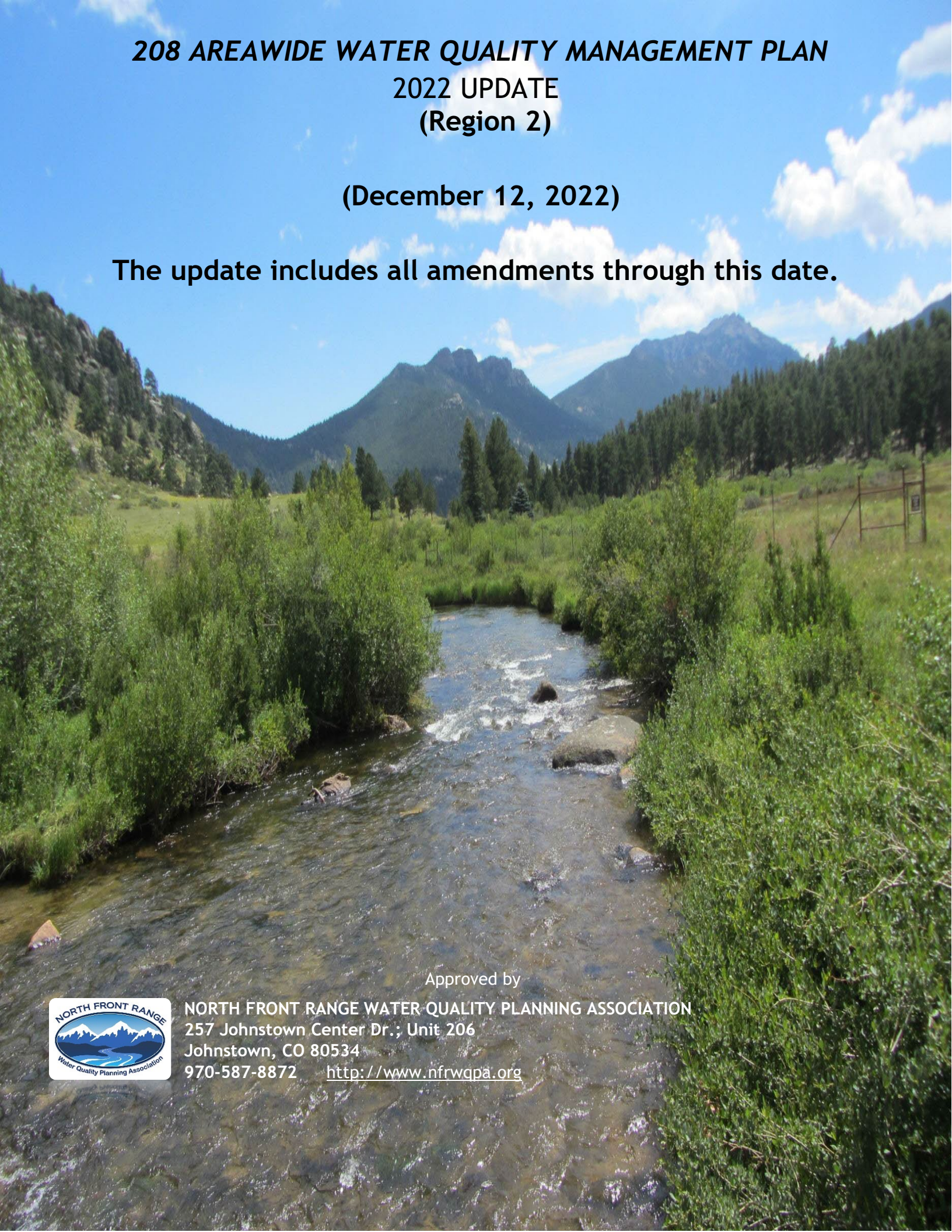
208 AREAWIDE WATER QUALITY MANAGEMENT PLAN

2022 UPDATE

(Region 2)

(December 12, 2022)

The update includes all amendments through this date.



Approved by

NORTH FRONT RANGE WATER QUALITY PLANNING ASSOCIATION
257 Johnstown Center Dr.; Unit 206
Johnstown, CO 80534
970-587-8872 http://www.nfrwqpa.org

Table of Contents

Chapter 1 INTRODUCTION 1

1.1 Executive Summary 1

1.2 Overview 2

1.3 Designation Of Management & Operating Agencies 7

Chapter 2 AREAWIDE WATER QUALITY MANAGEMENT PLAN(S) 17

2.1 Colorado Water Plan 17

2.2 Integrated Water Quality Monitoring & Assessment 305(b) Report 20

2.3 Colorado 10-Year Water Quality Roadmap 20

2.4 Nonpoint Source Activities 21

2.5 Stormwater 22

2.6 Oil and Gas-Mining 22

Chapter 3 RIVER BASIN POPULATION AND LOADING PROJECTIONS 23

3.1 Cache La Poudre River Basin 28

3.2 Big & Little Thompson River Basin 33

3.3 St. Vrain Creek River Basin 36

3.4 South Platte River Basin 39

3.5 Big Dry Creek River Basin 42

Chapter 4 AGENCY REGIONAL FINANCIAL SUMMARY 44

4.1 NFRWQPA DMOA Capital Improvement Projects Financial Summary 44

4.2 NFRWQPA DMOA Site Location & Design Applications Projects Financial Summary 44

4.3 NFRWQPA DMOA User Rates Summary 44

4.4 NFRWQPA DMOA Plant Investment Fees Summary 44

Chapter 5 WATER QUALITY 45

5.1 Regulation #31 Basic Standards and Methodologies for Surface Water 45

5.2 Regulation #38 Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, and Smoky Hill River Basin 45

5.3 Regulation #85 Nutrient Management Control Regulation 46

5.4 Waterbodies Requiring TMDLs 46

5.5 NFRWQPA Regional Water Quality Assessment Results Summary 47

5.6 Middle South Platte River Basin Assessment Results Summary 65

5.7 Cache la Poudre River Basin Assessment Results Summary 74

5.8 Big & Little Thompson River Basin Assessment Results Summary 83

5.9 St. Vrain Creek River Basin Assessment Results Summary 91

5.10 Big Dry Creek River Basin Assessment Results Summary 97
5.11 Regional Parameter Listing Summary 103
5.12 Regional Nutrients Estimates Results Summary 103
5.13 Cache la Poudre River Basin Nutrients Estimate 105
5.14 Middle South Platte River Basin Nutrients Estimate 108
5.15 Saint Vrain Creek River Basin Nutrients Assessment 114
5.16 Nutrients Assessment Summary 117
5.17 Watershed Rapid Assessment Program (WRAP) 118
Chapter 6 SECTION 208 PLANNING REQUIREMENTS 119
Chapter 7 NFRWQPA 2022 - 208 AWQMP RECOMMENDATIONS OR ACTIONS 120
7.1 208 AWQMP General DMOA Recommendations or Actions 121
7.2 208 AWQMP Specific DMOA Recommendations or Actions 122
7.3 208 AWQMP Association Recommendations and Actions 122
7.4 Municipality & County Local Comprehensive Plan Development 123
7.5 Creating a Comprehensive Plan Water Element 125
7.6 Water Quality Protection Standards for Construction 136
7.7 208 AWQMP WUSA Development Policy 157
7.8 208 AWQMP Consolidation Policy 163
Works Cited 167

Tables

Table 1-1 Approved Utility Plans 5
Table 1-2 Designated Land Use Management Agencies 14
Table 1-3 Designated Management & Operating Agencies 15
Table 1-4 Associates & Industries 16
Table 1-5 Private Agencies 16
Table 2-1 Colorado's Water Plan Actions 18
Table 2-2 EPA Elements of a Watershed Plan 21
Table 3-1 DMOA Growth Rates and Population Projections 27
Table 3-2 Cache la Poudre River Basin DMOAs 29
Table 3-3 Cache La Poudre Projections Table 31
Table 3-4 Big & Little Thompson River Basin DMOAs 34
Table 3-5 Big & Little Thompson Projections Table 34
Table 3-6 St. Vrain Creek River Basin DMOAs 36
Table 3-7 St. Vrain Creek River Basin Projections Table 37
Table 3-8 South Platte River Basin DMOAs 39
Table 3-9 South Platte River Basin Projections Table 40
Table 3-10 Big Dry Creek River Basin Agencies 42
Table 3-11 Big Dry Creek River Basin Projections Table 42
Table 5-1 Region 2 - Parameter Impairment Listings Table 62
Table 5-2 Region 2 - Parameter Impairment Listings Table Including M&E Listings 63
Table 5-3 Region 2 - Impairment Summary 103
Table 6-1 WQCD Policy 98-2 Section 208 Planning Requirements 119

Figures

Figure 3-1 Region 2 - Larimer County Population Projections 23
Figure 3-2 Region 2 - Weld County Population Projections..... 24
Figure 3-3 Region 2 - Weld County Municipalities Population Projections 25
Figure 3-4 Region 2 - Sanitation Districts Population Projections 26
Figure 3-5 NFRWQPA Region 2 Planning Projections 28
Figure 3-6 Cache la Poudre Planning Projections..... 29
Figure 3-7 CACHE LA POUDRE RIVER BASIN 32
Figure 3-8 Big & Little Thompson Planning Projections..... 33
Figure 3-9 BIG & LITTLE THOMPSON RIVER BASIN..... 35
Figure 3-10 St. Vrain Creek River Basin Planning Projections..... 36
Figure 3-11 ST. VRAIN RIVER BASIN 38
Figure 3-12 South Platte River Basin Planning Projections 39
Figure 3-13 SOUTH PLATTE RIVER BASIN 41
Figure 3-14 BIG DRY CREEK BASIN..... 43
Figure 5-1 303(d) Impaired and Use-Limited Rivers/Streams and Waterbodies Map 46
Figure 5-2 Integrated Report Categories (2022-Integrated Water Quality Monitoring and Assessment Report (305b)) 49
Figure 5-3 Region 2 - 305(b) Rivers/Streams and Waterbodies Classification Map..... 50
Figure 5-4 Region 2 - Rivers and Streams Designated Uses, 2018-2022..... 51
Figure 5-5 Region 2 - Lakes & Reservoirs Designated Uses, 2018-2022 52
Figure 5-6 Region 2 - Rivers & Streams Designated Use Classifications, 2018-2022 54
Figure 5-7 Region 2 - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022 . 55
Figure 5-8 Region 2 - Lakes & Reservoirs Designated Use Classifications, 2018-2022 56
Figure 5-9 Region 2 - Lakes & Reservoirs Designated Use Classifications, Fully Supporting, 2018-202257
Figure 5-10 Region 2 - Rivers & Streams Category Percentages 58
Figure 5-11 Region 2 - Rivers & Streams Units & Miles Assessed 59
Figure 5-12 Region 2 - Lakes & Reservoirs Category Percentages 60
Figure 5-13 Region 2 - Lakes & Reservoirs Units & Miles Assessed 60
Figure 5-14 Region 2 – Parameter Impairment Listings 61
Figure 5-15 Region 2 - Rivers & Streams Parameter Listings, 2022 64
Figure 5-16 Region 2 - Lakes & Reservoirs Parameter Listings, 2022 65
Figure 5-17 Middle South Platte River Basin - Rivers & Streams Designated Uses & Categories, 2022. 66
Figure 5-18 Middle South Platte River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022..... 67

Figure 5-19 Middle South Platte River Basin-Rivers & Streams Category Percentages, 2022 68
Figure 5-20 South Platte River Basin - Rivers & Streams Units & Miles Assessed 68
Figure 5-21 South Platte River Basin - Lakes & Reservoirs Designated Uses & Categories, 2022 69
Figure 5-22 South Platte River Basin - Lakes & Reservoirs Designated Use Classifications, Fully Supporting, 2018-2022 70
Figure 5-23 South Platte River Basin - Lakes & Rivers Category Percentages, 2022 71
Figure 5-24 South Platte River Basin - Lakes & Reservoirs Units & Acres Assessed 71
Figure 5-25 Middle South Platte River Basin - Rivers & Streams Parameter Listings, 2022 72
Figure 5-26 Middle South Platte River Basin - Lakes & Reservoirs Parameter Listings, 2022 73
Figure 5-27 Cache la Poudre River Basin - Rivers & Streams Designated Uses Categorical Summary, 2022 74
Figure 5-28 Cache la Poudre River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022 75
Figure 5-29 Cache la Poudre River Basin - Rivers & Streams Category Percentages, 2022 76
Figure 5-30 Cache la Poudre River Basin - Rivers & Streams Units & Miles Assessed 77
Figure 5-31 Cache la Poudre River Basin - Lakes & Reservoirs Designated Uses Categorical Summary, 2022 78
Figure 5-32 Cache la Poudre River Basin - Lakes & Reservoirs Designated Use Classifications, Fully Supporting, 2018-2022 79
Figure 5-33 Cache la Poudre River Basin - Lakes & Reservoirs Category Percentages, 2022 80
Figure 5-34 Cache la Poudre River Basin - Lakes & Reservoirs Units & Acres Assessed 80
Figure 5-35 Cache la Poudre River Basin - Rivers & Streams Parameter Listings, 2022 81
Figure 5-36 Cache la Poudre River Basin - Lakes & Reservoirs Parameter Listings, 2022 82
Figure 5-37 Big & Little Thompson River Basin - Rivers & Streams Designated Uses Categorical Summary, 2022 83
Figure 5-38 Big & Little Thompson River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022 84
Figure 5-39 Big & Little Thompson River Basin - Rivers & Streams Category Percentages, 2022 85
Figure 5-40 Big & Little Thompson River Basin - Rivers & Streams Units & Miles Assessed 85
Figure 5-41 Big & Little Thompson River Basin - Lakes & Reservoirs Designated Uses Categorical Summary, 2022 86
Figure 5-42 Big & Little Thompson River Basin - Lakes & Reservoirs Designated Uses Categorical Summary, 2022 87
Figure 5-43 Big & Little Thompson River Basin - Lakes & Reservoirs Category Percentages, 2022 88
Figure 5-44 Big & Little Thompson River Basin - Lakes & Reservoirs Units & Acres Assessed 88
Figure 5-45 Big & Little Thompson River Basin - Rivers & Streams Parameter Listings, 2022 89
Figure 5-46 Big & Little Thompson River Basin - Lakes & Reservoirs Parameter Listings, 2022 90
Figure 5-47 St. Vrain Creek River Basin - Rivers & Streams Designated Uses Categorical Summary, 2022

..... 91
Figure 5-48 St. Vrain Creek River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022..... 92
Figure 5-49 St. Vrain Creek River Basin - Rivers & Streams Category Percentages, 2022..... 93
Figure 5-50 St. Vrain Creek River Basin - Rivers & Streams Units & Miles Assessed 93
Figure 5-51 St. Vrain Creek River Basin - Lakes & Reservoirs Designated Uses Categorical Summary, 2022 94
Figure 5-52 St. Vrain Creek River Basin - Lakes & Reservoirs Designated Use Classifications, Fully Supporting, 2018-2022..... 95
Figure 5-53 St. Vrain Creek River Basin - Lakes & Reservoirs Category Percentages, 2022..... 96
Figure 5-54 St. Vrain Creek River Basin - Lakes & Reservoirs Units & Miles Assessed 96
Figure 5-55 St. Vrain Creek River Basin - Rivers & Streams Parameter Listings, 2022 97
Figure 5-56 Big Dry Creek River Basin - Rivers & Streams Designated Uses Categorical Summary, 2022 98
Figure 5-57 Big Dry Creek River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022..... 99
Figure 5-58 Big Dry Creek River Basin - Rivers & Streams Category Percentages, 2022..... 100
Figure 5-59 Big Dry Creek River Basin - Rivers & Streams Units & Miles Assessed 100
Figure 5-60 Big Dry Creek River Basin - Lakes & Reservoirs Category Percentages, 2022..... 101
Figure 5-61 Big Dry Creek River Basin - Lakes & Reservoirs Units & Miles Assessed 101
Figure 5-62 Big Dry Creek River Basin - Rivers & Streams Parameter Listings, 2022 102
Figure 5-63 Region 2 - Total Nitrogen & Phosphorus 105
Figure 5-64 Cache la Poudre - Total Nitrogen & Phosphorus..... 106
Figure 5-65 Cache la Poudre – Total Nitrogen (WWTF)..... 106
Figure 5-66 Cache la Poudre – Total Phosphorus (WWTF) 107
Figure 5-67 Cache la Poudre - Total Nitrogen (Stormwater) 107
Figure 5-68 Cache la Poudre - Total Phosphorus (Stormwater)..... 108
Figure 5-69 Middle South Platte River Basin – Total Nitrogen & Phosphorus..... 109
Figure 5-70 Middle South Platte River Basin - Total Nitrogen (WWTFs) 109
Figure 5-71 Middle South Platte River Basin - Total Phosphorus (WWTFs) 110
Figure 5-72 Middle South Platte River Basin - Total Nitrogen & Phosphorus (Stormwater)..... 110
Figure 5-73 Big & Little Thompson River Basin - Total Nitrogen & Phosphorus..... 111
Figure 5-74 Big & Little Thompson River Basin - Total Nitrogen (WWTFs) 111
Figure 5-75 City of Loveland TIN Reduction-16%..... 112
Figure 5-76 Big & Little Thompson River Basin - Total Phosphorus (WWTF) 112
Figure 5-77 City of Loveland Total P Reduction-93% 113

Figure 5-78 Big & Little Thompson River Basin - Total Nitrogen (Stormwater)..... 114
Figure 5-79 Big & Little Thompson River Basin - Total Phosphorus (Stormwater)..... 114
Figure 5-80 St. Vrain Creek River Basin - Total Nitrogen & Phosphorus 115
Figure 5-81 St. Vrain Creek River Basin - Total Nitrogen (WWTFs)..... 115
Figure 5-82 St. Vrain Creek River Basin - Total Phosphorus (WWTFs) 116
Figure 5-83 St. Vrain Creek River Basin - Total Nitrogen (Stormwater) 116
Figure 5-84 St. Vrain Creek River Basin - Total Phosphorus (Stormwater) 117

Acronym List

AUID	Assessment Unit ID
CDPHE	Colorado Department of Public Health and Environment
CWA	Clean Water Act
CWP	Colorado Water Plan
DMOA	Designated Management or Operation Agency
EPA	Environmental Protection Agency
GIS	Geographic Information System
GMA	Growth Management Area
gpd	Gallons per Day
IGA	Intergovernmental Agreement
NFRWQPA	North Front Range Water Quality Planning Association
M&E	Monitoring and Evaluation
mgd	million gallons per day
mg/l	milligrams per liter
MS4	Municipal Separate Storm Sewer Systems
SBNR	Single Basin Nutrient Removal
SWQMP	Statewide Water Quality Management Plan
TIN	Total Inorganic Nitrogen
TMDL	Total Maximum Daily Loads
WQCD	Water Quality Control Division
WUSA	Wastewater utility service area
WWTF	Wastewater treatment facility
WWTP	Wastewater treatment plant

Chapter 1 INTRODUCTION

1.1 Executive Summary

The North Front Range Water Quality Planning Association ("NFRWQPA" or "Association") provides the 2022 Areawide Water Quality Management Plan (208 AWQMP) for Larimer and Weld Counties (Region 2). The Association has been the responsible 208 Areawide Water Quality Designated Planning Agency since 1987. This update contains information on the following items:

- Water quality information for the region
- Statewide Water Quality Management Plan information for the region
- Policy/management changes
- A current listing of all the Designated Management and Operation Agencies (DMOAs) for the region
- All incorporated modifications to the plan through plan amendments or site applications since the last update (2018)
- All municipal point source discharges, including population, loading projections provided by the entities, and a description of the facility and service area map, are now available online
- Region and subbasin water quality assessments and observations
- Region and subbasin nutrient loading estimates

1.2 Overview

The Clean Water Act (CWA), first passed in 1972, and later amended in 1977 and 1987, is the primary federal law that regulates the quality of surface waters in the United States. This act establishes the need for water quality planning, including regional water quality planning, as outlined in section 208. The CWA allows states to administer many programs under the act if the state laws and regulations governing these programs are at least as stringent as the federal act. The Colorado Water Quality Control Act (Act) was established to assume the lead role in many of these program areas, including water quality management. This Act authorizes the governor to designate federal Clean Water Act planning agencies. The Association is the Designated Planning Agency for Larimer and Weld Counties (Region 2). The Association has the following Mission and Vision:

Mission Statement

To use collaborative regional planning, facilitation, and review to ensure that present and future wastewater needs are met economically and with a focus on water quality protection.

Vision Statement

As an advocate for our streams, lakes, and communities, NFRWQPA aspires to be a highly respected regional leader in resolving water quality planning issues, and a source of reliable information and data, regulatory interpretation, and thoughtful comment on proposals. It is a unifying force in regional long- term wastewater and water quality planning, ensuring that wastewater service is provided with coordination of effort, and technical expertise.

In addition to the Association's Mission and Vision statement, membership follows the Association's Code of Ethics and Values. The Association's Code of Ethics and Values can be accessed online here: https://nfrwqpa.colorado.gov/home/code-of-ethics-values.

As the designated 208 planning agency, the Association is responsible for developing and updating the 208 AWQMP to keep it current. Once approved, the 208 AWQMP serves as the overriding planning document used to coordinate water quality activities in the region. As stated in the CWA, the plan shall include "the identification of treatment works necessary to meet the area's anticipated municipal and industrial waste treatment needs" and "the identification of the measures necessary to carry out the plan." EPA's 40 CFR 130.6 establishes policies and program requirements for water quality planning, management, and implementation under several sections of the CWA, including section 208. Included in these program requirements is the need for states to establish a continuing planning process that, among other things, creates the mechanism for updating and maintaining Water Quality Management Plans. The Water Quality Control Division (WQCD) prepared "*A Guide to Colorado Programs for Water Quality Management and Safe Drinking Water*" (Commission Policy #98-2, updated in December of 2019). The Water Quality Control Commission's (WQCC) Website (https://www.colorado.gov/pacific/cdphe/wqcc-policies) provides stakeholders access to all policies and regulations, such as Policy 98-2. This document is the latest version of guidelines for the continuous planning process for the state. It also discusses additional details regarding the roles and required elements of regional water quality management plans. It provides a list of factors that "need to be kept current through the update and amendment process" for regional 208 water quality management plans to remain useful decision-making documents.

The Association is also responsible for conducting the tasks identified in the plan. The Association has policies and guidance documents that govern specific activities associated with these tasks. These policies are designed to steer the planning process. In the 2022 Update, the following policies and guidance documents have been updated and can be viewed online.

- Utility Plan Policy
- Utility Plan Guidance Document (updated in 2019)
- Site Location and Design Approval Review Policy
- Plan Amendment Process
- Plan Amendment Applications

This 208 AWQMP update includes information that the Association has identified as needing to be kept current. These elements include facility needs, facility location, capacity, facility expansion timing, population, service areas, level of treatment, and partnerships. The Association has descriptions of DMOA facilities, individual point source datasheets, Utility Plans, and wastewater utility service areas (WUSA), all available online.

DMOA point source data inventory sheets are updated biannually, coinciding with updates of the 208 AWQMP. These individual point source data inventory sheets include treatment levels, anticipated future needs, and projections of when the DMOA facility will reach 80% and 95 % of capacity. The DMOA point source datasheets may be accessed online here: https://nfrwqpa.colorado.gov/agency-point-source-data-inventory.

For the 2022-208 AWQMP, the following DMOAs provided updated point source data inventory sheets:

1. Abbey St. Walburga
2. Achieve More Reclamation Facility
3. Annunciation Heights
4. Ault, Town of
5. B &B Mobile Home Park
6. Ben Delatour Boy Scout Ranch
7. Berthoud, Town of
8. Berthoud Estates
9. Best Western Coach House Resort
10. Boxelder Sanitation District
11. Brighton, City of
12. Broomfield, City, and County of
13. Buckhorn Methodist Camp
14. Carestream
15. CPW – Hatcheries
16. Crystal Lakes Water & Sewer
17. CSU Mountain Campus
18. Dao house
19. Davies Mobile Home Park
20. Eaton, Town of
21. Eden Valley Institute
22. Erie, Town of
23. Estes Park Sanitation District
24. Evans, City of
25. Fort Collins, City of
26. Ft. Lupton, City of
27. Fox Acres
28. Front Range Energy
29. Galeton Water & Sanitation District
30. Gilcrest, Town of
31. Glacier View Meadows Water & Sewer Association
32. Glen Echo Resort
33. Greeley, City of
34. Grover, Town of
35. Harvest Farm, Denver Rescue Mission
36. High Country Estates HOA
37. Hemmingway Lodge at Eagles Nest
38. Hidden View Estates
39. High Peak Camp, Salvation Army
40. Hudson, Town of
41. In Bev Anheuser Busch- Nutri Turf Farm
42. JBS – Lone Tree Facility
43. Jellystone Park Estates (Yogi Bear's Jellystone Park)
44. Johnstown, Town of
45. Kennedy Mountain Campus-Magic Sky Ranch Girl Scout Camp
46. Keenesburg, Town of
47. Kersey, Town of
48. ~~Larimer River Guest Ranch-CLOSED PRE-COVID~~
49. LaSalle, Town of
50. Leprino Foods
51. Lochbuie, Town of
52. Longmont, City of
53. Loveland, City of
54. Mead, Town of
55. Metro Water Recovery
56. Milliken, Town of
57. New Vision Mobile Home Community
58. Northglenn, City of
59. ~~Opal Foods- now Under CAFO Permit~~
60. Pierce, Town of
61. Pine Lake Village Mobile Home Park
62. Platteville, Town of
63. Prairie School District RE-11J
64. Resource Colorado Water & Sanitation Metro District
65. Severance, Town of
66. Shambhala Mountain Center
67. Sky Ranch Lutheran Camp
68. South Ft. Collins Sanitation District
69. St. Vrain Sanitation District
70. Sunrise Ranch – Emissaries of Devine Light
71. Timnath, Town of
72. Upper Thompson Sanitation District
73. Wellington, Town of
74. Windsor, Town of

Utility Plans are critical in determining how wastewater service will be provided to urbanized portions of the region and unique case locations with a permitted wastewater treatment facility. The long-term goal is to have a Utility Plan approved by the Association for all the region's authorized domestic wastewater treatment systems. In working towards that goal, the Association has established a Utility Plan Policy that requires any DMOA submitting a site application, plan amendment request, or district formation/designation request to have an approved Utility Plan in place. The Association is also working with the Division's Permit Section to ensure that DMOAs have an approved Utility Plan with the Association as the state issues permits. Section 208 of the CWA states that no permit may be issued in conflict with a regional water quality plan (US EPA , [As Amended Through P.L. 107–303, November 27, 2002]). These Utility Plans provide specific information on how service will be provided to the planning area and include detailed information regarding recommendations, including infrastructure, to meet projected needs and how the recommended treatment processes will meet all water

quality standards. Utility Plans encourage the concept of wastewater planning, considering optimizing collection and treatment systems examining partnerships, and consolidating services within and beyond the planning horizon.

The 208 Plan, Utility Plans, and Site Applications collectively overlap to protect, maintain, and restore the environmental watershed quality. Utility Plans also include current capacities and projected future capacities for collection and treatment, lift stations, and interceptors (including a construction schedule based on time or milestones) needed to serve the DMOA's WUSA. These Utility Plans become the foundation for the 208 Plan Update and support the Association's decisions and recommendations. The Association's approved Utility Plans list is in Table 1-1 and available online here: https://nfrwqpa.colorado.gov/approved-utility-plans.

Table 1-1 Approved Utility Plans

NFRWQPA Approved Utility Plans			
Agency	**Approved Date**	**Agency**	**Approved Date**
Abbey of St. Walburga	March-2010	Hudson, Town of	July-2008
Ault, Town of	June-2014	Johnstown, Town of	July-2022
Ben Delatour Scout Ranch	October-2009	Keenesburg, Town of	March-2022
Berthoud Estates	August-2014	Loveland, City of	September-2010
Berthoud, Town of	November-2014	Mead, Town of	February-2022
Boxelder Sanitation District	March-2018	Metro Water Recovery	September-2010
Broomfield, City of	July-2012	Milliken, Town of	May-2016
Broomfield North Park Basin Wastewater Service Area Plan	July-2012	Northglenn, City of	July-2012
Covenant Heights	October-2014	Platteville, Town of	March-2019
Crystal Lakes	May-2014	Prairie School District	May-2012
CSU Mountain Campus	April-2019	River Glen HOA	June-2013
Eaton, Town of	October-2003	Riverview RV Park	March-2021
Eden Valley Institute	June-2013	Resource Colorado Water & Sanitation Metro District	September-2008
Erie, Town of	September-2020	New Vision Mobile Home Community	June-2010
Estes Park Sanitation District	December-2011	Saddler Ridge Metro District	October-2008
Evans, City of	August-2015	Salvation Army - High Peak Camp	December-2018
Fort Collins, City of	January-2009	Severance/Saddler Ridge Metro District Joint Utility Plan	December-2010
Fort Lupton, Town of	August-2014	Shambhala Mountain Center Mountain Center	April-2010

Fox Acres	May-2015	South Ft. Collins Sanitation District	March-2018
Galeton Water & Sanitation District	May-2022	St. Vrain Sanitation District	April-2019
Glacier View Meadows	Conditional-October-2007	Sunrise Ranch - Emissaries of Devine Light	June-2014
Greeley, City of	June-2021	Upper Thompson Sanitation District	October-2021
Grover, Town of	June-2010	Wellington, Town of	December-2021
Hidden View Estates	December-2007	Windsor, Town of	November-2019

All Utility Plans may be viewed at: https://nfrwqpa.colorado.gov/approved-utility-plans

All projects listed within approved Utility Plans become adopted and endorsed by the Association's 208 AWQMP. Vice versa, all endorsed projects listed are approved and supported through the Association approval of Utility Plans. The Association's endorsed project list tracks estimated construct costs, construction schedules, Regulation No. 22 project type, and total regional cost over time. The 208 AWQMP Endorsed Projects may be accessed online here: https://nfrwqpa.colorado.gov/208-areawide-water-quality-management-plan.

Updates to WUSA boundaries due to 208 Plan Amendment changes are implemented into the 208 AWQMP as amendments are approved. The WUSA maps outline the 208 boundaries of the areas for which the DMOA will be responsible for all wastewater services in the foreseeable future. No overlaps in service area boundaries are allowed unless there is, in existence, an intergovernmental agreement between the involved service providers as to how service will be provided to the overlapping areas. The WUSA boundaries are mapped using a GIS system (ESRI) that the Association maintains. Any change in these boundaries requires an amendment to the 208 AWQMP unless it is a minor adjustment involving less than ten acres. An approved Utility Plan must support all changes for the entity requesting the change. All agency WUSA boundary maps may be viewed online at: https://nfrwqpa.colorado.gov/agency-service-area-maps, or https://data-nfrwqpa.hub.arcgis.com/.

1.3 Designation Of Management & Operating Agencies

The original 208 AWQMP prepared in 1985 listed all the DMOAs in Larimer and Weld Counties. The DMOA agencies have been updated by including other agencies when they became eligible for designation. As in previous updates, the DMOAs having the authority to implement responsibilities and actions in the 208 AWQMP include the following duties described below.

DMOA Responsibilities

The CWA calls for local jurisdictions and agencies to carry out specific roles in protecting water quality. Agencies with specific responsibilities in implementing the CWA are approved DMOAs by the Association and the governor. Several federal and state agencies have regulatory oversight in water quality management; local DMOAs recognized by the Association in the 208 AWQMP are responsible for fulfilling federal and state agencies' legal requirements. With primacy to administer the Federal Clean Water Act, Colorado has regulatory oversight of 208 Planning agencies and their responsibilities according to the federal and state CWA. The federal agency is the U.S. Environmental Protection Agency, and the state agency is the Colorado Department of Public Health and Environment, and Water Quality Control Commission.

Depending on a DMOA's assigned role (Management or Operation) recognized by this 208 AWQMP, Counties, Municipalities, Special Districts, and representing administrative boards and councils must have the capability to:

1) Carry out their responsibilities according to the 208 AWQMP;

2) Have legal authority to provide wastewater service to its designated wastewater utility service area (WUSA);

3) Accept and utilize grants or other funds from any source for waste treatment management or nonpoint source control purposes to maintain, protect, or restore water quality in the Larimer/ Weld County region;

4) Continuously raise adequate revenues or necessary funding through sewer rates and tap fees, including rate increases as needed having the capabilities to incur short and long-term indebtedness if needed to implement its assigned portion of the 208 AWQMP to maintain, protect, or restore nonpoint source water quality;

5) Make every effort to provide Utility Plans, at least, every ten years regarding regional planning to meet the Colorado Discharge Permit System current and future known for point or nonpoint water quality-based limits or regulations;

6) Cooperate with and assist NFRWQPA in the performance of its Utility Plan responsibilities adopted into the 208 AWQMP.

7) Construct wastewater facilities or facility upgrades and nonpoint source best management practices (BMPs) to maintain, protect, or restore regional water quality;

8) Refuse wastes from industry, municipality, or subdivision thereof, which does not maintain, protect, or restore water quality in the region; i.e., PFAS

9) Effectively manage and operate collection systems, lift stations, and related wastewater treatment works and nonpoint source BMPs to maintain, protect, or restore regional water quality;

10) Implementing its portion of the 208 AWQMP requires each participating community to pay its proportionate share of related costs.

