Presentation Agenda

- Gunnison Basin Identified Project or Process List (IPP)
- Summary of Water Gaps Previously Identified
- Summary of Stream Management Plan Activities for Recommendation to Gunnison Basin IPP List
  - Maintain Conditional Storage Rights
  - Projects to allow water users in Ouray County to utilize the Ridgway Reservoir
    - Additional Storage Allocation in Ridgway Reservoir
    - Cow Creek to Ridgway Reservoir Project
  - Ramshorn Reservoir
  - Irrigation Efficiency Projects
  - City of Ouray and Town of Ridgway Projects

Gunnison Basin Implementation Plan

Gunnison Basin Implementation Plan Goals:

1. Protect existing water uses in the Gunnison Basin.
2. Discourage the conversion of productive agricultural land to all other uses within the context of private property rights.
3. Improve agricultural water supplies to reduce shortages.
4. Identify and address municipal and industrial water shortages.
5. Quantify and protect environmental and recreational water uses.
6. Maintain or, where necessary, improve water quality throughout the Gunnison Basin.
7. Describe and encourage the beneficial relationship between agricultural and environmental and recreational water uses.
8. Restore, maintain, and modernize critical water infrastructure, including hydropower.
9. Create and maintain active, relevant and comprehensive public education, outreach and stewardship processes involving water resources in the six sectors of the Gunnison Basin.

Gunnison Basin Implementation Plan

Gunnison Basin Identified Projects and Processes (IPP) in District 68:

REF No.	Project	Basin Goals Met								
		1	2	3	4	5	6	7	8	9
37	City of Ouray Water Efficiency and Conservation Plan	x			x				x	
38	Ouray County Upper Uncompahgre Basin Wide Augmentation Plan	x	x		x				x	
39	Inventory of Irrigation Infrastructure Improvement Needs - District 68	x		x		x		x	x	
40	Environmental Recreational Project Identification and Inventory - Upper Uncompahgre Region	x				x	x	x		
43	Gunnison Basin Selenium Management Plan and Gunnison Basin Selenium Task Force	x		x			x		x	
45	Development if Upper Uncompahgre Water Supplies	x		x	x				x	
46	Improvements to Red Mountain Ditch	x		x	x				x	

Upper Uncompahgre Basin – Water Gaps

Previously Identified Irrigation Water Gaps and Recommendations

- Approximately 12,400 AF of consumptive use shortage during a dry year (Gunnison Model).
- Approximately 4,000 AF of consumptive use shortage during an average year (Gunnison Model).
- Primary Source of Storage in the UUB is Ridgway Reservoir.
- Ouray County users cannot access Ridgway Reservoir Irrigation Water during dry
- Recommended development additional upper basin water storage supplies.

Previously Identified Recreational and Environmental Water Gaps and Recommendations

- Dallas Creek ISF shorted approximately 4,700 AF during a dry year and 100 AF during average year.
- Uncompahgre River ISF shorted approximately 2,000 AF during dry year.
- Recommended Improvements to conveyance structures and on farm efficiencies for inter-basin ditches to protect the source stream basin.

