

Strategies and Initiatives for Meeting San Miguel Water Use Needs

Notes reflecting recent stakeholder discussions from 2019-2022

Compiled by Lotic Hydrological

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Table of Contents

ABBREVIATIONS	2
BACKGROUND	2
PROCESS	3
OUTCOMES	3
STRATEGY AREAS	4
A. WORK ACROSS USER GROUPS AND INTERESTS TO INCREASE WATER SUPPLY RESILIENCY FOR ALL WATER USES. .	4
B. SUPPORT WHITEWATER BOATING AND FLOAT FISHING ACTIVITIES ON THE SAN MIGUEL RIVER	4
C. SUPPORT ENVIRONMENTAL DATA COLLECTION AND ASSESSMENT EFFORTS CRITICAL FOR UNDERSTANDING EVOLVING STREAM AND RIVER HEALTH CONDITIONS	4
D. IMPROVE AGRICULTURAL WATER CONVEYANCE AND IRRIGATION WATER APPLICATION EFFICIENCIES.	4
E. IMPROVE FLOODPLAIN CONNECTIVITY AND PROMOTE RIPARIAN ECOSYSTEM HEALTH ON THE MAINSTEM SAN MIGUEL RIVER AND IN TRIBUTARY STREAMS.....	4
F. PROTECT AND EXPAND HABITAT RANGE FOR NATIVE FISH THROUGHOUT THE WATERSHED.	4
POTENTIAL INITIATIVES AND PROJECTS	5
1. WRIGHTS MESA DROUGHT CONTINGENCY PLANNING	5
2. DISCUSSION OF MONTROSE COUNTY CONDITIONAL WATER STORAGE RIGHTS	5
3. IMPROVE/ENHANCE SEASONAL BOAT PASSAGE AND AQUATIC ORGANISM PASSAGE BETWEEN NORWOOD BRIDGE AND CALAMITY DRAW BY MODIFYING OR RECONSTRUCTING WATER DIVERSION SYSTEMS BETWEEN COTTONWOOD CREEK AND THE TOWN OF NATURITA.	6
4. CREATE RIVER MAPS AND/OR ELECTRONIC RESOURCES.	7
5. POST RIVER PROPERTY OWNERSHIP AND NAVIGATIONAL HAZARD SIGNAGE	7
6. RIVER ACCESS IMPROVEMENTS AT URAVAN	8
7. COTTONWOOD CREEK (PINYON BRIDGE) RIVER ACCESS IMPROVEMENTS	8
8. FURTHER DEVELOP TOWN OF NATURITA RIVER ACCESS.....	8
9. RECREATIONAL USER FLOW PREFERENCE VALIDATION	9
10. STREAMFLOW GAUGE NETWORK SUPPORT	9
11. REAL-TIME WATER TEMPERATURE MONITORING PROGRAM.....	10
12. INTEGRATED HYDROLOGICAL MODELING OF THE SAN MIGUEL WATERSHED.....	10
13. CC-HIGHLINE DITCH INFRASTRUCTURE IMPROVEMENTS	11
14. FLOODPLAIN RESTORATION OPPORTUNITY INVENTORY	11
15. INVASIVE RIPARIAN VEGETATION CONTROL	12
16. INVESTIGATE CREATIVE WATER USE AGREEMENTS TO PROTECT FISH	12
17. ENHANCE CONNECTIVITY TO TRIBUTARY STREAMS	13
18. EXPAND CUTTHROAT TROUT RANGE	14

Abbreviations

AW	American Whitewater
BLM	Bureau of Land Management
CDWR	Colorado Division of Water Resources
CPW	Colorado Parks and Wildlife
CWCB	Colorado Water Conservation Board
CWT	Colorado Water Trust
SMWC	San Miguel Watershed Coalition
TNC	The Nature Conservancy
Tri-State	Tri-State Generation and Transmission Association, Inc
TU	Trout Unlimited
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WEEDC	West End Economic Development Corporation
WQCD	Water Quality Control Division

Background

The Southwest Basin’s Roundtable’s 2015 Basin Implementation Plan (BIP) identified municipal, industrial and agricultural water supply needs across the southwest basins and identifies projects aimed at addressing those needs. With respect to environmental and recreational water supply needs, the BIP acknowledged a lack of information and proposes a process to (1) develop environmental and water supply needs information, and (2) evaluate opportunities to address identified needs, if any, in a cooperative manner. The San Miguel Basin was selected for a pilot project to begin implementation of this two-step process. In 2017, a draft analysis was undertaken to evaluate environmental and recreational water supply needs in the San Miguel basin. The draft was completed in April 2017. Based on feedback from public meetings, it was made clear that a more thorough stakeholder process with leadership and robust participation from agricultural water users needed to occur in order to meet the goals of having a locally supported and finalized analysis.