The DMOAs and their responsibilities established under this 208 AWQMP recognizes three types of DMOAs: 1) Counties, 2) Municipalities, and 3) Regional Water and Sewer Districts that collect and/or treat municipal wastewater, have the following responsibilities:

1) To protect water quality and public health by meeting the requirements of their Colorado Discharge Permit System (CDPS), Notice of Authorization (NOA), or National Pollutant Discharge Elimination System (NPDES) permits, and;

2) To protect water quality by managing stormwater runoff in compliance with the 208 AWQMP and applicable single and general permit(s);

3) A municipality that sells or gives its sanitary sewerage system to another public agency or political subdivision of the state, NFRWQPA will delist the original DMOA and transfer the DMOA designation to the new owner of the WUSA infrastructure;

4) County and municipal Health Department's responsibility is to protect water quality and public health by regulating the installation and maintenance of on-site wastewater treatment systems for household residences;

5) County and municipal Health Departments are responsible for providing Utility Plans and regional data concerning groundwater contamination of on-site wastewater treatment systems for household residences;

6) Counties are responsible for providing appropriate methods to evaluate water quality effects related to large lot developments served by on-site wastewater treatment systems within non-urban wastewater utility service areas;

7) Counties, municipalities, and townships are responsible for stormwater permits (MS4s) where required by CDPHE;

8) Counties are considered the nonpoint source control agency.

County Soil and Water Conservation District's responsibilities are:

1) To provide education and technical assistance to farmers in applying best agricultural management practices;

2) To prevent water pollution from sediment, nutrients, and pesticides;

3) Encourage fish and wildlife habitat consistent with productive agriculture practices.

Responsibilities of Associates and Industry members of the Association, although not recognized as DMOAs, are:

1) To protect water quality and public health by meeting the requirements of their Colorado Discharge Permit System (CDPS), Notice of Authorization (NOA), or National Pollutant Discharge Elimination System (NPDES) permits, and;

2) To protect water quality by managing stormwater runoff in compliance with the regional 208 AWQMP, local, and state applicable single and general permit(s);

3) Adequately fund their wastewater treatment facility ensuring the process can meet the Colorado Discharge Permit System current and future known water quality-based limits or regulations;

4) Adequately fund nonpoint source water quality best management practices to maintain, protect, or restore nonpoint source water quality.

DMOAs accept responsibility for implementing their part of the Clean Water Act Section 208 and protecting the Larimer/Weld County region's water quality. DMOA status is a prerequisite to participation in the Association to maintain and update the 208 AWQMP.

Relationship of 208 Planning to 208 Management

Management can be considered the doing phase of the 208 processes. In 208 planning, wastewater management policies are agreed upon by the membership DMOAs. Thus, planning is the designing and policy-setting elements, while management is the operational phase when policies are translated into action and implemented. Planning is a continuous process that exists in tandem with management. Planning is not a single act that concludes with completing a Utility Plan but instead guides all DMOAs involved in areawide water clean-up and protection continuously for all time. WQCC Policy 98-2 requires updates to 208 plans at regular intervals, including DMOA progress on their responsibilities within their individual Utility Plans and the overall 208 AWQMP. The Association has chosen to update its 208 AWQMP bi-annually.

DMOAs must provide a financially self-sustaining planning process, including Utility Plan updates every ten years and an independent planning process for wastewater treatment facilities, collection systems, and nonpoint source upgrades to meet current and known future water quality standards. Through DMOAs' Utility Plans, the Association develops and operates a continuing 208 AWQMP process for the region. The WQCC certification of the 208 AWQMP ensures the 208 AWQMP is consistent with the state's Colorado Water Plan (CWP) and applicable state basin plans. The Association has the duties of monitoring the endorsed 208 AWQMP projects approved through Utility Plans. The Association reports its findings to the DMOAs and the state using the 208 AWQMP bi-annually updates. The Association is not a watchdog of the DMOAs. The Association's primary responsibility is to report to the DMOAs to take corrective action to maintain, protect, or restore water quality. In a majority of cases, EPA expects that these responsibilities will lie with the designated planning agency.

Requirements that Management and Operation Agencies Must Meet

Areawide 208 planning is preparing for management and implementation of approved plans mandated by Congress, both in the actual language of Section 208 and other sections and in the spirit of the act. EPA has emphasized Congress' requirements to ensure Areawide 208 planning is carried out regionally. While Congress was quite specific that 208 plans should be implemented, Section 208 allows states and localities great flexibility in designing areawide water quality management systems. The EPA encourages 208 planning agencies to tailor an institutional network to its own water quality financial needs and organizational style.

A governor can designate one or more DMOAs to carry out the 208 Plan. There is considerable latitude within these agencies' requirements set by Section 208 to allow various metropolitan areas, small towns, and rural areas to devise an acceptable and implementable areawide water quality management plan. Most of the specific requirements for 208 DMOAs outlined relate to the financing, construction, operation, and maintenance of wastewater treatment works and nonpoint source pollution control. These require that DMOAs of an areawide water quality management plan as a whole must be able to:

1) Design, construct and operate waste treatment works;

2) Accept and use grants;

3) Raise revenues and assess wastewater treatment charges;

4) Incur short- and long-term indebtedness;

5) Require municipalities to pay a proportionate share of treatment costs;

6) Be able to refuse wastes from municipalities or subdivisions, which do not maintain, protect, or restore water quality;

7) Accept industrial wastes;

8) Set pretreatment standards;

9) Refuse industrial wastes that do not preserve, protect, or restore water quality, and

10) Be able to "manage effectively waste treatment works and related facilities." The legal, financial, and organizational capability of managing treatment works is broadly defined to include devices for storage, collection, treatment, recycling, reclamation of municipal sewage or industrial wastes, and nonpoint source pollution control.

In addition to these requirements related to treatment works, the law includes a general provision about the entire management program. This requirement both ensures flexibility in designing an areawide water quality system, and at the same time, demands innovation on the part of the 208 planning agency DMOAs, on the part

of governors who must designate management agencies, and within EPA, which must approve those management agencies designation and 208 plans. This requirement states that DMOAs must be able to carry out their responsibilities of the approved 208 AWQMP. This general feature of the law goes beyond those plan elements relating to the treatment works to ensure that all management functions called for in the 208 AWQMP are handled effectively by some DMOAs. Section 208 of the CWA requires DMOAs to have the legal, financial, and institutional capability to carry out their 208 AWQMP responsibilities. Also, it requires that DMOAs organizations exist with enough political power to fund their duties within the approved 208 AWQMP.

As a result, the Association's primary objective is to create a membership of competent decision-making DMOAs, working together to achieve local, regional, and state water quality objectives at the lowest economic, social, political, and environmental cost. Areawide water quality management must provide a comprehensive and unified approach, achieving the state's water quality standards and those agreed upon by the region itself. The 208 AWQMP must address all water pollution sources (point and nonpoint), and if not controlled, taken into account. All DMOA functions must be authorized and funded, and, perhaps the most essential ingredient, a coordinative mechanism provided, i.e., the 208 AWQMP. Congress's apparent aim in writing Section 208 is to overcome irrational fragmentation of responsibility by duplicating services and efforts unnecessarily, as governmental agencies sometimes work at cross purposes with one another. Coordination may be achieved procedurally through 208 Planning agencies when DMOAs agree to collaborate to maintain, protect, or restore water quality regionally. 208 Planning agencies strive to coordinate government agencies locally to prevent duplicated services and efforts regionally. Association members support that these agreed-upon activities in the 208 AWQMP produce a more effective and efficient public service through the collaboration and coordination of wastewater services to preserve, protect, or restore water quality regionally.

What functions will each 208 AWQMP perform, what powers are needed to complete the responsibilities, and does the management program as a whole perform all assignments required? In the 208 AWQMP, vital functions include:

1) Continuing 208 planning (including policy guidance to DMOAs, revising, updating the 208 AWQMP, evaluating the performance of DMOAs, and the relationship of water quality system with other systems in the region with state and federal governments).

2) Facilities planning, construction, operation, and maintenance of facilities to collect, intercept, treat, dispose of, reuse, and recycle wastes from municipalities and industries, including stormwater management, nonpoint source runoff controls, sludge disposal or use, regulation of existing and new pollution sources, including nonpoint sources, permits, water quality, and effluent standards, enforcement, and penalty application.

3) Financing the system, including construction, operation and maintenance, planning, administration, and overhead costs; setting user charge rates, tap fees, pricing policies, and rate and fee increases overtime.

4) Monitoring; ambient water quality monitoring (point and nonpoint), compliance monitoring, biological monitoring, and support for the general database.

5) Information systems – GIS, data gathering, storage, retrieval, analysis, dissemination, coordination, and enforcement of the Plan.

What questions will the 208 AWQMP satisfy concerning the DMOAs' responsibilities, and does the 208 AWQMP as a whole perform all assignments required? In the 208 AWQMP key questions answered include:

1) Who will require compliance with the 208 AWQMP?

2) How will compliance be achieved?

3) How will conflicts be resolved among management agencies within the same system, between management and planning functions, between the water quality management system and other systems in the same region?

4) Is primary control by local, state, or federal?

5) Should construction be split between two or more organizations along sub functional lines or centralized by the consolidation of WWTFs? For example, should sewer collection lines be built and operated locally, and interceptors and treatment plants be handled regionally?

6) Does the 208 AWQMP, as a whole, address all sources of pollution, including municipal point sources; stormwater nonpoint source runoff, including combined sewer overflows; nonpoint sources such as runoff from agriculture and concentrated animal feeding operations (CAFOs), and abandoned mines?

7) Is DMOAs financing adequate and assured for all needed actions, including operation, construction, overhead, and administrative costs?

Criteria for an Effective Water Quality Management Program

In deciding these 208 planning issues of where to place functions and responsibilities of DMOAs in the 208 AWQMP, judgments must first be made regarding criteria for "effective" membership networks.

Criteria for assigning practical DMOA functions might include:

1) Economic efficiency.
   i. Can the DMOA achieve its water quality goal at the lowest economic cost?
   ii. Does it achieve economies of scale?

2) Equity.
   i. Are the benefits of clean water and clean-up costs reasonably and fairly distributed over the affected resident population?
   ii. Are external costs, such as impacts on other environmental problems and effects on other services and social objectives, minimized?
   iii. Are individuals' rights protected?

3) Political accountability.
   i. Are the DMOAs accessible to, accountable to, and controlled by their affected residents in proportion to their stake in the outcome of governmental decisions?
   ii. For example, are the agencies not dominated by any single special interest group?
   iii. Is broadly-based citizen participation encouraged and structured?

4) Administrative efficiency.
   i. Has each DMOA been assigned adequate powers to carry out its 208 AWQMP responsibilities and duties?
   ii. Is each DMOA able to pursue intergovernmental cooperation and reduce interlocal, and membership, functional conflict?
   iii. Does each DMOA in the 208 AWQMP have adequate funding?
   iv. Does each DMOA in the 208 AWQMP utilize fee rate increases to meet current and future known water quality regulations?
   v. Is the DMOA structure sufficiently compatible with existing governmental institutions in the area to be a politically feasible instrument for performing assigned functions?
   vi. Are DMOAs functional with natural flexibility to consider all alternatives and trade-offs regarding the responsibilities and duties of the 208 AWQMP?

Legal Basis

The Association has the authority to assume responsibility for 208 Planning monitoring, planning, coordination, and conflict resolution responsibilities assigned as the designated Section 208 Areawide Water Quality Management Planning Agency. The current versions of the following documents are incorporated into this 208 AWQMP by reference:

1) §208 of the Federal Water Pollution Control Act Amendments (P.L. 107-303) as amended by the Clean Water Acts through November 27, 2022)

2) Federal Register §35.1521 et seq. Vol. 44 No. 101, Wednesday, May 23, 1979, Rules and regulations

3) Articles of Association

4) Implementing Documents, Policies, Procedures, and Resolutions of the Association.

DMOAs are responsible for planning and financing facilities needed to carry out their role. All DMOAs are accountable for planning, collecting, and treating sewage systems involving multiple DMOAs. Typically, the DMOA is the County or municipality that owns and operates the WWTP, but not always. If a WUSA does not include a treatment plant, the DMOA is responsible for building, managing, and maintaining the collection sewers.
The DMOA's role includes:

1) Prepare Utility Plans to meet NFRWQPA and CDPHE requirements and water quality goals.

2) Serve as the lead applicant to arrange to finance and construct needed facility improvements to meet water quality-based limits and future water quality-based limits.

3) Join into service agreements with other political jurisdictions within the Association to operate and maintain wastewater facilities, collection sewers, nonpoint source control, and other DMOA activities.

4) Request 208 AWQMP amendments as necessary. NFRWQPA encourages neighboring governments to resolve service area conflicts at the local level through a collaborative process. A membership vote determines the matter's final decision when affected jurisdictions cannot resolve disputes regarding an amendment of the 208 AWQMP through a collaborative process.

5) CDPHE reviews the 208 AWQMP and makes necessary recommendations to achieve the region's water quality goals, and the WQCC approves the 208 AWQMP.

6) DMOAs cooperate with membership and in the 208 AWQMP and updating process.

The guiding principles used in delineating WUSAs in NFRWQPA 208 AWQMP are:

1) WUSAs must comply with the CWA requirements, notably:

   a) "Waste treatment management shall be on an Areawide basis." [Clean Water Act §201(C)]

   b) "Identification of those areas which, due to urban-industrial concentrations or other factors have substantial water quality control problems." [Clean Water Act §208(A)(1)]

   c) WUSAs should use sound planning practices to identify future needs for wastewater collection and treatment facilities.

   d) A WUSA boundary is a planning area for a single specific present or future DMOA's designated wastewater plant(s) and a service area.

e) A WUSA may include service areas for multiple treatment plants.

f) WUSAs should be compact and contiguous concentrations of urban land uses without islands of one WUSA surrounding another.

g) Remote service areas may be included in a WUSA when connected by force main and separated by regions that remain unurbanized.

h) DMOAs are to design WUSAs to serve residents cost-effectively without duplication of service.

i) WUSA boundaries should be consistent with adopted local land use and zoning plans.

j) WUSA boundaries consider the topography selecting gravity sewer lines over lift stations.

k) DMOAs should develop WUSA boundaries through cooperative dialogue among affected local jurisdictions. The Association encourages neighboring governments to resolve sewage service conflicts at the local level through a collaborative process. A membership vote will determine the matter's final decision if affected local jurisdictions cannot resolve disputes regarding an amendment to the 208 AWQMP through a collaborative process.

Association Land-Use Management Agencies

A designated land-use management agency should have land-use authority to solve water quality problems associated with development, including nonpoint source urban runoff. The land-use management agency would be responsible for land-use decisions that could affect the quality of waters in their area of jurisdiction or the ability to provide adequate wastewater collection and treatment. The concerns for water quality related to on-site wastewater treatment systems (OWTS) use, the proliferation of small treatment plants, urban runoff, construction-caused erosion and sedimentation, and other activities can be approached through various forms of land use control.

Designated land-use management agencies typically include a general-purpose governmental agency with land-use control powers, such as a county, city, or town. These land-use management agencies are responsible for oversight of all water quality concerns related to land use within their jurisdiction, including point and non-point sources of pollution and activities which can degrade receiving waters. The management agency is responsible for all wastewater services in the foreseeable future within their WUSA. Table 1-2 lists the Associations' designated land use management agencies.

Table 1-2 Designated Land Use Management Agencies

NFRWQPA Designated Land Use Management Agencies: (Approved 2018 & Recommended for Approval)		
Ault, Town of	Garden City	Mead, Town of
Berthoud, Town of	Gilcrest, Town of (1979)	Milliken, Town of
Brighton, City of	Greeley, City of	New Raymer, Town of
Broomfield, City & County of	Grover, Town of	Northglenn, City of
Dacono, Town of (1979)	Hudson, Town of (1978)	Nunn, Town of
Eaton, Town of	Johnstown, Town of (1978)	Pierce, Town of
Erie, Town of (1979)	Keenesburg, Town of	Platteville, Town of (1978)
Estes Park, Town of (1978)	Kersey, Town of	Resource Colorado Water & Sanitation Metro District*

Evans, City of	Larimer County (1978)	Severance, Town of (1980)
Firestone, Town of	LaSalle, Town of	Timnath, Town of
Fort Collins, City of (1978)	Lochbuie, Town of	Weld County (1979)
Fort Lupton, Town of	Longmont, City of	Wellington, Town of
Frederick, Town of	Loveland, City of (1978)	Windsor, Town of (1978)

*Recommend in 2022

Association Land-Use Management & Operating Agency

An agency responsible for controlling all aspects of the collection, treatment, and discharge of sewage or industrial wastewaters within their (district) boundaries or service area or, in the case of an industrial concern, within their company's sphere of operation is considered both land-use management and operating agency. The DMOA is responsible for all wastewater collection and treatment services in the foreseeable future within their WUSA.

As in previous updates, a municipality that serves as their wastewater collection system and treatment plant(s) is designated both a land-use management agency and an operating agency. A DMOA must be able to design, construct, operate, and maintain waste treatment works and satisfactorily finance these operations by raising sufficient revenues. All agencies should have the capacity to enter into agreements to provide the best cooperative approach to water quality management. Table 1-3 lists the Associations' designated land use management and operating agencies.

Table 1-3 Designated Management & Operating Agencies

NFRWQPA Designated (Public) Management/Operating Agencies: (Approved 2018 & Recommended for Approval)		
Ault, Town of	Garden City	Milliken, Town of
Berthoud, Town of (1978)	Gilcrest, Town of	Northglenn, City of
Boxelder Sanitation District	Greeley, City of	Nunn, Town of
Brighton, City of	Grover, Town of	Pierce, Town of
Broomfield, City & County of	Hudson, Town of	Platteville, Town of
Eaton, Town of	Johnstown, Town of	Prairie School District RE-11J
Erie, Town of	Keenesburg, Town of	Resource Colorado Water & Sanitation Metro District
Estes Park Sanitation District	Kersey, Town of	Severance, Town of (1980)
Evans, City of	LaSalle, Town of	South Fort Collins Sanitation District
Firestone, Town of	Lochbuie, Town of	St. Vrain Sanitation District
Fort Collins, City of (1978)	Longmont, City of	Timnath, Town of
Fort Lupton, Town of	Loveland, City of	Wellington, Town of
Frederick, Town of	Mead, Town of	Windsor, Town of
Galeton Sanitation District	Metro Water Recovery	Upper Thompson Sanitation District

Table 1-4 lists the Associates and Industry agencies in the region of the Association.

Table 1-4 Associates & Industries

NFRWQPA – Industries		
Carestream*	Front Range Energy	Swift Beef – Lone Tree
In Bev – Anheuser-Busch	Leprino Foods	Colorado Division of Wildlife; Watson Hatchery
Colorado Division of Wildlife; Bellvue Hatchery	Colorado Division of Wildlife; Poudre Hatchery	

**Carestream is a member of the Association.*

Table 1-5 lists the private agencies in the region of the Association. Noting that the Hemmingway Lodge at Eagles Nest and Pine Lake Village Mobile Home Park both derated in this update cycle (2018-2022), and the Laramie River Guest Ranch closed pre-COVID-19. Sky Ranch Lutheran Camp also derated in 2015. Additionally, Opal Foods, denoted in previous 208 AWQMP updates, converted its permit from a General Permit under the CAFO regulations and will no longer be listed within the 208 AWQMP.

Table 1-5 Private Agencies

NFRWQPA – Private/Other Operating Agencies		
Abbey of St. Walburga	Crystal Lakes Water & Sewer Association	Hidden View Estates
Annunciation Heights Camp & Retreat Center	CSU - Mountain Campus	High County Estates
B & B Mobile Home Park	Dao House	New Vision Mobile Home Park
Ben Delatour Boy Scout Ranch	Davies Mobile Home Park	Shambhala Mountain Center Mountain Center
Berthoud Estates	Eden Valley Institute	Kennedy Mountain Campus (formerly-Magic Sky Ranch Lutheran Camp)
Best Western Coach House Resort	Fox Acres	Sunrise Ranch - Emissaries of Devine Light
Bonnell West HOA	Glacier View Meadows Water & Sanitation Association	Jellystone Park Estates – (formerly Yogi Bear's Jellystone Park)
Buckhorn United Methodist Camp	High Peak Camp-Salvation Army	

Chapter 2 AREAWIDE WATER QUALITY MANAGEMENT PLAN(S)

One of the goals of these reports is to fulfill the requirements of 40 CFR 130.6 as required by the CWA to develop a water quality management plan. In doing so, the 208 AWQMP covers various water quality planning subjects being conducted on a statewide level to address these planning areas. These subject areas overlap with the elements associated with regional 208 Plans, State Water Quality Management Plan, and Colorado's Water Plan. This section discusses these overlapping subject areas.

2.1 Colorado Water Plan

In 2013, the Governor decreed developing a "Water Plan" for Colorado through 2050. In the following months, many entities participated in hundreds of public meetings to discuss and develop the plan, which the Colorado Water Conservation Board oversaw. In November of 2015, the Colorado Water Plan (CWP) was produced, which provides many long-reaching goals for the State involving water quantity and quality. As a result of the CWP, the WQCD will work with stakeholders, including watershed groups and those with point and nonpoint permits, to continue to employ available programs to maintain and or improve water quality at a basin-scale level. The CWP (Chapter 7 - Section 7.1) recommends the actions listed in Table 2-1 to better understand and promote watershed health to support water quality management and planning. The hope is these CWP actions support regional watershed master plans from a diverse group of stakeholders responsible for planning across the state in a coordinated fashion across watershed divides. The Associations' deliverables related to those actions can also be viewed in Table 2-1. Access the full report online at https://www.colorado.gov/pacific/cowaterplan.

Table 2-1 Colorado's Water Plan Actions

Action:	Deliverables:
1. Identify existing watershed coalitions and existing watershed plans and assessments, including source-water protection plans.	1a. The Association has identified the following watershed groups with existing watershed plans and assessments: Northwest Colorado Council of Governments, Pikes Peak Area Council of Governments, Colorado Water Conservation Board, Bear Creek Watershed Association, Pueblo Area Council of Governments, Big Dry Creek Watershed Association, Barr Milton Watershed Association, Coalition for the Poudre River Watershed, South Platte Coalition for Urban River Evaluation, Big Thompson Watershed Coalition, St. Vrain Creek Coalition, CDPHE.
2. Encourage and support capacity in many areas that currently do not have watershed groups or other groups that work with a broad set of local stakeholders.	Support Education efforts through: 2a. The Association has set the goal of doing presentations for its members and local DMOAs during their city, town, or county public meetings throughout the following years.
3. Assist stakeholders in existing watershed groups to identify tools and resources that address gaps and build capacity in existing plans.	3a. It is the Association's goal to offer or provide assistance to the following Stakeholders as needed: ➢ Attorney General's Office ➢ Big Thompson Water Conservation District ➢ Cattleman's Association Partners for Western Conservation Ag Water Network ➢ Colorado Department of Public Health and Environment ➢ Colorado Agricultural Water Alliance ➢ Colorado Decision Support Systems ➢ Colorado Ground Water Commission ➢ Colorado Hazard Mapping ➢ Colorado Healthy Rivers Fund ➢ Colorado Riparian Association ➢ Colorado River Water Conservation District ➢ Colorado Parks and Wildlife ➢ Colorado State University – One Water Solutions Institute (eRAMS) ➢ Colorado Stormwater Council ➢ Colorado Watershed Assembly ➢ Colorado Water Conservation Board ➢ Department of Agriculture ➢ Department of Natural Resources ➢ Department of Local Affairs ➢ Division of Local Government ➢ Division of Local Affairs, Colorado ➢ Division of Reclamation, Mining, and Safety, Colorado ➢ Ducks Unlimited ➢ EPA Healthy Watersheds Protection ➢ Growing Water Smart ➢ Nation Forest Service Foundation ➢ Northern Water Conservancy District ➢ Larimer County Conservation District ➢ River Network ➢ South Platte Coalition for Urban River Evaluation ➢ South Platte Basin Roundtable ➢ The Freshwater Trust

	➢ The Greenway Foundation ➢ The Water Research Foundation ➢ Trout Unlimited ➢ U.S. Bureau of Land Management ➢ U.S. Forest Service ➢ U.S. National Park Service ➢ Water Education Colorado ➢ West Greeley Conservation District
4. Identify public and private funding sources that together can support watershed- and forest health projects.	4a. Funding through Colorado Water Conservation Board, Ducks Unlimited, Trout Unlimited, Colorado Parks and Wildlife, Colorado Healthy Rivers Fund, Colorado Watershed Restoration Program, Fish and Wildlife Resources Fund, Water Supply Reserve Account, CDPHE-Grants, and Loans Unit, and Watershed Wildfire Protection Group.
5. Identify watersheds that are critical to the water supply.	5a. South Platte River Basin 5b. Big & Little Thompson River Basin 5c. Cache la Poudre River Basin 5d. St. Vrain Creek River Basin 5e. Dry Creek River Basin
6. Work toward a long-term goal of developing watershed master plans for watersheds critical to the consumptive and nonconsumptive water supply.	It is the Association's goal to develop watershed master plans critical to the consumptive and nonconsumptive water supply through the following plans. 6a. Identify the OWTSs in Region 2 by GIS. 6b. Identify the current sewer collection systems in Region 2 by GIS. 6c. Identify the future planned or projected sewer collection systems in Region 2 by GIS.
7. Prioritize and implement projects identified in master planning.	7a. Accomplished by the Association's endorsed 208 Areawide Water Quality Management Plan Projects listing.
8. Monitor projects to ensure that objectives are met and maintained.	8a. The Association has the goal to monitor projects in the Bi-annual revisions of the 208 AWQMP. 8b. The Association can track how many DMOAs adopt recommendations here within into their local municipal code.
9. Conduct adaptive management as necessary.	9a. NFRWQPA must be flexible, inventive, and amendable to new management ideas to protect, maintain, or restore the region's water quality with the concept that the plan would be fluid, evolving to deal with changes in water quality concerns brought on by urban development. Adaptive management strategies will include: • Biannual evaluation of water quality data to investigate whether plan endorsed programs and BMPs to improve water quality. • Provide new GIS web tools to currently promote regional coordination and collaboration of wastewater infrastructure and treatment and for future planning. • Once the New Nonpoint Source Watershed Plan is completed, implement those actions to improve water quality due to nonpoint source pollution. • Adjustments to management decisions and practices will also be communicated to membership DMOAs as responsibilities and duties.

10. Coordinate statewide watershed-coalition and partnership plans, projects, monitoring, and adaptive management strategies.	The Association has the goal to begin statewide coordination efforts for watershed-coalition and partnership plans, projects, monitoring, and adaptive management strategies. 10a. The Association has begun collaborating with the other 208 Planning agencies in the state regarding nonpoint source watershed plans and 208 Plan reporting for a united and coordinated statewide effort.
11. Watershed management plans may include potential impacts on the environment, public water supplies, and agricultural production from abandoned mines, and a strategy for addressing these impacts. CDPHE and DRMS are potential partners in developing a prioritized list of mines that could impact streams.	11a. New Utility Plan format should address the impacts of listed topics. 11b. Information from these Utility Plans will be incorporated into the NFRWQPA 208 AWQMP. 11c. The Association has received a grant to develop a nonpoint source watershed plan between 2022-2024 which will address many of these topics.

2.2 Integrated Water Quality Monitoring & Assessment 305(b) Report

The WQCD develops the Statewide "Integrated Water Quality Monitoring and Assessment Report (305(b))" biannually to report on the status of the state water quality progress. This periodic report is available for review on the WQCC website https://www.colorado.gov/pacific/cdphe/wqcc-reports-and-plans. The Association can then regionally assess only the water quality in the Weld/Larimer County region by the same means the WQCD used to create the Integrated Water Quality Monitoring and Assessment Report. A focused regional water quality assessment reveals in character of Section 208 of the CWA whether the region's water quality is being maintained, protected, or restored. This regional water quality assessment is presented in Chapter 5.

2.3 Colorado 10-Year Water Quality Roadmap

Additionally, WQCD has developed a Water Quality 10-year roadmap (2017-2027) for the implementation of specific regulations and water quality goals. WQCD's plan allows stakeholder input concerning how the new or revised standards will be adopted for the next 10-years. The Water Quality roadmap addresses point and nonpoint sources, outlining major milestones the division, WQCC, and stakeholders will undertake collaboratively to implement the plan. Including water quality goals for nutrients (nitrogen, phosphorus, and chlorophyll-*a*), cadmium, temperature, arsenic, ammonia, and selenium through 2027. Water quality goal development will include technical and scientific assessments to give the commission evidence to support the adoption of the goals. Once the commission adopts the goals, those water quality standards will be translated into permits that allow the discharge of acceptable levels of pollutants based on the scientific assessments. CDPHE's 10-year water quality roadmap may be viewed here: https://www.colorado.gov/pacific/cdphe/WQ- 10-Year-Roadmap. As a result of the Colorado 10-Year, Water Quality Roadmap DMOAs will have to plan for capital improvement projects to meet new or revised standards. These planned capital improvement projects proposed within DMOAs' Utility Plans become the endorsed projects of the Association's 208 AWQMP to maintain, protect, or restore regional water quality. The supported projects of the Association's 208 AWQMP may be viewed online here: https://nfrwqpa.colorado.gov/208-areawide-water-quality-management-plan.

2.4 Nonpoint Source Activities

The original 208 Plans provided a first attempt at addressing nonpoint sources of water pollution. In 1987, the CWA was amended to include Section 319 to address nonpoint source types of pollution specifically. The WQCD has been primarily responsible for administering the federally mandated nonpoint source program in Colorado. Much of the emphasis on nonpoint source planning and management has shifted from traditional 208 plans into the Nonpoint Source Program at the state level. The WQCD's responsibility includes preparing and updating the nonpoint source assessment and management plan. The current NPS management plan can be found at www.npscolorado.com. The plan identifies current priorities for the WQCD's NPS program. This program also maintains information about statewide best management practices (BMPs), solicits projects to meet NPS program priorities, and administers grant funding for priority projects that help achieve the goals discussed in the NPS management program.

The WQCD works with the Colorado Nonpoint Source Alliance (NPS Alliance) to assist with all of these responsibilities. The NPS Alliance serves as an advisory group to the WQCD with the Colorado Nonpoint Source Management Program, assisting in meeting various needs such as identifying nonpoint source issues and solutions in Colorado, providing technical feedback on potential nonpoint source projects, and demonstrating and promoting best management practices.

The EPA has nine minimum elements in nonpoint watershed plans for threatened or impaired waters (EPA, Integrating Watershed Assessment and Protection across EPA, 2016). NFRWQPA has defined the Association's actions related to the EPA's nine elements for nonpoint source watershed plans in Table 2-2.

Table 2-2 EPA Elements of a Watershed Plan

EPA Elements of a Watershed Plan	NFRWQPA Actions
a) Identify the causes and sources of pollution.	1. The Association has received a grant to construct a Nonpoint source watershed plan between 2022-2025 which will address many of these topics. 2. eRAMS & CLASIC Assessments of Nonpoint Sources.
b) Estimate pollutant loading into the watershed and the expected load reductions.	eRAMS & CLASIC Assessments of Nonpoint Sources-Chapter 5.
c) Describe management measures that will achieve load reductions and targeted critical areas.	Best Management Practices recommended in Utility Plans and adopted in the 208 AWQMP Endorsed Project Schedule.
d) Estimate amounts of technical and financial assistance and the relevant authorities needed to implement the plan.	Identified in Table 2-1, Colorado's Water Plan Actions. The financial aspect of completing regional projects can also be found in the 208 AWQMP Endorsed Project Schedule.
e) Develop an information/education component.	The Association has set the goal of doing presentations for its members and local DMOAs during their city, town, or county public meetings throughout the following years.
f) Develop a project schedule.	The Association developed the 208 AWQMP Endorsed Project Schedule.
g) Describe the interim, measurable milestones.	The Association can track how many presentations have been completed for its members and DMOAs.
h) Identify indicators to measure progress.	The Association can track how many DMOAs adopt recommendations here within into their local municipal code.

i) Develop a monitoring component.	Water Quality Assessments within the 208 AWQMP that track and monitor changes in actual water quality over time-Chapter 5.

2.5 Stormwater

Historically, stormwater was considered a nonpoint source of pollution and was not regulated as a discharge. In August 1993, Colorado established regulations to control the release of stormwater from specific industrial and municipal sources. These regulations were necessary to implement the 1987 revisions to the CWA. As a result, these regulations redefined stormwater discharges from these sources as point source discharges, requiring a permit. Recently (2021), the Association required DMOAs to assess an agency's WUSA annual nutrient stormwater load to the watershed and propose future BMPs if necessary, within Utility Plans. Those future stormwater BMPs are then adopted into the Association's 208 AWQMP as endorsed projects.

The WQCD issues stormwater permits that fall into the point source category permits under Regulation No. 61: *Colorado Discharge Permit System Regulation* (5 CCR 1002-61). These include permits for stormwater discharges from industry and construction sites and government entities (municipalities) responsible for stormwater discharges from urban areas. Additional details regarding stormwater regulation and permits can be found on the WQCD's website. Water quality municipal MS4 permits may be found on the WQCD's website, https://cdphe.colorado.gov/wq-municipal-ms4-permits, Industrial Storm water permits may be found at, https://cdphe.colorado.gov/renewal-industrial-stormwater-general-permit, and construction stormwater permits may be viewed at https://www.colorado.gov/pacific/cdphe/cor400000-stormwater-discharge. For the types of discharges that still fall under the category of nonpoint sources, additional information can be found in the WQCD's Nonpoint Source Management Program.