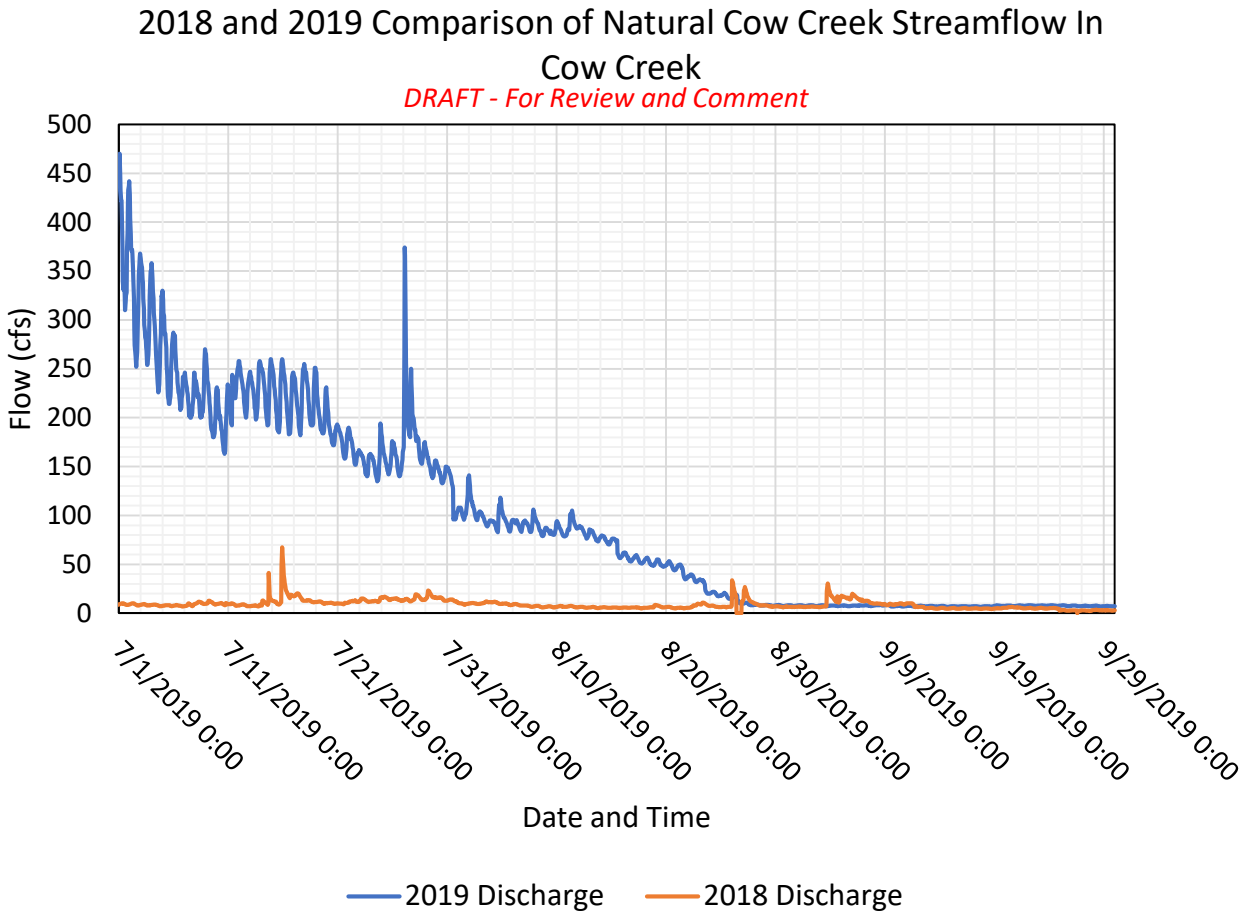
Upper Uncompahgre Basin – Water Gaps

Water in the UUB is limited - especially during dry year and during the late irrigation season.

Upper Uncompahgre Basin (Ouray County)
All Values in AF/ year

Gage Station	Station Name	Gage Station Discharge		Dry Year Percent of Average
		2002	2002-2012	
		1		2
USGS 9146200	Uncompahgre River near Ridgway	54,429	116,248	47%
USGS 9147000	Dallas Creek near Ridgway	10,640	22,556	47%
* CDWR COWCRKCO	Cow Creek near Ridgway Dam	16,777	47,612	35%
USGS 9147500	Uncompahgre River at Colona	84,033	170,756	49%

Notes:
(1) Gage Station Data
(2) (2002 Gage Station Discharge)/ (2002-2012 Gage Station Discharge)
* COWCRKCO Gage Station has a shortened period of record from 2008-2012