In 2019, the San Miguel River Partnership was convened to engage local stakeholders to review and finalize the analysis. As an additional purpose, the stakeholder group identified voluntary, multi-purpose or multi-benefit project opportunities, positioning the San Miguel stakeholders to obtain state funding for those projects.

Process

The planning process was supported from by a project team that provided leadership, facilitation, coordination and technical support. The process was funding through the Colorado Water Conservation Board, Southwest Water Conservancy District and The Nature Conservancy. The stakeholder group, self-titled the San Miguel River Partnership, was comprised of diverse water interests from throughout the San Miguel River region including agricultural water users, local, state and federal government representatives, recreational interests, conservation experts, and industry representatives. Stakeholders spent a total of three years, 12 meetings, two field trips and multiple one-on-one conversations developing a shared understanding of their watershed, sharing their diverse values and discussing possible win-win project opportunities that could address the needs outlined in the assessment.

Outcomes

Substantial outcomes to the process include:

- Finalization of the San Miguel River Non-consumptive Needs Assessment¹ in March 2021.
- Consensus on strategy areas and project opportunities (this document) in June 2022.
- Conclusion of this phase of the stakeholder process in June 2022.

Additional outcomes, as identified by stakeholders, include:

- Increase in their collective understanding of the upper and lower watershed, including the needs and dynamics of the river.
- Growth in relationships among stakeholders including a broad understanding of the diverse stakeholder values represented in the process.
- Shared interest in supporting projects that support the multi-benefit needs of the river and its users, and a continued interest in working collaboratively to support those efforts.

Moving forward, the San Miguel Watershed Coalition agreed to coordinate the activities of the stakeholder group. Goals include:

- Maintain this projects list, supporting edits or expansion as stakeholders see fit into the future.
- Help to identify project sponsors.
- Ensure projects with project sponsors are listed within the Southwest Basin Roundtable Projects List/Database.
- Provide semi-annual updates to the stakeholder group as to any progress or changes to the list.
- Maintain the stakeholder email list.
- Convene the San Miguel River Partnership stakeholder group as needed.

SMWC will be seeking funding to play this role will be assessing the relationship between the Coalition's stakeholder group and the San Miguel River Partnership stakeholders to ensure no undue overlap/confusion in the watershed while maintaining active engagement from stakeholders.

¹ <https://waterinfo.org/resources/southwest-basin-roundtable/#1618327039974-dbefec6d-3beb>
Click on San Miguel Basin Needs Assessment.

Strategy Areas

A. Work across user groups and interests to increase water supply resiliency for all water uses.

West-end communities desire increased water security and resiliency for municipal supplies and irrigated acreages. Large-scale options to address drought resilience concerns in the vicinity of Norwood, Nucla, and Naturita have included additional reservoir development (e.g. ‘Straw Dam’, Big Bucktail Reservoir), improvements to the Gurley system, and new municipal supply diversions of water from the San Miguel River. These various projects have individual advantages/disadvantages and benefits/impacts that will accrue both locally and, potentially, elsewhere in the lower San Miguel watershed.

B. Support whitewater boating and float fishing activities on the San Miguel River

Local residents and visitors to the San Miguel watershed recreate on numerous stream and river segments. Some segments are preferred by whitewater enthusiasts while others are more often used by anglers. Several navigational hazards limit or deter use of the lower San Miguel River mainstem between the Ledges Campgrounds and the Town of Naturita. Use of the lower San Miguel River by boaters and float fishermen is also limited by the lack of developed river access facilities. Increased river use in this portion of the watershed is expected to help realize the economic and local social benefits of river recreation in west-end communities.

C. Support environmental data collection and assessment efforts critical for understanding evolving stream and river health conditions

Ongoing environmental data collection and analysis efforts are critical for ensuring that stakeholders and water managers can react to changing streamflow and water quality conditions over time, and better understand how those conditions may be altered under a warming climate future.

D. Improve agricultural water conveyance and irrigation water application efficiencies.

Improving water infrastructure and use efficiency enhances resiliency for water users during periods of scarcity and may increase flexibility for and openness to multi-use/benefit water management decision-making. Recent actions by the federal government make financial support for infrastructure improvements more likely than in previous years.

E. Improve floodplain connectivity and promote riparian ecosystem health on the mainstem San Miguel River and in tributary streams.