The Association in 2021 was awarded a grant and approved to construct a Nonpoint Source Watershed Plan for Region 2. The Nonpoint Source Watershed plan will focus on the current urban developed portions of Region 2 and help prepare those municipalities in the region that are not currently permitted MS4s, and address the EPA's nine minimum elements in nonpoint watershed plans for threatened or impaired waters.

2.6 Oil and Gas-Mining

The Colorado Oil and Gas Control Commission has oversight of Oil and Gas in Weld and Larimer County. Additionally, the Weld County Department of Public Health and Environment has a free groundwater testing program for residents concerned about common oil and gas mining contaminants. The Weld County Department of Public Health and Environment Laboratory may be contacted to request testing and the most current results at: 970-400-2276. The Weld County Department of Public Health and Environment Laboratory is a regional Health Department lab and may be contracted for sample analysis outside of Weld County. Recently (2021), the Association required DMOAs to assess whether Oil and Gas/Mining is within an agency's WUSA impacts the watershed and propose future BMPs if necessary. Those future Oil and Gas/Mining BMPs are then adopted into the Association's 208 AWQMP as endorsed projects.

Chapter 3 RIVER BASIN POPULATION AND LOADING PROJECTIONS

Regionally 208 planning considers population projections and relates them to each basin's wastewater design capacity while tracking current loadings. This section illustrates the region's population projections, flow design capacity, and loadings, approved within DMOA Utility Plans, including capital improvement projects (CIP), and planned expansions to accommodate growth. The following Figures Figure 3-1,Figure 3-2,Figure 3-3, and Figure 3-4 show the population projections for Region 2 illustrated by Larimer County, Weld County, Weld County Municipalities, and Sanitation Districts. The population projections were constructed using local agency projections provided within agency point source data inventory sheets, the State Demographers Office population data and profiles, and DOLA census data. The Association applied the most recent known growth rates and census data for the accuracy of the population projections. Figure 3-3 was provided for the municipalities of Weld County for better visual representation without the larger projections reducing the other municipalities' projections.

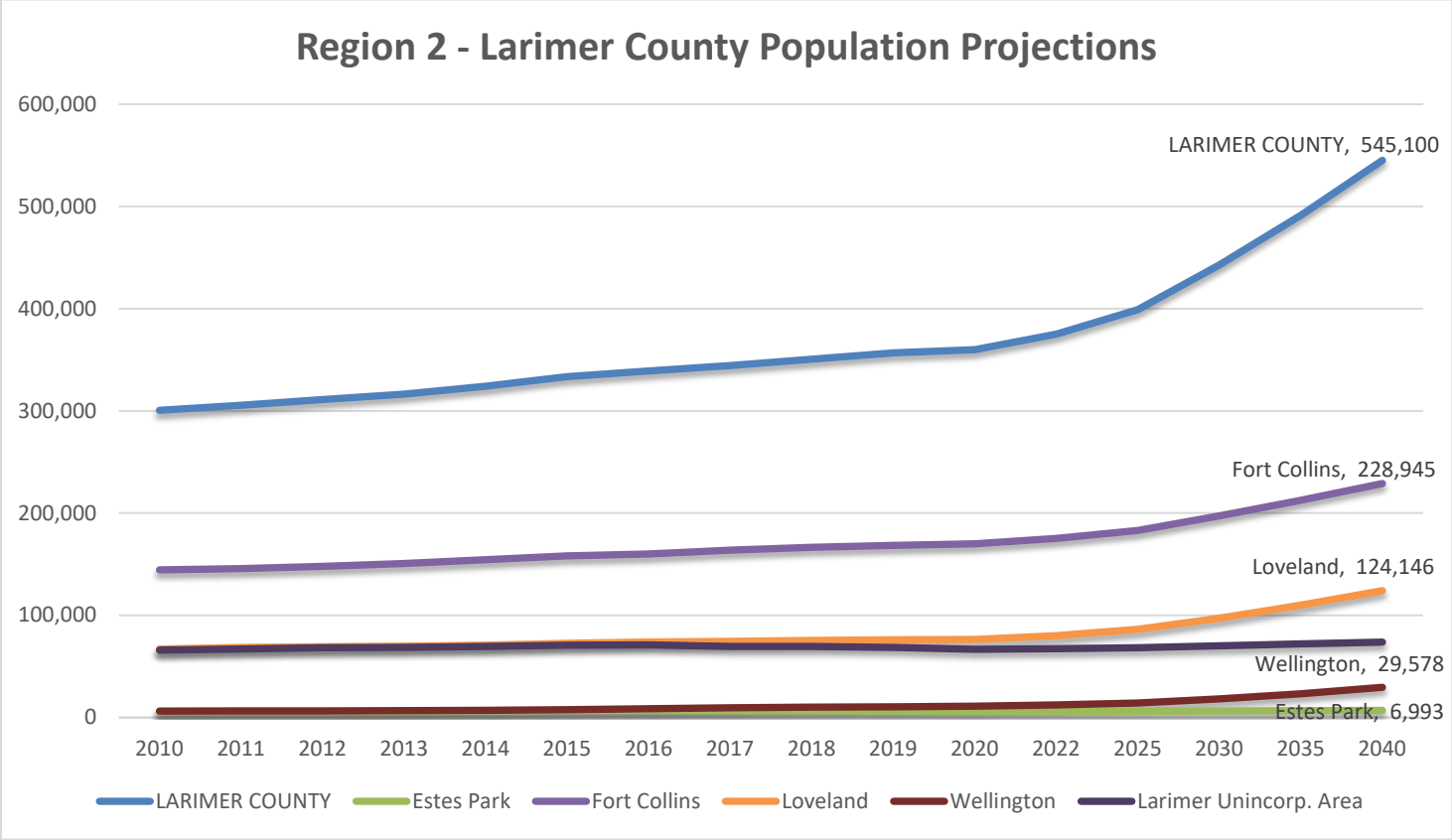


Figure 3-1 Region 2 - Larimer County Population Projections

Table 3-1 illustrates the growth rates associated with population projections for Larimer County. The growth rates were either obtained from the local DMOA, SDO, or DOLA applying the most current values known. Population datasets generated through the planning horizon are linked to each DMOA WUSA and each area designated for interim or permanent non-urban wastewater service. The datasets help predict wastewater flows in 5-year increments through the planning horizon: for non-urban service areas defined by DMOAs at the watershed level. These projections estimate population, and flow, and loading by industry-accepted methods. These population and wastewater flow and load forecasts will be updated and adjusted bi-annually in the 208 AWQMP for future years.

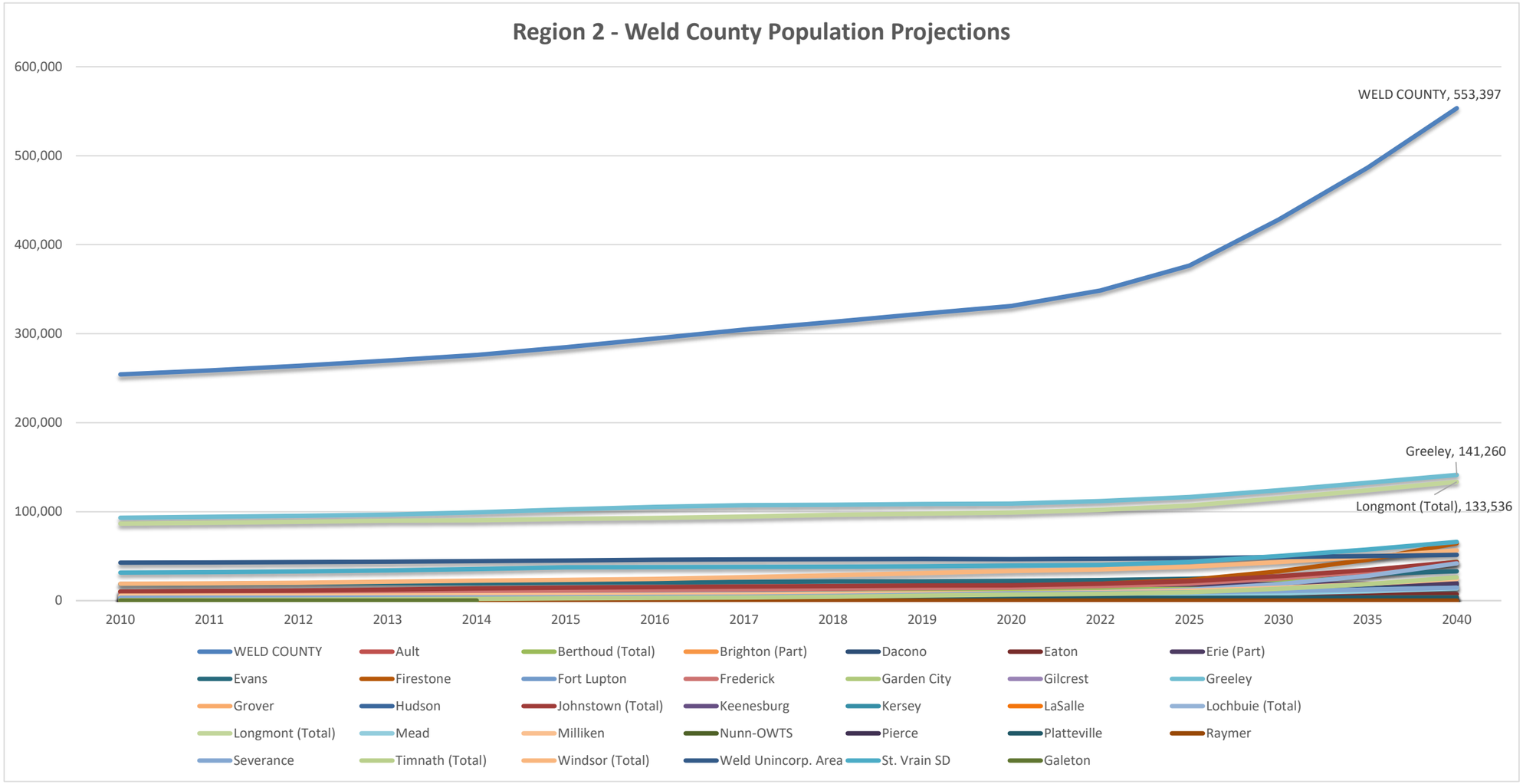


Figure 3-2 Region 2 - Weld County Population Projections

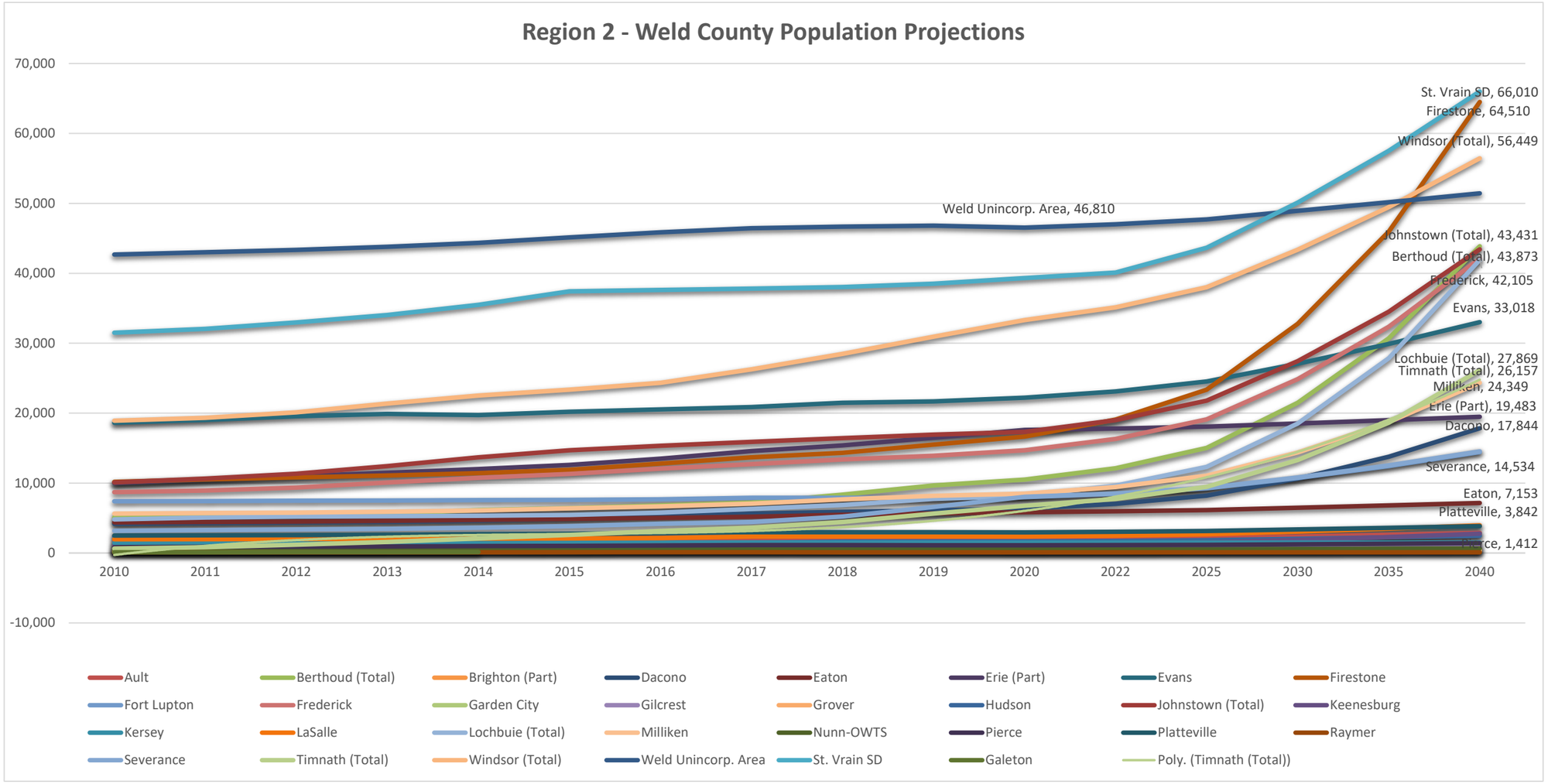


Figure 3-3 Region 2 - Weld County Municipalities Population Projections

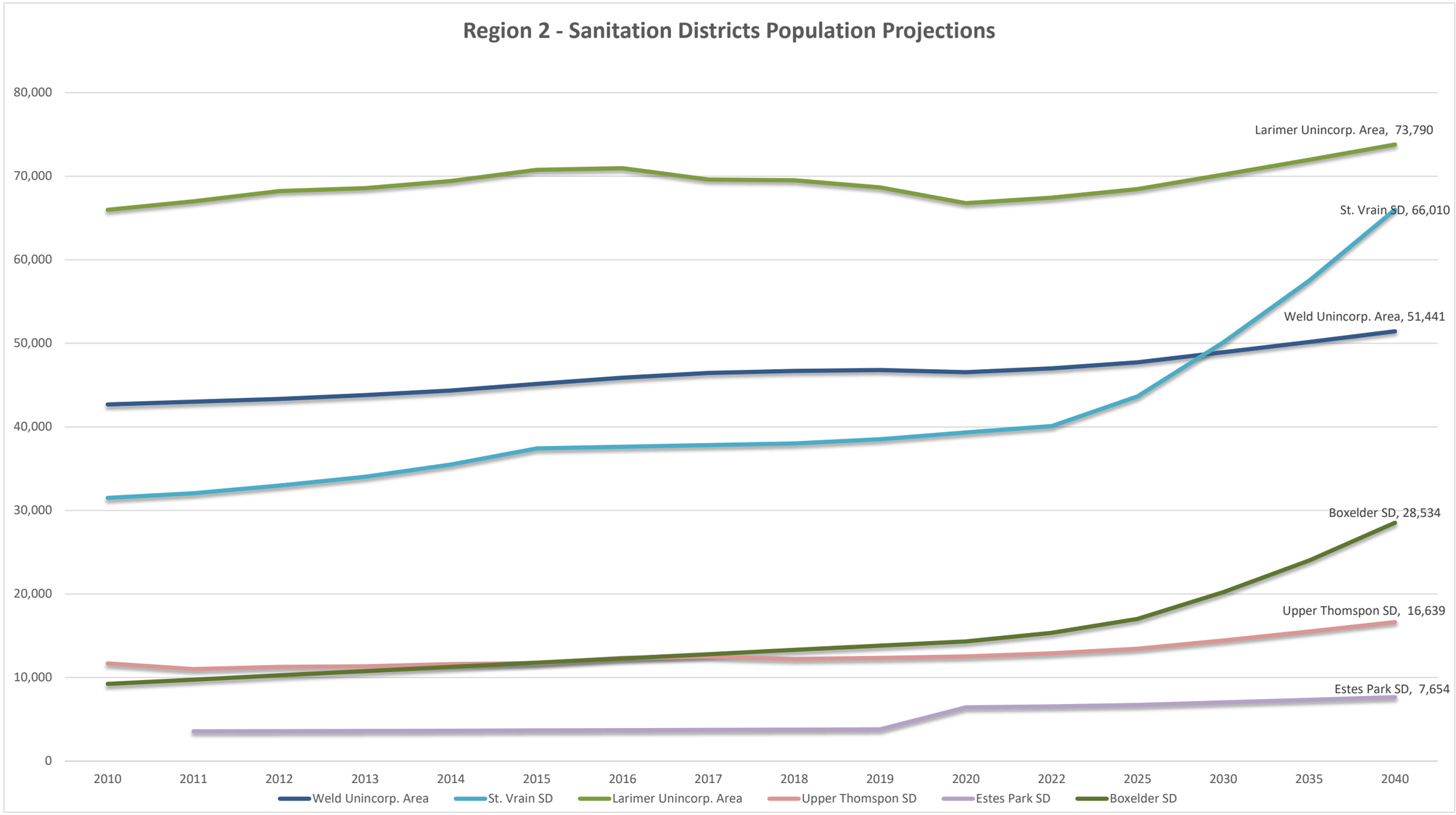


Figure 3-4 Region 2 - Sanitation Districts Population Projections

Table 3-1 DMOA Growth Rates and Population Projections

Area	Growth Rate	2022	2025	2030	2035	2040
LARIMER COUNTY	**2.1%**	**374,969**	**399,095**	**442,802**	**491,296**	**545,100**
Estes Park	0.9%	5,988	6,146	6,416	6,699	6,993
Fort Collins	1.5%	175,107	183,109	197,266	212,516	228,945
Loveland	2.5%	80,145	86,210	97,353	109,937	124,146
Wellington	5.0%	12,278	14,217	18,150	23,170	29,578
Upper Thomspon SD	1.4%	12,893	13,454	14,441	15,502	16,639
Estes Park SD	0.9%	6,556	6,728	7,024	7,332	7,654
Larimer Unincorp. Area	0.5%	67,437	68,457	70,191	71,968	73,790
WELD COUNTY	**2.6%**	**348,631**	**376,541**	**428,109**	**486,739**	**553,397**
Ault	2.0%	2,000	2,125	2,351	2,601	2,877
Berthoud (Total)	7.4%	12,127	15,027	21,479	30,698	43,873
Berthoud (Part)	7.4%	308	384	555	799	1,148
Brighton (Part)	1.4%	376	395	429	465	504
Boxelder SD	3.5%	15,348	17,020	20,220	24,020	28,534
Dacono	5.3%	7,032	8,213	10,639	13,779	17,844
Eaton	1.0%	5,963	6,147	6,466	6,801	7,153
Erie (Part)	0.5%	17,793	18,064	18,525	18,998	19,483
Erie (Total)	0.5%	30,712	31,178	31,970	32,782	33,615
Evans	2.0%	23,103	24,520	27,078	29,901	33,018
Firestone	7.0%	19,076	23,372	32,787	45,991	64,510
Fort Lupton	3.0%	8,462	9,249	10,728	12,442	14,429
Frederick	5.4%	16,327	19,120	24,877	32,365	42,105
Garden City	0.1%	257	260	267	273	279
Gilcrest	-0.6%	1,017	1,001	977	953	929
Greeley	1.3%	111,941	116,366	124,135	132,421	141,260
Grover	1.3%	163	173	189	207	226
Hudson	2.0%	1,720	1,828	2,024	2,239	2,478
Johnstown (Total)	4.7%	18,988	21,797	27,429	34,515	43,431
Keenesburg	4.0%	1,354	1,526	1,862	2,271	2,769
Kersey	-0.1%	1,497	1,496	1,493	1,491	1,488
LaSalle	2.6%	2,481	2,683	3,055	3,479	3,961
Lochbuie (Total)	8.5%	9,642	12,319	18,530	27,869	41,911
Longmont (Total)	1.5%	102,127	106,795	115,054	123,951	133,536
Mead	5.4%	5,308	6,218	8,094	10,534	13,708
Milliken	5.4%	9,437	11,053	14,383	18,715	24,349
Northglenn (Total)	1.7%	39,312	41,354	44,996	48,958	53,269
Nunn-OWTS	1.2%	517	539	577	618	661
Pierce	1.2%	1,123	1,167	1,244	1,326	1,412
Platteville	1.3%	3,029	3,152	3,367	3,597	3,842
Raymer	-0.9%	110	110	110	110	110
Severance	3.0%	8,523	9,317	10,806	12,532	14,534
Timnath (Total)	7.0%	7,729	9,472	13,290	18,646	26,157
Windsor (Total)	2.7%	35,116	38,007	43,365	49,477	56,449
St. Vrain SD	3.4%	40,100	43,655	50,106	57,511	66,010
Weld Unincorp. Area	0.5%	47,007	47,718	48,928	50,169	51,441
Average	2.7%					

Figure 3-5 shows the Association's Region 2 population and wastewater flow and load projections by river basin. The following population and wastewater flow and load projections are derived only from the agency point source data inventory sheets provided by DMOAs bi-annually. Region 2 projections show the area is adequately preparing for the expected population over the next 20-year planning period. The regions' DMOAs have adequate wastewater treatment facility design and loading capacity for the predicted population and resulting flow and organic loadings from WWTFs. These forecasts allow the Association to forecast and calculate treatment facilities' sizing and staging needs compared to the expected population growth rates associated with urban development. DMOA Utility Plans document the wastewater management strategy for the anticipated growth and urban development within the DMOA's wastewater utility service area, as shown in these figures.

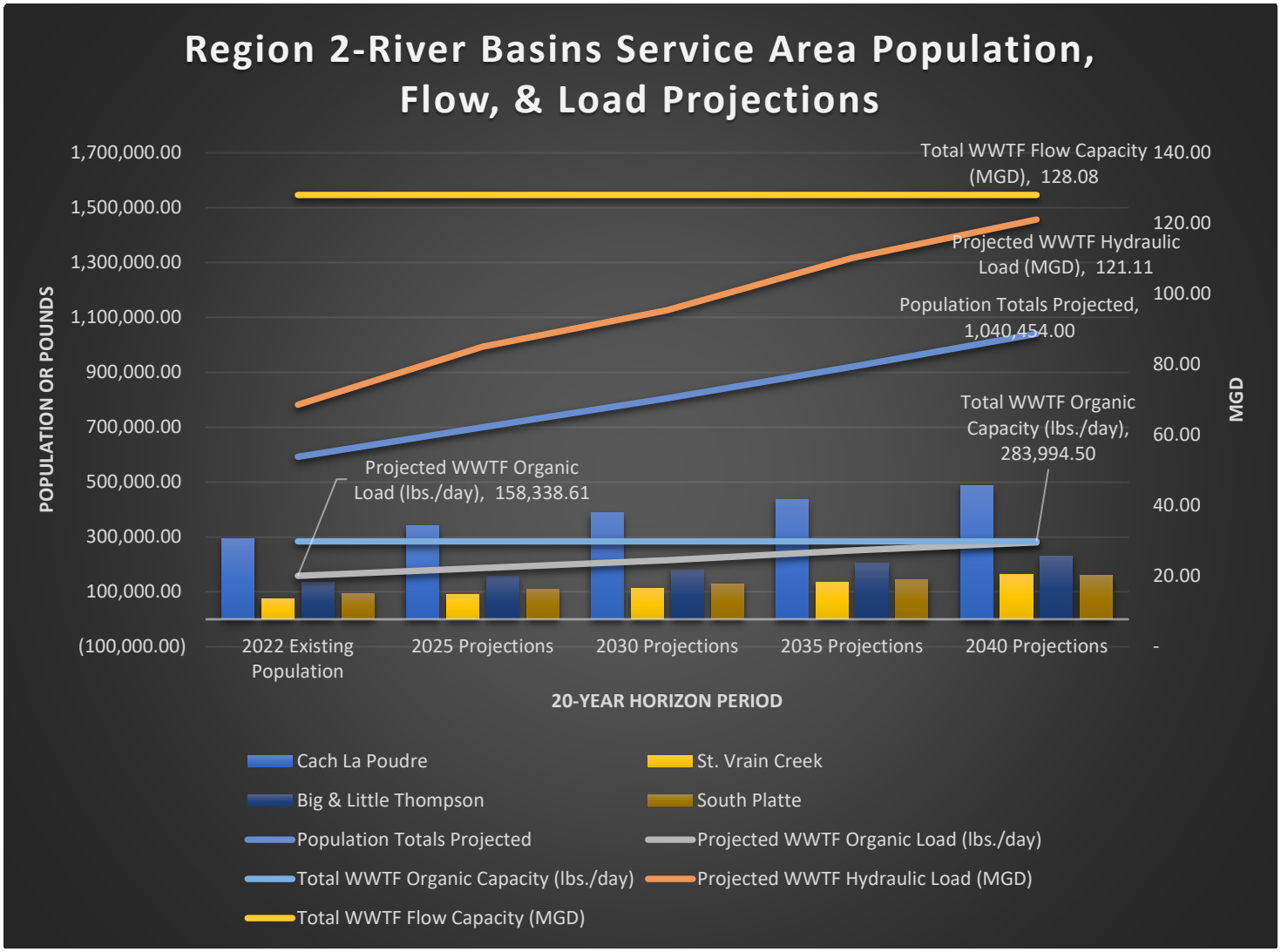


Figure 3-5 NFRWQPA Region 2 Planning Projections

3.1 Cache La Poudre River Basin

The Cache la Poudre River drains a significant portion of northern Larimer County and the northwest portion of Weld County. Municipal discharges in the basin include Ault, Eaton, Ft. Collins, Fox Acres, Greeley, Severance, Wellington, Windsor, Boxelder Sanitation District, and South Ft. Collins Sanitation District. Following this section, the Cache la Poudre River Basin map highlights the basin and identifies the wastewater treatment facilities (WWTF) located within it. Table 3-2 lists the DMOAs within the Cache la Poudre River basin. Some agencies within the basin have static population and loadings and are not included in the predictions, such as private and industrial facilities or private agencies. Cache la Poudre River basin projections show the area is adequately

preparing for the expected population over the next 20-year planning period. Figure 3-6 shows the Cache la Poudre River basin planning projections. Table 3-3 is the data table for Figure 3-6. The Cache la Poudre basin DMOAs have adequate wastewater design and loading capacity for the predicted population and resulting flow and organic loadings.

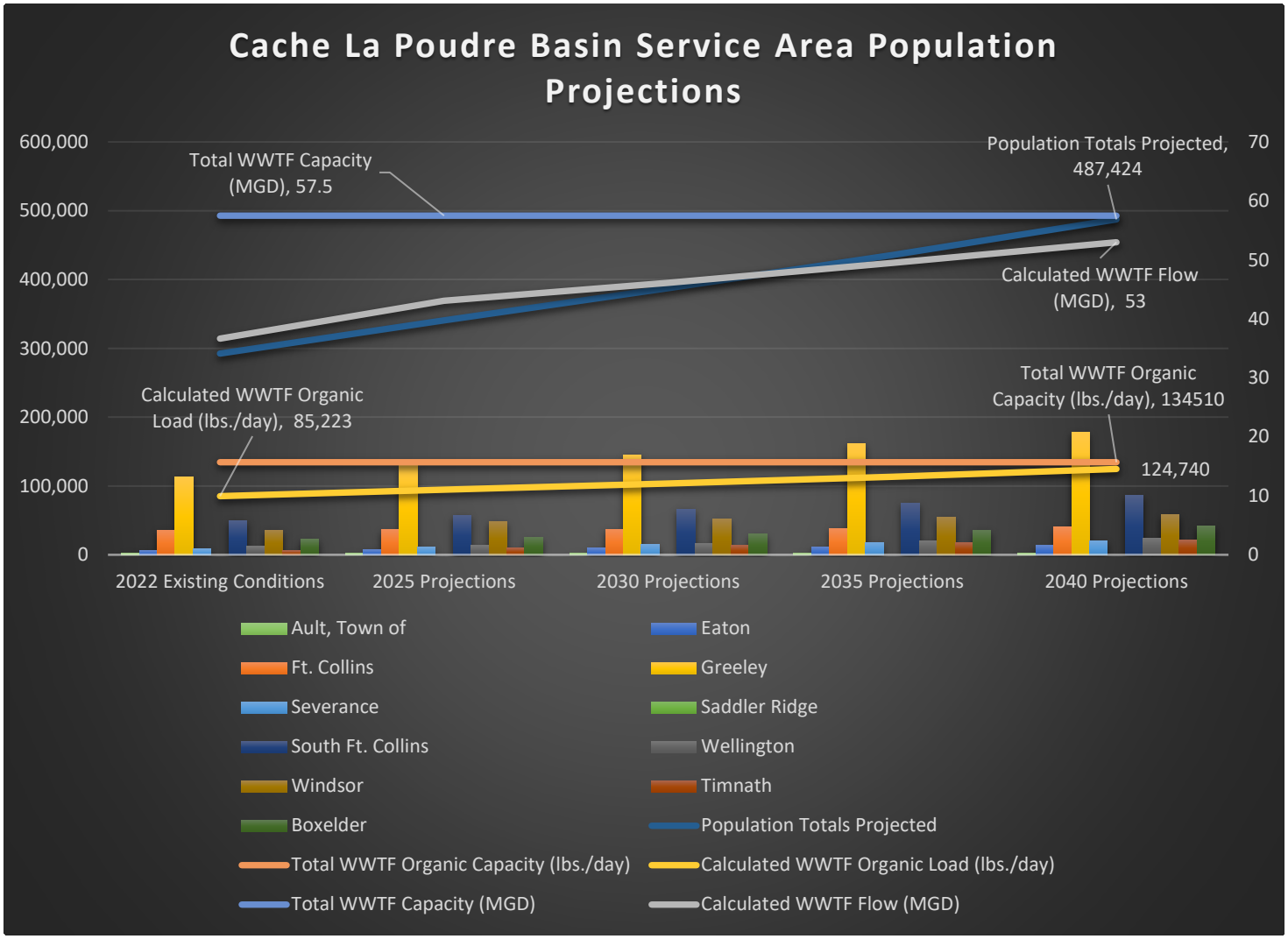


Figure 3-6 Cache la Poudre Planning Projections

Table 3-2 Cache la Poudre River Basin DMOAs

Cache la Poudre River Basin DMOAs	
Ault, Town of	South Fort Collins Sanitation District
Fort Lupton, Town of	Timnath, Town of
Boxelder Sanitation District	Wellington, Town of
Eaton, Town of	Windsor, Town of
Fort Collins, City of	Abbey of St. Walburga
Greeley, City of	Ben Delatour Boy Scout Ranch
Severance, Town of	Buckhorn United Methodist Camp
Crystal Lakes Water & Sewer Association	Davies Mobile Home Park
Fox Acres Community Services	Glacier View Meadows Water & Sewer
Laramie River Guest Ranch	High County Estates

Pine Lake Village-DERATED 2022	CSU Mountain Campus
Shambhala Mountain Center Mountain Center	Kennedy Mountain Campus
Glenn Echo Resort	
INDUSTRIAL	
In-Bev-Anheuser-Busch-Nutri Turf Farm	Carestream
Colorado Parks and Wildlife-Bellvue Hatchery	Colorado Parks and Wildlife-Poudre Hatchery
Colorado Parks and Wildlife-Watson Hatchery	Front Range Energy
Leprino Foods	

All Agency Point Source Data Sheets may be viewed online at: https://nfrwqpa.colorado.gov/agency-point-source-data-inventory