IPP Projects to Address Water Gaps

Maintain Upper Uncompahgre Basin Conditional Storage Rights

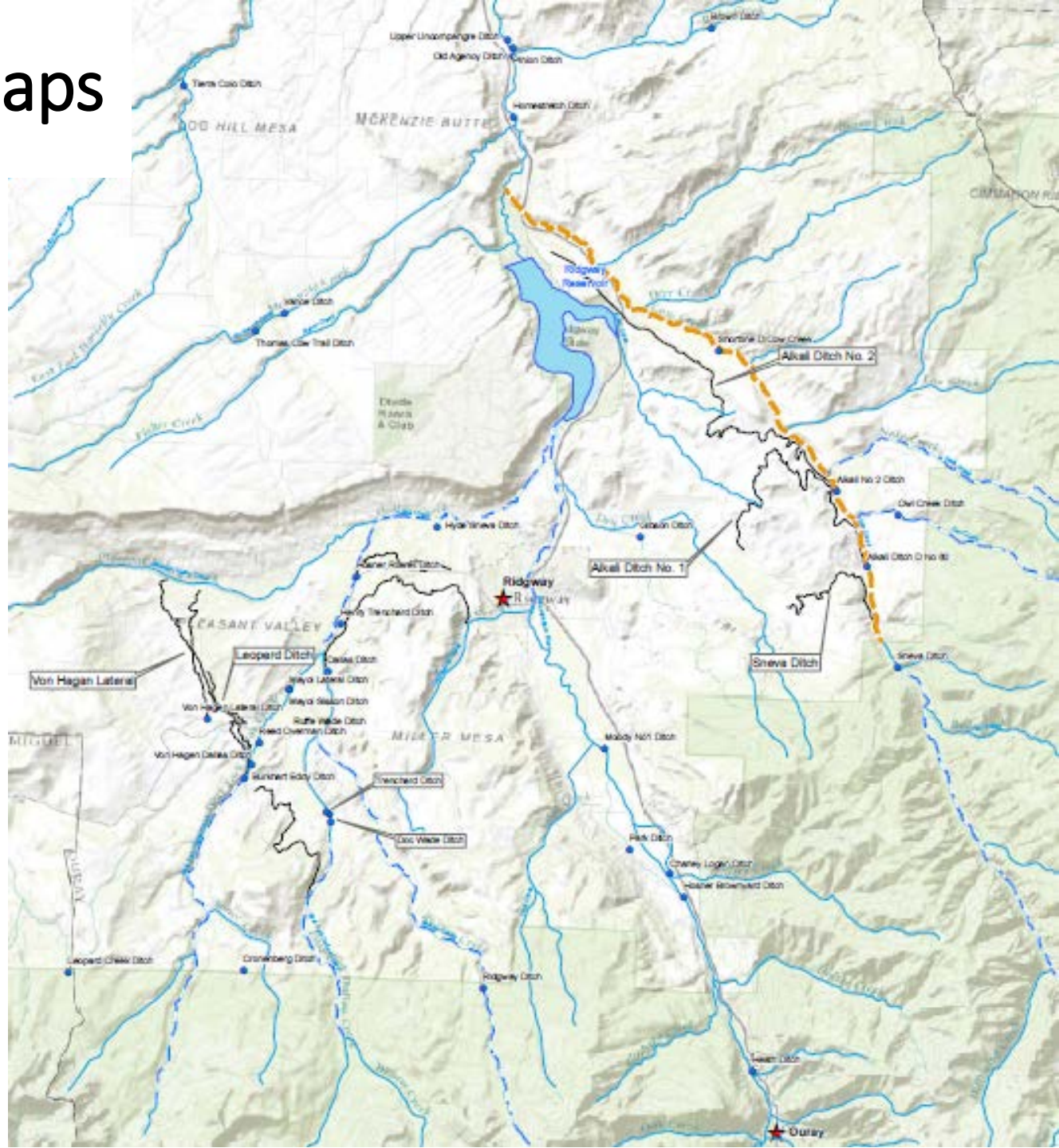
- Sneva Reservoir
  - Capacity: 823.02 AF
  - 2019 Diligence Completed
- Dallas Divide Reservoir
  - Capacity: 17,578.79 AF
  - 2019 Diligence Completed
- Ramshorn Reservoir
  - Capacity: 25,349.15 AF
  - Diligence in 2020
- Additional Use of Ridgway Reservoir

Note: Reservoir Locations are conceptual in nature

IPP Projects to Address Water Gaps

Provide Upper Basin Water Users with Access to Water in Ridgway Reservoir

- Work with CWCB to identify potential projects to provide upper basin users with access to Ridgway Reservoir.
- Injury with mitigation approach:
  - Water quality improvement project in the Uncompahgre River.
  - Streamflow enhancement downstream of Ridgway Reservoir
  - Streamflow enhancement via upper basin storage projects.
- Removing or relaxing ISF calls during dry years.
- Others



IPP Projects to Address Water Gaps

Cow Creek Flow Dampening Reservoir and Ridgway Reservoir Diversion Project

- Additional Water Supply to Ridgway Reservoir:
  - **Hydropower Production**
  - Potential additional average annual revenue of $89,000.