Floodplains provide valuable ecosystems services including flood peak attenuation, baseflow regulation and groundwater recharge, infrastructure protection, key seasonal aquatic wildlife habitat, terrestrial habitat, and water temperature modulation, etc. Historical impacts to the San Miguel River geomorphology include localized disconnection and fragmentation of river floodplains from railroad or road creation, diking on agricultural and residential lands, and other activities. Reconnecting floodplains with stream channels can increase stream health and ecosystem function and improve resiliency to climate change. The health of vegetation communities on floodplains can be further enhanced by controlling and/or removing invasive species.

F. Protect and expand habitat range for native fish throughout the watershed.

Habitat range for native fish in the San Miguel watershed has decreased due to water diversions, stocking of non-natives, infrastructure development and legacy mining effects. Vulnerability to critical population declines persists. Native cutthroat population resiliency may be improved by

increasing occupied range, reducing entrainment in water diversion infrastructure, improving habitat quality and reducing competition and hybridization by non-native species in headwaters streams. Warm-water fish range may be protected or enhanced by improving aquatic organism passage and reducing dry-up points on the San Miguel River mainstem and on the lower portions of tributary streams in the western half of the watershed.

Potential Initiatives and Projects

1. Wrights Mesa Drought Contingency Planning

Strategy Areas: A

Champions: WEEDC

Stakeholders: Montrose County, Farmers Water Development Company, CDWR, Town of Norwood, TU, SMWC, AW, all west-end water users

Opportunities: WEEDC is working with a coalition of 8 organizations developing a water plan leading toward a sustainable water future for the Wright's Mesa Region. The parties recognize that by collaborating, sharing information, and supporting the needs of individual entities they are more likely to effectively, efficiently and affordably implement much needed water projects to benefit agriculture, municipal, fire-fighting/wildland mitigation, and environmental water supplies. This effort was recently awarded funding by the CWCB. The greatest benefit of this project is in its focus on bringing multiple stakeholders together to achieve a common goal. This type of cooperation and strategic approach reduces competition for limited financial support resources.

Issues for Consideration: With the recent drought, a changing climate, the need for housing and new development, as well as the realization that current infrastructure is aging and needs repairs and upgrades to accommodate growth, there is interest by the owners and managers of water resources on Wright's Mesa in collaborating to prepare for an uncertain climate and water future. With the support of long-standing stakeholders that include the Town of Norwood, San Miguel County, Norwood Water Commission, Farmers Water, the Lone Cone Ditch Company, the San Miguel Water Conservancy District, the Norwood Fire District, and the San Miguel Watershed Coalition the need for an overarching planning effort for Wright's Mesa water has been identified as the key element for creating an efficient, synergistic and organized approach to our regional water future. Successful execution of this project will depend, largely, on the ability of the project proponents to keep all stakeholders engaged and motivated. Failure to do so may limit the planning effort's ability to yield a broad set of beneficial outcomes.

2. Discussion of Montrose County Conditional Water Storage Rights

Strategy Areas: A

Champions: _____

Stakeholders: CDWR, Town of Nucla, Town of Naturita, Town of Norwood, TU, SMWC, AW, TNC, CPW, CWCB, all west-end water users, BLM.

Opportunities: Montrose County holds conditional water rights for reservoir development in the western portion of the watershed. An initial investigation of a 5,000 acre foot reservoir on Big

Bucktail Creek fed by diversions through the CC-Highline Ditch has been completed. Another investigation explored an 8,400-9,100 acre foot reservoir on Maverick Draw, fed largely by irrigation return flows from the Gurley system. To the extent that new storage is developed in the western portion of the watershed, opportunities exist for discussing how stored water can beneficially impact multiple water uses.

Issues for Consideration: Montrose County has expressed interest in this concept but these are big, expensive projects. The challenges associated with implementation of this action make it a low-priority among stakeholders. Strong, multi-interest coalitions and a high level of trust between all stakeholders is required to make such a potentially-contentious conversation productive.

3. Improve/enhance seasonal boat passage and aquatic organism passage between Norwood Bridge and Calamity Draw by modifying or reconstructing water diversion systems between Cottonwood Creek and the Town of Naturita.

