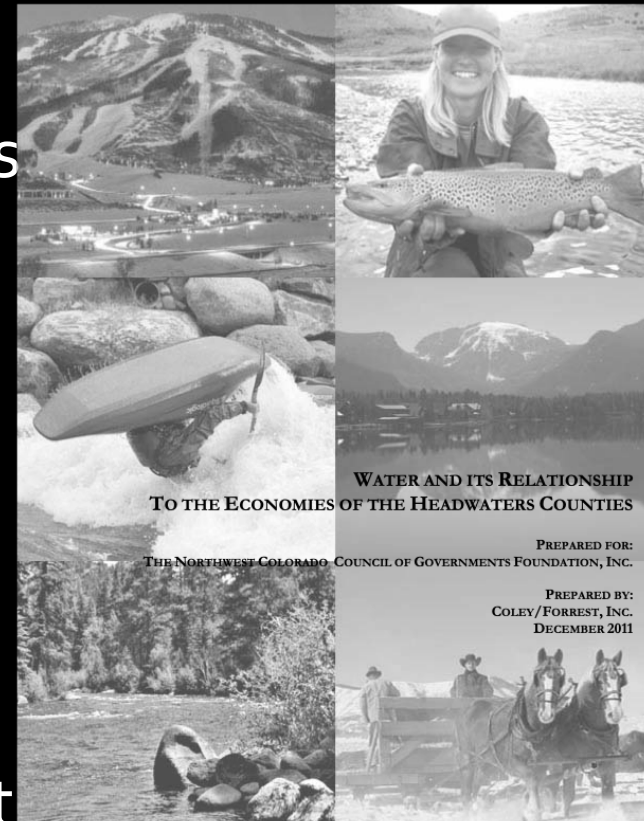


A report to the Northwest Colorado Council of Governments

QQ Study (2012): *Water and Its Relationship to the Economies of the Headwaters Counties*

WHY?

- Statewide focus on adverse economic consequences of purchasing agricultural water rights from properties on the Eastern Plains.
- *Inference:* Transmountain water diversion projects cause less adverse consequences
- *Inference:* “Streamlining” local government approvals is important



COUNTERBALANCING PERSPECTIVE

- There are adverse economic consequences to transmountain water diversions.
- Some management & mitigation solutions have not left headwaters counties “whole.”