Draft Work in Progress

Water Year	Additional Yield (AF)	Without Cow Creek Diversion and Flow Dampening Reservoir		With Cow Creek Diversion and Flow Dampening Reservoir		Additional Hydropower Revenue ($)
		Calculated Annual Hydropower Generated (MWH)	Calculated Hydropower Revenue ($)	Calculated Annual Hydropower Generated (MWH)	Calculated Hydropower Revenue ($)	
2009	10,813	24,788	$1,713,875	25,495	$1,762,700	$48,825
2010	8,773	22,902	$1,583,459	24,397	$1,686,785	$103,326
2011	11,603	25,535	$1,765,499	26,531	$1,834,378	$68,879
2012	8,403	12,493	$863,775	13,197	$912,443	$48,668
2013	8,801	11,473	$793,234	12,758	$882,082	$88,848
2014	7,578	25,606	$1,770,406	26,788	$1,852,147	$81,741
2015	11,762	23,116	$1,598,272	24,872	$1,719,636	$121,363
2016	10,038	23,896	$1,652,169	25,761	$1,781,104	$128,935
2017	12,817	24,940	$1,724,329	26,737	$1,848,577	$124,248
2018	8,056	9,390	$649,242	10,453	$722,751	$73,510
					Average	$88,835
					Maximum	$128,935
					Minimum	$48,668

Notes:

1 MWH = Megawatt Hours

2 Cost per MWH $69.14

3 Assumes all water diverted from Cow Creek is released out of Ridgway Reservoir on the same day.

4 In the event the additional water diverted from Cow Creek generates a release which is in a turbine "flow gap" then the Cow Creek Diversion is not added to the release and is lost from the model (conservative assumption).

5 Changes in storage as a result of the additional water diverted form Cow Creek are not considered (conservative assumption).

IPP Projects to Address Water Gaps

Cow Creek Flow Dampening Reservoir and Ridgway Reservoir Diversion Project

- **Potential Downstream Streamflow Enhancement**
  - Provide additional winter season release from Ridgway Reservoir
  - Note: CPW is no longer as concerned with winter flows below Ridgway Reservoir
- **Potential Boater Recreation Enhancement**
  - Potential to provide optimum flows downstream of Ridgway Reservoir During Peak Weekend

Draft Work in Progress

Winter	Additional Winter Season Release From Ridgway Reservoir to Meet Minimum Flow Targets (AF)		
	Minimum Flow Target Below Reservoir		
	50 CFS	60 CFS	70 CFS
2014 - 2015	111	268	805
2015 - 2016	22	165	754
2016 - 2017	155	420	998
2017 - 2018	617	1702	3705
2018 - 2019	368	1660	3717

Peak Season: May 1st to August 31st
Peak Two Weeks: July 1st to July 14th

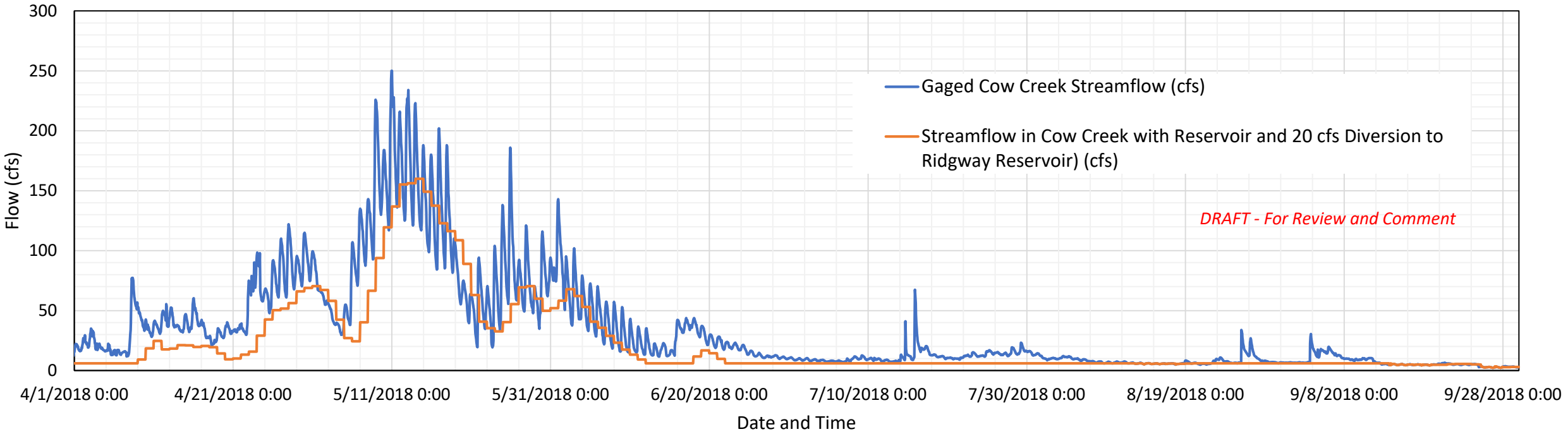
Year	Uncompahgre River below Ridgway Reservoir	
	Average Daily Volume Needed to Meet Target Minimum Optimum Flow (AF)	
	Peak Season	Peak Two Weeks
2002	676	723
2012	519	594
2013	596	574
2018	557	510
Average (AF)	587	600
Average (CFS)	296	303