Strategy Areas: B, F

Champions: _____

Stakeholders: Town of Naturita (Reed-Chatfield Ditch), SMWC, AW, CPW, BLM, interested owners/water users on other diversions in the reach

Opportunities: Numerous irrigation water diversion structures on the San Miguel River between Cottonwood Creek and the Town of Naturita present navigational hazards. Previous work completed at the CC-Highline Ditch diversion may serve as an example for addressing hazards without negatively impacting water users. The Town of Naturita is currently interested in reducing maintenance burdens associated with the Reed-Chatfield Ditch system. Opportunity may exist to include boat/fish passage enhancements alongside other engineering plans for the ditch system. Stakeholders are generally supportive of this idea. It may be possible to reduce navigation hazards by simply creating a ramp of large angular stone on the downstream side of the concrete dam. If this was the initial configuration of the diversion structure, work to recreate that condition might not necessitate any additional permitting from the Army Corps of Engineers. Similar work could be considered at the other diversions in the reach if there is landowner interest. This project can be coupled with fish passage enhancements to achieve multiple benefits.

Issues for Consideration: Existing estimated costs for reducing maintenance burdens on the Reed-Chatfield Ditch are near \$500K. Work to enhance boater and fish passage at the diversion dam may add tens of thousands of dollars to this total (or much more, depending on the availability of materials and the final engineering design for the work). Any preliminary design work would need to be coordinated closely with the Town of Naturita and Colorado Parks and Wildlife. The overall recreational use value of the improvements to the Reed-Chatfield Ditch diversion can only be realized after navigation hazards associated with upstream diversions are also addressed. This project is expected to somewhat expand habitat ranges for native warm-water fish species.

Landowner/water user interest in pursuing similar projects on structures upstream of the Reed-Chatfield diversion is uncertain. Project costs at these locations may be higher than at the Reed-Chatfield Ditch as a result of access constraints, permitting requirements, etc. Stakeholders recently identified a need to engage in conversations with Tri-State to explore opportunities regarding the Power Plant diversion. Similar exploration opportunities with other diversion may exist for other structures on this reach.

4. Create River Maps and/or Electronic Resources.

Strategy Areas: B

Champions: _____

Stakeholders: Recreational users, outfitters, local tourism boards, Chamber of Commerce, city governments, USFS, BLM, Montrose County, San Miguel County

Opportunities: Currently, and in some locations of the lower watershed, access issues and river hazards (unpassable diversion structures, river-spanning fences) limit the potential for communities to advertise and realize the full potential of the river for social and economic benefits. Although much local river knowledge exists regarding access, private vs. public property bounds, river hazards, and navigation challenges at various flow levels, etc.; little is documented in published material or it is hard to find/access by visitors. User knowledge of the San Miguel may be enhanced locally via production of electronic or printed maps.

Issues for Consideration: Generation of an electronic map can be a relatively low-cost endeavor (~\$5-15K, depending on the level of detail and amount of “new” information collected) but may be limited in its utility to users once they embark on a river trip. An electronic map may be hosted by a local government or NGO, on a publicly available website, or provided via a mobile phone app. Large-format printed maps posted at river access locations may be helpful but are not suitable for on-river navigation. Paper maps are generally more suitable for time on-river. Production of Folded maps or small guidebooks for segments of the San Miguel River and its tributaries frequented by boaters and anglers may be well received and heavily utilized by local residents and visitors. Folded maps or guidebooks may cost \$5-\$30 per copy, depending on development costs, page count and total number printed.

5. Post River Property Ownership and Navigational Hazard Signage

Strategy Areas: B

Champions: _____

Stakeholders: Town of Naturita, AW, SMWC, BLM, Montrose County

Opportunities: The safety of river recreation on the lower San Miguel between BLM Ledges Campground and UraVan may be enhanced with signage at river access points and along the riverbank immediately above diversion dams. This signage can alert users to downstream navigation hazards and improve river safety. Users may also benefit from posted signage along riverbanks alerting them to private and public property boundaries. This action may help reduce trespassing issues and conflicts between river users and property owners. Developing appropriate signage for hazard notification and property boundaries is relatively easy.

Issues for Consideration: Most diversions with boater passage issues in the lower watershed occur on private lands. Posting signage immediately upstream of hazards will require landowner permissions. Hazard identification via signage immediately upstream of hazards is only helpful if/when there is an opportunity to safely avoid the hazard. Several channel spanning structures on the San Miguel River are unavoidable by floating craft. There may be a more immediate need to explore opportunities with landowners for designated portage routes around such hazards. However, creation of designated portage routes may be infeasible due to concerns of trespass, liability, property damage, right of ways, non-interference with infrastructure operation, etc.

