



Colorado's Water  
Supply Future

COLORADO



DEPARTMENT OF  
NATURAL  
RESOURCES

# Southwest Basin Roundtable Nonconsumptive Needs Assessment

*February 2009*

*Presented by Jacob Bornstein, CWCB*



# Outline

- Overall Context: Why are we here?
- CWCB Efforts
- Overview of Water for the 21<sup>st</sup> Century Act
- Discuss Southwest Environmental and Recreational Attributes
- Next steps



# Why are we here?

1. PLAN Upfront
2. Cultural, Ethical, and Aesthetic Values
3. **Economics**
4. Avoiding Endangered Species Act “train wrecks”
5. Avoiding long National Environmental Policy Act (NEPA) and litigation processes
6. Providing Data for Wild & Scenic Alternatives
7. **For the benefit of our water quality and supplies**



# Local Economics

Out of the ten counties with the highest proportion of **fishing & hunting** jobs, four are in the SW region of Colorado:

- San Juan: 6.3%
- Mineral: 5.4%
- Hinsdale: 4.7%
- Archuleta: 4.4%
- Others include Jackson (17.3%), Rio Blanco (8.3%), Grand (5.4%), Gunnison (4.7%), Moffat (4.4%), and Chaffee (3.9%)

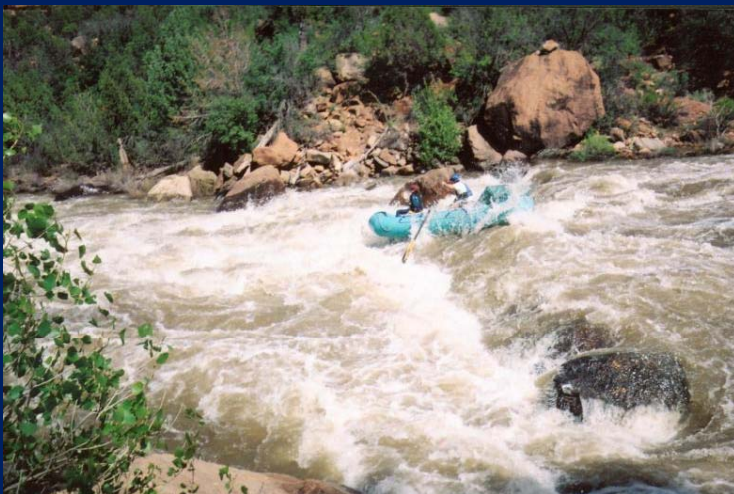


# The Economics of Recreation Statewide

- White Water Rafting:
  - Economic Activity estimated at \$135 million per year
  - Supports 2,600 jobs
- Fishing
  - Direct expenditures estimated at \$458 million per year
  - Supports 11,000 jobs

*Sources: SWSI II, Loomis 2008*

*Source: Pickton and Sikorowski 2004*





# Other “Watershed” Values

- Water Quality Benefits
  - Effluent Dilution
  - Nutrient Cycling
  - Erosion Reduction
- Water Supply Benefits
  - Holding Snowpack in Place to Slow Spring Melt
  - Shading Snowpack to Reduce Evaporation
  - Maintaining Adequate Tributary Groundwater Levels
- Flood Protection
- Draw for Relocation and Quality of Life