*Outflow from the Homestake Tunnel into Turquoise Lake.
Photo by Torie Jarvis*

PRIMARY ECONOMIC SECTORS

- Tourism
- Agriculture
- Mineral Resources

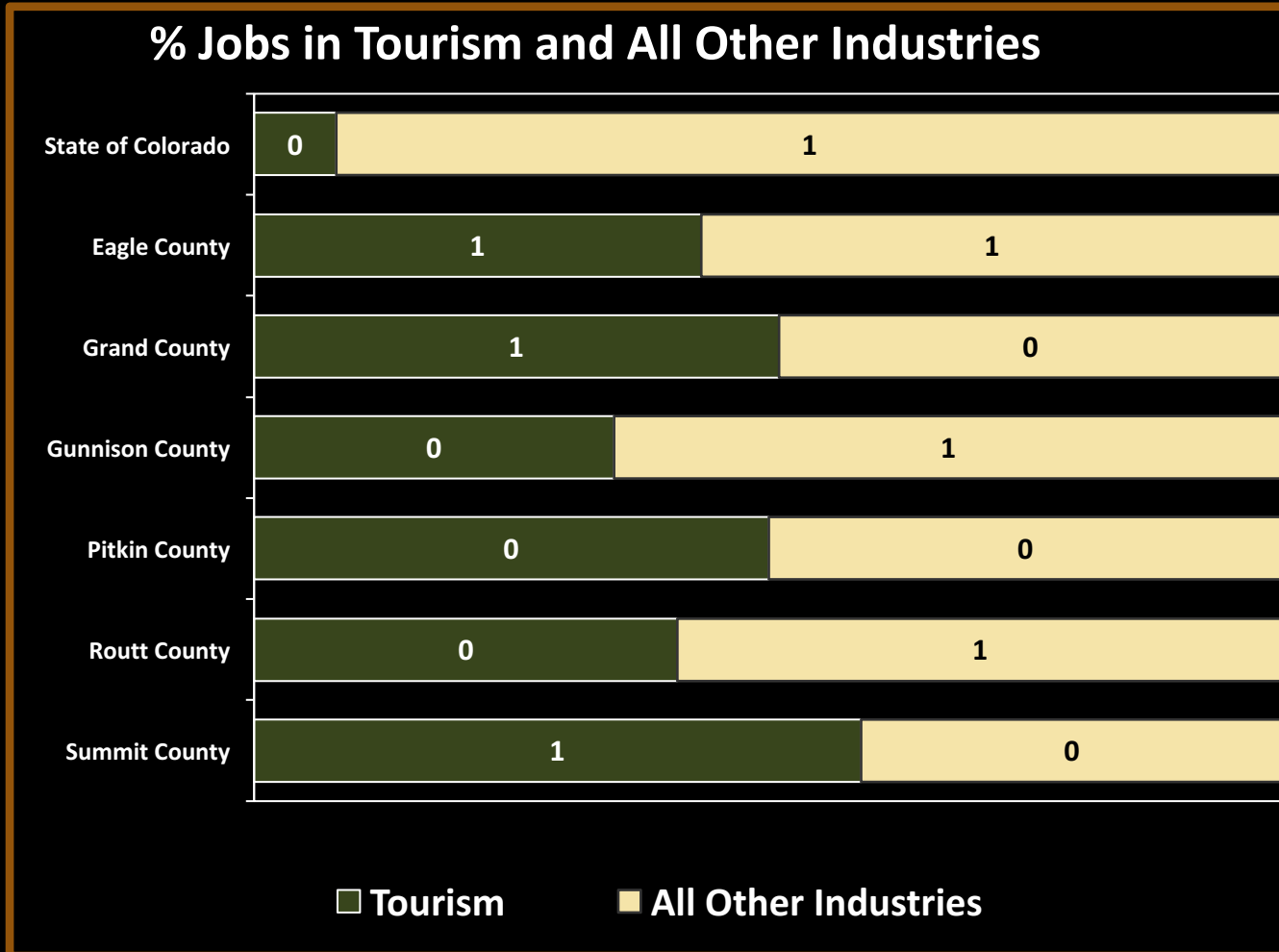


*Photos by
Torie Jarvis*



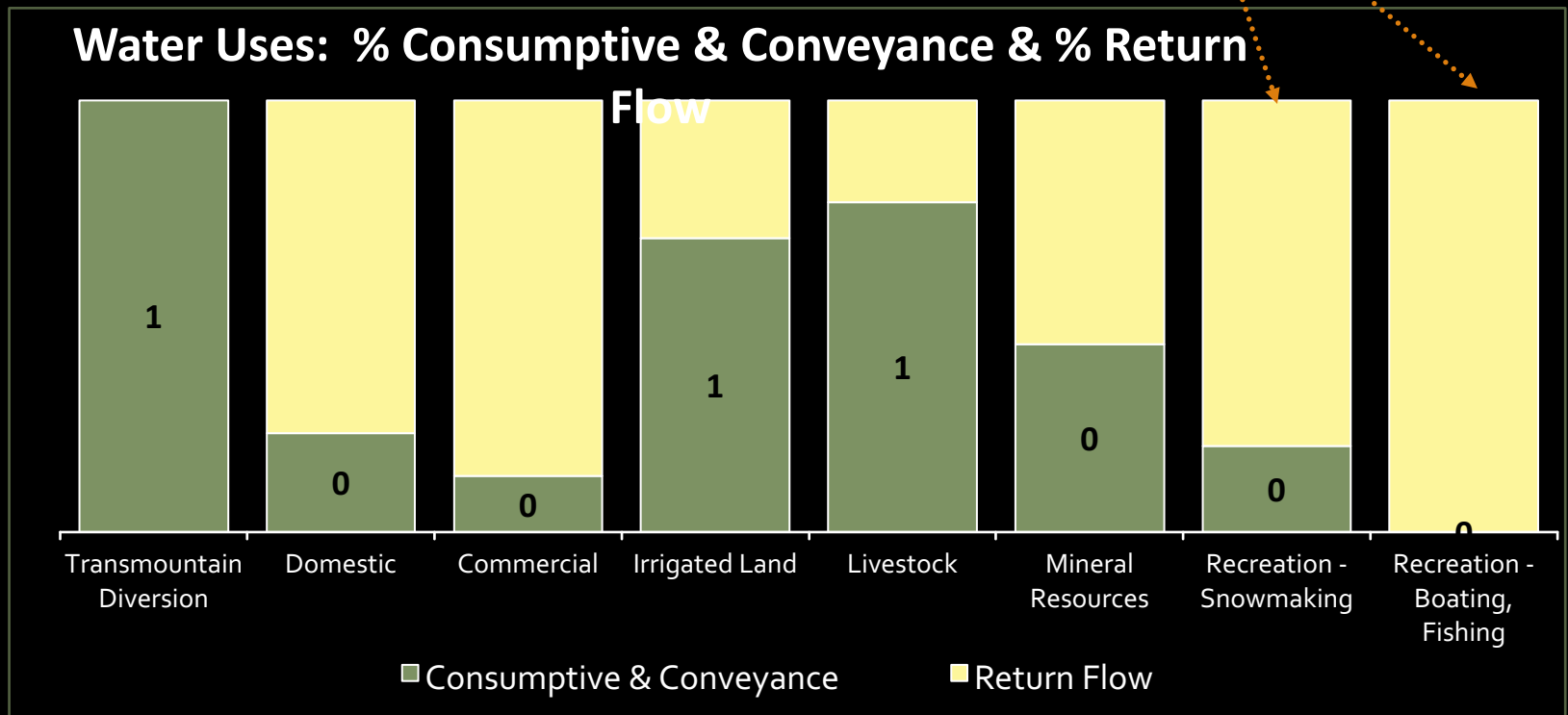
Photo by San Juan Citizens Alliance

TOURISM



Source: *Tourism Jobs in Colorado*, Center for Business and Economic Forecasting