6. River Access Improvements at Uravan

Strategy Areas: B

Champions: WEEDC

Stakeholders: AW, Montrose County, Town of Naturita, Town of Nucla

Opportunities: Communities in the lower San Miguel Region are interested in diversifying their local economies by encouraging recreational uses for the San Miguel River. Recreational boating activities below Naturita are currently hampered by the limited number and/or condition of river access points. Improvements to the existing river access point at Uravan, including creation of a designated trailer accessible ramp and formation of an eddy to facilitate launch and take-out of boats will facilitate trips originating upstream at Naturita and finishing in Uravan, or trips originating in Uravan and headed downstream to the Dolores River confluence. Improvements of this access point will also reduce the potential for conflicts between river users and guests at the Uravan campground.

Issues for Consideration: Significant water diversions in the late summer of most years represent the primary constraint on boating use of the San Miguel River below the CC-Highline Ditch. Return flows at Calamity Draw may not be sufficient to support recreational uses of this river segment for much of the late summer and fall months. Costs for development of an access facility at Uravan will depend on the final engineering design but may be in the range of tens of thousands to low hundreds of thousands of dollars. Multiple use benefits of this project are not yet identified.

7. Cottonwood Creek (Pinyon Bridge) River Access Improvements

Strategy Areas: B

Champions: _____

Stakeholders: Town of Naturita, AW, Montrose County

Opportunities: Improved public river access near the Cottonwood Creek confluence, including a designated and maintained hand-launch site or trailer-accessible boat ramp at will enhance opportunities for trips originating at this location and finishing in the Town of Naturita. River access improvements at this location will also provide take-out options for trips originating upstream from Ledges/Stonehouse or from the Beaver Creek Campground/Sanborn Park Road area.

Issues for Consideration: This location is located on private property and nearby public lands are not suitable for access point development. The presence of several water diversion structures on the reach between Cottonwood Creek and the Town of Naturita make boat passage through the section difficult under some conditions. Significant water diversions in the late summer of most years represent the primary constraint on boating use below the CC-Highline Ditch. Costs for development of an access facility at this site will depend on the engineering design but may be in the range of tens of thousands to low hundreds of thousands of dollars. Multiple use benefits of this project are not yet identified. Stakeholders identified this action as a low-priority but elected to keep it on the list as a long-term aspirational or opportunistic project.

8. Further Develop Town of Naturita River Access

Strategy Areas: B

Champions: _____

Stakeholders: Town of Naturita, AW, Montrose County, CPW

Opportunities: The Town of Naturita is interested in diversifying their local economy by encouraging recreational uses for the San Miguel River near town. Improvements to an existing river access point in Town, including a designated trailer-accessible ramp and an eddy feature will ease access by multiple craft types and, presumably, increase opportunities for trips originating upstream and finishing in town, or trips originating in town and headed downstream.

Issues for Consideration: This action would benefit from concurrent river access development at upstream (e.g. Cottonwood Creek) and downstream (e.g. Uravan) locations. However, the presence of several water diversion structures on the reach upstream from Naturita make boat passage through that section difficult under some conditions. Significant water diversions in the late summer of most years represent the primary constraint on boating use of the San Miguel River below the CC-Highline Ditch. Costs for development of an access facility at this site will depend on project configuration but may be in the range of tens of thousands to low hundreds of thousands of dollars. Multiple use benefits of this project are not yet identified. However, enhancements for fishing (e.g., habitat structures, ADA angling access) may increase the likelihood of securing CPW Fishing Is Fun grants.

9. Recreational User Flow Preference Validation

Strategy Areas: B

Champions: _____

Stakeholders: AW, SMWC, USFS, BLM

Opportunities: A Boatable Days analysis conducted on the San Miguel River used community surveys to identify recreational flow preferences for many stream reaches. However, a low number of survey responses on some reaches may bias results. Collection of new data or collation of additional existing data sources could facilitate an update to the existing analysis results. Potential data sources include BLM user sign-in data from river access points; review of outfitter permit/user day data reported to agencies like CPW, USFS, or BLM; and distribution of paper or web surveys. Opportunity also exists to combine an update of the Boatable Days analysis with American Whitewater's ongoing economic impact study of river recreation activities in Colorado.

Issues for Consideration: It is unclear how better characterization of recreational user preferences will result in different consideration of recreational use needs by water users or water administration/management authorities. Limited historical use on some reaches of the San Miguel River may constrain efforts to collect additional user input. This project does not have multiple use benefits. Stakeholders suggested that this effort is a low priority.