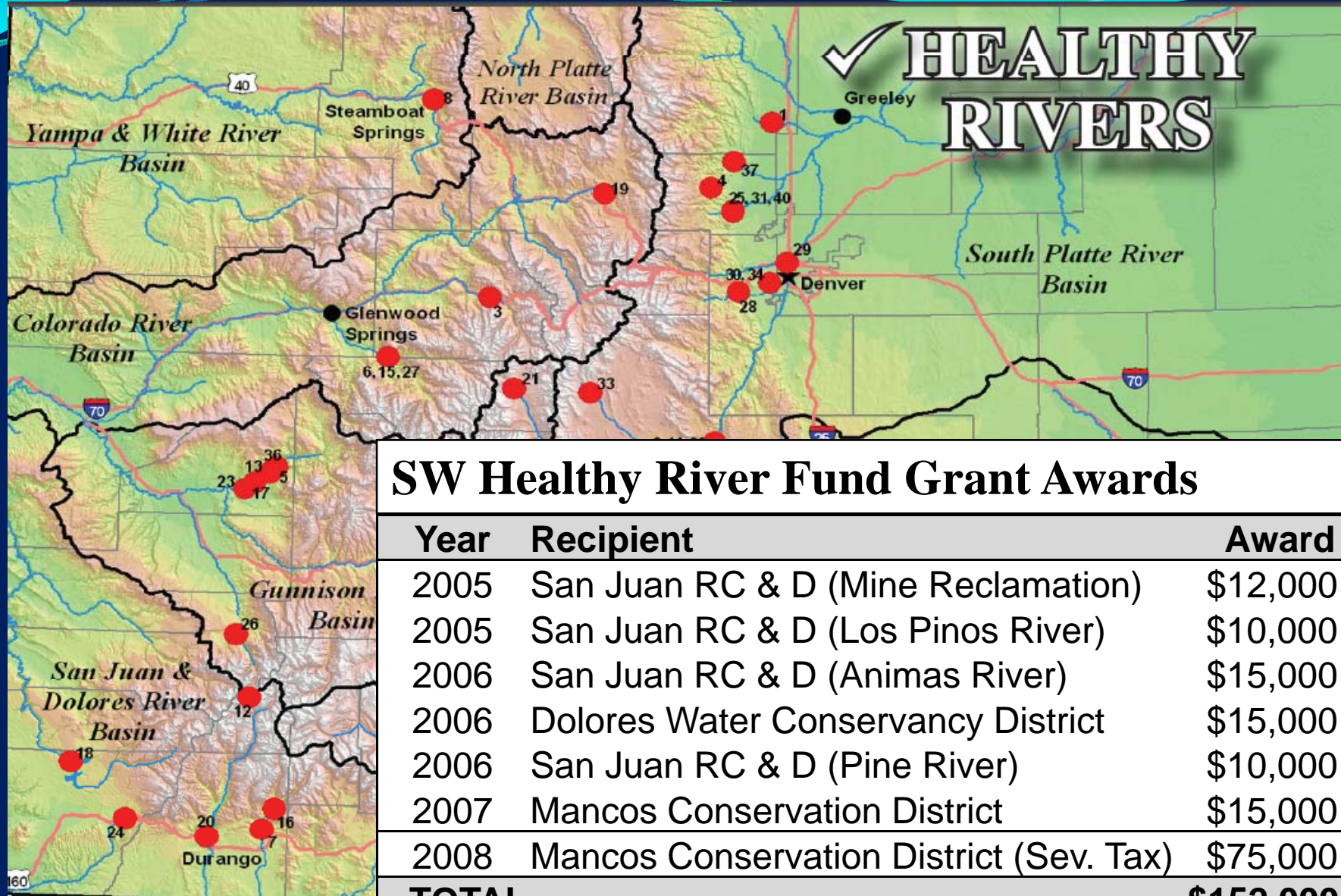






## ***CWCB Environmental & Recreational Efforts***

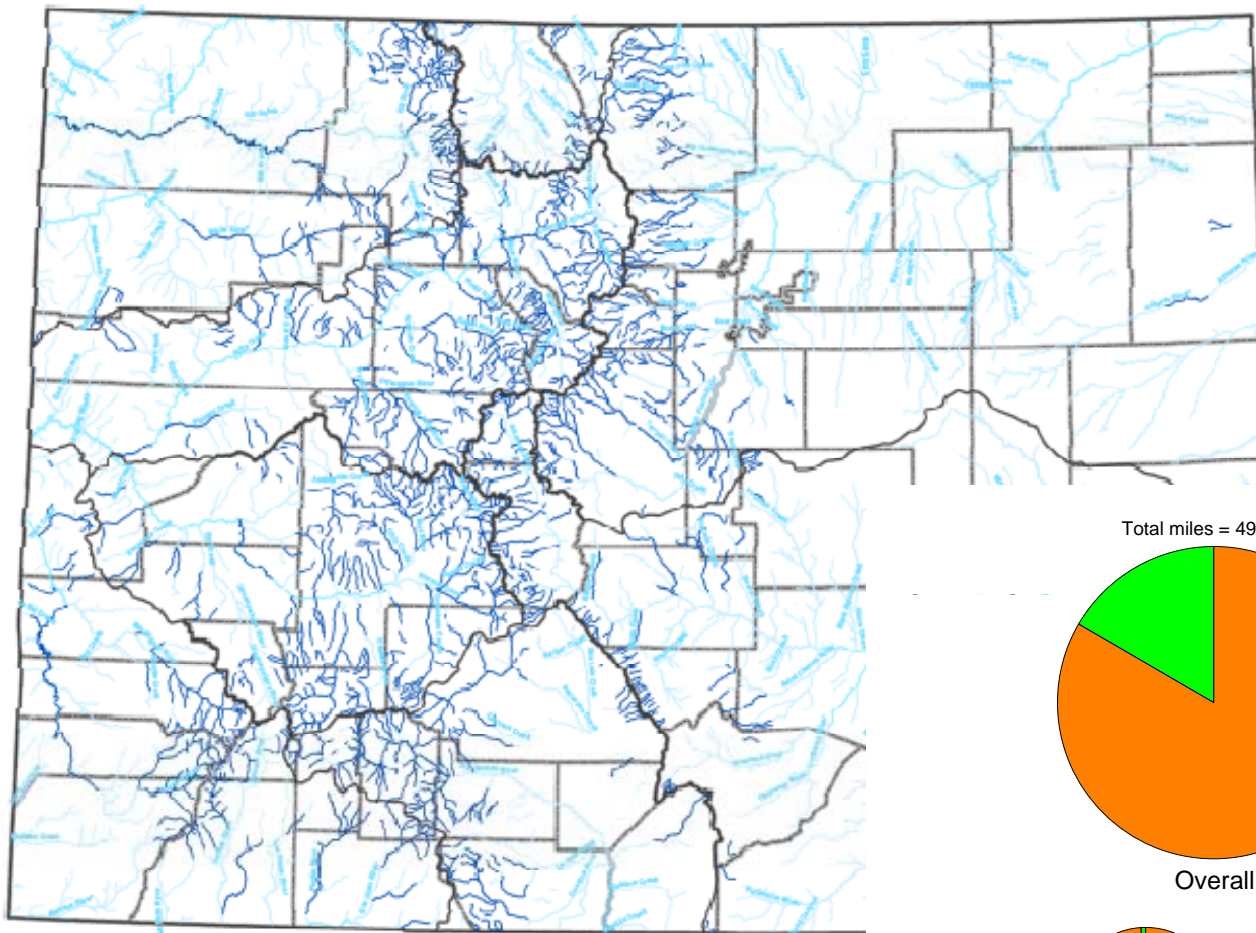
- Watershed Restoration Program (e.g. Healthy Rivers Fund, Watershed Restoration Grant, Fish & Wildlife Resources Fund)
- Stream & Lake Protection (e.g. Instream Flow Program)
- Wild & Scenic Alternatives
- Statewide Water Supply Initiative, Phase II
- **Water for the 21<sup>st</sup> Century Act** (a.k.a. Interbasin Compact Committee, Basin Roundtables, HB-1177)
  - Requires consumptive and nonconsumptive (env. & rec.) needs assessments
  - Funds Water Supply Reserve Account Grants



## SW Healthy River Fund Grant Awards

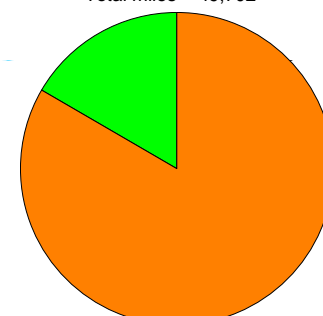
| Year         | Recipient                               | Award            |
|--------------|---|------------------|
| 2005         | San Juan RC & D (Mine Reclamation)      | \$12,000         |
| 2005         | San Juan RC & D (Los Pinos River)       | \$10,000         |
| 2006         | San Juan RC & D (Animas River)          | \$15,000         |
| 2006         | Dolores Water Conservancy District      | \$15,000         |
| 2006         | San Juan RC & D (Pine River)            | \$10,000         |
| 2007         | Mancos Conservation District            | \$15,000         |
| 2008         | Mancos Conservation District (Sev. Tax) | \$75,000         |
| <b>TOTAL</b> |   | <b>\$152,000</b> |





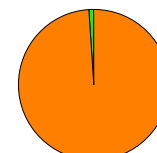
Colorado River Basins

Total miles = 49,702

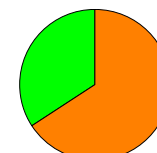


Overall

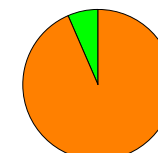
ISF water right  
No ISF water right



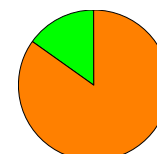
Plains



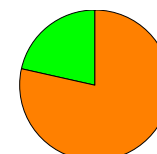
Mountains



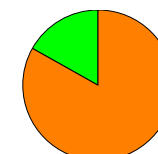
Western Valleys



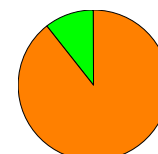
Small  
Streams



Large  
Streams

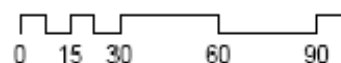


Small-Medium  
Rivers



Large  
Rivers

Data provided by the following sources:



# Instream Flow Program



# SWSI II: Environment & Recreation

## DELIVERABLES:



- Additional GIS mapping of basin resources/attributes
- Examples of successful environmental and recreational projects water management strategies
- Identified potential funding sources
- Identified federal, state, and local regulatory and nonregulatory tools
- Identified potential future environmental and recreational projects



# Identified SWSI II Projects in SW

|   |  |  |  |   |
|---|--|--|--|---|
| San Juan /<br>Dolores / San<br>Miguel (Dolores<br>River)  | Dolores River Below<br>McPhee Reservoir                                    | Combination of improved flow management and<br>channel reconstruction/ rehabilitation to enhance<br>downstream fishery; ancillary benefits to downstream<br>native roundtail chub populations. Increase available<br>Fish Pool water contemplated by Dolores Project<br>Definite Plan Completion Report. | HI   | Ongoing discussions b/ BOR,<br>DWCD, Division of Water<br>Resources (DWR) re:<br>administration, opportunities,<br>constraints w/ re-operation of<br>fish pool. Ongoing efforts to<br>enhance fish pool (AF storage in<br>McPhee) (Tier I). |
| San Juan /<br>Dolores / San<br>Miguel (La Plata<br>River) | La Plata River –<br>Long Hollow<br>Mitigation Flows                        | Ensure winter and late-season base flows in Long<br>Hollow/ La Plata River to support native fish (roundtail<br>chub).   | HI   | Discussions w/ project<br>proponents, CWCB re: ISF<br>needs for native fish (Tier II).  |
| San Juan /<br>Dolores / San<br>Miguel (Fall<br>Creek)     | Woods Lake<br>Cutthroat Refugio  | Isolate Woods Lake and Fall River above the lake as a<br>Colorado River Cutthroat Trout refugia.   | MED-HI                                     | Engineering design in place to<br>address spillway/ outlet<br>isolation; design underway for<br>instream improvements above<br>Woods Lake to ensure isolation<br>(Tier I).  |
| Dolores / San<br>Miguel River Basin                       | Aquatic Wildlife<br>Management Plan  | Provide management guidance and strategies in order<br>to conserve and protect aquatic resources in the basin.<br>Collaborative iterative (5-yr) process w/ various intra-<br>basin task force partners.   | HI   | Early phase of plan<br>development; expected<br>completion and approval in<br>2006.   |
| San Juan River<br>Basin                                   | Aquatic Wildlife<br>Management Plan  | Provide management guidance and strategies in order<br>to conserve and protect aquatic resources in the basin.<br>Collaborative iterative (5-yr) process w/ various intra-<br>basin task force partners.   | HI   | Plan in Draft – expected<br>completion and approval in 2004<br>(Tier I).  |
| <b>Animas River<br/>Animas River</b>                      | <b>Kansas City Mine Remediation<br/>Pride of the West Mine Remediation</b> |  | <b>Watershed Group<br/>Watershed Group</b> |   |