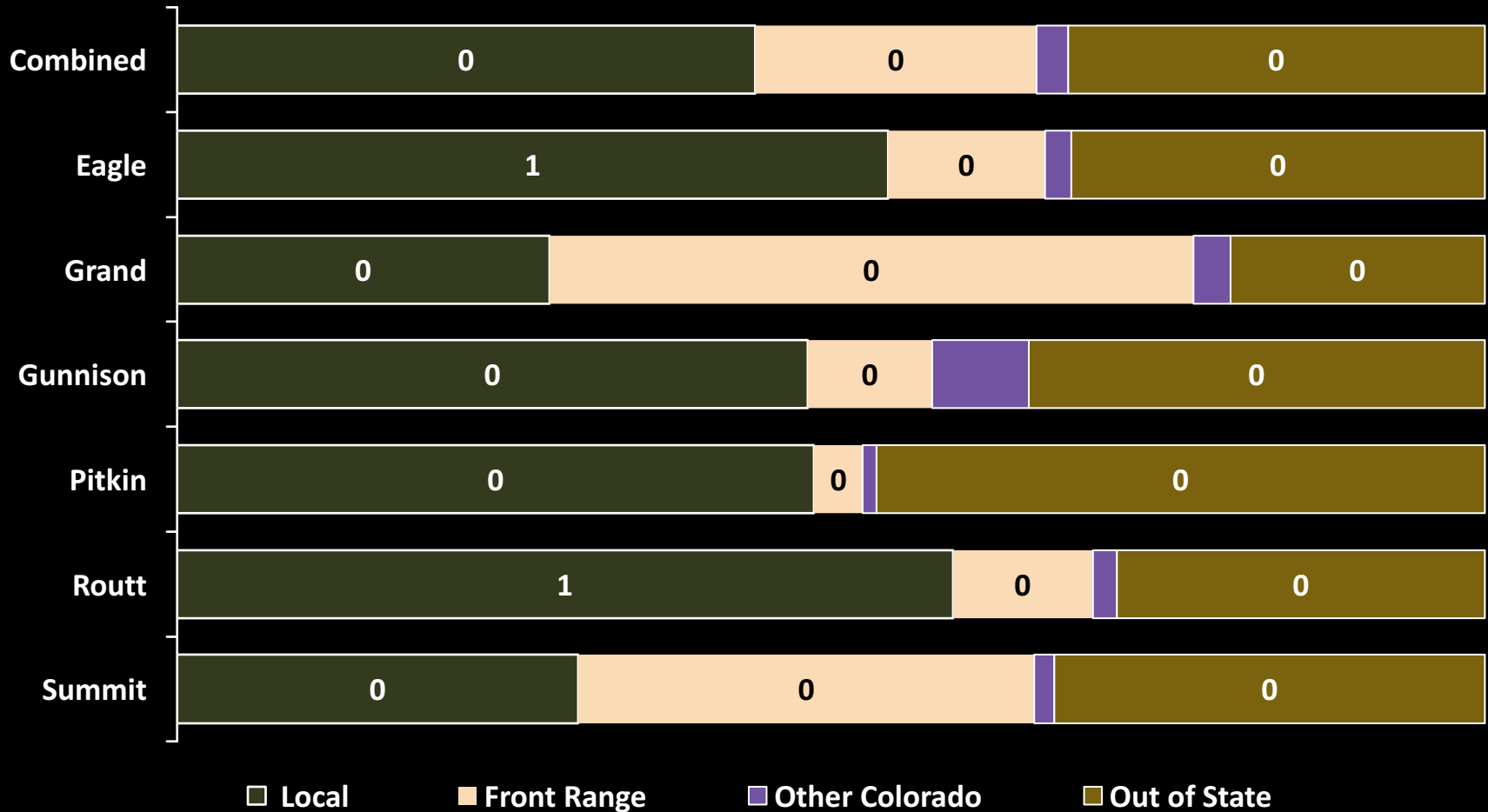
TOURISM - Minimal enviro. footprint



Sources: *Estimated Use of Water in the United States in 1995*, Circular 1200, USGS and Individual Ski Areas (Snowmaking)

TOURISM - Statewide Benefits

Primary Residence of Homes Owned - Headwaters Counties

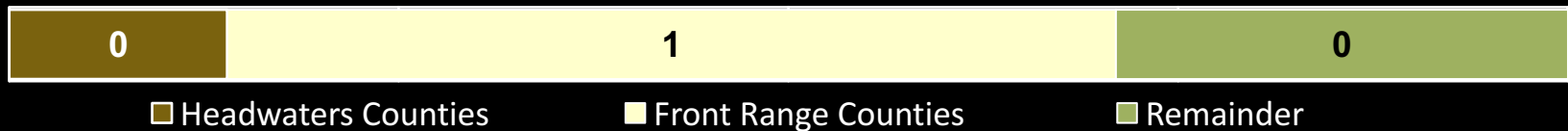


Source: Individual County Assessor Data Bases

TOURISM - Statewide Benefits

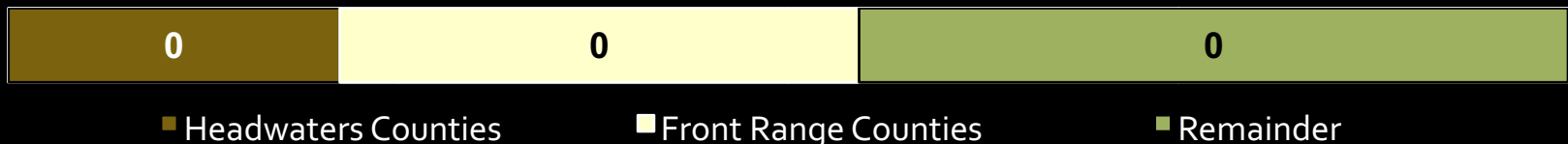
FISHING - Economic Impact (Statewide, \$1,259,390)

Percent spent in Headwaters Counties, Front Range Counties...



HUNTING - Economic Impact (Statewide, \$502,730,000)

Percent Spent in Headwaters Counties, Front Range Counties and...