10. Streamflow Gauge Network Support

Strategy Areas: C

Champions: _____

Stakeholders: USGS, SMWC, San Miguel County, Montrose County, lower San Miguel municipalities and agricultural water users, CWCB, CPW, CDWR

Opportunities: Streamflow monitoring provides important social, economic, and ecological benefits for all stakeholders including agricultural water administration functions, flood warning, tracking of hydrologic change and trends, recreational user safety. Streamflow gauging also plays a crucial role in strategic water planning and fisheries management. Ensuring that existing gauging stations in the San Miguel watershed continue operation is critical. Stream gauging priority should be given to locations critical for administration of water rights, including instream flow rights, on the mainstem San Miguel River and on tributary streams. Stakeholders indicated that this is a very high-priority initiative.

Issues for Consideration: Most USGS gauges in Colorado rely on a combination of federal, state, and local partner funding for continued operation. Changes in agency budgets and priorities can result in disruption or discontinuation of gauging in some locations. Where federal funding for gauging stations is reduced or eliminated, local communities may need to provide annual financial contributions or petition CDWR to replace USGS gauges with stations operated by the State of Colorado. Annual O&M costs for a single gauging station (without match support from USGS) can reach ~\$16K.

11. Real-time Water Temperature Monitoring Program

Strategy Areas: C

Champions: _____

Stakeholders: CPW, TU, SMWC

Opportunities: Water temperature regimes on the San Miguel River are affected by rising air temperatures and seasonal water diversions. Installation of a network of real-time water temperature sensors along the mainstem San Miguel River below Leopard Creek may yield important insights regarding the spatial extent of suitable thermal habitat for various fisheries species of interest. Real-time data may be used to alert anglers to the onset of stressful conditions for fish. Collected data may also aid in the development of predictive models that relate air temperature and streamflow to water temperature at various locations along the river. Stakeholders indicated that this is a high-priority initiative.

Issues for Consideration: Cold water fisheries in the headwaters and middle watershed rely on continued maintenance of existing temperature regimes for health and survival. The upper San Miguel River exhibits relatively little alteration to natural flow regimes. Alteration of summer temperature regimes in most streams in the eastern portion of the watershed is also expected to be small. An exception exists on the South Fork San Miguel River below Trout Lake. Data generated in the western portion of the watershed where water management is expected to influence water temperature regimes more strongly may yield valuable insights into the frequency, magnitude and duration of conditions that are problematic for native aquatic biota and sport fish. Notably, collection of data and establishing relationships between streamflow and water temperature is not likely to affect local conditions or water management actions because water supplies in this portion of the watershed are so limited.

12. Integrated Hydrological Modeling of the San Miguel Watershed

Strategy Areas: C

Champions: SMWC

Stakeholders: Montrose County, San Miguel County, CWCB, CDWR, Town of Telluride, Town of Mountain Village

Opportunities: The San Miguel Watershed Coalition (SMWC) and its partners propose to use MIKE-SHE to construct a fully-distributed hydrological model of the San Miguel surface-subsurface watershed system. This robust, physics-based tool simulates a wide range of hydrologic issues, is FEMA approved, and provides detailed outputs for all hydrological processes, including wetlands/channel flows, soil moisture, complex aquifer flows, and discharge to streams, wetlands and springs. The tool can simulate irrigation diversions and applications, complex hydraulic structures and operations, evapotranspiration, and integrated water quality. The model will provide stakeholders with a powerful, living water management tool that: a) improves understanding of fundamental integrated hydrologic system behavior and controlling factors, b) can predict a range of current and potential future impacts due to climate change, fires, floods, extended droughts, water quality degradation, and development, and c) can be used to help design and assess alternative engineering approaches that can achieve specific goals. A successfully calibrated and validated model may help local water users and land managers identify important source areas for salinity and evaluate potential benefits of various salinity control measures. Use of the tool in this way may help identify local projects suitable for funding by the Colorado River Basin Salinity Control Program (Note: CWCB provides technical assistance grants for groups pursuing federal salinity control funding). This modeling effort may further support Actions 13 and 14 discussed below.

Issues for Consideration: Calibration of fully distributed watershed models is a difficult and time-consuming task. The availability or quality of various input data sets may constrain the accuracy and utility of modeling outputs. If the model is intended to be used in a predictive manner, it is unclear how water rights administration will be represented and accommodated.