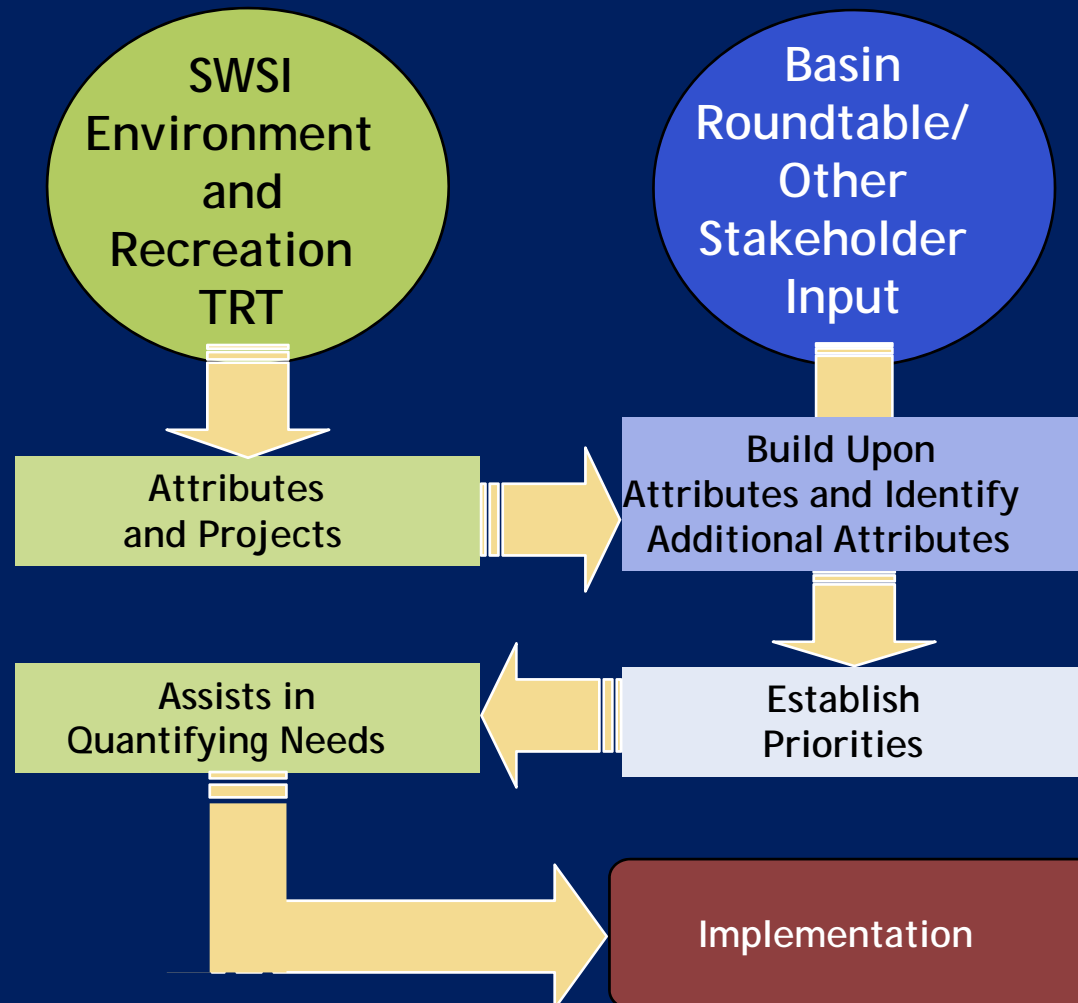


# SWSI II Attributes

- **CWCB Instream Flow Rights**
- CWCB Natural Lake Levels
- CWCB water rights where water availability had a role in appropriation
- **Audubon important bird areas**
- CDPHE WQCD 303(d) listed segments
- **Rare Riparian Wetland Vascular Plants**
- **Significant Riparian/Wetland Communities**
- Boreal Toad Critical Habitat
- Arkansas Darter
- Greenback Cutthroat Trout
- Colorado Pikeminnow
- Bonytail Chub
- **Flannemouth Sucker**
- **Colorado River Cutthroat Trout**
- Razorback Sucker
- Humpback Chub
- Greenback Cutthroat Trout
- **Bluehead Sucker**
- Rio Grande Cutthroat Trout
- Rio Grande Sucker
- **Roundtail Chub**
- **Gold Medal Trout Streams**
- **Gold Medal Trout Lakes**
- **Recreational In-Channel Diversions**
- **Rafting and Kayak reaches**



# SWSI II Recommendation







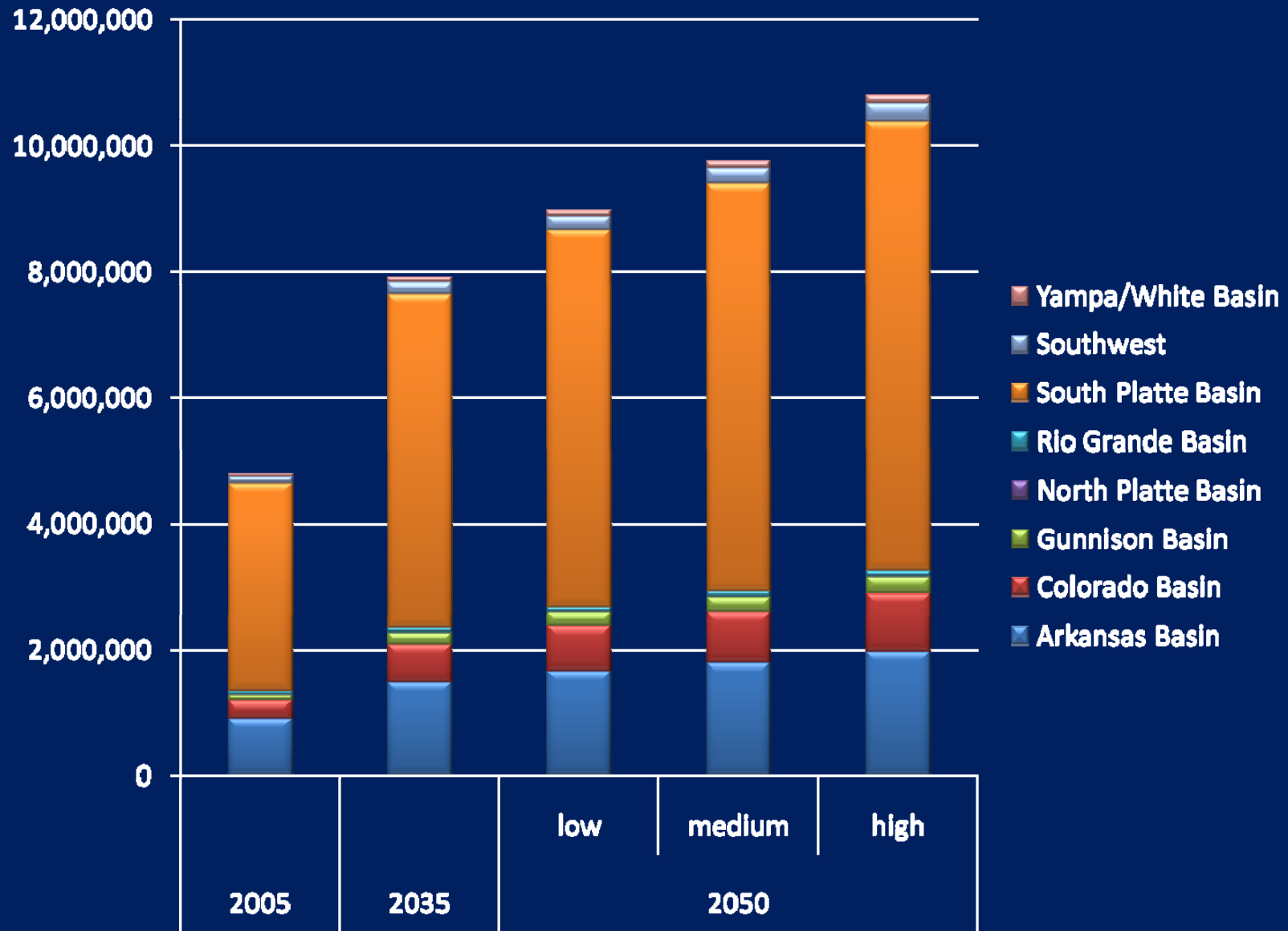
# ***Water for the 21<sup>st</sup> Century Act***