Table 3-3 Cache La Poudre Projections Table

DMOAs	Permit	Permit Status	Design Capacity		DMOA Population, Flow, & Organic Load Projections						Estimated Year at		2040 Needed Capacity	
			Hydraulic (MGD)	Organic (lbs./day)		2022 Existing Conditions	2025 Projections	2030 Projections	2035 Projections	2040 Projections	80% Capacity	95% Capacity	Hydraulic (MGD)	Organic (lbs./day)
Ault, Town of	COG-589140	Expired-Sept-2018	0.15	625	Population	1,920	1,940	1,980	2,130	2,440				
					Flow (MGD)	0.100	0.115	0.129	0.138	0.159	2030	2035	0.16	464
					BOD (lbs./day)	285	335	376	402	464	2040	2040		
Boxelder S.D	CO-0020478	Active	3.0	3,881	Population	22,392	25,237	29,974	35,600	42,281				
					Flow (MGD)	2.040	3.1	3.5	4.0	4.6	2033	2037	6.00	11,159
					BOD (lbs./day)	4,829	5,792	6,976	8,383	10,053	2033	2037		
Eaton, Town of	CO-0047414	Expired-August 2020	0.75	1,876	Population	6,379	7,448	9,478	11,631	13,681				
					Flow (MGD)	0.460	0.56	0.67	0.80	0.95	2037	2042	0.95	2,140
					BOD (lbs./day)	1,043	1,248	1,494	1,788	2,140	2050	2055		
Fort Collins, City of (Mulbery)	CO-0026425	Expired-April 2021	6	10,007	Population	35,590	36,381	37,381	38,500	40,200				
Population total includes both faciities for the Fort Collins, City of (Mulbery + Drake)					Flow (MGD)	2.7	2.9	2.9	2.9	2.9	>2040	>2040	6.00	10,007
					BOD (lbs./day)	5,461	5,461	5,461	5,461	5,461	>2040	>2040		
Fort Collins, City of (Drake)	CO-0047627	Expired-April 2021	23	57,000	Population	0	0	0	0	0				
					Flow (MGD)	10	14	15	16	17	>2040	>2040	23.00	57,000
					BOD (lbs./day)	29,977	30,560	31,400	32,340	33,768	>2040	>2040		
Greeley, City of	CO-0040258	Expired	14.7	39,000	Population	113,700	129,450	145,200	161,750	178,300				
*Assumes per capita BOD contribution of 0.163 lbs/day					Flow (MGD)	14.7	14.7	14.7	14.7	14.7	2031*	2039**	14.70	39,000
**Assumes per capita flow contribution of 66 gallons/day					BOD (lbs./day)	26,723	31,013	33,410	35,992	39,121	2032*	2040*		
Severance, Town of	COG-0589009	Expired-Sept-2018	0.15	388	Population	8,377	11,144	15,127	18,232	20,527				
Saddler Ridge Metro District (Severance)	COG-589107	Expired-Sept-2018	0.05	100	Population	0	0	0	0	0				
The Town of Severance will continue to provide treatment for 0.150 MGD at the lagoon system and					Flow (MGD)	0.4750	0.668	0.907	1.093	1.231	2030	2034	0.15	388
bypass the remaining flows to Windsor.					BOD (lbs./day)	278.0	278.0	278.0	278.0	278.0	N/A	N/A		
South Fort Collins S. D.	CO-0020737	Expired	6	12,000	Population	50,000	57,343	66,454	75,565	86,543				
					Flow (MGD)	3.40	3.74	4.20	4.70	5.00	2037	2040	6.00	18,500
					BOD (lbs./day)	9,000	10,700	13,200	15,800	18,500	2024	2027		
Timnath, Town of	N/A	N/A	0	-	Population	6,000	9,750	13,500	17,250	21,000				
Timnath is currently provided sewer service by both the South Fort Collins Sanitation District (mid and south portions of Town and the GMA) and the Boxelder Sanitation District (north portions of Town and GMA).					Flow (MGD)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	-
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Wellington, Town of	CO-0046451	Active	0.9	2,627	Population	12,119	13,459	16,821	20,602	24,647				
					Flow (MGD)	0.680	0.91	1.13	1.38	1.65	2021	2022	1.75	6,300
					BOD (lbs./day)	2,627	3,252	4,062	4,978	5,955	2037	2039		
Windsor, Town of	CO-0020320	Expired-May 2020	2.8	7,006	Population	36,000	48,534	51,445	54,533	57,805				
					Flow (MGD)	1.80	2.30	2.90	3.70	4.70	2023	2029	4.70	9,000
					BOD (lbs./day)	5,000	6,000	7,000	8,000	9,000	2027	2032		
Abbey of St. Walburga	COX622052	Administratively Extended	0.006	21	Population	30	30	30	30	30	N/A		0.01	21
Population and Loads based on full capacity.					Flow (MGD)	0.002	0.002	0.002	0.002	0.002				
					BOD (lbs./day)	4.35	4.35	4.35	4.35	4.35				
Ben Delatour Boy Scout Camp	COX631054	Active	0.0075	28	Population	625	625	625	625	625	N/A		0.01	28
Population and Loads based on full capacity.					Flow (MGD)	0.001	0.001	0.001	0.001	0.001				
					BOD (lbs./day)	3.18	3.18	3.18	3.18	3.18				
CSU Mountain Campus	COG-620000	Active	0.034	112	Population	100	100	100	100	100	N/A		0.03	112
Facility #COG-620056. Permit Certification COX631068. The campus has an existing bed count of 275, and averages 100 persons per night, the MBR WWTP is designed to serve 562 persons. All populations are seasonal (May through October).					Flow (MGD)	0.010	0.010	0.010	0.010	0.010				
					BOD (lbs./day)	41.00	41.00	41.00	41.00	41.00				
Davies Mobile Home Park	COX-634000	Active	0.006825	28	Population	54	54	54	54	54	N/A		0.01	28
					Flow (MGD)	0.003	0.003	0.003	0.003	0.003				
					BOD (lbs./day)	10	10	10	10	10				
Fox Acres Community Services	CO-0049019	Active	0.081	160	Population									
Existing Population is based on 91 units built, with the build out potential of 230 total units.					Flow (MGD)	0.011	0.020	0.025	0.030	0.035	>2030	>2030	0.08	160
					BOD (lbs./day)	56	50	60	65	70	>2030	>2030		
Glacier View Meadows Water & Sewer Association- 12th Filing	CO-00046442	Active	0.0065	10	Population	N/A	N/A	N/A	N/A	N/A	N/A		0.01	10
CO-00046442-12 Filing, COX-631000, COX-631020-system for the 4th, 7th, and upper 8th filings.					Flow (MGD)	N/A	N/A	N/A	N/A	N/A				
Population and Loading data not provided.					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
Glacier View Meadows Water & Sewer Association-4th, 7th, and 8th filings.	COX-631020	Active	0.03	72	Population	N/A	N/A	N/A	N/A	N/A	N/A		0.03	72
CO-00046442-12 Filing, COX-631000, COX-631020-system for the 4th, 7th, and upper 8th filings.					Flow (MGD)	N/A	N/A	N/A	N/A	N/A				
Population and Loading data not provided.					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
Glenn Echo Resort	CO0000009	N/A	0.01	50	Population	100.000	100.000	100.000	100.000	100.000	N/A		0.01	50
					Flow (MGD)	N/A	N/A	N/A	N/A	N/A				
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
High County Estates	N/A	N/A	0.0076	17	Population	N/A	N/A	N/A	N/A	N/A	N/A		0.01	17
Service Area Population=25 residences and 4 commercial properties.					Flow (MGD)	N/A	N/A	N/A	N/A	N/A				
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
Kennedy Mountain Campus	CO-0047317	Expired-August 2020	0.013	31	Population	352	352	352	352	352	N/A		0.01	31
Formerly, Magic Sky Ranch Girl Scout Camp.					Flow (MGD)	0.001	0.001	0.001	0.001	0.001				
					BOD (lbs./day)	0.300	0.300	0.300	0.300	0.300				
Drala Mountain Center (formerly Shambhala)	COX630000	Active	0.033	117	Population	350	350	400	400	400	N/A		0.01	117
CDPS#: COX-630037, COX-631055					Flow (MGD)	N/A	N/A	N/A	N/A	N/A				
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
Carestream	CO-0032158	Expired-June 2020	1.8	600	Population	0	0	0	0	0	N/A		1.80	600
Industrial Facility					Flow (MGD)	0.640	0.640	0.640	0.640	0.640				
					BOD (lbs./day)	250.0	250.0	250.0	250.0	250.0				
CPW-Bellvue Watson Hatchery	COG-130021	Active	26	N/A	Population	0	0	0	0	0	N/A		26.00	N/A
Industrial Facility					Flow (MGD)	20.4	20.4	20.4	20.4	20.4				
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
CPW-Poudre Hatchery	COG-130008	Active	14	N/A	Population	0	0	0	0	0	N/A		14.00	N/A
Industrial Facility					Flow (MGD)	9.5	9.5	9.5	9.5	9.5				
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
Front Range Energy	CO-0047635	Expired-June 2020	0.482	N/A	Population	0	0	0	0	0	N/A		0.48	N/A
Industrial Facility					Flow (MGD)	0.350	0.350	0.350	0.350	0.350				
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
In-Bev Anheuser Busch-Nutri-Turf Farm	CO-0039977	Administratively Extended	N/A	N/A	Population	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A
The Anheuser-Busch, brewery in Ft. Collins produces wastewater which 100% is pumped to Nutri-Turf, a subsidiary of Anheuser-Busch Companies, for irrigation. Wastewater is land applied by center pivot systems and used as irrigation water.					Flow (MGD)	N/A	N/A	N/A	N/A	N/A				
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
Leprino Foods - Greeley WWTF	CO-0048860	Administratively Extended	2.83	36,000	Population	0	0	0	0	0	N/A		2.83	36,000
Industrial Facility; Design Capacities (MGD), Tier 1 - 0.513, Tier 2 - 1.69, Tier 3 - 2.83.					Flow (MGD)	2.8	2.8	2.8	2.8	2.8				
					BOD (lbs./day)	27,000.0	27,000.0	27,000.0	27,000.0	27,000.0				
Crystal Lakes Water & Sewer District		Inactive			Population						N/A			
The Association abandoned plans to upgrade the system and opted to use the 10,000 gallon tank that was part of digestor system as a holding tank. Crystal Lakes currently contracts with McDonald Farms					Flow (MGD)									
					BOD (lbs./day)									
Pine Lake Village Mobile Home Park	COX622052	Inactive			Population						N/A			
Derated - February 24, 2022					Flow (MGD)									
					BOD (lbs./day)									
Sky Ranch Lutheran Camp	CO0047325	Terminated			Population	170	170	170	170	170	N/A			
Derated - May 18, 2015. Flows are total of the Christ Lodge, Backpack Center, Shower House, and Bonhoeffer.					Flow (MGD)	0.004	0.004	0.004	0.004	0.004				
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
DMOAs		Totals	57.5	134,510	Population	292,477	340,686	387,360	435,793	487,424	2040 Needed Capacity Totals for Flow (MGD) and Organic Load (lbs./day)		63	153,958
Private					Flow (MGD)	37	43	46	50	53				
Industrial Facility					BOD (lbs./day)	85,223	94,639	103,657	113,422	124,740				
				Design Capacity	Flow (MGD)	57.5	57.5	57.5	57.5	57.5				
					BOD (lbs./day)	134,510	134510	134510	134510	134510				

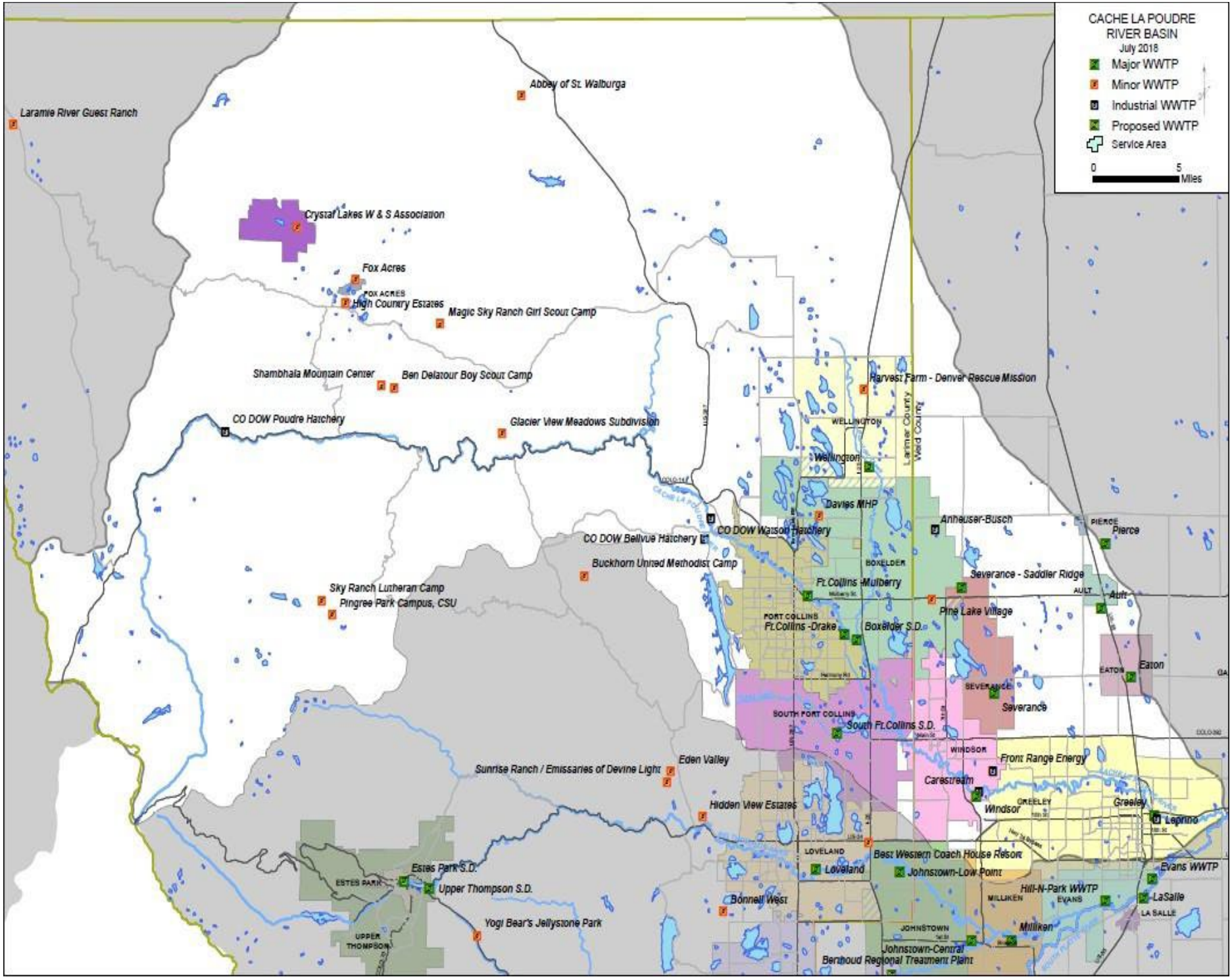


Figure 3-7 CACHE LA POUDRE RIVER BASIN

3.2 Big & Little Thompson River Basin

The headwaters of the Big Thompson River are in Rocky Mountain National Park between the Town of Estes Park and the Continental Divide. After leaving the Big Thompson Canyon, the river flows by Loveland, Johnstown, and Milliken before joining the South Platte River near LaSalle. The Little Thompson River, a significant tributary, converges with the Big Thompson at Milliken. Municipal discharges in the basin include Estes Park and Upper Thompson Sanitation Districts, Loveland, Johnstown, and Milliken to the Big Thompson River, and Berthoud and Johnstown to the Little Thompson River.

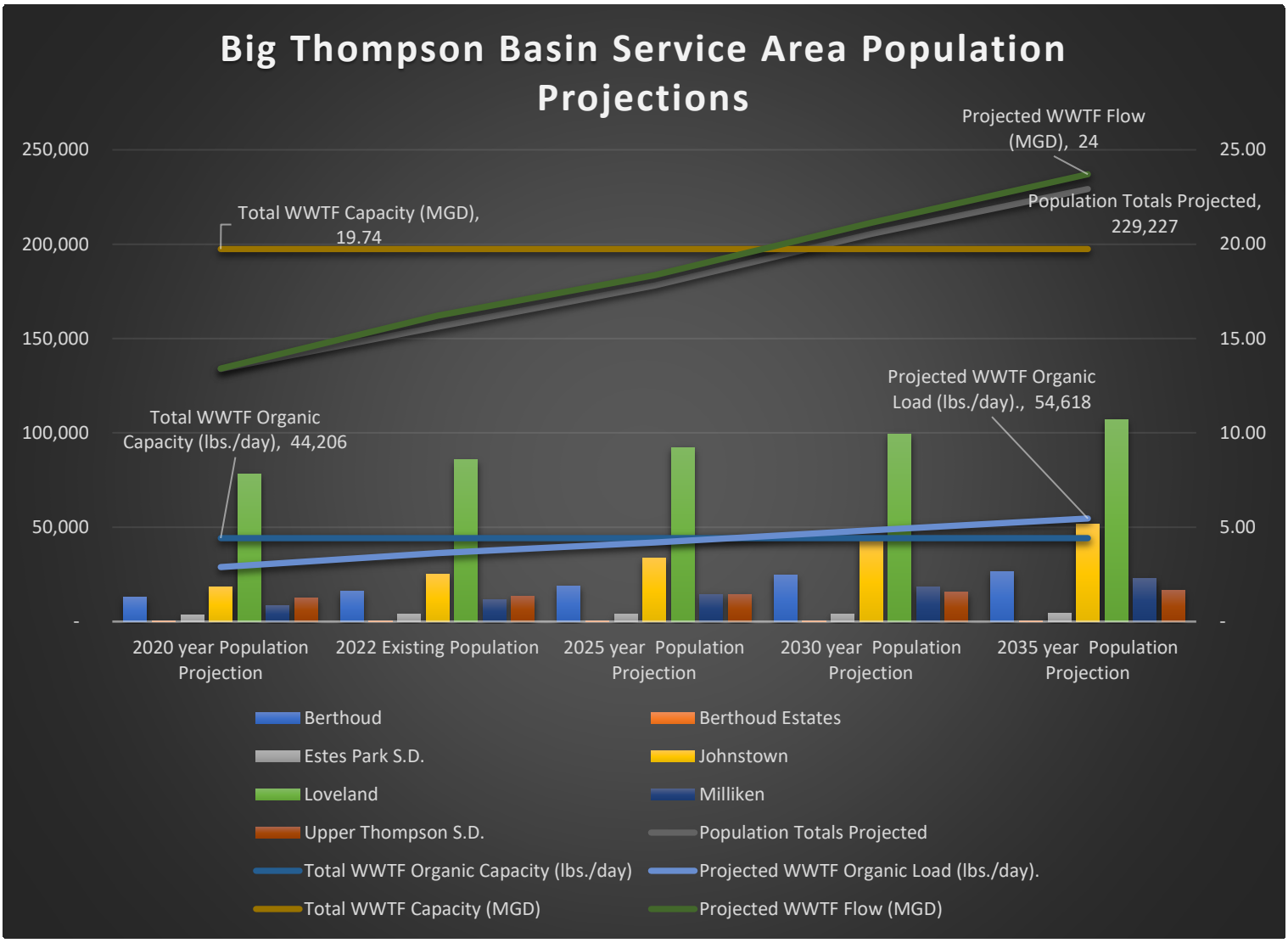


Figure 3-8 Big & Little Thompson Planning Projections

Following this section, the Big and Little Thompson River Basin map highlights the basins and identifies the wastewater treatment facilities located within them. Figure 3-8 shows the Big and Little Thompson River basin planning projections. Big and Little Thompson River basin projections show the area is undersized for hydraulic capacity and organic capacity for the population projections. Table 3-5 is the data table for Figure 3-8.

Table 3-4 lists the DMOAs within the Big and Little Thompson River basin. Some agencies within the river basin have static population and loadings and are not included in the projections.

Table 3-4 Big & Little Thompson River Basin DMOAs

Big & Little Thompson River Basin DMOAs	
Berthoud, Town of	Berthoud Estates
Estes Park Sanitation District	Johnstown, Town of
Loveland, City of	Milliken, Town of
Upper Thompson Sanitation District	Bonnell West Homeowners Association
Best Western Coach House Inn	Hidden View Estates
Eden Valley Institute	Sunrise Ranch – Emissaries of Divine Light
Jellystone Park Estates-formerly Yogi Bear's Jellystone Park	Annunciation Heights Camp & Retreat Center
Buckhorn United Methodist Camp	

All Agency Point Source Data Sheets may be viewed online at: https://nfrwqpa.colorado.gov/agency-point-source-data-inventory

Table 3-5 Big & Little Thompson Projections Table

DMOAs	Permit	Permit Status	Design Capacity		DMOA Population, Flow, & Organic Load Projections						Estimated Year at		2040 Needed Capacity	
			Hydraulic (MGD)	Organic (lbs./day)		2022	2025	2030	2035	2040	80% Capacity	95% Capacity	Hydraulic (MGD)	Organic (lbs./day)
Berthoud, Town of (Main)	CO-0046663	Expired-August 2014	2.0	3,900	Population	12,754	16,111	18,911	24,700	26,500				
Main-CO-0046663 Expired 8/31/2014; Serenity Ridge-CO-0047007 Terminated, Berthoud Regional-CO-0048998 Expired 4/30/2021					Flow (MGD)	1.35	1.62	1.90	2.50	2.90	2023	2024	2.9	5500
					BOD (lbs./day)	1,950	2,871	3,700	4,900	5,500	2023	2024		
Berthoud Estates	COG-589097	Expired-Sept. 2018	0.052	193	Population	439	439	439	439	439				
Population and Loads based on full capacity.					Flow (MGD)	0.047	0.047	0.047	0.047	0.047	N/A		0.052	193
					BOD (lbs./day)	83.3	83.3	83.3	83.3	83.3				
Estes Park Sanitation District	CO-0020290	Expired	1.5	3,300	Population	3,400	3,750	3,950	4,150	4,350				
					Flow (MGD)	0.74	0.800	0.850	0.900	0.950	N/A	N/A	1.5	3,300
					BOD (lbs./day)	2,093	2,335	2,500	2,650	2,775	2040	N/A		
Johnstown, Town of (Central)	CO-0021156	Administratively Extended	0.99	2,213	Population	18,353	25,193	33,639	42,790	51,490				
					Flow (MGD)	0.77	1.34	1.87	2.56	3.31	2022	2023	5.4	11,339
					BOD (lbs./day)	1,604	3,383	4,725	6,480	8,814	2022	2023		
Johnstown, Town of (Low Point)	CO-0047058	Administratively Extended	0.5	1,000	Population	-	-	-	-	-				
Population Totals under Town of Johnstown (Central)					Flow (MGD)	0.28	0.82	1.18	1.51	1.77	2022	2023	1.8	5,747
					BOD (lbs./day)	898	2,657	3,835	4,924	5,747	2021	2022		
Loveland, City of	CO-0026701	Expired-August 2020	12	27,150	Population	78,000	85,700	92,300	99,400	107,100				
					Flow (MGD)	8.7	9.40	10.10	10.90	11.70	2027	2038	12.0	27,150
					BOD (lbs./day)	18,880	20,340	21,900	23,600	25,400	2029	2041		
Milliken, Town of	CO-0042528	Expired-July2020	0.7	2,000	Population	8,400	11,500	14,440	18,500	22,726				
					Flow (MGD)	0.53	0.81	1.01	1.30	1.60	2022	2024	1.6	3,115
					BOD (lbs./day)	1,150	1,575	1,980	2,535	3,115	N/A	N/A		
Upper Thompson Sanitation District	CO-0031844	Active	2.0	4,450	Population	12,533	13,449	14,433	15,489	16,622				
					Flow (MGD)	1.00	1.39	1.40	1.41	1.43	≈2050	≈2060	4.0	4,450
					BOD (lbs./day)	2,220	3,095	3,117	3,140	3,184	≈2050	≈2060		
Best Western Coach House Resort	COX-634000	Unpermitted	0.0332	216	Population	-	-	-	-	-				
This was one of the permits still in the Division's queue to renew under a new permit. The Division still needs to receive a new application in order to proceed.					Flow (MGD)	0.015	0.015	0.015	0.015	0.015	N/A		0.03	216
					BOD (lbs./day)	44	44	44	44	44				
Buckhorn Methodist Camp	N/A		0.006375	32	Population	100	100	100	100	100				
Site Application Approval #4374					Flow (MGD)	N/A	N/A	N/A	N/A	N/A	N/A		0.01	32
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
Eden Valley Institute	CO-0048985	Expired-Dec. 2020	0.015	31	Population	54	104	104	104	104				
Population and Loads based on full capacity.					Flow (MGD)	0.008	0.008	0.008	0.008	0.008	N/A		0.02	31
					BOD (lbs./day)	9.0	9.0	9.0	9.0	9.0				
Hidden View Estates	CO-0048861	Active	0.008	12.7	Population	23	60	60	60	60				
Population and Loads based on full capacity.					Flow (MGD)	0.002	0.005	0.005	0.005	0.005	N/A		0.01	13
					BOD (lbs./day)	1.6	4.2	4.2	4.2	4.2				
Sunrise Ranch- Emissaries of Devine Light	COG-630000	Administratively Extended	0.034	70	Population									
Population and Loads based on full capacity. Three houses and a farm located within the complex are on the OWTS. CDPS Facility #-COG-630052					Flow (MGD)	0.0066	0.0066	0.0066	0.0066	0.0066	N/A		0.03	70
					BOD (lbs./day)	17	17	17	17	17				
Yogi Bear's Jellystone Park	COX631000	Active	0.01	22.7	Population	400	400	400	400	400				
Transient Population and Loads based on full capacity, at peak summer usage population of 400/day. Facility # COX631014					Flow (MGD)	0.006	0.006	0.006	0.006	0.006	N/A		0.01	23
					BOD (lbs./day)	9.84	9.84	9.84	9.84	9.84				
Western Mini Ranches/Vaquero Estates	COG-589095	Terminated			Population									
Terminated					Flow (MGD)	-					N/A			
					BOD (lbs./day)	-								
DMOAs		Totals	19.74	44,206.00	Population	133,879	156,142	178,112	205,468	229,227	2040 Needed Capacity Totals for Flow (MGD) and Organic Load (lbs./day)		29	60,794
Private					Flow (MGD)	13	16	18	21	24				
Industrial Facility					BOD (lbs./day)	28,878	36,339	41,840	48,312	54,618				
				Design Capacity	Flow (MGD)	19.74	19.74	19.74	19.74	19.74				
					BOD (lbs./day)	44,206	44,206	44,206	44,206	44,206				

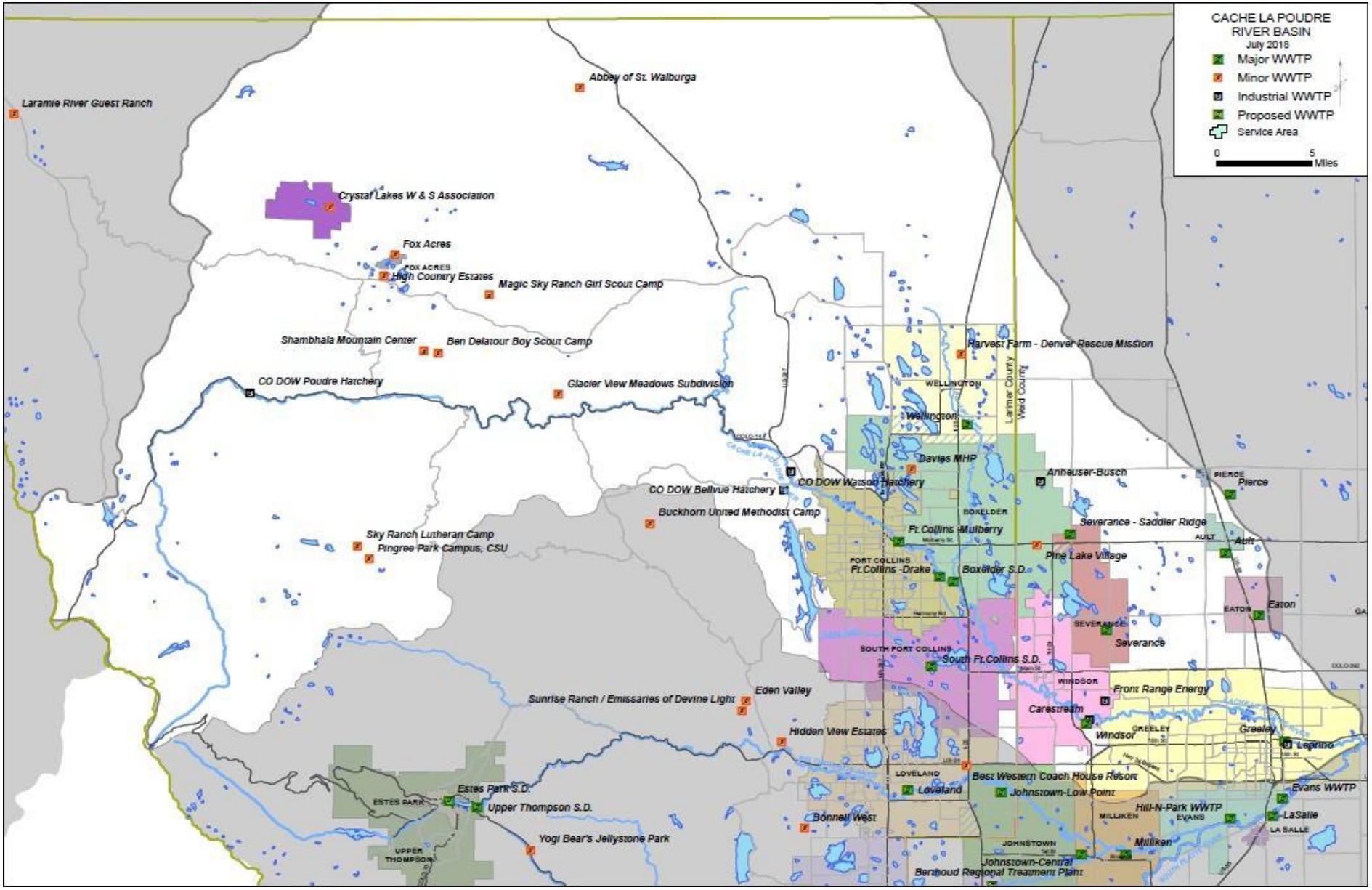


Figure 3-9 BIG & LITTLE THOMPSON RIVER BASIN

3.3 St. Vrain Creek River Basin

A portion of the St. Vrain Creek River Basin within Weld County is in the Region 2 planning area. The entities in this basin have service area boundaries that are in close proximity to each other. Consolidation or regionalization of services should be considered when expanded services or treatment is planned in this watershed. The St. Vrain Creek River basin projections show the area is undersized for the expected population over the next 20-year planning period.

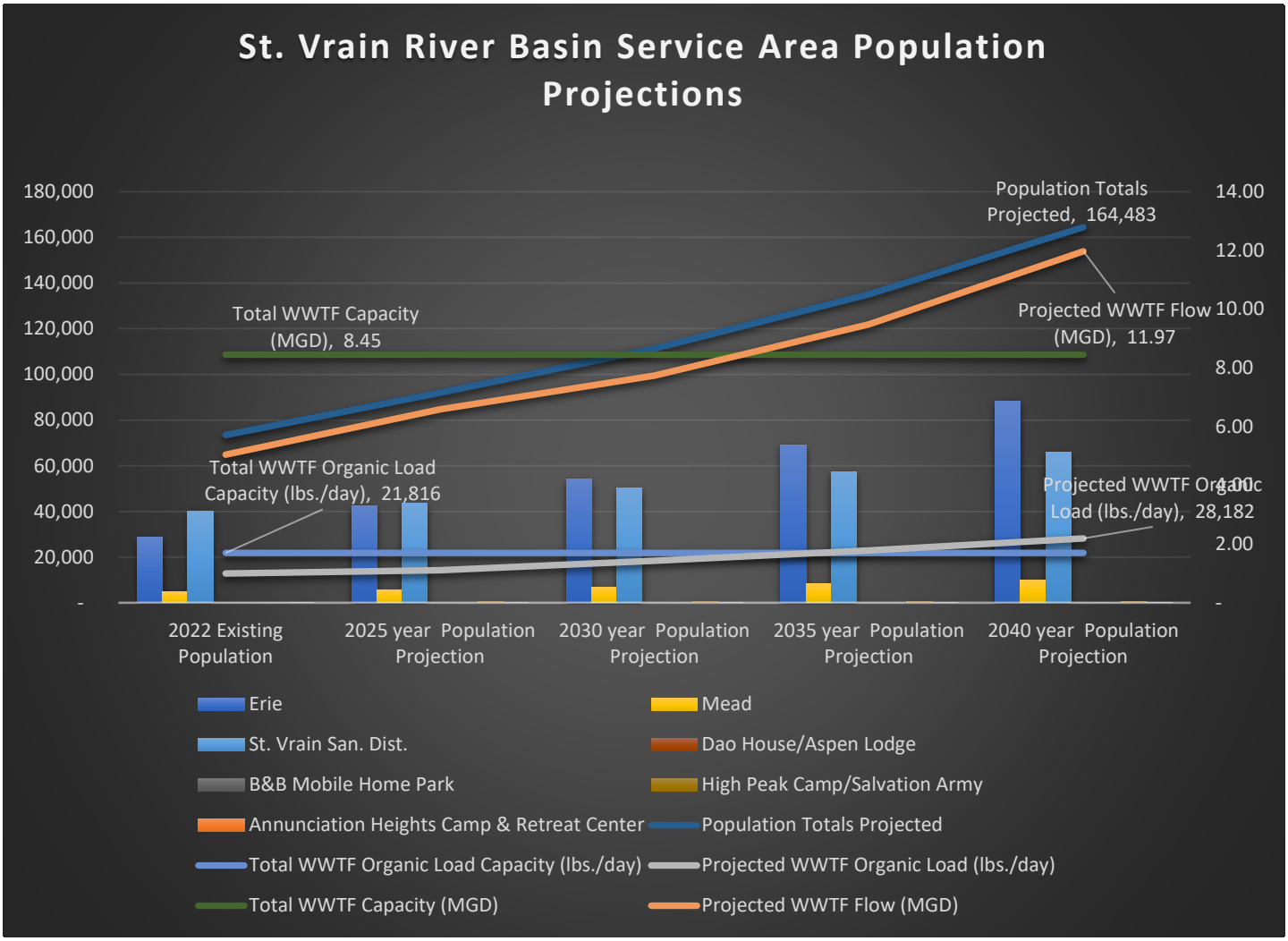


Figure 3-10 St. Vrain Creek River Basin Planning Projections

Following this section, the St. Vrain River Basin map highlights the basin and identifies the wastewater treatment facilities located within it. Figure 3-10 shows the St. Vrain River basin planning projections, and Table 3-6 lists the DMOAs within the basin. Table 3-7 is the data table for Figure 3-10.