IPP Projects to Address Water Gaps

Cow Creek Flow Dampening Reservoir and Ridgway Reservoir Diversion Project

- Additional Water Supply to Ridgway Reservoir
- Dampen flows from Cow Creek to maximize efficiency of UVWUA diversions and potential to relax M&D call.
- Since 2002 a call from M&D has been historically placed 1 out of every 4 years.

2018 Comparison of Natural Cow Creek Streamflow Versus Streamflow in Cow Creek with Dampening Reservoir and 20 cfs Diversion to Ridgway Reservoir



IPP Projects to Address Water Gaps

Ramshorn Reservoir

- Conditional Decreed Volume of 25,349.15 AF
- Potential for Phased approach.
- Phase 1 – Flow Dampening Reservoir.
- Phase 2 – Full Decreed Amount Reservoir.
- No Recreational uses will be permitted on Ramshorn Reservoir

Preliminary Cow Creek Reservoir Options and Associated Volume Estimates

Ouray County Cooperative Stream Management Plan

Draft Work in Progress

Reservoir Pool Description	Storage Volume (AF)	Notes and Comments
Reservoir Option 1 - Flow Dampening Reservoir		
Flow Attenuation Pool	700	Reservoir sized to attenuate flows from Cow Creek and release at a target rate of the 3-previous days rolling average streamflow. Based on 2018 gaged Cow Creek streamflow data.
Dead Storage / Sediment Pool	105	Estimated as 15% of the total required storage volume based on USBR (2015)[1].
Total Volume (AF)	**805**	
Reservoir Option 2 - Ramshorn Reservoir Full Decreed Amount		
Exchange Pool for: 1) All Dallas Creek and Upper Uncompahgre River Water Users 2) All Non-Mainstem Cow Creek and Lower Uncompahgre Water Users	1,500 (Avg year) 4,000 (Dry Year)	Estimated storage for 1 years worth of average year or dry year exchange water supply for non-mainstem Region 1 water users, all Region 2 and Region 3 water users, and non-mainstem Region 4 water users. Note, Region 1 and Region 4 mainstem users can be provided with additional physical water supply from the water supply pool.
Water Supply Storage for Mainstem Cow Creek and Lower Uncompahgre River Users Pool	1,800 (Avg Year) 7,000 (Dry Year)	Estimated storage for 1 years worth of average year or dry year water supply to meet Irrigation Water Requirement for mainstem Region 1 and Region 4 water users.
Cow Creek Instream Flow Augmentation Pool	9,000	Estimated storage for 1 years worth of dry year water supply to meet CWCB's minimum instream flow in Cow Creek.
Carry over Storage for Dry Year Firming	9,247 (Avg Year) 1,547 (Dry Year)	Range of carry over volume for dry year firming.
Dead Storage / Sediment Pool	3,802	Estimated as 15% of the total required storage volume based on USBR (2015)[1].
Total Volume (AF)	**25,349.15**	Ramshorn Reservoir was conditionally decreed for 25,349.15 AF of storage in Decree of April 14, 1961, Civil Action No. 2440.

Notes:

[1]Assumes 100 year design life and an average annual sediment accumulation rate of 0.15%. USBR (2015) estimates typical average annual sediment accumulation rates in reservoirs range between 0.1 and 0.2 percent. A sediment flux study in Cow Creek is recommended to more accurately determine this volume.