WATER & TOURISM, whitewater parks

- Current Parks: Avon, Aspen, Breckenridge, Gunnison, Vail, Basalt, Steamboat, Grand County, Town of Eagle, Glenwood Springs, Silverthorne (in the works), Glenwood Canyon (in the works)
- Go Pro Mountain Games in Vail, e.g., \$7.2 million in 2017



Above photo by Pitkin
Healthy Rivers board;
left photo by Rick Lohre
via
www.mountaingames.com

WATER & TOURISM: snowmaking

Snowmaking — Lots of value - per - 💧

- Average Acre-Feet Used: 499 per ski area
- Average Acres of Manmade Snow: 459 per ski area
- % Consumptive: 18% to 24%
- Assures Nov./ Dec. skiing: jobs + out-of-state holiday trips



Snowmaking at Copper Mountain

WATER & TOURISM

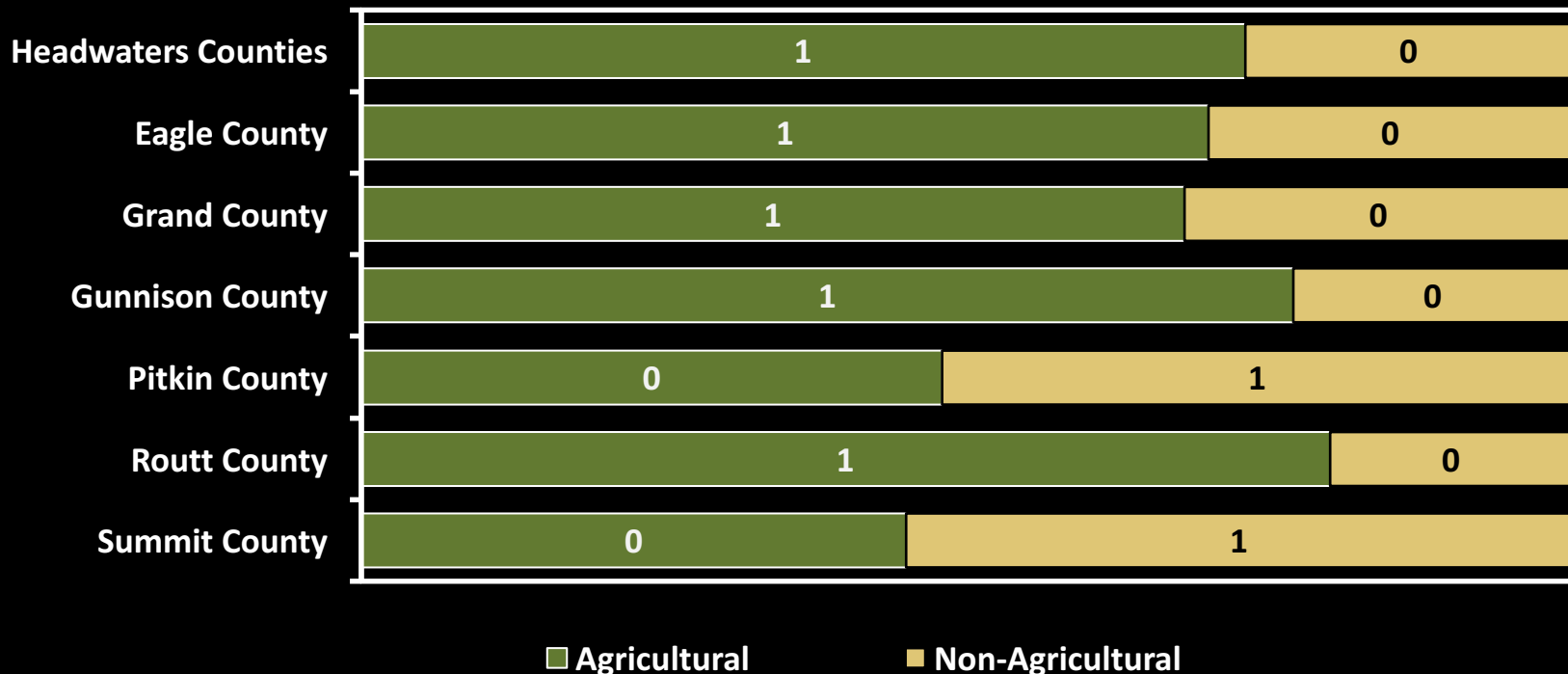
- “Gold Medal” Fishing
- Endangered river designations
- Reservoir & Lake clarity and volume
- Instream flows
- “Wild & Scenic” Rivers



Grand Lake – Photo by Creative Commons

AGRICULTURE

Private-Sector Land in Headwaters Counties: Percent in Agricultural and Non-Agricultural Land Use



Source: Individual County Assessor Data Bases

AGRICULTURE

Value Often Understated

Many attributes are intrinsic and qualitative.