Table 3-6 St. Vrain Creek River Basin DMOAs

St. Vrain Creek River Basin DMOAs	
Erie, Town of	Longmont, City of
Mead, Town of	St. Vrain Sanitation District
Dao House	B & B Mobile Home & RV Park

High Peak Camp/Salvation Army	Annunciation Heights Camp & Retreat Center

All Agency Point Source Data Sheets may be viewed online at: https://nfrwqpa.colorado.gov/agency-point-source-data-inventory

Table 3-7 St. Vrain Creek River Basin Projections Table

DMOAs	Permit	Permit Status	Design Capacity		DMOA Population, Flow, & Organic Load Projections						Estimated Year at		2040 Needed Capacity	
			Hydraulic (MGD)	Organic (lbs./day)		2022	2025	2030	2035	2040	80% Capacity	95% Capacity	Hydraulic (MGD)	Organic (lbs./day)
Erie, Town of (NWRF)	CO-0048445	Administratively Extended	2.0	5,335	Population	28,579	42,523	54,272	69,266	88,403			5.0	12,566
Erie, Town of (SWRF) NOT IN OPERATION	CO-0045926	Administratively Extended	-	-	Population	-	-	-	-	-				
					Flow (MGD)	1.7	2.4	3.1	3.9	5.0	2026	2029		
					BOD (lbs./day)	5,392	6,045	7,715	9,846	12,566	2030	2033		
Longmont, City of (Outside Planning Area)	CO-0026671	Administratively Extended	13	31,770	Population	99,629	104,626	112,953	112,953	112,953	Not Provided.		13.0	31,770
Not Included in Totals.					Flow (MGD)	7.0	8.1	9.9	9.9	9.9				
					BOD (lbs./day)	19,367	22,081	26,590	26,590	26,590				
Mead, Town of (Main & Lake Thomas)	CO-0046876	Active	0.499	1,286	Population	4,776	5,775	6,935	8,357	10,070				
Lake Thomas (CO-0046868) Facitliy - Termination Pending					Flow (MGD)	0.210	0.364	0.561	0.747	0.951	2026	2029	0.95	2,616
					BOD (lbs./day)	529	1,003	1,545	2,056	2,616	2026	2028		
St. Vrain Sanitation District	CO-0041700	Administratively Extended	6.0	15,195	Population	40,100	43,655	50,106	57,511	66,010	N/A-Growth Dependent		6.0	15,195
					Flow (MGD)	3.1	3.8	4.1	4.8	6.0	N/A	2043		
					BOD (lbs./day)	6,900	7,200	9,100	11,000	13,000	N/A	2043		
Dao House/Aspen Lodge	CO-0042820	Administratively Extended	0.021	52	Population	300	300	300	300	300	N/A		0.021	52
Population and Loads based on full capacity, Organic Loading not available (N/A)					Flow (MGD)	0.0139	0.0139	0.0139	0.0139	0.0139				
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
B&B Mobile Home Park	COG-588000	Administratively Extended	0.015	30.1	Population	110	110	110	110	110	N/A		0.015	30
Population and Loads based on full capacity.					Flow (MGD)	0.004	0.004	0.004	0.004	0.004				
					BOD (lbs./day)	12	12	12	12	12				
High Peak Camp/Salvation Army	COX-632099	Active	0.026	65	Population	196	371	566	566	566	N/A		0.026	65
					Flow (MGD)	0.006	0.011	0.017	0.017	0.017				
					BOD (lbs./day)	18.4	34.8	53.1	53.1	53.1				
Annunciation Heights Camp & Retreat Center	COG-589141	Unknown	0.0171	46	Population	250	250	250	250	250	N/A		0.017	46
Population and Loads based on full capacity.					Flow (MGD)	0.002	0.002	0.002	0.002	0.002				
					BOD (lbs./day)	2.93	2.93	2.93	2.93	2.93				
DMOAs		Totals	8.45	21,816	Population	73,455	91,953	111,313	135,134	164,483	2040 Needed Capacity Totals for Flow (MGD) and Organic Load (lbs./day)		12	30,377
Private					Flow (MGD)	5.05	6.58	7.74	9.49	11.97				
Industrial Facility					BOD (lbs./day)	12,821	14,248	18,360	22,902	28,182				
				Design	Flow (MGD)	8.45	8.45	8.45	8.45	8.449				
				Capacity	BOD (lbs./day)	21,816	21,816	21,816	21,816	21,816				

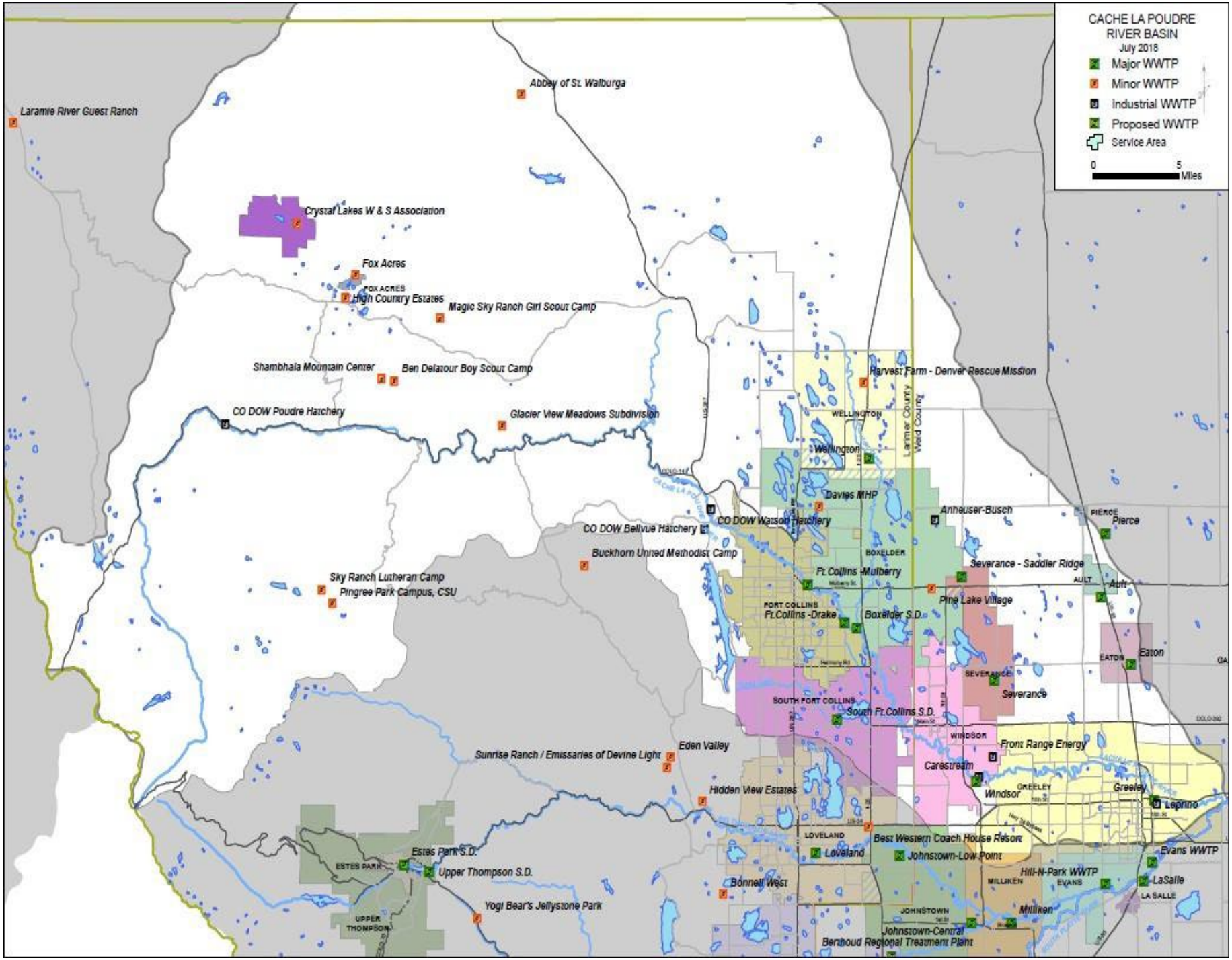


Figure 3-11 ST. VRAIN RIVER BASIN

3.4 South Platte River Basin

The South Platte River is the primary drainage through Weld County, entering from the south and flowing into Morgan County on the east. In addition to the Cache la Poudre River, Big Thompson River, and St. Vrain Creek, its other significant tributaries are Big Dry Creek, Crow Creek, and Lone Tree Creek. Municipal dischargers in this lowest basin of the region include Ft. Lupton, Gilcrest, Hudson, Lochbuie, Platteville, LaSalle, Evans, Pierce, Kersey, Keenesburg, and Grover. South Platte River basin projections show the area is adequately sized for flow and organic capacity for the population projections throughout the planning period. Figure 3-12 shows the South Platte River basin planning projections, and Table 3-8 lists the DMOAs within the basin. Some agencies within the river basin have static population and loadings and are not included in the projections. Table 3-9 is the data table for Figure 3-12.

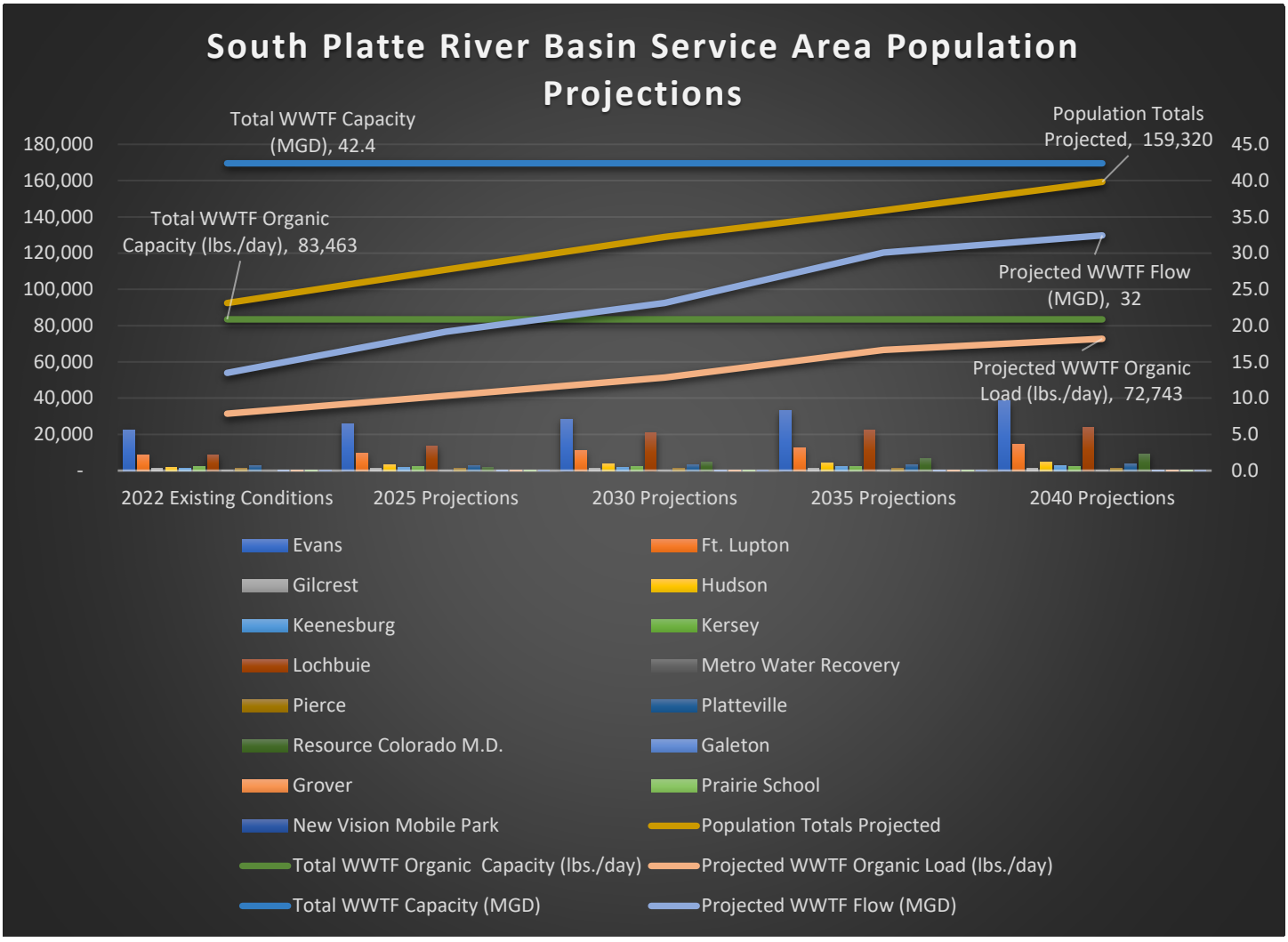


Figure 3-12 South Platte River Basin Planning Projections

Table 3-8 South Platte River Basin DMOAs

South Platte River Basin DMOAs	
Brighton, City of	Evans, City of
Fort Lupton, Town of	Gilcrest, Town of
Hudson, Town of	Keenesburg, Town of
Kersey, Town of	LaSalle, Town of
Lochbuie, Town of	Metro Water Recovery

Pierce, Town of	Platteville, Town of
Resource Colorado Water & Sanitation Metro District	Galeton Water and Sanitation District
Grover, Town of	New Vision Mobile Home Community
Prairie School District	JBS-Lone Tree Facility
Achieve More Reclamation Facility	

All Agency Point Source Data Sheets may be viewed online at: https://nfrwqpa.colorado.gov/agency-point-source-data-inventory

Table 3-9 South Platte River Basin Projections Table

DMOAs	Permit	Permit Status	Design Capacity		DMOA Population, Flow, & Organic Load Projections						Estimated Year at		2040 Needed Capacity	
			Hydraulic (MGD)	Organic (lbs./day)		2022 Existing Conditions	2025 Projections	2030 Projections	2035 Projections	2040 Projections	80% Capacity	95% Capacity	Hydraulic (MGD)	Organic (lbs./day)
Brighton, City of	CO-0021547	Expired-Feb. 2021	3	5610	Population	40,083	45,013	47,206	49,400	51,593				
Brighton began incrementally transitioning flows in early 2018 and will continue to divert additional flows annually to Metro Water Recovery's North Treatment Plant.					Flow (MGD)	1.3	1.20	1.10	1.00		Not Provided		-	-
					BOD (lbs./day)	3,100	3,000	2,900	2,800					
Evans, City of	CO-0047287	Active	2.88	6624	Population	22,437	26,026	28,409	32,996	38,323				
					Flow (MGD)	1.7	2.40	2.60	3.00	3.50	2024	2032	3.50	10,103
					BOD (lbs./day)	6,624	5,338	6,870	7,489	10,103	2020	2030		
Fort Lupton, City of	CO-0021440	Expired	2.75	4355	Population	8,410	9,500	10,900	12,700	14,700				
					Flow (MGD)	1.80	1.96	2.17	2.37	2.74	2031	2041	2.75	4,355
					BOD (lbs./day)	3,200	3,200	3,800	4,200	4,861	2026	2034		
Gilcrest, Town of	CO-0041653	Expired	0.196	466	Population	1,100	1,100	1,100	1,100	1,100				
					Flow (MGD)	0.06	0.06	0.06	0.06	0.06	Not Provided		0.20	466
					BOD (lbs./day)	264	264	264	264	264				
Hudson, Town of	COG-0589014	Expired-Sept. 2018	0.5	1043	Population	1684	3030	3499	4378	4500				
					Flow (MGD)	0.19	0.12	0.17	0.18	0.2	2026	2029	0.5	1043
					BOD (lbs./day)	240	200	250	300	350	2035	2037		
Keenesburg, Town of	CO-0041254	Active	0.256	468	Population	1,250	1,520	1,849	2,250	2,737				
					Flow (MGD)	0.13	0.146	0.185	0.225	0.273	2033	2037	0.27	468
					BOD (lbs./day)	213	258	314	383	465	2035	2039		
Kersey, Town of	CO-0021954	Expired-June 2021	0.38	919	Population	2,101	2,132	2,220	2,300	2,400				
					Flow (MGD)	0.079	0.09	0.09	0.10	0.11	>2030	>2030	0.38	919
					BOD (lbs./day)	265	300	350	375	400	>2030	>2030		
LaSalle, Town of	COG-588000, COG-588058	Expired	0.46	1841	Population	2,355	2,482	3,362	4,035	4,842				
					Flow (MGD)	0.132	0.139	0.189	0.226	0.272	2050	2055	0.46	1,841
					BOD (lbs./day)	505	532	720	865	1,038	2050	2050		
Lochbuie, Town of	CO-0047198	Administratively Extended	2.0	3840	Population	8,747	13,655	20,709	22,549	24,083				
					Flow (MGD)	1.37	1.88	3.57	4.00	4.20	2024	2026	4.20	8,231
Population includes Lochbuie and a portion of Bromley Park in Adams County.					BOD (lbs./day)	2,678	3,688	6,987	7,835	8,231	2023	2025		
Metro Water Recovery	CO-0048959	Expired-April-2021	28.8	55300	Population	78	148	171	251	275				
					Flow (MGD)	6.5	10.60	12.30	18.00	19.90	>2040	>2040	28.80	55,300
					BOD (lbs./day)	13,690	23,500	27,200	40,000	44,240	>2040	>2040		
Pierce, Town of-Groundwater Discharge	COX-631000 COX-631042	Administratively Extended	0.18	495	Population	1,067	1,100	1,200	1,300	1,400				
					Flow (MGD)	0.069	0.08	0.08	0.09	0.10	>2035	>2035	0.18	495
					BOD (lbs./day)	171	200	225	250	300	>2035	>2035		
Platteville, Town of	COG589164	Active	0.348	871	Population	2,760	2,944	3,139	3,348	3,557				
					Flow (MGD)	0.140	0.16	0.17	0.19	0.21	>2040	>2040	0.35	871
					BOD (lbs./day)	410	451	496	545	600	>2040	>2040		
Resource Colorado Water & Sanitation Metropoliatan District	NA	NA	0.6	1540	Population	-	1,806	4,750	6,515	9,347				
Has Not been Constructed.					Flow (MGD)	-	0.17	0.43	0.59	0.85	2031	2034	0.85	1,822
					BOD (lbs./day)	-	368	926	1,270	1,822	2031	2034		
Galeton Water & Sanitation District	CO-0043320	Expired-April 2021	0.0113	38.5	Population	228	230	232	234	236				
					Flow (MGD)	0.004	0.005	0.006	0.007	0.008	2040	2040	0.01	27
					BOD (lbs./day)	26.3	26.6	26.8	27.1	27.4	2040	2040		
Grover, Town of	COX-621050	Active	0.025	52	Population	156	175	191	207	227				
					Flow (MGD)	0.016	0.180	0.020	0.022	0.024	2030	2035	0.03	52
					BOD (lbs./day)	30	33	36	39	42	2038	2050		
JBS-Lone Tree Facility	CO-0027707	Administratively Extended	5.2	18754	Population									
					Flow (MGD)	1.956	1.956	1.956	1.956	1.956	Not Provided		5.20	18,754
					BOD (lbs./day)	10,851	10,851	10,851	10,851	10,851				
Prairie School District	COX634025	Active	0.0044	21	Population	204	204	204	204	204				
Groundwater Discharge. Population based on full capcity of school.					Flow (MGD)	0.001	0.001	0.001	0.001	0.001	Not Provided		0.004	21
					BOD (lbs./day)	4.2	4.2	4.2	4.2	4.2				
Achieve More Reclamation Facility	REG 84	NOA	0.025	63	Population	100	100	100	100	100				
Population is transient. Agricultural Complex with livestock barn, event center, RV Park. ~Typ avg is 100 visitors/staff per 8-hr day, plus 150 RV spaces. Facility has not been Constucted.					Flow (MGD)	N/A	N/A	N/A	N/A	N/A	Not Provided		0.025	63
					BOD (lbs./day)	N/A	N/A	N/A	N/A	N/A				
New Vision Mobile Home Community Wastewater Treatment Facility	COX-631056	Administratively Extended	0.0151	44	Population	216	216	216	216	216				
Population and Loads based on full capacity.					Flow (MGD)	0.009	0.009	0.009	0.009	0.009	Not Provided		0.015	44
					BOD (lbs./day)	30	30	30	30	30				
DMOAs		Totals	42.4	83,463	Population	92,456	110,861	128,937	143,563	159,320	2040 Needed Capacity Totals for Flow (MGD) and Organic Load (lbs./day)		42.5	85,993
Private					Flow (MGD)	13	19	23	30	32				
Industrial Facility					BOD (lbs./day)	31,416	41,359	51,365	66,642	72,743				
				Design Capacity	Flow (MGD)	42.4	42.4	42.4	42.4	42.4				
					BOD (lbs./day)	83,463	83462.5	83462.5	83462.5	83462.5				

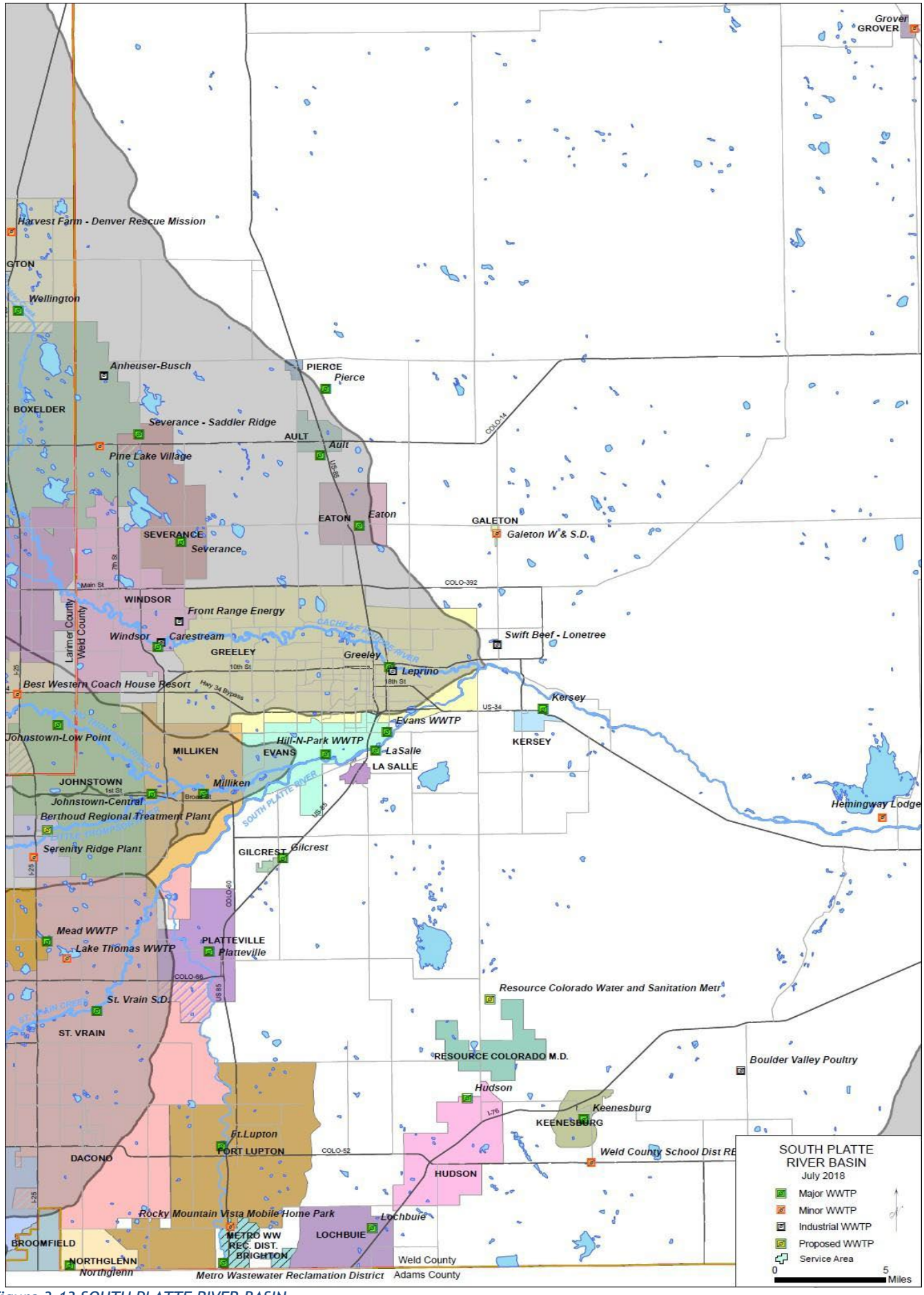


Figure 3-13 SOUTH PLATTE RIVER BASIN

3.5 Big Dry Creek River Basin

Big Dry Creek flows north from the Broomfield area into Weld County and into the South Platte River just south of Ft. Lupton. The only municipal treatment plant in the Weld County portion of this basin is that of Northglenn, and Table 3-10 lists the DMOAs of the Big Dry Creek River basin. Following this section, the South Platte River / Big Dry Creek Basin map highlights both basins and identifies the wastewater treatment facilities located within each. A tiny portion of the Big Dry Creek River basin resides within the Region 2 planning area; thus, the Association did not construct population and loading projections. Although Table 3-11 depicts the projections for Northglenn and Broomfield.

Table 3-10 Big Dry Creek River Basin Agencies

Big Dry Creek River Basin Agencies	
City and County of Broomfield	Northglenn, City of
Portions of:	
St. Vrain Sanitation District	Fort Lupton, City of

All Agency Point Source Data Sheets may be viewed online at: https://nfrwqpa.colorado.gov/agency-point-source-data-inventory

Table 3-11 Big Dry Creek River Basin Projections Table

DMOAs	Permit	Permit Status	Design Capacity		DMOA Population, Flow, & Organic Load Projections						Estimated Year at		2040 Needed Capacity	
			Hydraulic (MGD)	Organic (lbs./day		2022 Existing Conditions	2025 Projections	2030 Projections	2035 Projections	2040 Projections	80% Capacity	95% Capacity	Hydraulic (MGD)	Organic (lbs./day)
Northglenn, City of	CO-0036757	Active	4.2	7916	Population	38,694	39,671	40,673	41,700	43,000			5.78	11,794
					Flow (MGD)	3.0	4.61	4.88	5.14	5.78	2020	2024		
					BOD (lbs./day)	5,603	8,849	9,830	10,308	11,794	2020	2024		
Broomfield, City and County	CO-0026409	Active	12	23018	Population	78,202	85,028	94,151	95,646	95,747			8.62	21,064
					Flow (MGD)	6.49	7.65	8.47	8.61	8.62	>2040	>2040		
					BOD (lbs./day)	14,233	18,706	20,713	21,042	21,064	2028	>2040		
DMOAs		Totals	16.2	30934	Population	116,896	124,699	134,824	137,346	138,747	2040 Needed Capacity Totals for Flow (MGD) and Organic Load (lbs./day)		14	32,858
Private					Flow (MGD)	9.5	12.3	13.4	13.8	14.4				
Industrial Facility					BOD (lbs./day)	19,836	27,555	30,543	31,350	32,858				
					Design Capacity Flow (MGD)	16.2	16.2	16.2	16.2	16.2	16.2			
					Design Capacity BOD (lbs./day)	30,934	30934	30934	30934	30934	30934			

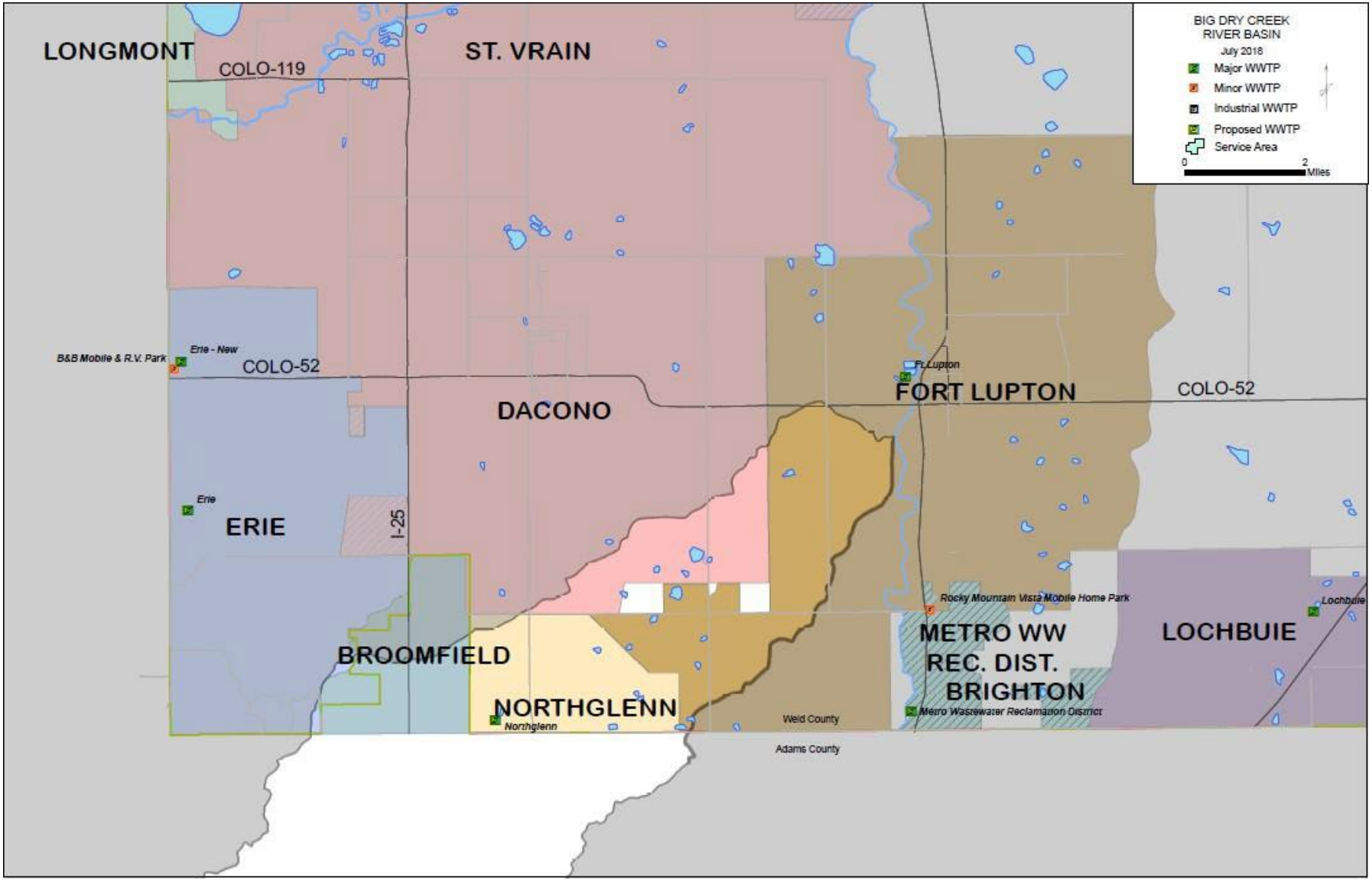


Figure 3-14 BIG DRY CREEK BASIN

Chapter 4 AGENCY REGIONAL FINANCIAL SUMMARY

The technical and economic feasibility of implementing permit water quality-based limits, regulation standards, and new and updated regulations such as those in the 10-year water quality plan, including TENORM and PFAS, all come at a cost.

Capital Improvement Projects (CIP) may be self-funded, funded by Grants, State Revolving Loans, or a combination thereof. The endorsed projects of the Association's 208 AWQMP illustrate the DMOA costs regionally to maintain, protect, or restore the region's water quality.

4.1 NFRWQPA DMOA Capital Improvement Projects Financial Summary

The regional DMOAs are investing heavily in improving water quality to meet water quality standards, investing nearly 1 billion dollars over the last ten years. CIP costs can include plant upgrades, collection system upgrades, lift stations and interceptors, and nonpoint source BMP projects in agency Utility Plans. CIPs also result from new regulations and new water quality-based limits within current regulatory standards. Noting the annual average cost of CIPs increases over time. DMOA CIP costs may be viewed within the 208 AWQMP Endorsed Project listing here: https://nfrwqpa.colorado.gov/208-areawide-water-quality-management-plan.