- Consumptive Needs
- Nonconsumptive Needs
- Water Supply Availability
- Projects and Methods to Meet Needs

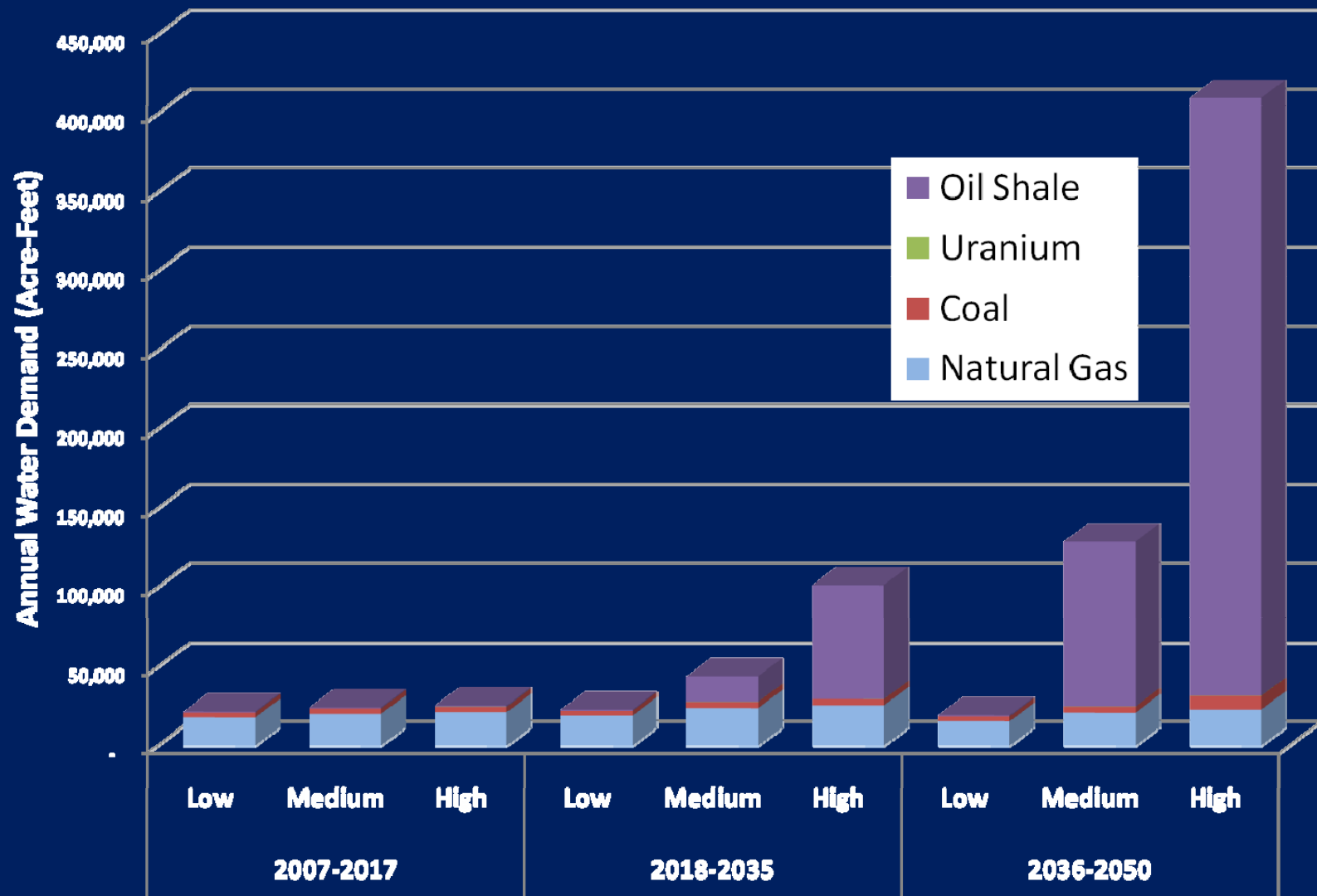


# Population Projections



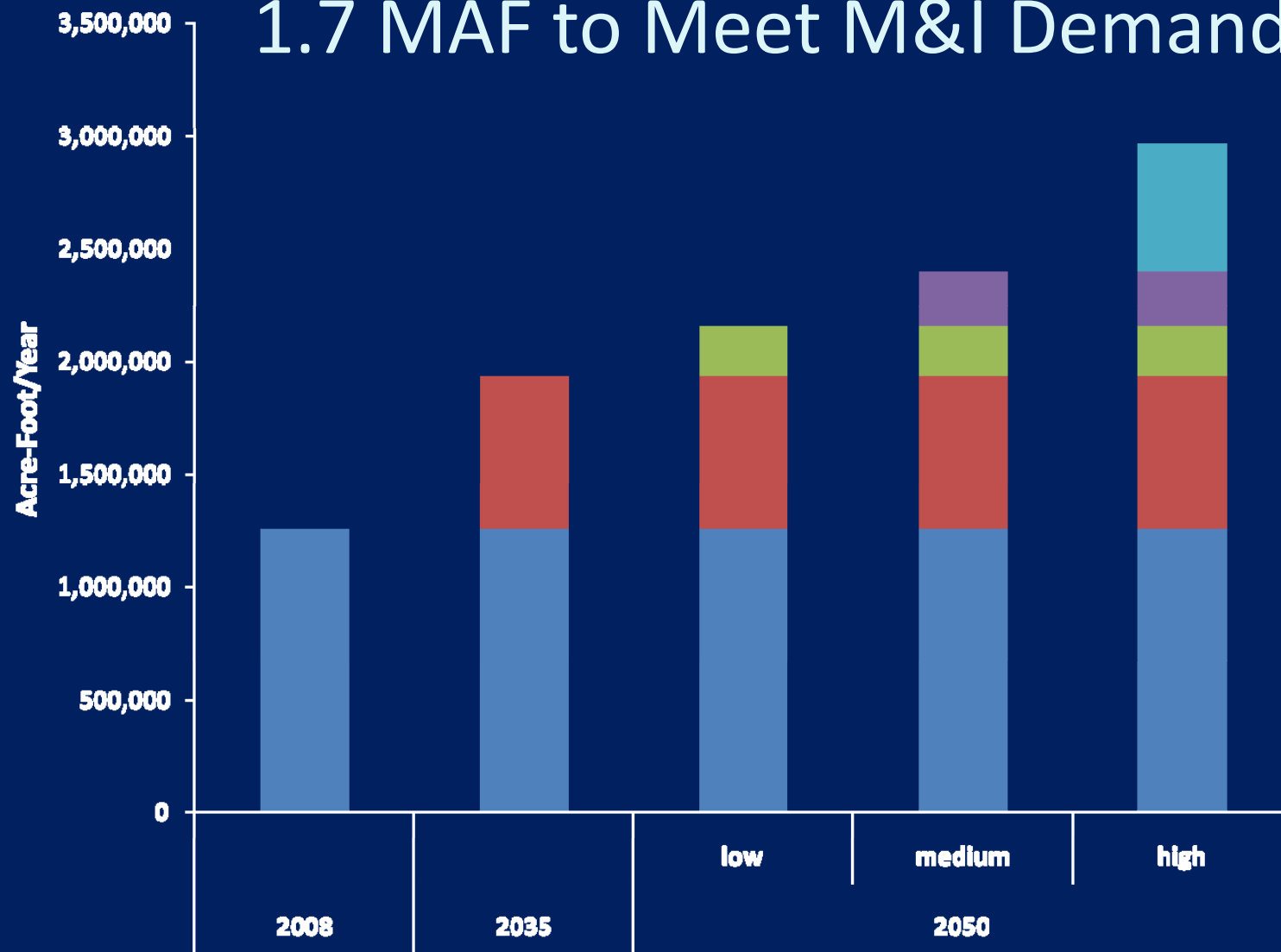


# Colorado and Yampa/White Energy Demands





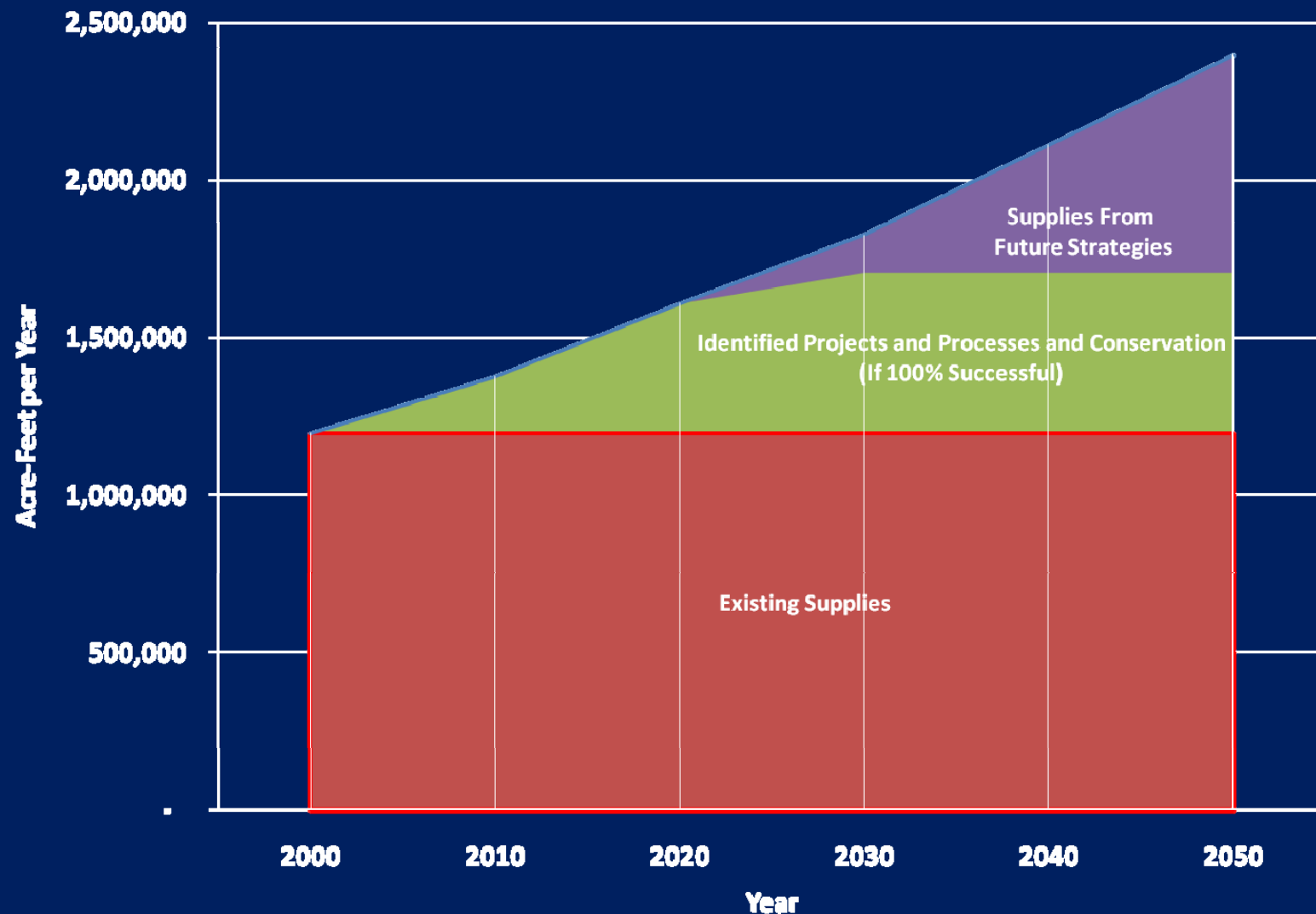