- Part of historic culture
- Complementary relationship to tourism
- Landscape – intrinsic value to residents and visitors
- Return flows sustain late season streamflows for fisheries and recreation
- Cow / calf operations & Eastern Plains feed lots



■ Winter visitors value agriculture

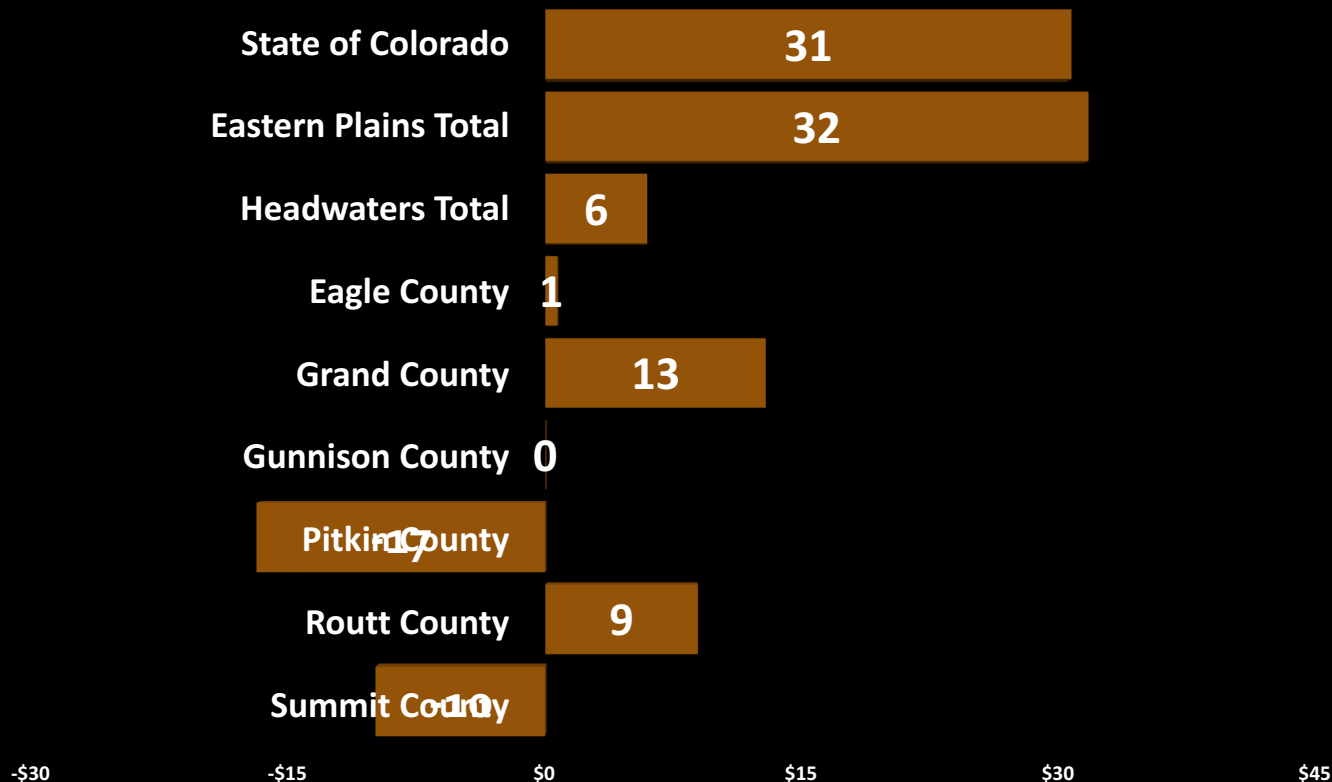
- 51% - farms/ranches are an important attribute
- 83% - valley views are an important attribute
- 72% - open vistas are an important attribute
- 54% - would reconsider visit if 25% of ranch land were converted