4.2 NFRWQPA DMOA Site Location & Design Applications Projects Financial Summary

Site Application project costs are ever-increasing from year to year. All endorsed projects of the 208 AWQMP essentially turn into Regulation No. 22 Site Location and Design Regulations for Domestic Wastewater Treatment Works applications for DMOAs, including projects for plant upgrades, collection system upgrades, and lift stations interceptors. The Association maintains a historical database of all Site Location and Design Applications online here: https://nfrwqpa.colorado.gov/site-application-process/site-applications-by-agency. DMOA CIP costs related to Regulation 22 Site Location and Design Application approvals may be viewed within the 208 AWQMP Endorsed Project listing here: https://nfrwqpa.colorado.gov/208-areawide-water-quality-management-plan.

4.3 NFRWQPA DMOA User Rates Summary

Affordable utilities are an essential aspect of a 208-planning concerning the region's social-economic feasibility to provide sewer services. For DMOAs to afford those CIP and Site Application projects due to new standards and regulations, agency user rates and sewer tap costs increase over time. The link below is a summary of the increased user rates documented with agency Utility Plans over time. User Rates have steadily increased over the last ten years. The rate increases are concerning and should be considered by the Office of Health Equity and the WQCD goals of social-environmental justice. DMOA user rates are monitored and available on this webpage:https://nfrwqpa.colorado.gov/208-areawide-water-quality-management-plan.

4.4 NFRWQPA DMOA Plant Investment Fees Summary

Along with User Rates, DMOAs generate revenue by Plant Investment Fees (PIFs) generated from new sewer taps. Below is a summary of the increase of PIFs documented with DMOAs Utility Plans for over ten years. PIFs have steadily increased over the last ten years to keep pace with costs. DMOA PIFs are monitored and available on this webpage: https://nfrwqpa.colorado.gov/208-areawide-water-quality-management-plan.

Chapter 5 WATER QUALITY

As regional population increases and urban development expands, regional environmental water quality is affected. DMOA CIP projects are typically the result of population increases and technology improvements to meet water quality standards that protect, maintain, or restore our regional water quality. The state programs which establish water quality standards must meet the minimum requirements set by EPA under the CWA. The system used by the state for determining surface water quality classification and standards is based on adopting a use classification for waterbody segments (i.e., uses to be protected) and then adopting numeric standards for specific pollutants to protect those uses. There are three components to water quality standards, which include: (1) use classifications, (2) numeric or qualitative standards, and (3) antidegradation provisions.

5.1 Regulation #31 Basic Standards and Methodologies for Surface Water

Regulation #31 establishes basic water quality standards and methodologies for surface waters in the state. The division continues to work with stakeholders on the development of nutrient water quality standards and to adopt revised temperature standards. These modifications possibly include removing shoulder limits with bell curve limits to protect reproductive stages and other sensitive life periods of fish but may uncover where the criteria may be too stringent. Additional studies will be needed to determine if transition zones require different limits in individual stream segments. Upon review of the studies, the division may suggest changes to temperature criteria in Regulation No. 31 during the hearing based on the work done and all the data compiled in the temperature technical advisory committee and the basin site-specific hearings. DMOAs are required within Utility Plans to assess influent and effluent temperature, including 3-years of WWTP performance regarding temperature.

These established standards become an essential part of the overall planning process for the Association. Entities must identify the stream segment they will be discharging to and the water quality standards associated with that segment. Once a water quality standard is adopted by the WQCC, effluent limits to meet that standard in a stream segment or waterbody will be included in discharge permits. Through the plan, the DMOA not only identifies which segments they will discharge to but how the treatment facilities (both existing and proposed) will provide treatment sufficient to meet these standards or effluent limits. If applicable, DMOAs should also work with the Division to implement wasteload allocations identified in Utility Plans. A wasteload allocation (WLA) is the maximum load, in pounds/day or pounds/year, a permittee is allowed to discharge into a receiving water as determined from a TMDL. The load may be calculated from a water quality standard or a permit effluent limit and the volume of water released (often the facility's design capacity) by the discharger. Operating Agencies are also required to consider the potential for more stringent water quality standards in the future and identify potential mechanisms for meeting those requirements.

5.2 Regulation #38 Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, and Smoky Hill River Basin

The WQCC assigns water quality classifications and standards for specific water body segments to rulemaking processes. All point source dischargers must meet the levels of effluent quality necessary to achieve and maintain these water quality standards established for the receiving stream. Regulation No. 38 *Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, and Smoky Hill River Basin* identify the standards associated with all Larimer and Weld County segments. Access the regulation on the WQCC website at https://www.colorado.gov/pacific/cdphe/water-quality-control-commission-regulations.

5.3 Regulation #85 Nutrient Management Control Regulation

In June 2012, the Colorado Water Quality Control Commission adopted Regulation No. 85, "Nutrient Management Control Regulation" (Reg. 85). Reg. No. 85 requires individual, more extensive wastewater treatment facilities to meet effluent limits for phosphorus and nitrogen based on levels determined to be achievable with available technology. The regulation became effective in September of 2012 and required facilities with over 2.0 MGD capacity to meet effluent limits of 1.0 mg/l Phosphorus and 15 mg/l Total Inorganic Nitrogen (TIN). New systems would have to meet 0.7 mg/l Phosphorus and 7 mg/l TIN. Domestic facilities with $\leq$ 1.0 mgd capacity are exempted from the regulation but must still monitor their effluent. Likewise, existing systems with <2.0 mgd capacity were given a 10-year deferral from meeting the nutrient standards. The WQCD will use the data collected from the Statewide sampling program to develop a database of nutrient levels in the State. This information will be of use in developing future standards. Regulation No. 31 "The Basic Standards and Methodologies for Surface Water" will lower these nutrient limits further. The anticipated in-stream Total Phosphorus and Total Nitrogen values for warm water streams are 0.17 mg/L-phosphorus and 2.01 mg/L-Nitrogen for Regulation No. 31.

Additionally, the division will continue to work with stakeholders to administer the voluntary nonpoint source provisions of Regulation No. 85 over the term of the regulation. The division also implemented the nutrients Voluntary Incentive Program https://www.colorado.gov/pacific/cdphe/nutrients/nutrients-incentive-program, allowing facilities to reduce nutrients in exchange for extended compliance schedules. The program also creates certainty regarding the year the facility will need to meet water quality-based effluent limits. DMOAs are required to assess an agency's wastewater utility service areas' nutrient loading and provide treatment technologies or nonpoint source BMP projects to reduce loading.

5.4 Waterbodies Requiring TMDLs

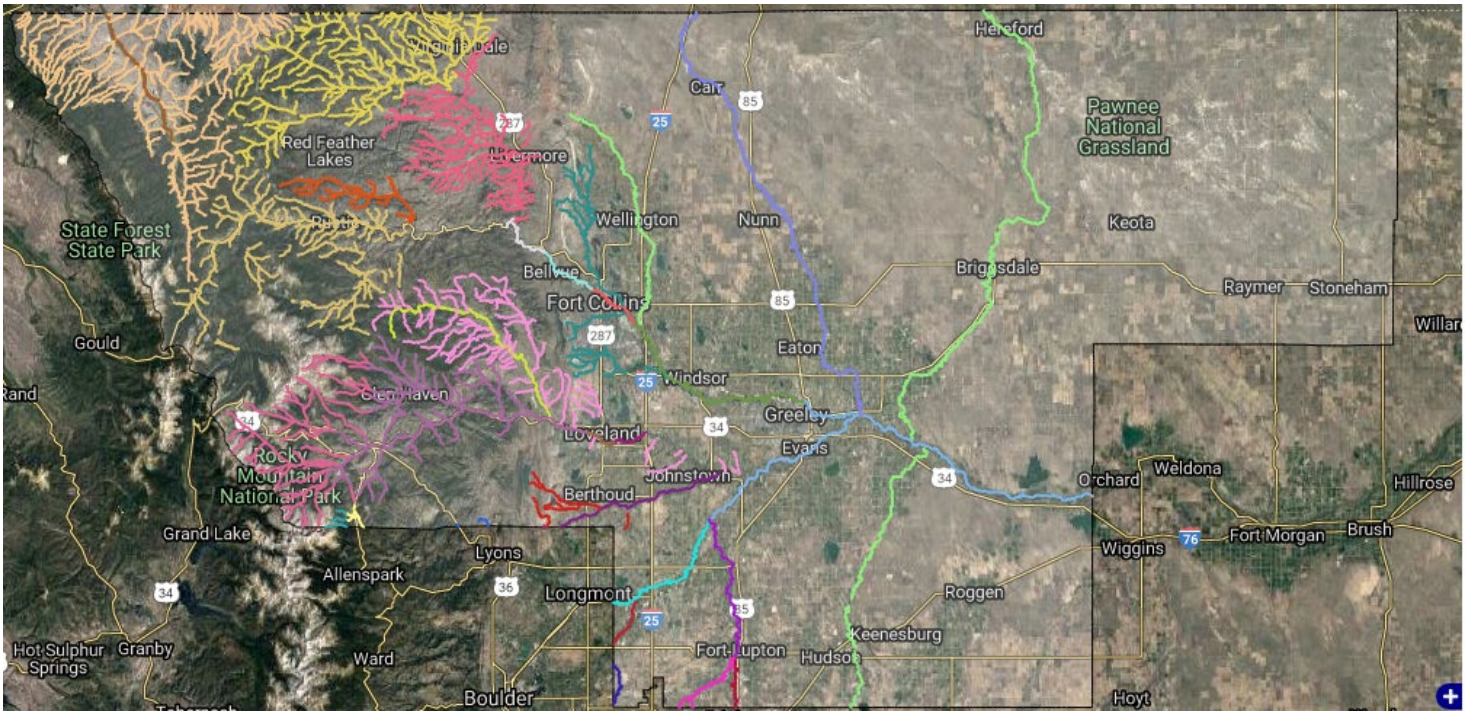


Figure 5-1 303(d) Impaired and Use-Limited Rivers/Streams and Waterbodies Map

The EPA and the CWA require that TMDLs be developed for all waterbodies on the 303(d) list; TMDLs identify pollutant sources and loading information related to water quality impairments for both point and nonpoint sources. TMDLs calculate the total amount of pollutant(s) (load) that may be discharged into a water body to

ensure that water quality standards are met. Only those segments the WQCD has identified as impaired on the 303(d) list require TMDLs. TMDLs are only necessary for impairments for these segments due to "pollutants, not "pollution." Those impairments within the Associations' 208 region may be obtained via the WQCD website or the Association's website: https://data-nfrwqpa.hub.arcgis.com/app/0ac440bd9be24e6ca4131c9d9ec9005b. The GIS maps provide the waterbody identification number (WBID), a description of the segment, the portion of the segment that is impaired or needs more data for a determination of impairment, the parameter of concern, and the level of priority for TMDL development. DMOAs are required to list any TMDLs within their Utility Plans and provide the segment table value standards (TVS). Depending on the listings, DMOAs assess whether the listings are naturally occurring or due to human activity, considering the contributing factors, and provide a recommended list of treatment technologies or BMPs to address the pollutants of concern within Utility Plans. Those treatment technologies or BMPs are then adopted into the Association's 208 AWQMP as endorsed projects. Stream segments that demonstrate impairment by not meeting water quality standards for the assigned use classification and do not currently have enough data to support listing the segment as impaired are considered water quality data-limited and placed on the monitoring and evaluation (M&E) list within Regulation No. 93. With 600 waterbody segments on the M&E list statewide, the Association plans to aid the division in assessing all M&E waterbody segments in Region 2. CSU's eRAMS WRAP & CLEAN database is also utilized by the Association to examine 303(d) and M&E segments included in Regulation No. 93.

5.5 NFRWQPA Regional Water Quality Assessment Results Summary

Surface water quality standards (referenced as "water quality standards" for the remainder of the Chapter 5 discussion) are established to protect all uses in the WQCD's Integrated Water Quality Monitoring and Assessment Report (305(b)). The WQCD evaluates the degree to which water quality standards are being met through systematic sampling of waterbodies throughout the state. When a waterbody is not meeting water quality standards for a particular pollutant(s), the waterbody is listed as impaired with respect to that pollutant(s) and placed on the 303(d) list in Regulation 93. To support listing decisions, the WQCD develops a listing methodology in collaboration with stakeholders and there is a public process associated with revisions to Regulation 93. This 208 plan update evaluated changes in number of waterbodies listed as impaired with respect to pollutant(s) and changes in number and type of pollutants that resulted in waterbodies being listed. The plan then uses this analysis to identify areas where additional evaluation is necessary in order to determine if changes in number of impaired waterbodies and pollutant number and type represent changes in water quality or changes caused by programmatic activities. For example, an increase in number of waterbodies listed as impaired does not necessarily mean water quality is declining. It could mean that more water quality data were collected and assessed in an area, resulting in a better understanding of status of water quality in the area rather than a definitive determination that water quality is declining or that there is a downward trend in water quality. The need for additional evaluation to better understand status of water quality in the region are identified and prioritized as recommendations in Chapter 7.

Tracking potential changes in water quality based on changes in number of impaired waterbodies and number and type of listed pollutants is the most direct way to characterize water quality in the region over time. The analysis of water quality changes by 208 Planning agencies is essential for DMOAs to assess the impact of natural and anthropogenic factors from urban development on water quality over an extended period, including how or whether regional projects protect, maintain, or restore water quality. It is difficult to determine water quality regionally with single-point data points. Residents of Colorado, regional DMOAs, and utility rate payers want to know whether their efforts in water quality are making a difference, and changes that can be demonstrated to actually represent either improving or declining water quality illustrate where the needle is moving and what needs to be addressed through the 208 plan. To this end, NFRWQPA is evaluating refining its method to look at

this by impaired miles for specific parameters, understanding that exclusions of some parameters might still be needed for example if water quality standards changed recently.

In addition to tracking potential changes in water quality based on information in Regulation 93, one goal of the CWA is that all classified waters of the state fully support "fishable" and "swimmable" use classifications. Waterbodies may be assigned any of the four following categories of use classifications: aquatic life, recreation, water supply, or agriculture. Each waterbody segment then fits into one of the five reporting categories based on whether or not its assigned uses are currently met or not as illustrated in Figure 5-2. This section evaluates information about the five reporting categories in the WQCD Integrated Reports over time.

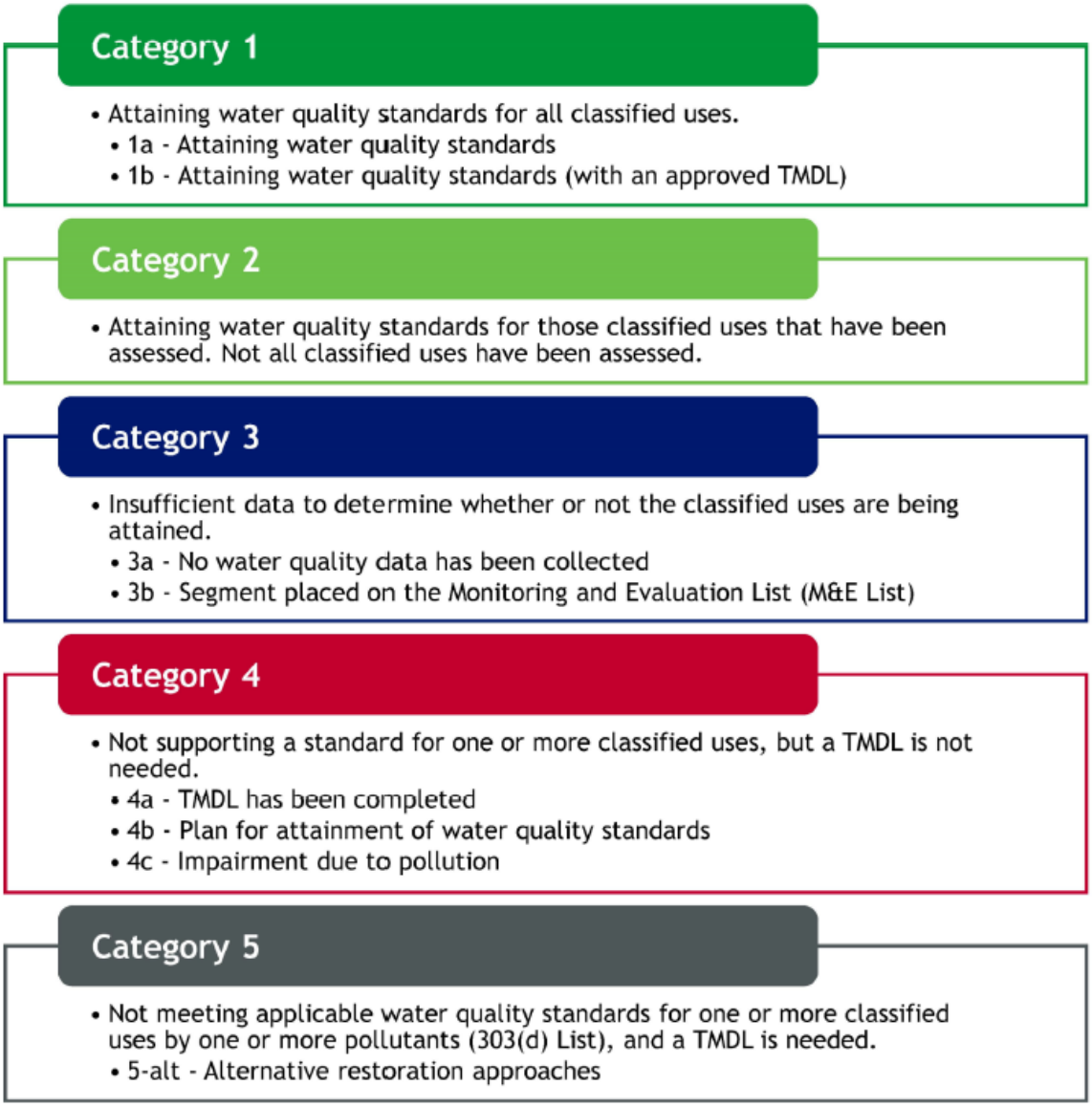


Figure 5-2 Integrated Report Categories (2022-Integrated Water Quality Monitoring and Assessment Report (305b))

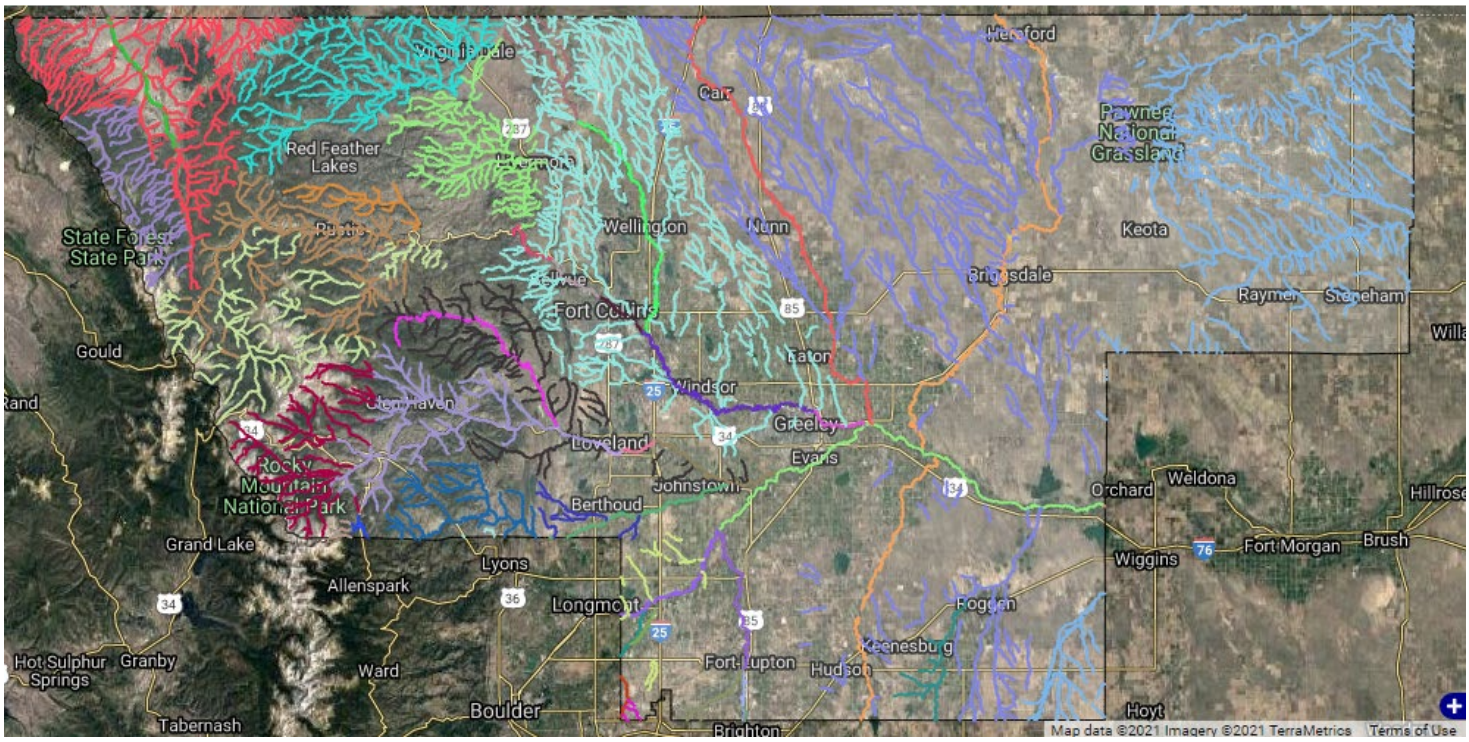
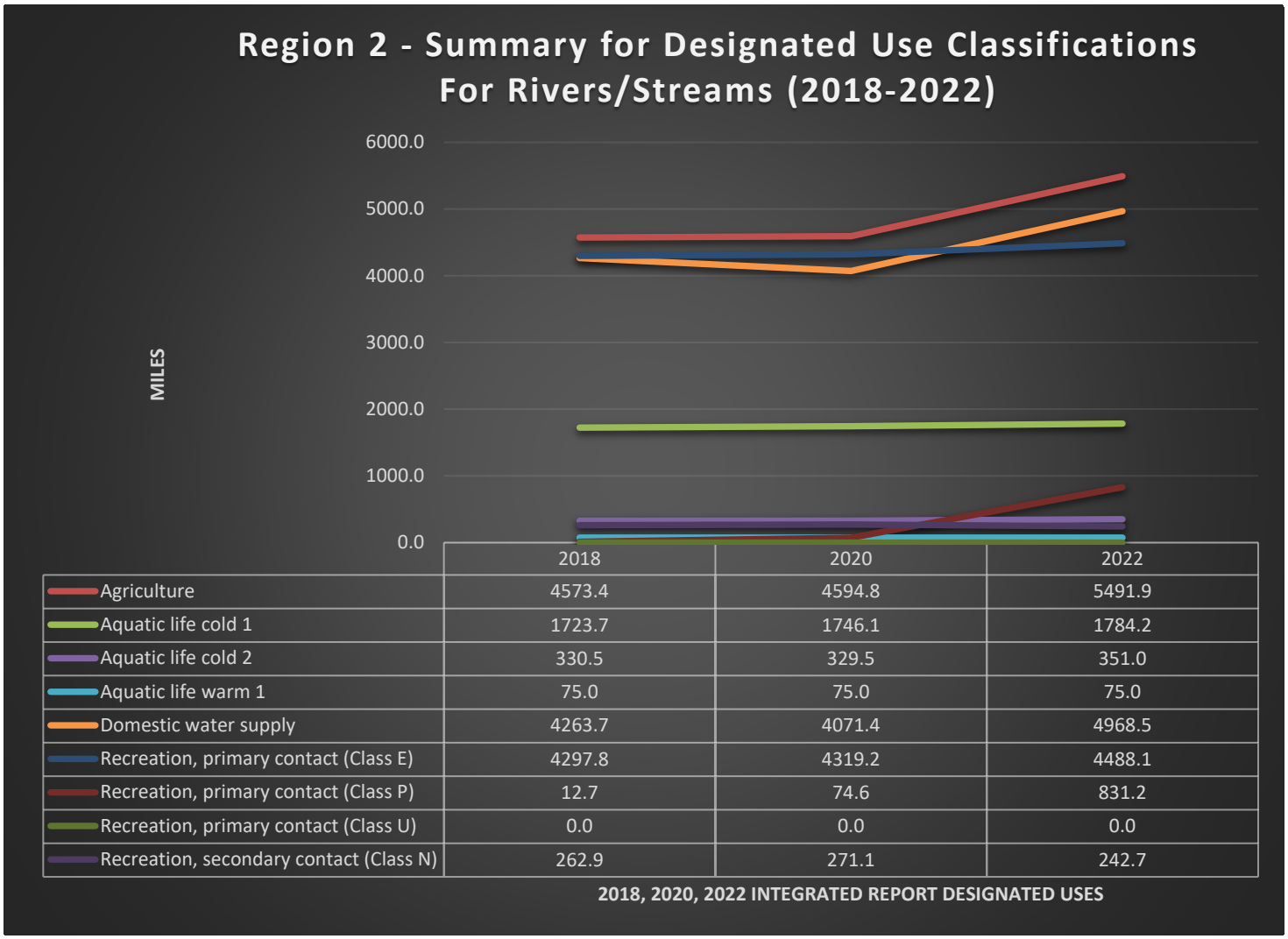


Figure 5-3 Region 2 - 305(b) Rivers/Streams and Waterbodies Classification Map

This section of the report that discusses water quality based on the five categories in the Integrated Report is limited by the fact that changes in these five categories do not necessarily reflect changes in water quality. For examples, changes in these five categories could be caused by modifications in waterbody segmentation, changes in water quality standards and changes in the degree to which data and assessments are available for waterbodies. Federal requirements of the CWA sections 303(d), 305(b), and 314, require all states to assess and report on the status of water quality; changes in the status of water quality over time can be due to both changes in water quality and changes in programmatic activities as discussed above. This section of the report includes a summary of water quality assessment efforts in Region 2, including the attainment status of all surface waters in Region 2 according to the five reporting categories (WQCD, 2022). This section also includes evaluation of changes in attainment and EPA use categories with discussions about what these changes might mean and recommendations for actions that will be taken to analyze these changes in order to better assess water quality in the region.

The total number of segments in the region can change over time due to water body segments being split into multiple segments, combined, or reclassified, however, the total number of miles does not change. The stream and river segments or waterbodies are known as Assessment Units IDs (AUIDs). Figure 5-3 presents all the water segments for rivers and streams only within Region 2, and Figure 5-4 illustrates the designated uses for rivers and streams, in miles, only within Region 2 from 2018-2022 due to re-segmentation over that period. And Figure 5-5 illustrates the designated uses for lakes and reservoirs, in acres, only within Region 2 from 2018-2022 due to re-segmentation over that same period. Users can generate these GIS illustrations of stream segments and waterbodies with the CSU eRAMS database by uploading a desired boundary of interest and generating either the default or Healthy Watershed reports.



	2018	2020	2022
Agriculture	4573.4	4594.8	5491.9
Aquatic life cold 1	1723.7	1746.1	1784.2
Aquatic life cold 2	330.5	329.5	351.0
Aquatic life warm 1	75.0	75.0	75.0
Domestic water supply	4263.7	4071.4	4968.5
Recreation, primary contact (Class E)	4297.8	4319.2	4488.1
Recreation, primary contact (Class P)	12.7	74.6	831.2
Recreation, primary contact (Class U)	0.0	0.0	0.0
Recreation, secondary contact (Class N)	262.9	271.1	242.7

Figure 5-4 Region 2 - Rivers and Streams Designated Uses, 2018-2022 (note: changes to water quality standards and waterbody segmentation occurred between the 2020 and 2022 Integrated Reports that could affect how this information should be interpreted.)

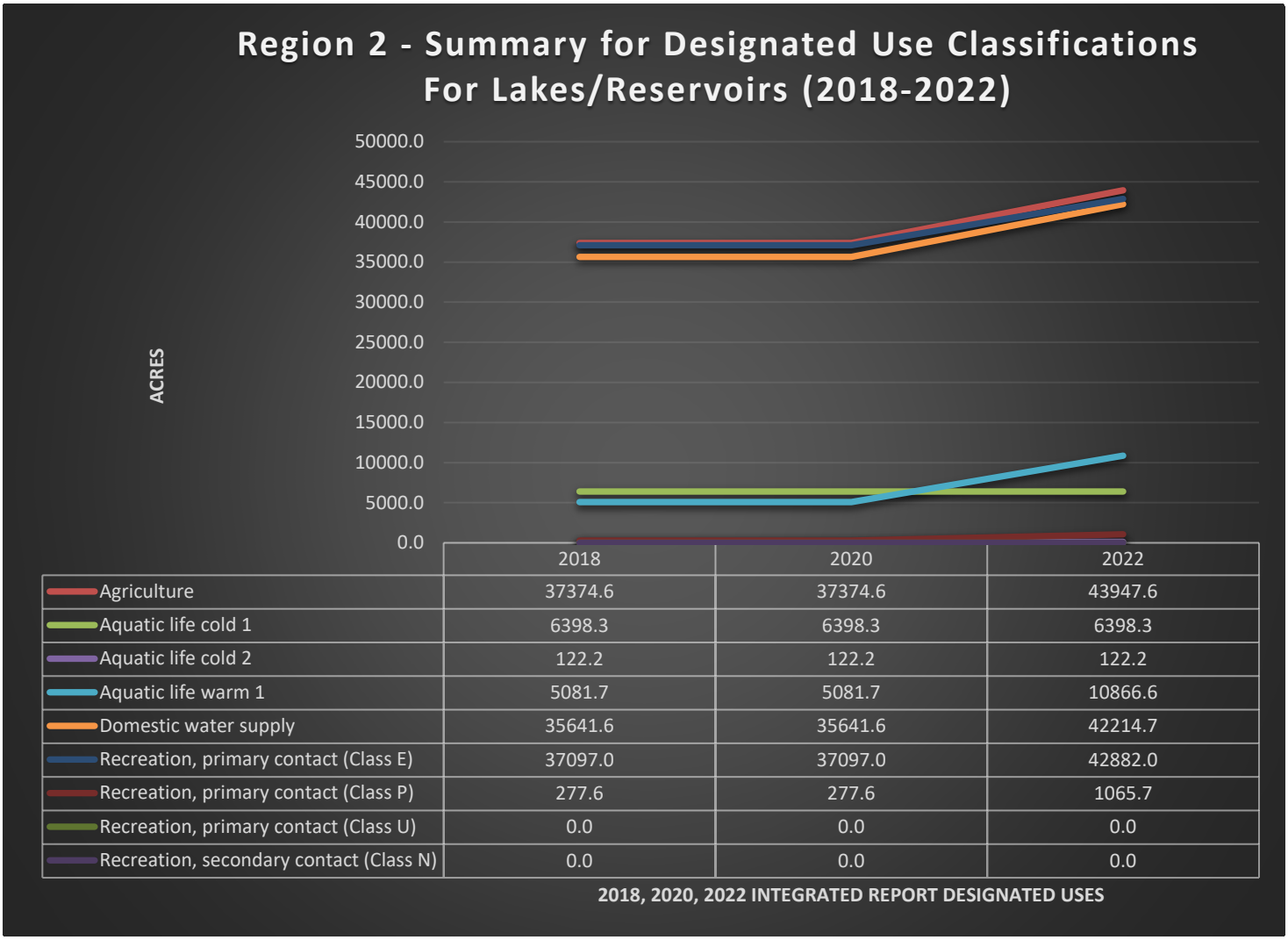


Figure 5-5 Region 2 - Lakes & Reservoirs Designated Uses, 2018-2022

Figure 5-6 represents Region 2's rivers and streams use designations and their resulting classifications per segment determined by whole percentages. For 2018-2022, Figure 5-6 illustrates that "all uses" are increasing, meeting attainment status in Region 2 for a variety of reasons that could range from actual water quality improvement to programmatic activities as discussed earlier in the document (2018-64%, 2020-75%, and 2022-79%). Figure 5-7 illustrates this more clearly, only displaying the changes in designated uses that are "Fully Supporting Uses." Figure 5-7 shows the region's use classifications are increasing in attainment status by assessing the cumulative total miles of rivers and streams attaining the designated uses divided by the actual miles in the region for each designated use. For example, in 2022 there were for Aquatic Life Use, 3,778 miles of rivers and streams which were attaining the Aquatic Life Designated Use standards, and 5,491 miles in the region assigned for Aquatic Life Designated Use, as such that percentage results in 69% of the miles in the region attaining standards for the Aquatic Life Designated Use. The calculation is repeated for each designated use of the total miles in the region, attaining standards divided by the total miles assigned by the Division for each designated use and averaged for "all uses" achieving standards in 2022 at 79%. This methodology is repeated for each watershed for the region separately for both rivers and streams in miles and for lakes and reservoirs in acres. This percentage methodology allows the Association to track changes in the regional attainment status of all surface waters, changes that could be due to water quality improvement or programmatic activities discussed

earlier in this document. In this particular case, it is important to note some changes in miles are due to refining the spatial scope of the listing without any actual improvement of the chemical data or water quality. It is also important to note that the recreational use not assessed is 54% in 2018 and 1% in 2020 which likely is due to programmatic reasons (i.e., this could be due to a programmatic change made by the division that resulted in including pH, along with other parameters, as an indicator of assessment; previously, only *E. coli* was used).