# By 2050, Colorado will need up to 1.7 MAF to Meet M&I Demands\*



\*This does not take into account demand reductions from conservation for future demands



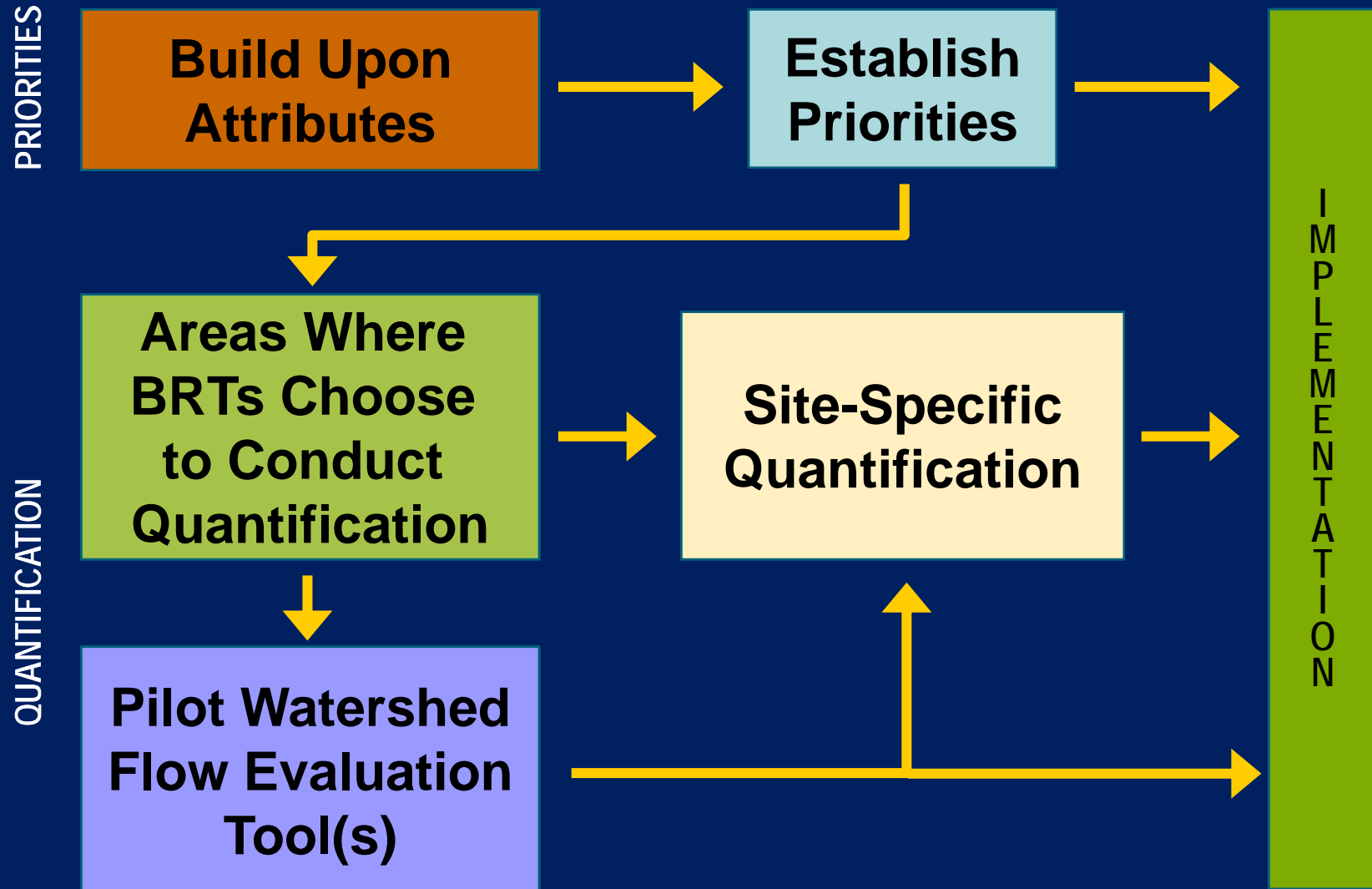
# State of Colorado Projected Water Demands, Supplies, and Gaps