IPP Projects to Address Water Gaps

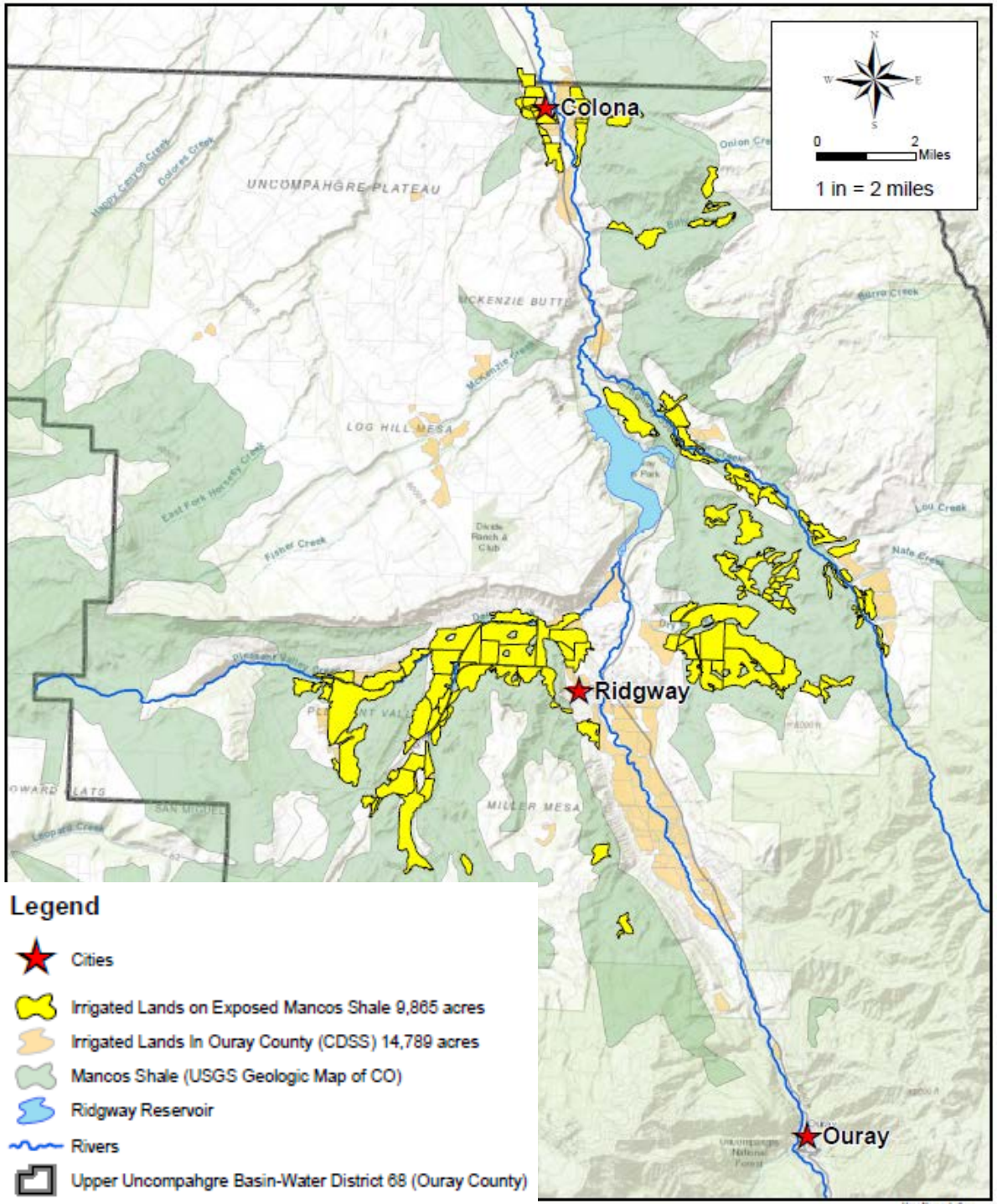
Efficiency Projects

- Target interbasin diversions for efficiency so long as downstream users are not impacted.
- **Cow Creek Region – Automated Headgates**
  - Sneva Ditch
  - Alkali No. 1 Ditch
  - Alkali No. 2 Ditch
- **Dallas Creek Region – Automated Headgates**
  - Dallas Ditch –adjust headgate diversion based on tailwater spill conditions to keep more water in Dallas Creek.