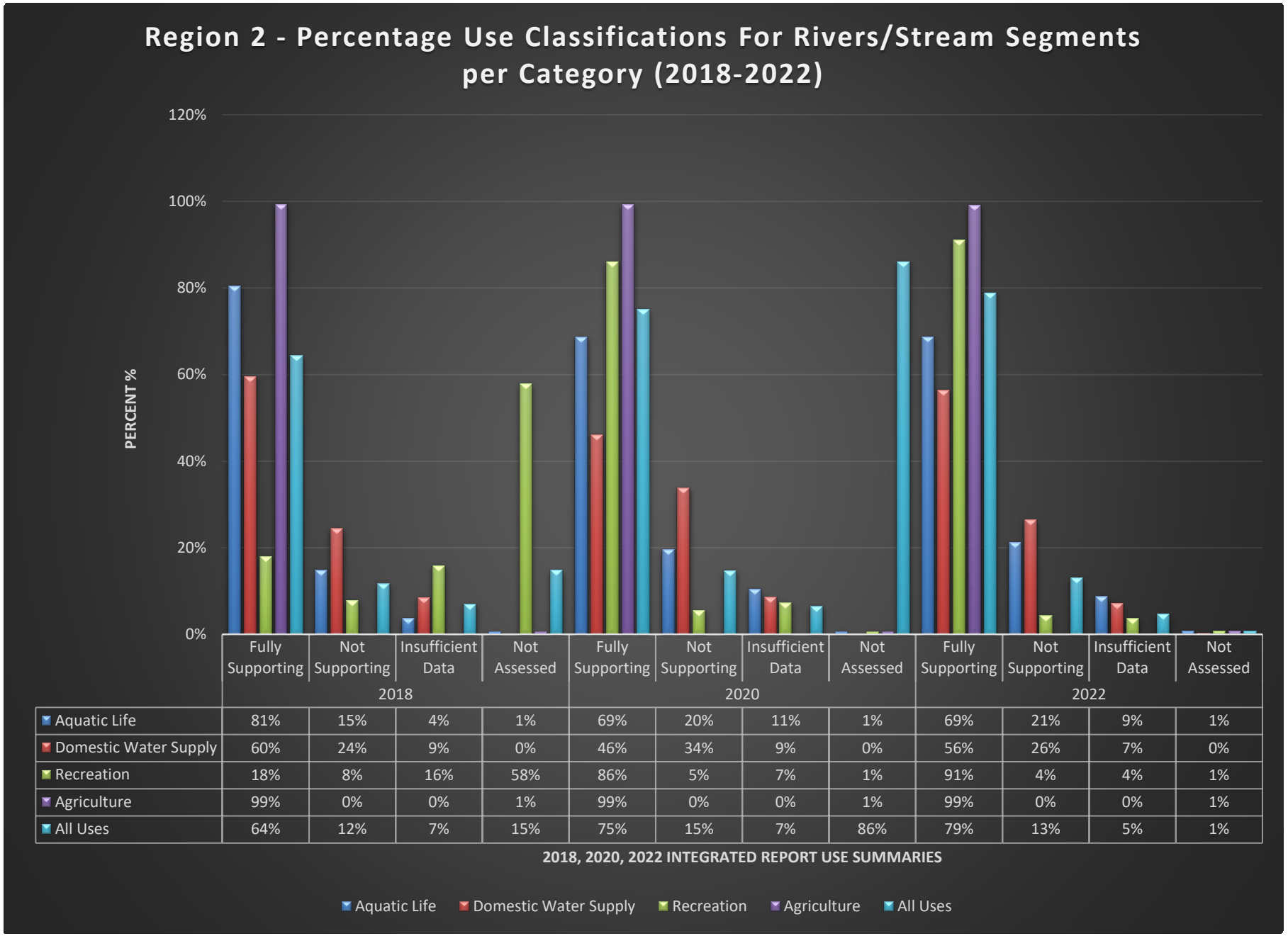
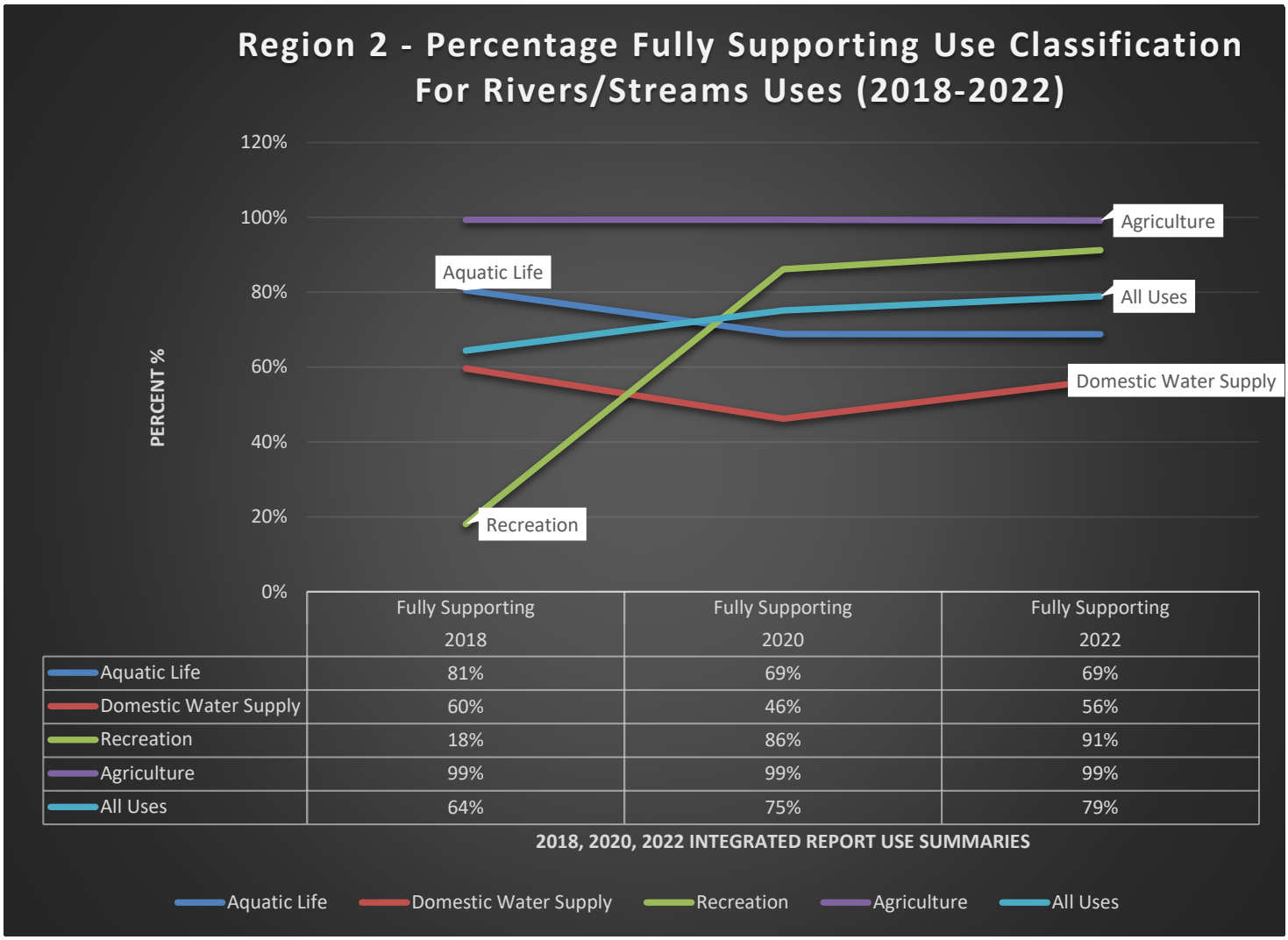


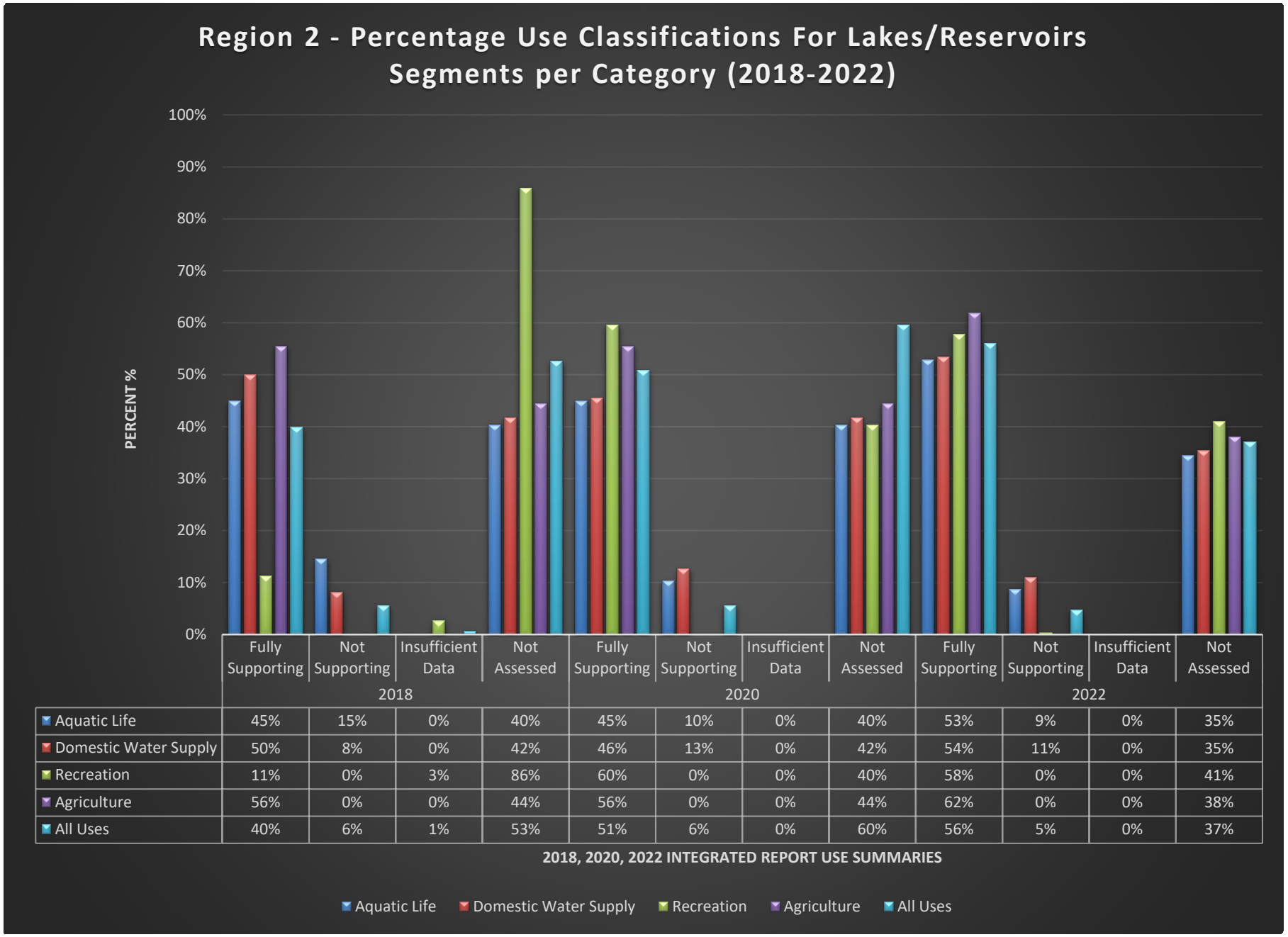
Figure 5-6 Region 2 - Rivers & Streams Designated Use Classifications, 2018-2022



	Fully Supporting 2018	Fully Supporting 2020	Fully Supporting 2022
Aquatic Life	81%	69%	69%
Domestic Water Supply	60%	46%	56%
Recreation	18%	86%	91%
Agriculture	99%	99%	99%
All Uses	64%	75%	79%

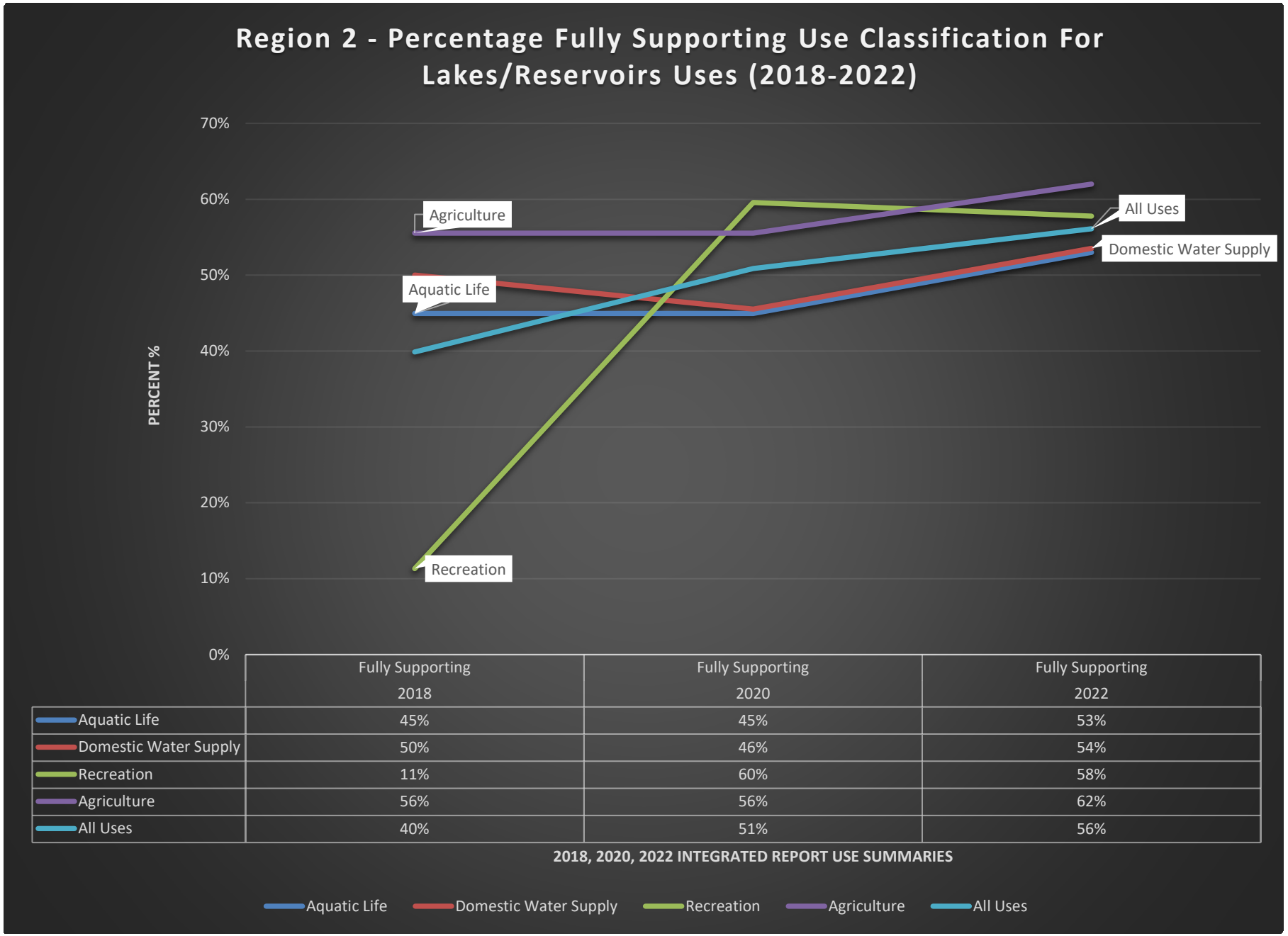
Figure 5-7 Region 2 - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022

Although the lakes and reservoirs of the region are not changing as much as the rivers and streams of Region 2, all uses are increasing in attainment status overall and over the time period assessed, understanding all of these increases are not necessarily tied to water quality improvement. Figure 5-8 represents Region 2's lakes and reservoirs use designations and their resulting classifications per segment determined by whole percentages. For 2018-2022, Figure 5-9 illustrates that there is an increase in "all uses" across Region 2, 2018-40%, 2020-51%, and 2022-56%, understanding increases do not necessarily lead to the conclusion that water quality is improving.



	2018 Fully Supporting	2018 Not Supporting	2018 Insufficient Data	2018 Not Assessed	2020 Fully Supporting	2020 Not Supporting	2020 Insufficient Data	2020 Not Assessed	2022 Fully Supporting	2022 Not Supporting	2022 Insufficient Data	2022 Not Assessed
Aquatic Life	45%	15%	0%	40%	45%	10%	0%	40%	53%	9%	0%	35%
Domestic Water Supply	50%	8%	0%	42%	46%	13%	0%	42%	54%	11%	0%	35%
Recreation	11%	0%	3%	86%	60%	0%	0%	40%	58%	0%	0%	41%
Agriculture	56%	0%	0%	44%	56%	0%	0%	44%	62%	0%	0%	38%
All Uses	40%	6%	1%	53%	51%	6%	0%	60%	56%	5%	0%	37%

Figure 5-8 Region 2 - Lakes & Reservoirs Designated Use Classifications, 2018-2022



	Fully Supporting 2018	Fully Supporting 2020	Fully Supporting 2022
Aquatic Life	45%	45%	53%
Domestic Water Supply	50%	46%	54%
Recreation	11%	60%	58%
Agriculture	56%	56%	62%
All Uses	40%	51%	56%

Figure 5-9 Region 2 - Lakes & Reservoirs Designated Use Classifications, Fully Supporting, 2018-2022

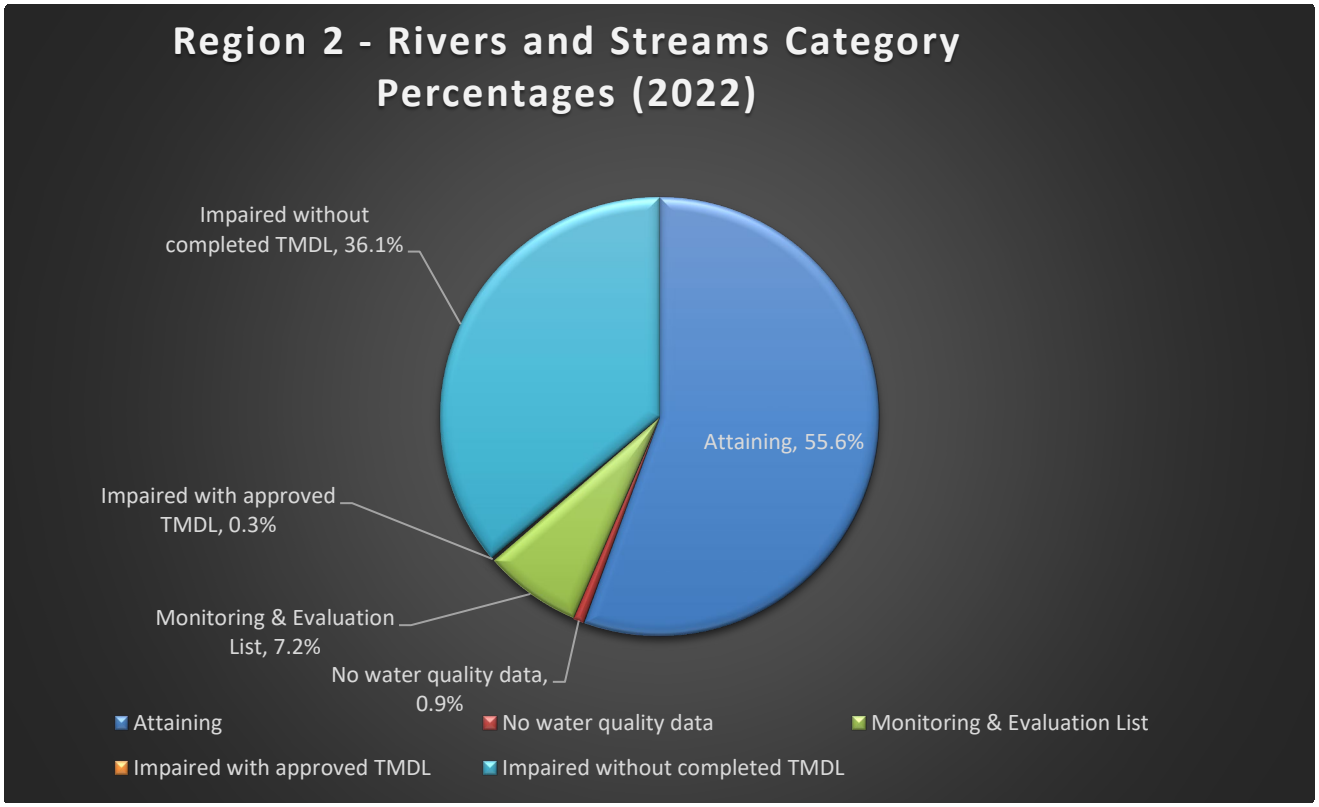


Figure 5-10 Region 2 - Rivers & Streams Category Percentages

Although the increases in Region 2 fully supporting uses might be incredibly beneficial, the region must determine if these increases are actually due to water quality improvement and assess why the remaining use designations do not support their classifications. This is the only way the information can fully inform the 208 plan and prioritized, recommended actions in the plan. Figure 5-10 illustrates Region 2's rivers and streams category results for the designated uses for 2022. The Association also calculated the region's category percentages related to total miles and acres, similar to the methodology to calculate the percentage of each designated use attaining standards. For example, in Figure 5-10, in 2022 there were 3,051 miles of rivers and streams assigned a Category of 1a-attaining, based on a total of 5,491 miles in the region, as such that percentage results in 55.6% of the miles in the region attaining a Category of 1a-attaining. The calculation is repeated for each category assigned measured in miles divided by the total miles of rivers and streams in the region. This methodology is repeated for each watershed for Region 2 separately for miles of rivers and streams and in acres for lakes and reservoirs. This percentage methodology allows the Association to track surface water meeting attainment standards in order to then evaluate if changes over time are due to water quality improvement and/or programmatic activities that were discussed earlier in the document.

To further understand the category percentage results of Figure 5-10, Figure 5-11 illustrates how many segments or AUIDs and miles were assessed for each category resulting percentage.

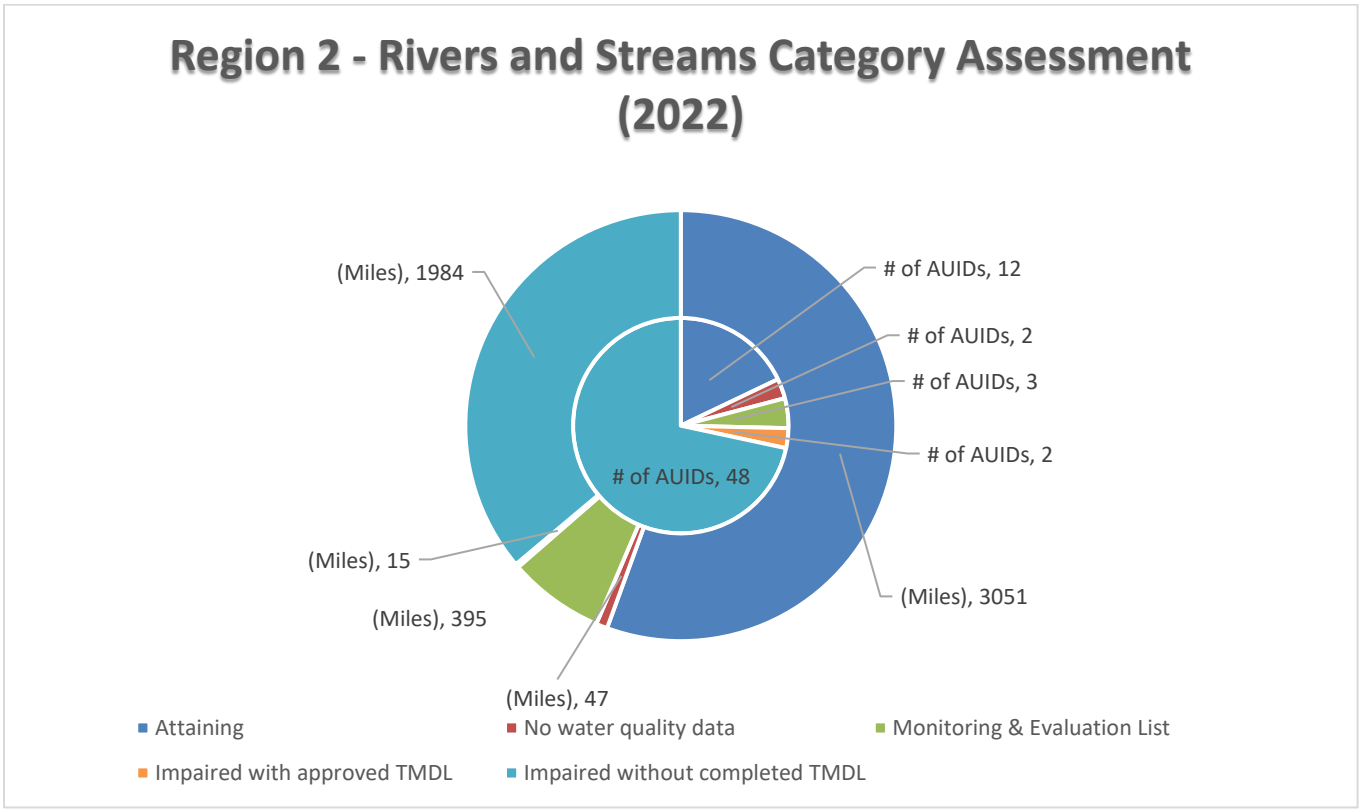


Figure 5-11 Region 2 - Rivers & Streams Units & Miles Assessed

Similarly, although the increase of the lakes and reservoirs fully supporting uses might be incredibly beneficial, the region must determine if these increases are actually due to water quality improvement and assess why the remaining uses are not supporting their designations. This is the only way the information can fully inform the 208 plan and prioritized, recommended actions in the plan. For example, in this case, the trend illustrated is dominated by a shift from AUIDs that were not originally assessed and does not necessarily represent water quality improvement. Figure 5-12 illustrates Region 2's lakes and reservoirs category results for the designated uses for 2022. To further understand the category percentage results of Figure 5-12, Figure 5-13 illustrates how many segments and acres were assessed for each category resulting percentage.

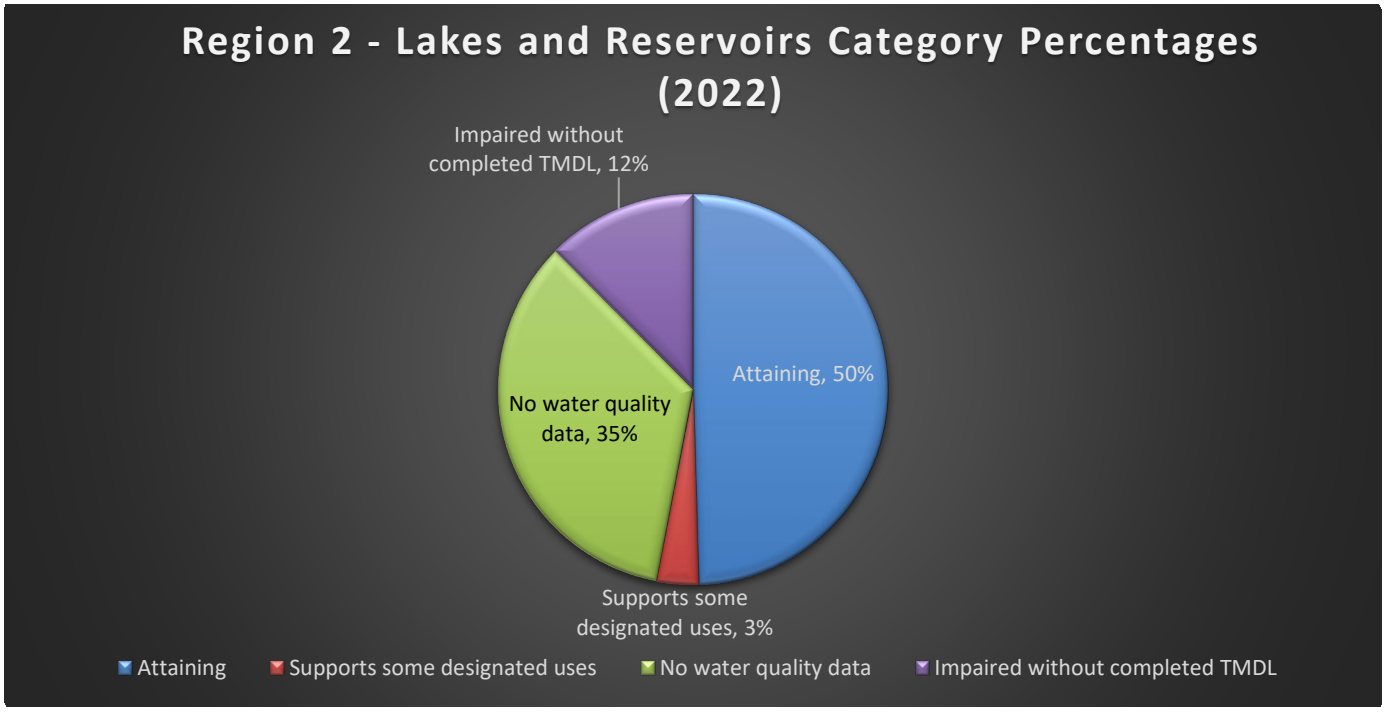


Figure 5-12 Region 2 - Lakes & Reservoirs Category Percentages

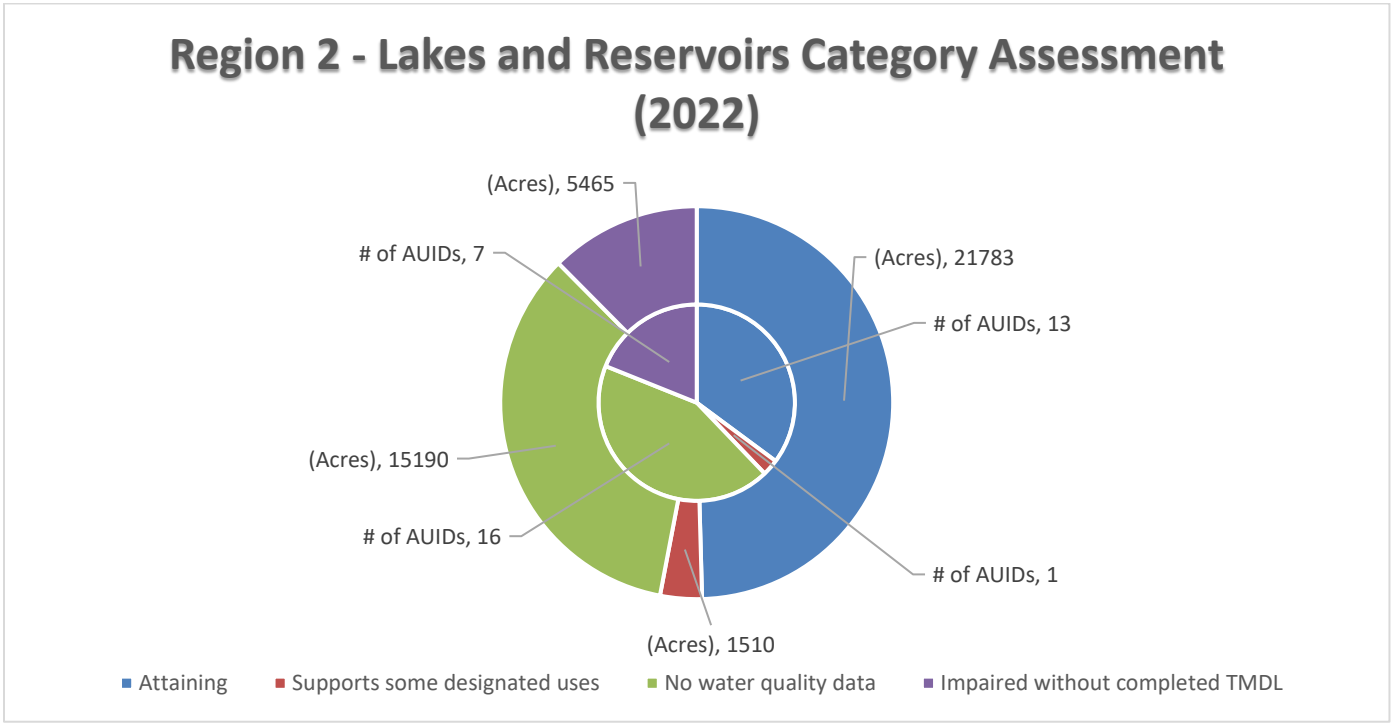


Figure 5-13 Region 2 - Lakes & Reservoirs Units & Miles Assessed

Figure 5-14 shows an increase in E. coli impairments (recreational uses) which suggests a decline in water quality. Lead and ammonia information in Figure 5-14 might indicate water quality improvement with respect to these two parameters. However, number of AUIDs may not tell the entire story and the individual impairments should be investigated more specifically in order to make a more informed decision. Figure 5-15 represents the know parameter listings shown in previous figures for rivers and streams and their associated listing for 2022.