# Nonconsumptive Needs Assessment Methodology





# Statewide Products

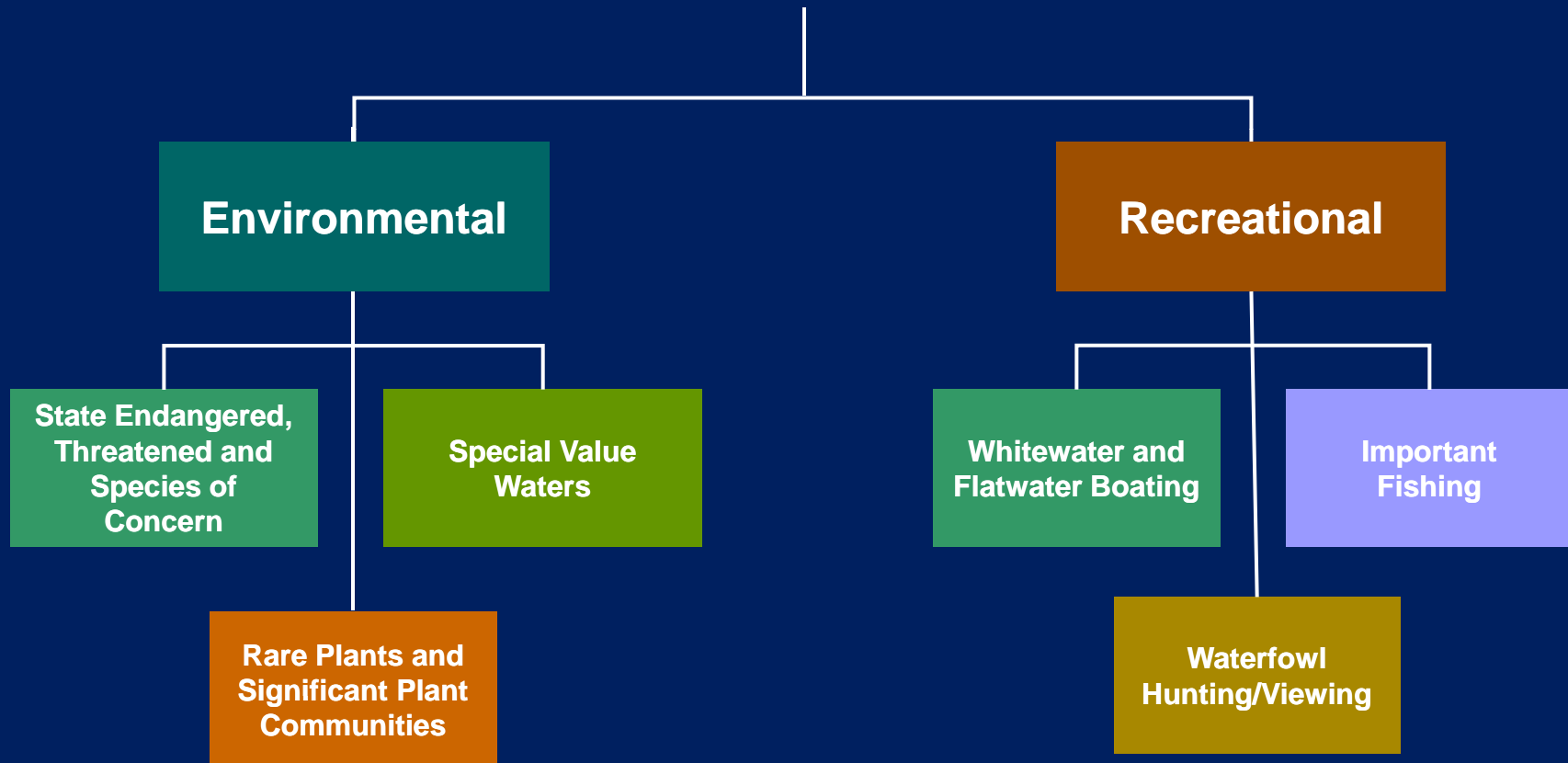
- GIS coverages representing Colorado's important environmental and recreational attributes
- Map of Basin Roundtable prioritized areas and reaches
- Results of flow evaluation tools and site-specific instream flow pilot studies
- Identification of flow and non-flow related resource management options



***Discuss Southwest  
Environmental and  
Recreational Attributes***



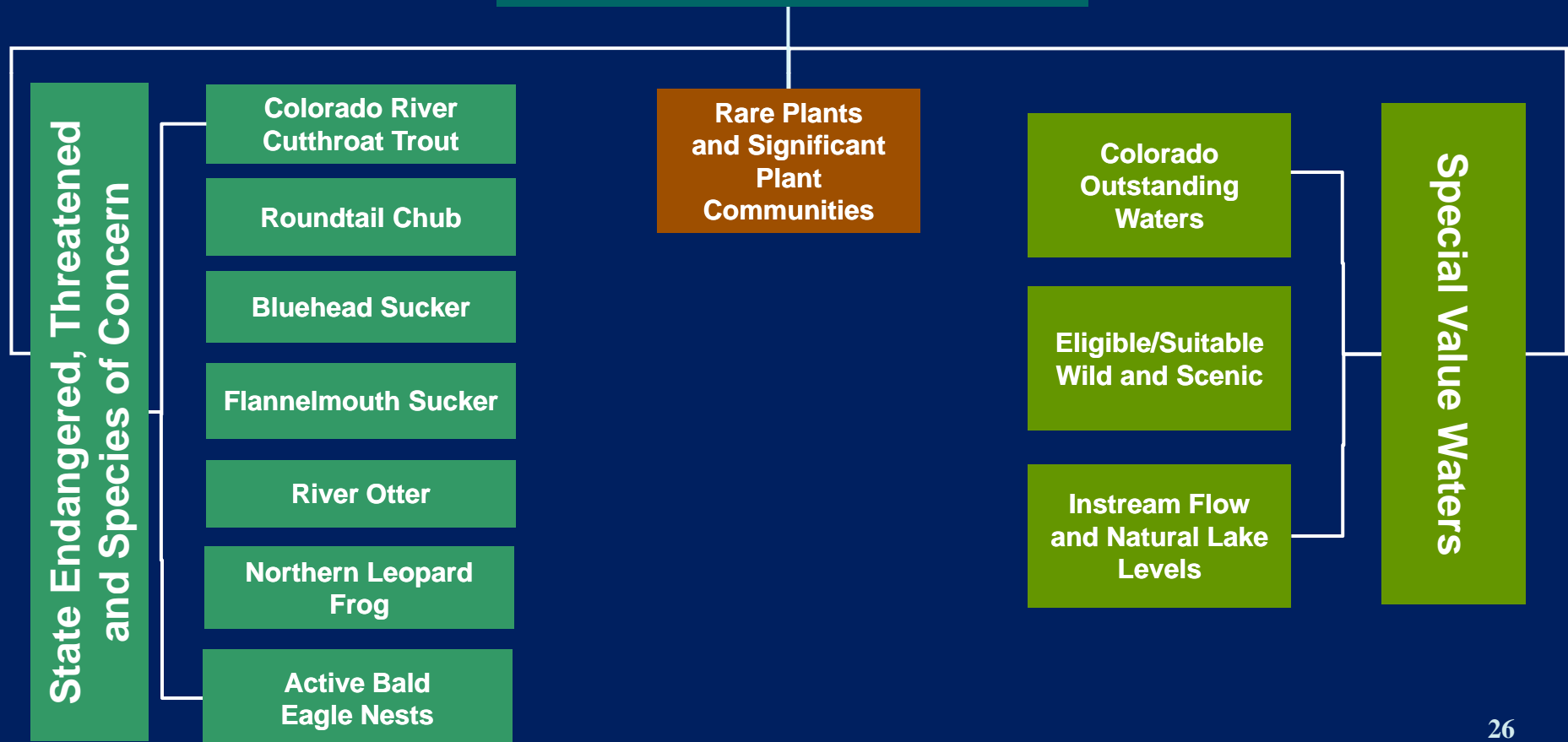
# Southwest Basin Attribute Categorization