IPP Projects to Address Water Gaps

Efficiency Projects

- **On Farm Efficiency and Ditch Lining Projects**
  - Potential funding opportunities via Salinity and Selenium control funds.
  - Identify efficiency projects that reduce the potential for downstream users to be impacted.



IPP Projects to Address Water Gaps

Efficiency Projects

- **Impacts to Shortages with Region Scale Efficiency Projects**
- By increasing region scale efficiency by 10% the region scale shortage is estimated to reduce by approximately 1,700 AF.
- Identify efficiency projects that reduce the potential for downstream users to be impacted.
- Care must be taken that changes in return flow patterns does not impact/injure other water users

Estimated Excess or Shortage based on Average Historical Diversions x Irrigation Efficiency Minus Demand

Assumed Irrigation Efficiency = 40%

Month	Region				Total Shortage (AF)
	1	2	3	4	
April	509	84	195	12	0
May	1,238	-689	-22	-430	-1,141
June	854	607	1,228	519	0
July	834	-649	12	-1,046	-1,695
August	1,214	2,268	2,076	1,812	0
September	870	-53	192	-181	-234
October	547	105	261	88	0
Total Shortage (AF)	0	-1,391	-22	-1,656	-3,070

Estimated Excess or Shortage based on Average Historical Diversions x Irrigation Efficiency Minus Demand

Assumed Irrigation Efficiency = 50%

Month	Region				Total Shortage (AF)
	1	2	3	4	
April	662	157	270	62	0
May	1,793	-369	220	-96	-465
June	1,458	1,538	1,928	1,347	0
July	1,378	-141	353	-706	-846
August	1,697	3,193	2,775	2,587	0
September	1,227	213	381	25	0
October	737	239	380	207	0
Total Shortage (AF)	0	-510	0	-801	-1,311