13. CC-Highline Ditch Infrastructure Improvements

Strategy Areas: A, D

Champions: _____

Stakeholders: CDWR, CWCB, CWT, TNC, SMWC, CC-Ditch Company

Opportunities: The CC-Highline Ditch is an earthen structure that loses some non-trivial fraction of diverted water to infiltration or evaporation between the headgate and the point of use. Ditch lining or piping projects may significantly reduce water losses. Water users could contemplate leaving some portion of the ‘saved’ water in the river at the point of diversion during certain times of year or for a short period of time when conditions are deemed particularly problematic for aquatic life. Recent increases in federal spending on infrastructure and specific allocation of funds for water-projects may improve the likelihood of completing high-dollar projects like this one. If salinity control benefits can be expected from efficiency improvements on the ditch system, funding may be available from the Colorado River Basin Salinity Control Program. CWCB provides technical assistance grants for groups pursuing federal salinity control funding. Work completed by the Uncompahgre Valley Water Users Association may serve as a useful example for this project.

Issues for Consideration: Efforts to reduce leakage out of the ditch will impact cottonwood and willows that exist on hillslopes along and below the ditch in many locations. Any agreement with the CC-Highline is subject to approval by the Board of Directors. Piping is preferred to ditch lining to the rockfall hazards present above many portions of the ditch. Therefore, efficiency projects that affect the entire ditch system are likely to be extremely expensive. Costs for ongoing maintenance of a long pipeline are uncertain. This action must be seen as a global benefit to CC-Highline Ditch shareholders. There may be other locations in the watershed where efficiency improvements meet similar objectives and have a lower cost barrier.

14. Floodplain Restoration Opportunity Inventory

Strategy Areas: C, E

Champions: SMWC

Stakeholders: USFS, BLM, CPW, TU, TNC, Ducks Unlimited, Audubon Society, American Rivers, SMWC

Opportunities: Work to reconnect the San Miguel River with the historical floodplain on the valley floor near Telluride is ongoing. Additional opportunity exists to reconnect smaller tributary streams with floodplains and enhance the functional characteristics of wet meadows. Numerous low-cost approaches (e.g., beaver dam analogs) exist for remediating incised channels in these settings. Inventorying locations of disconnected floodplains can occur via a combination of desktop exercises (GIS topography analysis, etc.) and field visits. A combination of desktop exercises and rapid field visits can also be used to identify positions along stream and river corridors that exhibit low slopes, a relatively wide floodplain, and adequate access of high streamflows to overbank areas. These areas (a.k.a. Response Zones) may be critical areas for attenuating flood waves and debris flows that follow catastrophic wildfire. Protecting intact Response Zones from alteration and remediating degraded Response Zones on tributary streams across the watershed may help protect downstream communities and river segments from the worst effects of wildfire.

Issues for Consideration: Field visits may require landowner permission. While inventorying itself is a relatively low-cost exercise, physical restoration projects to actually address connectivity can face landowner permission issues and may be costly, varying widely in level of engineering analysis and design required.

15. Invasive Riparian Vegetation Control

Strategy Areas: E

Champions: _____

Stakeholders: RiversEdge West, TNC, San Miguel County, Montrose County, BLM, USFS, CPW

Opportunities: Significant work by local governments and conservation organizations to eradicate invasive riparian vegetation from river/stream corridors led to significant declines in the presence of those species in many locations around Naturita and Uravan. Despite these successes, communities of invasive woody and herbaceous plants persist, particularly in the western watershed. Removal of these species and replacement with native species can benefit terrestrial and aquatic animals and insects—generally improving the ecological function of riparian areas and floodplains.

Issues for Consideration: Widespread eradication of invasive woody plants in the western portion of the San Miguel watershed will require close coordination with private landowners and town governments. The value of some species (e.g. Russian olive) as shade trees may complicate efforts to remove them. Small, persistent pockets of invasive plants can provide an abundant seed source for colonization of upstream and downstream areas and necessitate ongoing control and removal efforts. Invasive herbaceous species will be the most difficult to control.

16. Investigate Creative Water Use Agreements to Protect Fish

Strategy Areas: A, F

Champions: _____

Stakeholders: Water rights holders, CWCB, CDWR, TNC, Montrose County, BLM, USFS, CPW, CWT

Opportunities: No instream flow water right exists on the San Miguel River between the CC-Highline Ditch diversion and Calamity Draw. This area of river is regularly dewatered—a condition that can be stressful or fatal for native and sport fish. Managing flows to protect aquatic life in this reach by administering existing instream flow water rights on upstream and downstream reaches is not possible. Water management by other means may, therefore, be a critical strategy in the lower San Miguel River for supporting the health of the native warm water fishery and the sport fishery enjoyed by anglers. Options that may be explored by local stakeholders include incentivized bypass of water past headgates or formal water leasing for environmental uses. Opportunity exists to work with CPW aquatic biologists to test the beneficial effects of late summer 24-hour (or longer) pulse flows that provide fish stranded in pools in the dewatered reach with an opportunity to move upstream, downstream, or into tributary habitats. Ensuring that native warm-water species do not become listed as Threatened or Endangered will help retain local control and limit the potential for involvement by federal agencies in water use and management conversations and decision-making. Stakeholders noted that this is a very important initiative.