# Southwest Basin Environmental Attribute Categorization

## Environmental Attributes







# Colorado Cutthroat Trout

- Historically occupied portions of the Colorado River drainage in Wyoming, Colorado, Utah, Arizona, & New Mexico.
- Widespread introductions of non-native salmonids over the last century limit current distributions to isolated headwater streams and lakes.
- Designated as a species of special concern in Colorado
- CO, UT, & WY developed the Conservation Agreement for Colorado River Cutthroat for long-term conservation.





# 3-Species

- Joint management plan between WY, CO, UT, NM, AZ, NV
- Species are generally of special concern.





# River Otter

- Otters probably occurred in major streams statewide in Colorado, although they apparently have never been abundant.
- With settlement, subsequent water pollution and control of streamflows, otters disappeared from the state by the early part of this century.
- In the 1970s, however, the Colorado Division of Wildlife began to restore populations to several drainages in the state, including the Upper Colorado, the Dolores & the upper South Platte rivers.
- Otters eat animals like crayfish, frogs, fish, young muskrats and beavers.
- The river otter's status in Colorado was recently changed from endangered to threatened.
- A self sustaining population exists on the Piedra.





# Bald Eagle

- Threatened species
- Riparian dependent







# Northern Leopard Frog

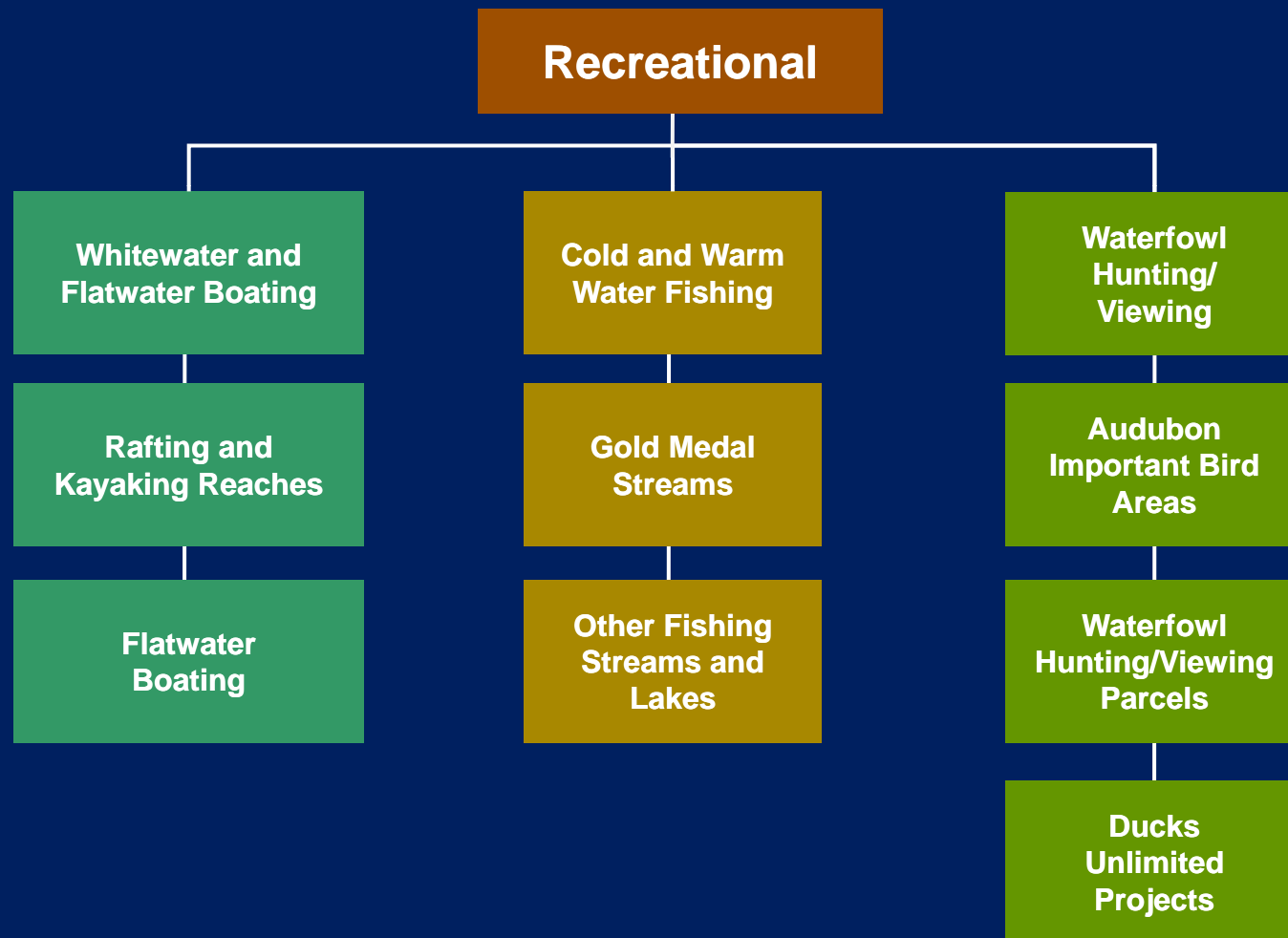
- Formaldehyde-soaked specimen in the high school lab tray
- Once the most abundant & widespread frog in North America
- Massive declines began in the early 1970s, likely due to pollution, deforestation, and water acidity
- Colorado Species of Special Concern