Source: CSU Survey – Visitors to Gunnison County, March 2003



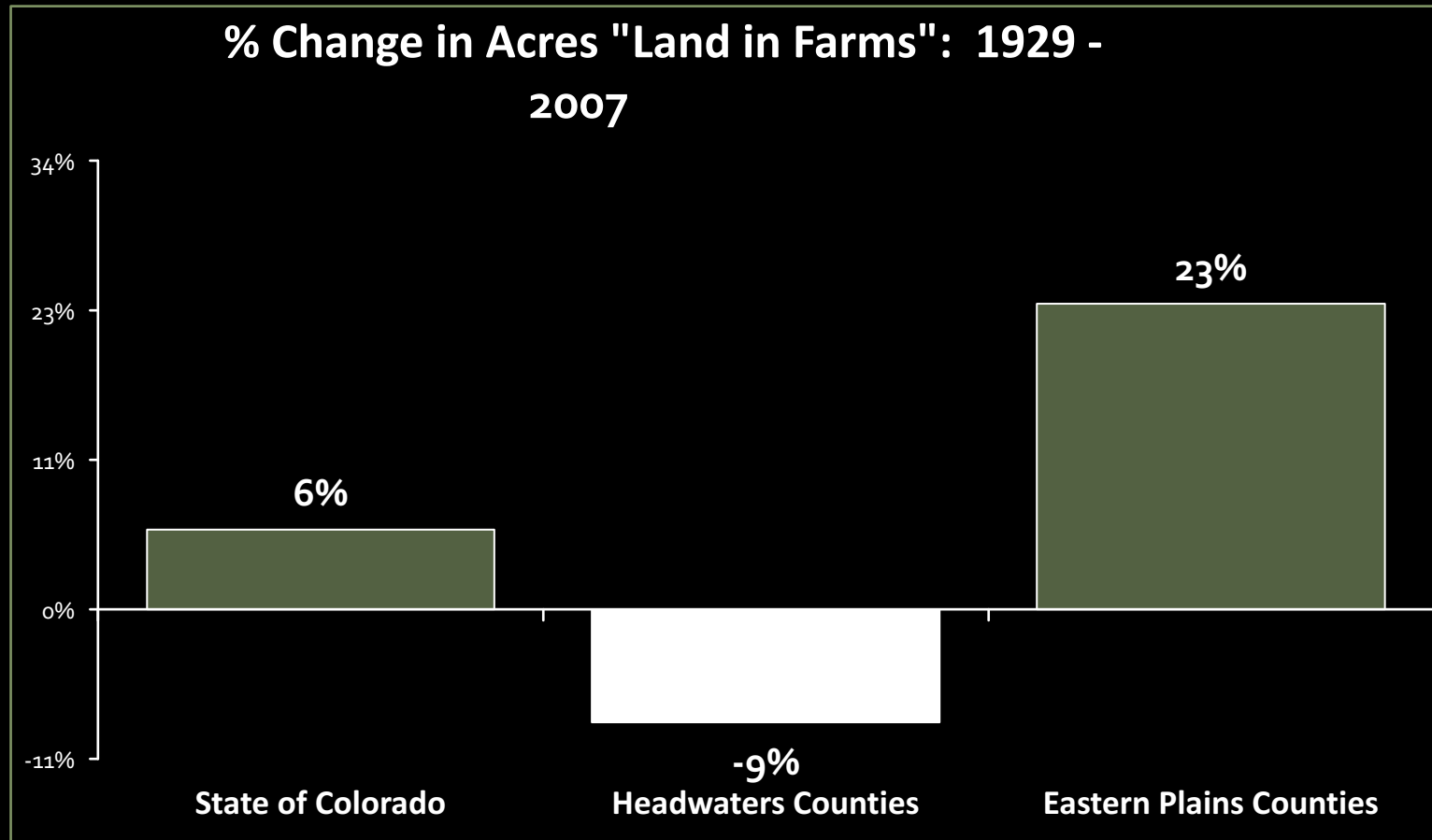
AGRICULTURE, at risk

2007 Net Cash Farm and Ranch Income Per Acre



Source: 2007 US Census of Agriculture, US Department of Agriculture

WATER & AGRICULTURE



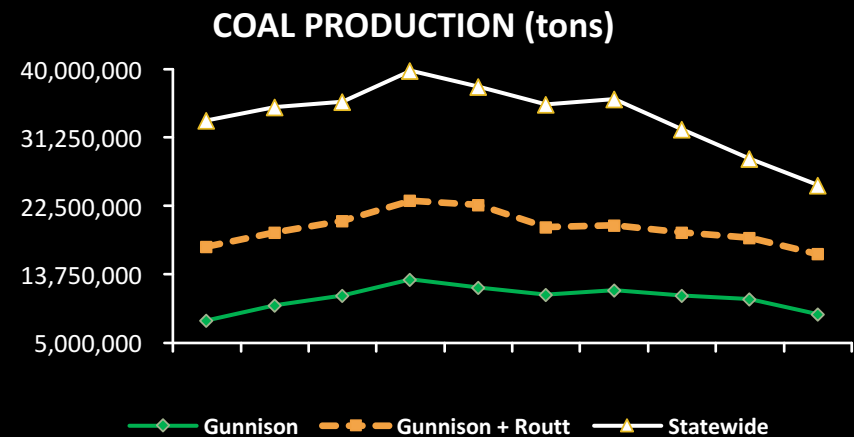
Sources: US Census of Agriculture (various years), US Department of Agriculture

WATER & AGRICULTURE

- Colorado River Compact Calls → junior ag. water rights
- Transmountain Diversion → low flows / irrigation ditch failures
- Low streamflows in high plateaus → reduce to 1 crop per year
- Irrigation practices & rural residential
- BENEFITS to recreation and tourism → increased flows in headwaters to meet downstream ag. water rights

MINERAL RESOURCE DEVELOPMENT

- Coal (Gunnison & Routt)
- Oil & Gas (Gunnison & Routt)
- Molybdenum (Summit & Grand)
- Rare Earth Minerals (Gunnison)



- Low # of jobs
- High salaries – double countywide figures
- High assessed valuation

WATER & Natural Gas Development

- Water demands from future energy development (oil shale, natural gas, coal and uranium mining) may require between zero and 120,000 acre-feet annually.
- Local governments now have much more say in how energy development will occur locally (SB 19-181).
- Natural Gas – Extraction via Fracking
 - Renewed interest in leases on BLM land in Gunnison, Pitkin and Routt Counties
 - Water pumped down w/ proprietary mix of chemicals
 - Indigenous water table
 - Water quality concerns
 - Leases in remote areas



WATER & Water & San Districts

- Water temperature increases and lower streamflows triggered by diversion projects make it more difficult to achieve State water quality discharge minimums.
- State imposes its standards and penalties on dischargers (local districts) not diverters.