Issues for Consideration: Water availability in this section of river, especially in below-average water years, is very limited. Identifying and implementing creative, voluntary, and incentivized approaches for leaving some amount of water in the stream will require functional personal relationships that enjoy a high level of trust between parties. The lack of an instream flow water right and the unique water administration/delivery approaches used on this section of river may complicate or limit downstream shepherding of water. The reach of the San Miguel River between CC-Highline Ditch and the Town of Naturita loses ~30 cfs of flow during dry, late-summer conditions. Any water left in the river would, presumably be affected by these characteristic losses. The degree to which losses to groundwater affect water delivered to or left in the channel will depend on location.

17. Enhance Connectivity to Tributary Streams

Strategy Areas: F

Champions: _____

Stakeholders: SMWC, TU, CPW, USFS, TU, CPW, TNC, BLM, Montrose County, San Miguel County, municipalities, private land owners and water users, CDWR

Opportunities: The ability of wild native warm-water fish to survive, reproduce, and thrive without additional interventions (e.g., population stocking) requires that those fish have access to a variety of habitats suitable for different life stages. Warm-water fish native to the San Miguel and Dolores watersheds utilize the lower portions of perennial and ephemeral tributaries for spawning and juvenile growth/rearing. Hydrological disconnection of tributary streams occurs seasonally on several tributaries to the lower San Miguel River due to water diversion. Transportation infrastructure and irrigation infrastructure present physical barriers to aquatic organism passage on other tributaries. Upgrading or reconstructing culverts and ditch infrastructure to include aquatic organism passage (AOP) features can help improve regional fishery resiliency in the face of changing watershed conditions. Physical changes to infrastructure can be leveraged with periodic/temporary changes in water management that ensure that water is available for spawning/rearing in connected reaches during critical periods in the late spring and early summer (April-June).

Issues for Consideration: The expected range of the warm-water fishery in the San Miguel mainstem extends up to approximately the CC-Highline Ditch, although these species are known to range widely and have been observed as far upstream as the mouth of Beaver Creek in some years. Several channel spanning structures on the river between the CC-Highline and the Town of Naturita likely present barriers to upstream travel by native fish during some or most times of the year. Therefore, the greatest opportunities for improving hydrological and/or physical connectivity between the mainstem and tributaries likely exist downstream from the CC-Highline diversion point. Lessons-learned and successes from previous projects to improve aquatic organism passage on lower Tabeguache Creek may be instructive for similar efforts on other streams. Opportunities upstream of the CC-Highline may present themselves after mainstem barriers to passage are addressed. Formal water leasing from senior water users on lower Naturita Creek or scheduled releases of water from Miramonte Reservoir may achieve desired outcomes on Naturita Creek but the willingness of water rights owners to participate in such strategies is uncertain.

18. Expand Cutthroat Trout Range

Strategy Areas: F

Champions: _____

Stakeholders: SMWC, TU, CNHP, USFWS, CPW, USFS, BLM

Opportunities: The San Miguel watershed provides many opportunities for cutthroat trout population restoration and/or habitat enhancement due to the prevalence of low-order (small), high-elevation, snowmelt-fed streams. Cutthroat migrate to small perennial streams for spawning after spring runoff. Movement between adult feeding/residential habitats and spawning habitats is dictated by stream network connectivity. Road culverts on some USFS, BLM, and County Road stream crossings may create barriers to upstream movement by cutthroat trout. Surface water diversions may cause entrainment and increase mortality of fish as they move downstream. Targeted aquatic organism passage (AOP) projects combined with installation of fish screens on water diversion structures and the strategic removal of non-native species and replacement with native trout on stream reaches below existing cutthroat trout populations may increase occupied habitat and ensure long term population resiliency in the watershed. Increasing the total stream miles occupied by healthy native trout populations increases the likelihood that those populations can persist following large wildfire, debris flows, localized non-native species invasions, or some other watershed-scale event.

Issues for Consideration: Any work to improve stream network connectivity should proceed in close coordination with CPW and other resource management agencies (BLM, USFS, USFWS). Poorly contemplated AOP projects have the potential to inadvertently promote new access by non-native species into productive existing native trout habitat.