# Southwest Basin Recreational Attribute Categorization



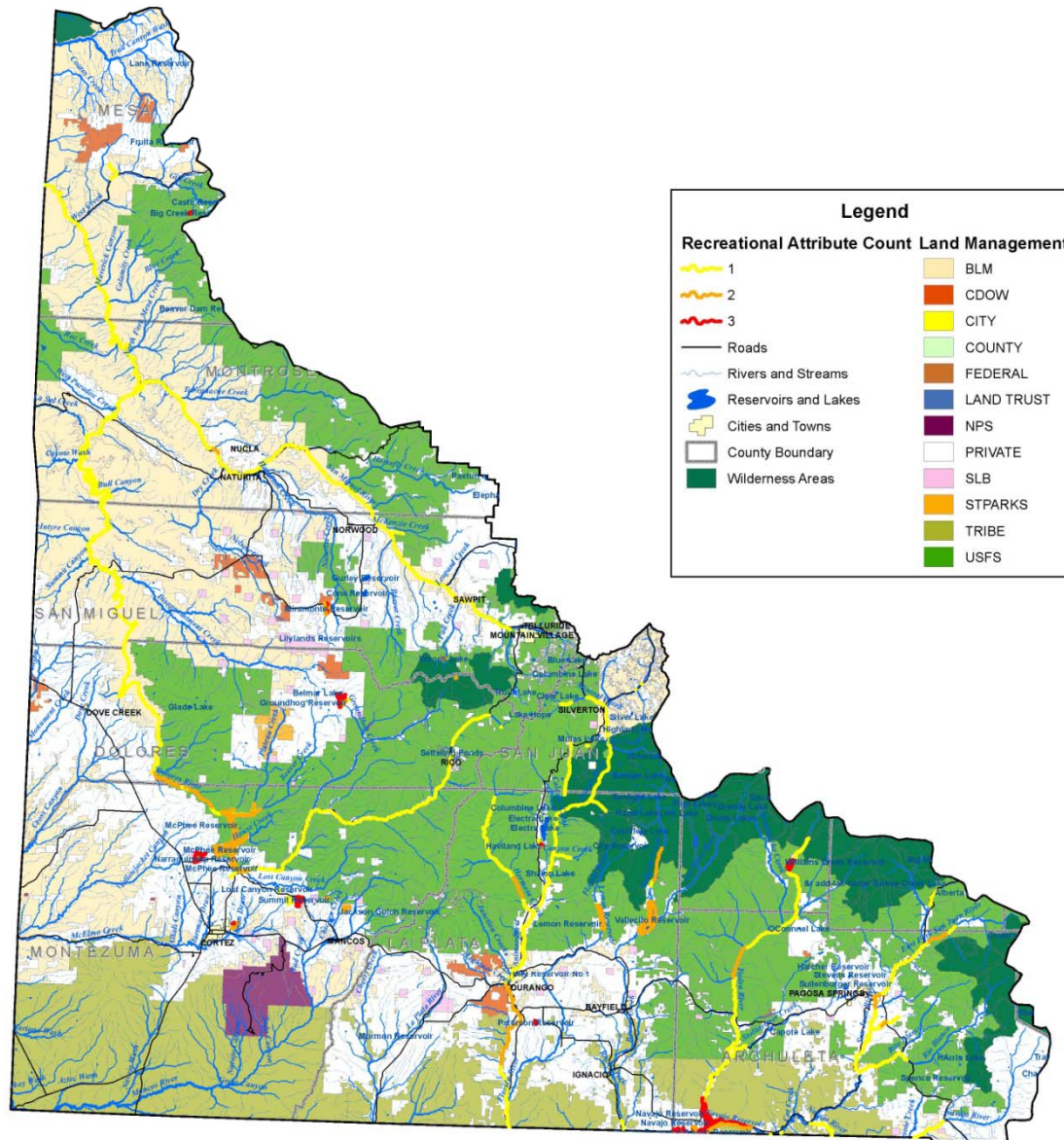


# Prioritization Process

- Develop environmental and recreational attribute maps (9 total for Southwest Basin)
- Map environmental and recreational attributes by waterbody (9 total for Southwest Basin)
- Overlay waterbodies to show where there is concentration of recreational and environmental attributes
- Ensure adequate representation of all attributes

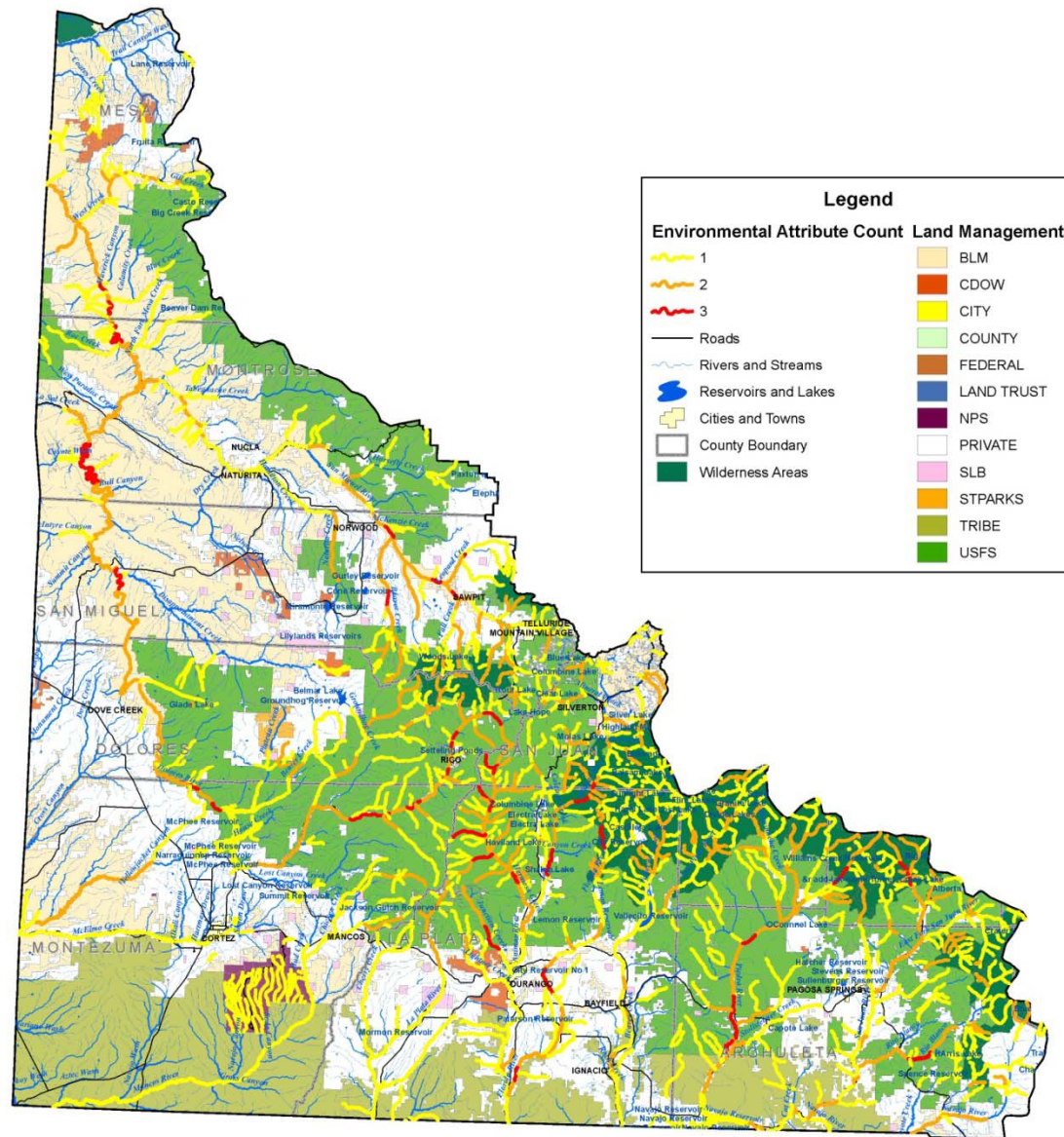


## Southwest Basin Non-Consumptive Needs Assessment Recreational Attribute Count per Stream Segment





## Southwest Basin Non-Consumptive Needs Assessment Environmental Attribute Count per Stream Segment







## Southwest Basin Non-Consumptive Needs Assessment Environmental and Recreational Attribute Count per Stream Segment