- Created concerns in Eagle, Grand, Pitkin and Summit.



Tools for increased streamflows

- **Instream flow program**
 - *Appropriation, acquisition, loan*
- **Recreational in-channel diversions (RICDs)**
 - *Think: whitewater parks.*
- **"Creative contracting"**
 - *Eg. 5280 AF "fish water" for endangered species in the lower Colorado.*
- **Negotiated agreements like CRCA, WGFP 1041, Shoshone Outage Protocol**
- **Voluntary community-based reductions under conservation plans.**
 - *E.g. ERWSD program. Made possible through SB 19.*
- **Others?**

CREATIVE & COOPERATIVE SOLUTIONS

WEST-SLOPE EAST-SLOPE PROBLEM-SOLVING SUCCESSES – ILLUSTRATIVE PROJECTS AND DATES

- Learning-by-Doing
- Colorado River Cooperative Agreement (2011)
- Blue Mesa Plan (2010)
- Wild & Scenic River Determination – Stake'holder Groups (2008)
- Denver Water – Eagle County Settlement Agreement (2007)
- Winter Park Master Plan – Zoning Density Constraint (2006)
- Roaring Fork Watershed Collaborative (2002)
- Blue River Restoration Project (2001+)
- GMUG Pathfinder Project (2000)
- Grand Valley / Gunnison Selenium Task Force (1998)
- Local Voter-Authorized Tax Rate Increases (1995 +)
- Water Conservation (1993)
- Wolford Mountain Reservoir Agreement (1992)
- Clinton Reservoir-Fraser River Agreement (1992)
- Eagle River Memorandum of Understanding (1988)
- Upper CO. Endangered Fish Recovery Program (1988)
- Summit County / Denver Water Agreement (1985)
- QQ Committee of the NWCCOG (1978)

KEY MESSAGES

We are all linked.

Water in its natural stream course is essential to economies of headwaters counties. Headwaters counties' water needs are primarily nonconsumptive.

West Slope is already compromised from historic diversions, and climate change will worsen conditions.

Creative solutions are needed. We need to utilize all the tools to protect or increase streamflows.