IPP Projects to Address Water Gaps

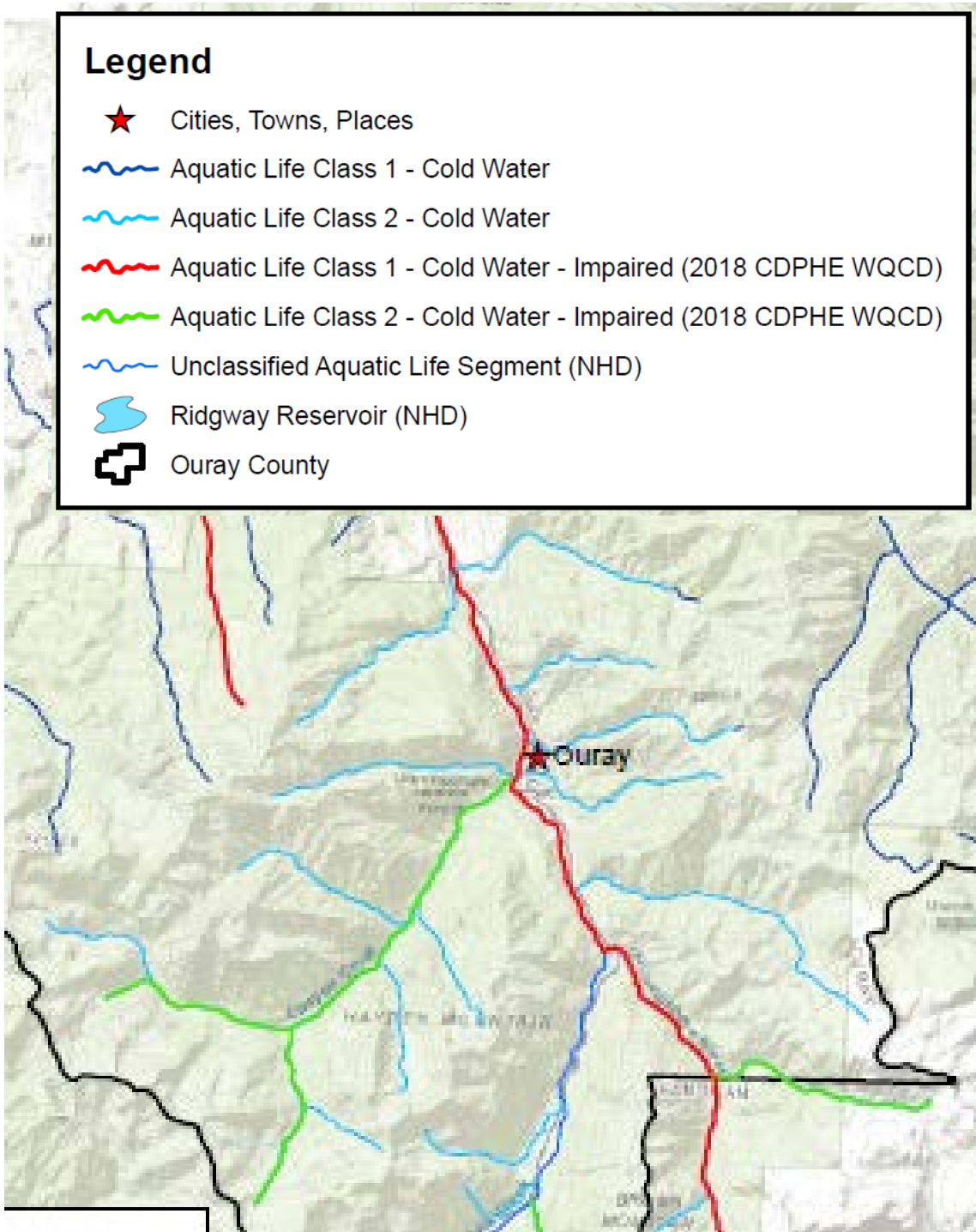
City of Ouray

Non-potable water supply project

- Project is exploring potential opportunity to reduce or eliminate hot springs discharge into the Uncompahgre River and help improve water quality.
- Project could be a good candidate for injury with mitigation to ISF to allow UUB exchange.

Reclassification of Uncompahgre River Stream Segment through Ouray

- The Uncompahgre River through Ouray is classified for water supply.
- Currently there are two domestic wells identified by CDPHE in this reach, however the properties are served water by Tri-County and may not be using the wells for domestic purposes.
- Reclassification could help to relax permitting requirements for The City of Ouray's WWTF.



IPP Projects to Address Water Gaps

Town of Ridgway

- Support potential projects to firm up Ridgway's existing municipal water supplies.
- If necessary, support potential projects to ensure future municipal water supplies.
- Support recommendations from the City's in progress Stormwater Masterplan for water quality improvement projects.
- Source water protection projects including Ridgway Ditch.

Tri-County Water and Dallas Creek Water Company System Interconnect

- Continue support of pipeline project to interconnect Tri-County Water with DCWC to provide backup supply. Already funded via two CWCB grants, a USBR grant, and contributions from Tri-County and DCWC.

Project 7 Water Authority

- New water treatment plant downstream of Ridgway Reservoir.

IPP Projects to Address Water Gaps

- Projects for Consideration on updated Gunnison Basin Projects List

REF No.	Project	Basin Goals Met								
		1	2	3	4	5	6	7	8	9
37	City of Ouray Water Efficiency and Conservation Plan Implementation	x			x		x		x	
38	Ouray County Upper Uncompahgre Basin Wide Augmentation Plan	x	x		x				x	
39	Inventory of Irrigation Infrastructure Improvement Needs - District 68	x		x		x		x	x	
40	Environmental Recreational Project Identification and Inventory - Upper Uncompahgre Region	x				x	x	x		
43	Gunnison Basin Selenium Management Plan and Gunnison Basin Selenium Task Force	x		x			x		x	
45	Development if Upper Uncompahgre Water Supplies	x	x	x	x	x		x	x	
46	Improvements to Red Mountain Ditch	x		x	x				x	
Potential Additional Projects resulting from Stream Management Plan										
	Provide Upper Basin Water Users Access to Ridgway Reservoir									
	Cow Creek Flow Dampening Reservoir and Ridgway Reservoir Diversion Project									
	Agricultural Efficiency Projects									
	City of Ouray – Non-potable water supply and water quality projects									
	Town of Ridgway – Water supply and water quality projects									

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9. Create and maintain active, relevant and comprehensive public education, outreach and stewardship processes involving water resources in the six sectors of the Gunnison Basin.

Steering Committee Open Discussion