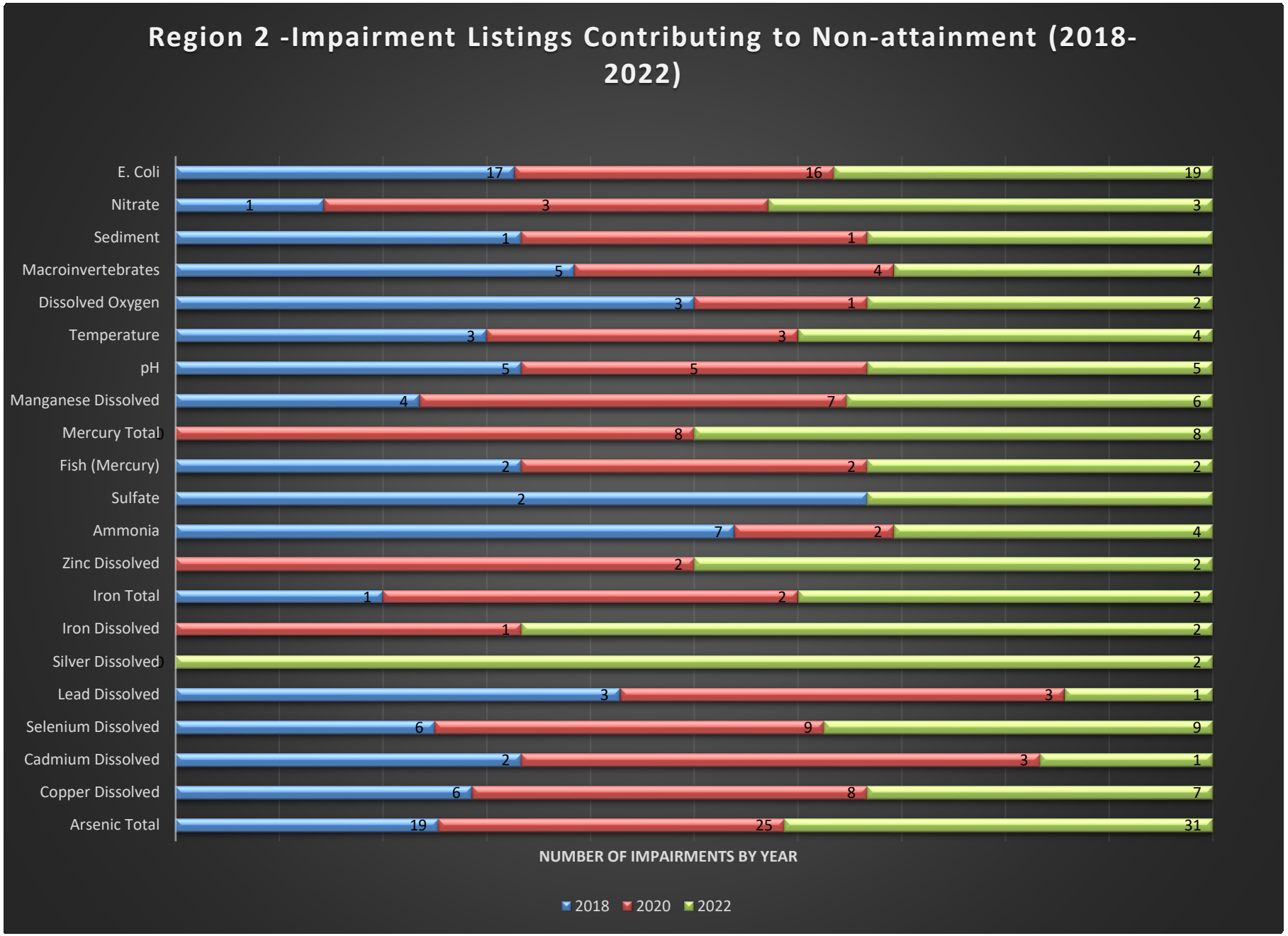


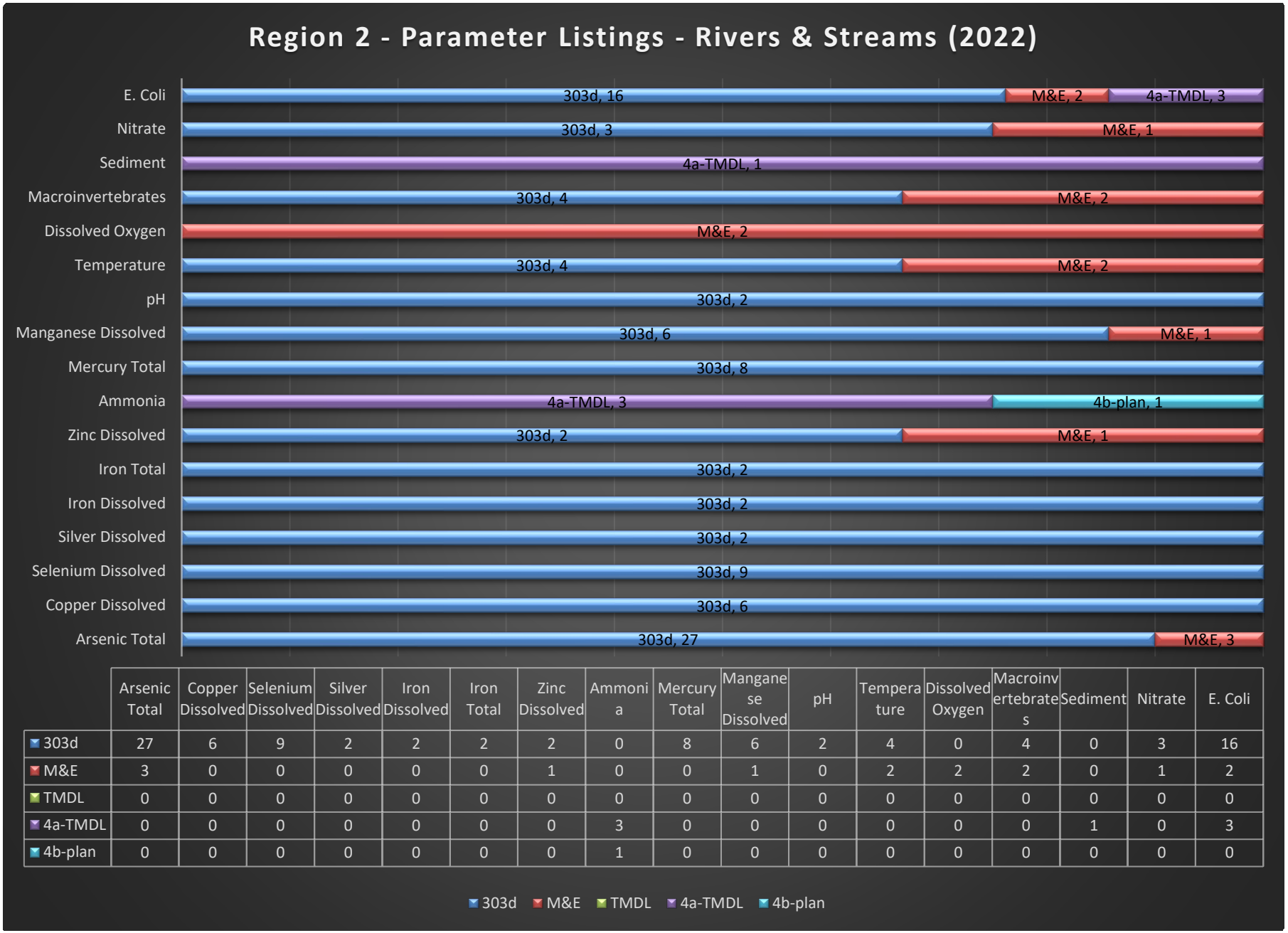
Figure 5-14 Region 2 - Parameter Impairment Listings

Table 5-1 Region 2 - Parameter Impairment Listings Table

Parameter Impairment Listing - Minus M&E		2018		2020		2022	
Category	Parameter	River & Streams (miles)	Lakes & Reservoirs (acres)	River & Streams (miles)	Lakes & Reservoirs (acres)	River & Streams (miles)	Lakes & Reservoirs (acres)
Physical	dissolved oxygen	6.3	1722.2	0.0	120.4	0.0	4650.1
	pH	9.4	2255.1	37.2	653.3	8.4	2255.1
	sediment	5.1	0.0	5.1	0.0	5.1	0.0
	temperature	20.0	0.0	20.0	0.0	21.2	0.0
Biological	E. coli	589.1	0.0	264.8	0.0	260.2	0.0
	fish (mercury)	0.0	2927.9	0.0	2927.9	0.0	2927.9
	macroinvertebrates	353.0	0.0	106.9	0.0	96.0	0.0
Inorganic	ammonia	18.2	2255.1	5.9	0.0	18.2	0.0
	nitrate	6.3	0.0	96.2	0.0	96.2	0.0
	sulfate	139.1	0.0	0.0	0.0	47.3	0.0
Metals	copper (dissolved)	221.6	161.5	326.0	161.5	321.8	161.5
	cadmium (dissolved)	21.9	0.0	132.9	0.0	111.0	0.0
	iron (dissolved)	0.0	0.0	13.2	0.0	18.3	0.0
	iron (total recoverable)	4.0	0.0	13.9	0.0	13.9	0.0
	lead (dissolved)	21.9	161.5	21.9	0.0	0.0	161.5
	manganese (dissolved)	120.0	0.0	86.7	0.0	42.3	0.0
	mercury (total recoverable)	0.0	0.0	354.7	0.0	354.6	0.0
	silver (dissolved)	0.0	0.0	0.0	0.0	321.1	0.0
	zinc (dissolved)	0.0	0.0	155.5	0.0	155.5	0.0
Other elements	selenium (dissolved)	95.2	0.0	331.5	0.0	320.6	0.0
	arsenic (total recoverable)	1051.87	2927.9	1409.3	4529.7	1360.46	4650.1

Table 5-2 Region 2 - Parameter Impairment Listings Table Including M&E Listings

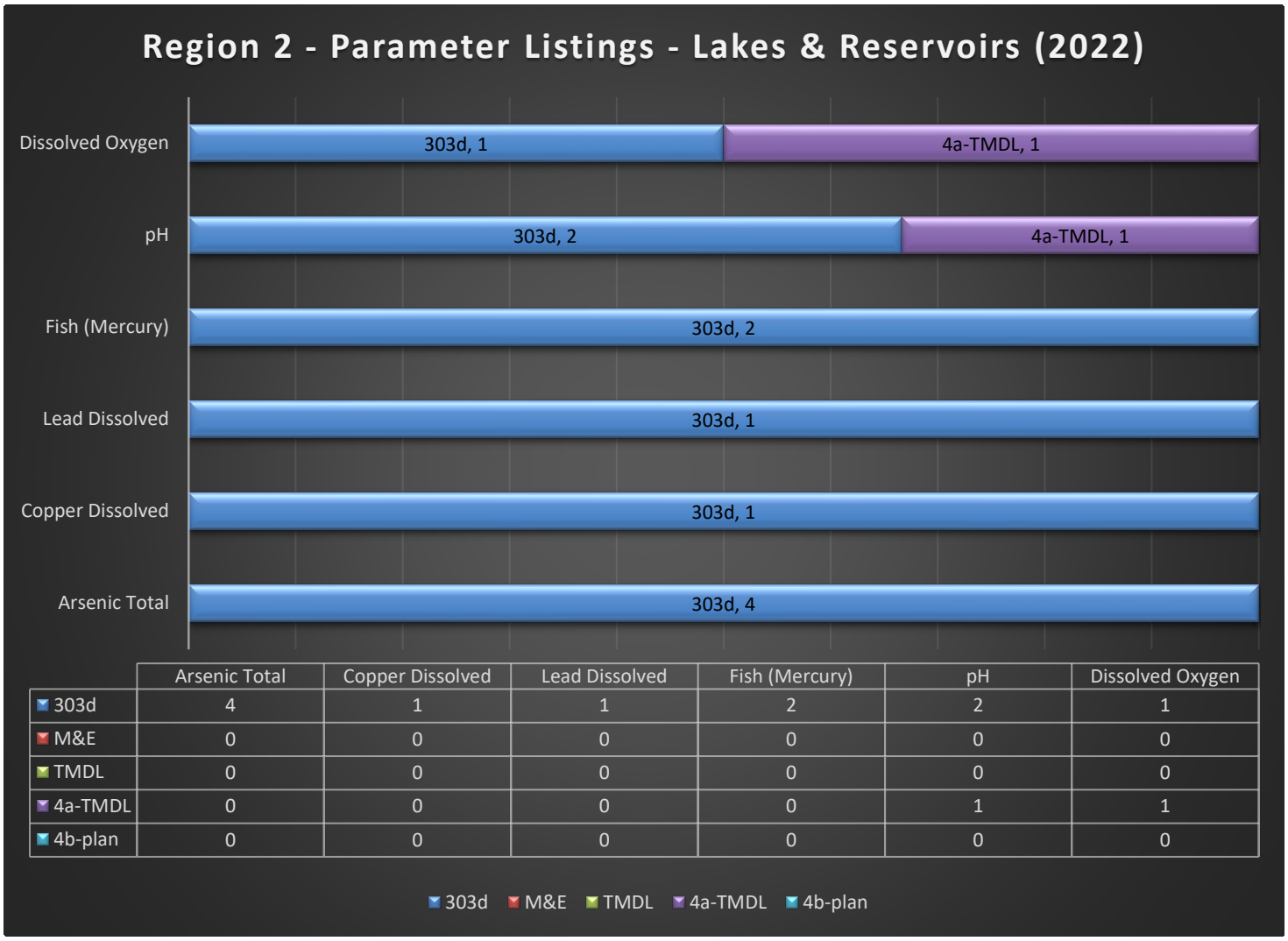
Parameter Impairment Listing - Including M&E		2018		2020		2022	
Category	Parameter	River & Streams (miles)	Lakes & Reservoirs (acres)	River & Streams (miles)	Lakes & Reservoirs (acres)	River & Streams (miles)	Lakes & Reservoirs (acres)
Physical	dissolved oxygen	28.7	1722.2	133.4	120.4	133.4	1722.2
	pH	63.7	2255.1	37.2	653.3	8.4	2255.1
	sediment	5.1	0.0	5.1	0.0	5.1	0.0
	temperature	118.8	0.0	118.8	0.0	120.0	0.0
Biological	E. coli	608.0	0.0	601.7	0.0	433.8	0.0
	fish (mercury)	0.0	2927.9	0.0	2927.9	0.0	2927.9
	macroinvertebrates	358.9	0.0	480.6	0.0	469.7	0.0
Inorganic	ammonia	18.2	2255.1	5.9	0.0	18.2	0.0
	nitrate	25.2	0.0	147.7	0.0	147.7	0.0
	sulfate	139.1	0.0	0.0	0.0	47.3	0.0
Metals	copper (dissolved)	221.6	161.5	326.0	161.5	321.8	161.5
	cadmium (dissolved)	21.9	0.0	132.9	0.0	111.0	0.0
	iron (dissolved)	21.9	0.0	35.1	0.0	18.3	0.0
	iron (total recoverable)	4.0	0.0	13.9	0.0	13.9	0.0
	lead (dissolved)	21.9	161.5	21.9	161.5	0.0	161.5
	manganese (dissolved)	538.3	0.0	454.5	0.0	410.1	0.0
	mercury (total recoverable)	0.0	0.0	354.7	0.0	354.6	0.0
	silver (dissolved)	23.6	0.0	21.9	0.0	321.1	0.0
	zinc (dissolved)	0.0	0.0	184.8	0.0	184.8	0.0
Other elements	selenium (dissolved)	95.2	0.0	331.5	0.0	320.6	0.0
	arsenic (total recoverable)	1051.87	2927.9	1825.7	4529.7	1755.0	4650.1
	other	28.7	1722.2	133.4	120.4	133.4	1722.2



	Arsenic Total	Copper Dissolved	Selenium Dissolved	Silver Dissolved	Iron Dissolved	Iron Total	Zinc Dissolved	Ammonia	Mercury Total	Manganese Dissolved	pH	Temperature	Dissolved Oxygen	Macroinvertebrates	Sediment	Nitrate	E. Coli
303d	27	6	9	2	2	2	2	0	8	6	2	4	0	4	0	3	16
M&E	3	0	0	0	0	0	1	0	0	1	0	2	2	2	0	1	2
TMDL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4a-TMDL	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	3
4b-plan	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Figure 5-15 Region 2 - Rivers & Streams Parameter Listings, 2022

Figure 5-16 represents the known parameter listings shown in previous figures for lakes and reservoirs and their associated listing for 2022.



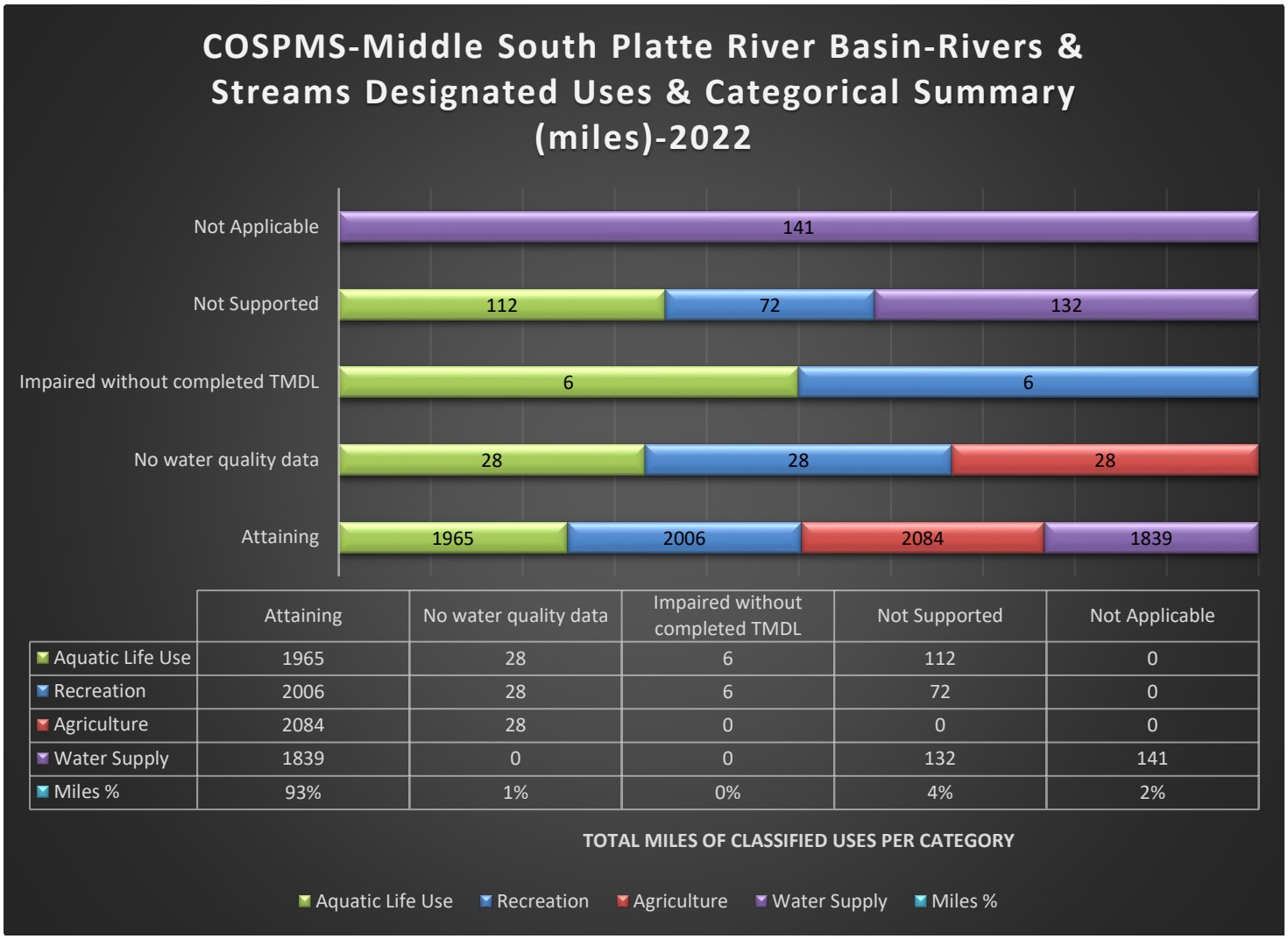
	Arsenic Total	Copper Dissolved	Lead Dissolved	Fish (Mercury)	pH	Dissolved Oxygen
303d	4	1	1	2	2	1
M&E	0	0	0	0	0	0
TMDL	0	0	0	0	0	0
4a-TMDL	0	0	0	0	1	1
4b-plan	0	0	0	0	0	0

Figure 5-16 Region 2 - Lakes & Reservoirs Parameter Listings, 2022

The segment parameter listings and category assignments allow the Association to track and monitor attainment status improvements at the most basic level to pinpoint available parameter listings for each watershed river basin regionally.

5.6 Middle South Platte River Basin Assessment Results Summary

In the Middle South Platte River basin within Region 2 only, a total of 2,112 river miles and 15,910 lake acres were assessed. Figure 5-17 presents the designated uses and category summary for rivers and streams, in miles, of the Middle South Platte River basin within Region 2 only in 2022. Figure 5-17 sums the total number of miles for each category and divides each category by the whole total to determine the categorical percentages for the basin. For example, by totaling the number of miles in the watershed basin that are attaining standards, not each segment, the data shows that 93% of the rivers and streams miles in the Middle South Platte River basin within Region 2 only are attaining standards, respectively. Figure 5-17 also illustrates how many miles in the Middle South Platte River basin do not support the use categories, were not assessed, or did not have any water quality data.



	Attaining	No water quality data	Impaired without completed TMDL	Not Supported	Not Applicable
Aquatic Life Use	1965	28	6	112	0
Recreation	2006	28	6	72	0
Agriculture	2084	28	0	0	0
Water Supply	1839	0	0	132	141
Miles %	93%	1%	0%	4%	2%

Figure 5-17 Middle South Platte River Basin - Rivers & Streams Designated Uses & Categories, 2022

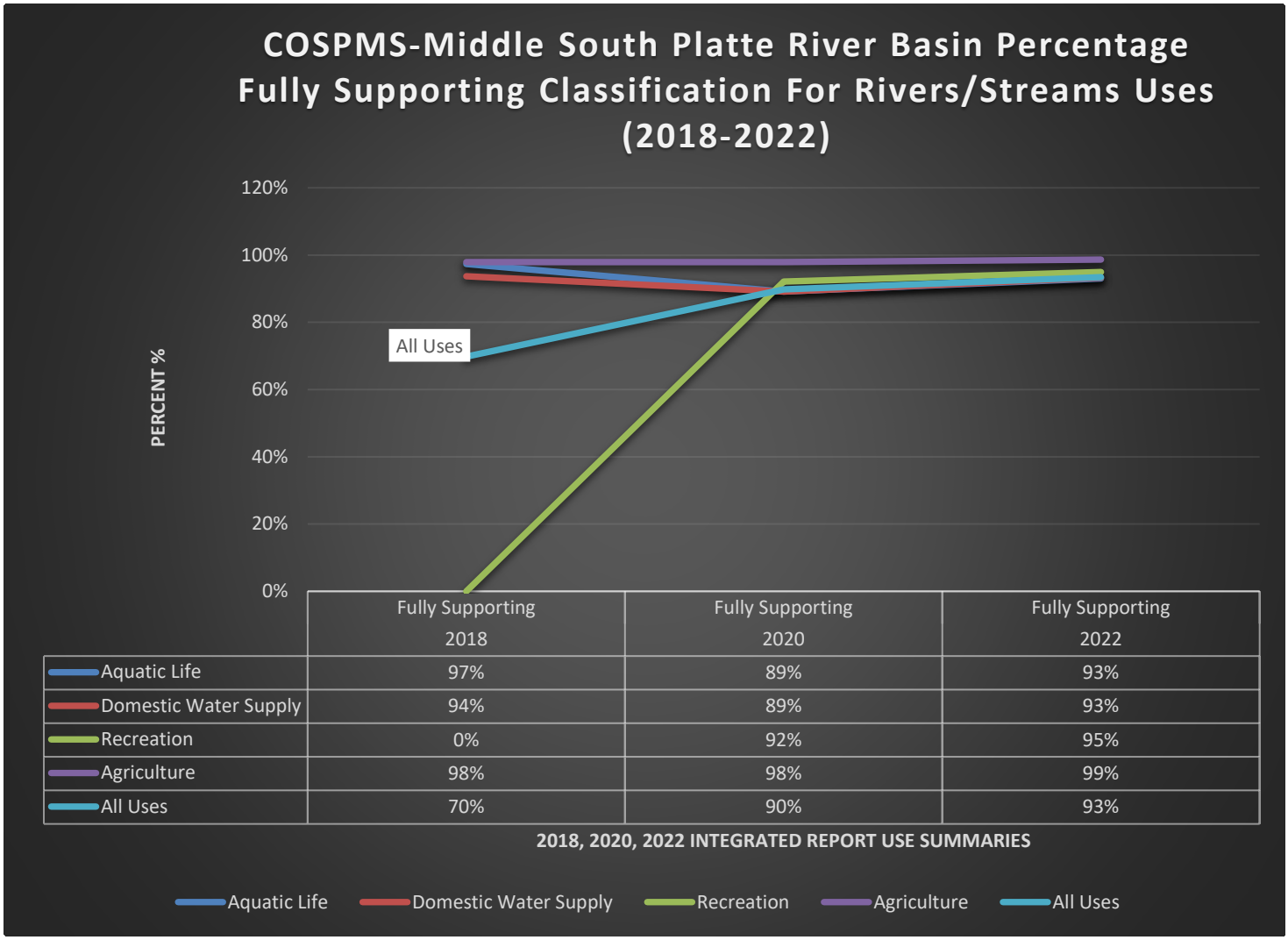


Figure 5-18 Middle South Platte River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022

Similar to the assessment of the entire Region 2, Figure 5-18 illustrates that "all uses" are increasing, "fully supporting" uses displaying increasing miles of surface water attaining standards across the Middle South Platte River Basin within Region 2 only, 2018-70%, 2020-90%, and 2022-93%. The percentages represent the total number of miles assigned a designated use divided by the number of miles fully supporting the designated use.

Reiterating, that although the increase in fully supporting uses may be incredibly beneficial, the region must determine if these increases are actually due to water quality improvement and assess why the remaining use designations do not support their classifications in future 208 Planning efforts. This is the only way the information can fully inform the 208 plan and prioritized, recommended actions in the plan. Figure 5-19 illustrates the South Platte River basin rivers and streams category results for the designated uses for 2022. The percentages are based on the actual number of miles of rivers and streams in the river basin divided by the total number of miles for the category assessed. To further understand the category percentage results of Figure 5-19, Figure 5-20 illustrates how many segments and miles were assessed for each category resulting percentage.

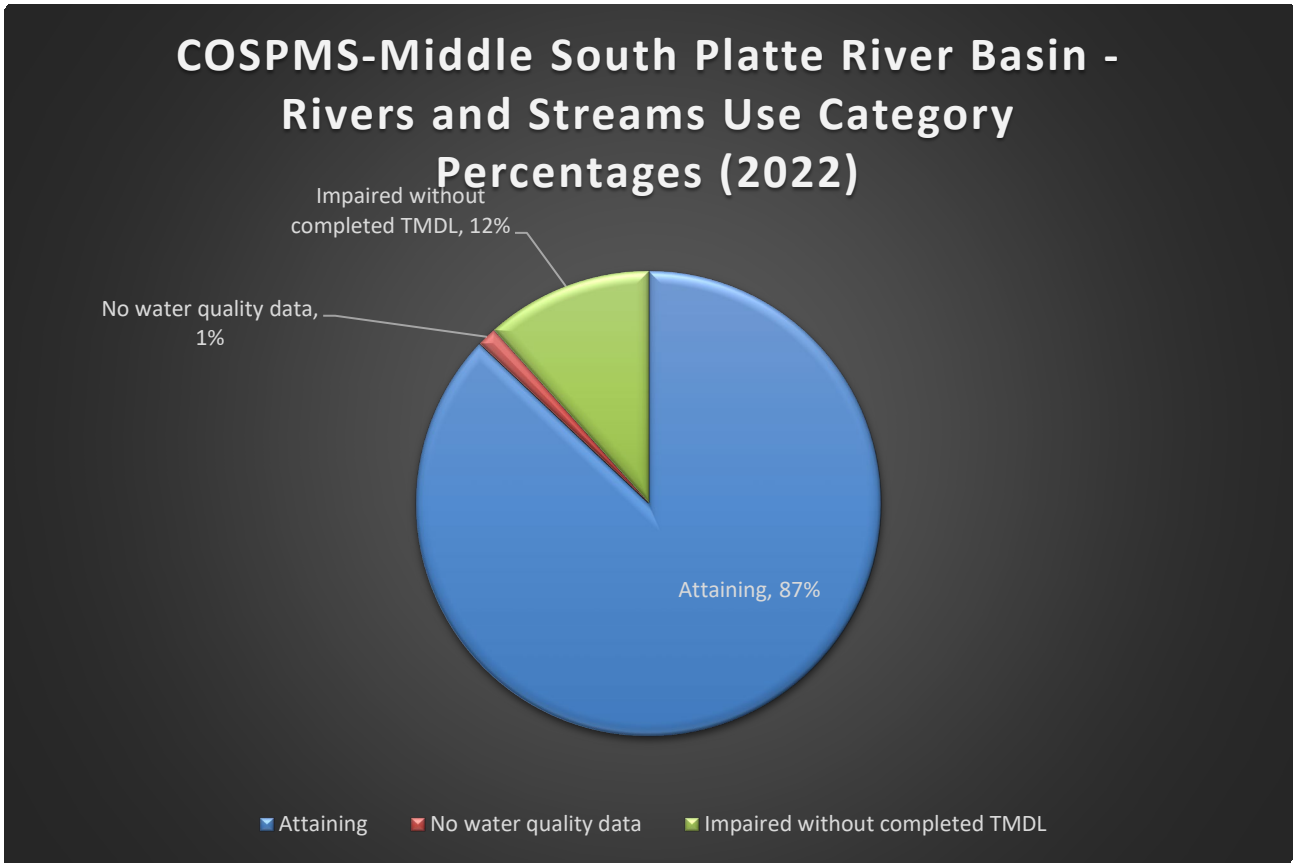


Figure 5-19 Middle South Platte River Basin-Rivers & Streams Category Percentages, 2022

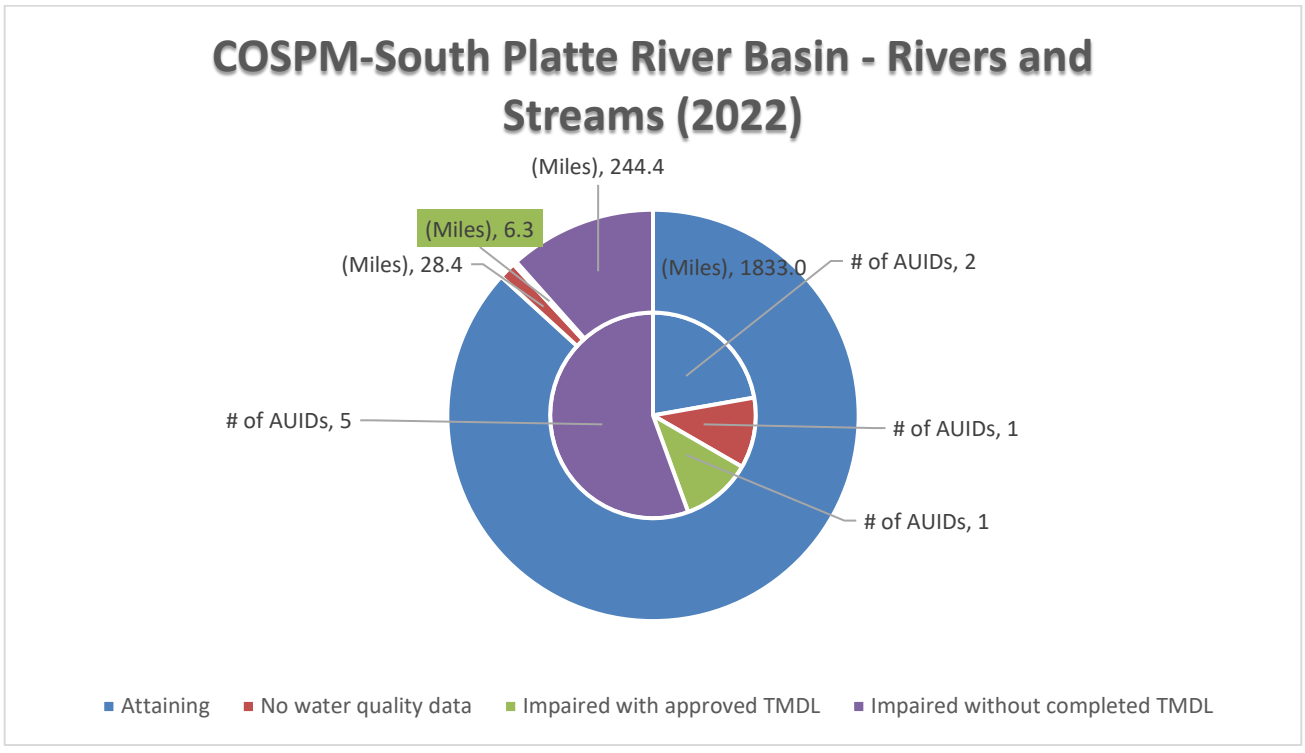
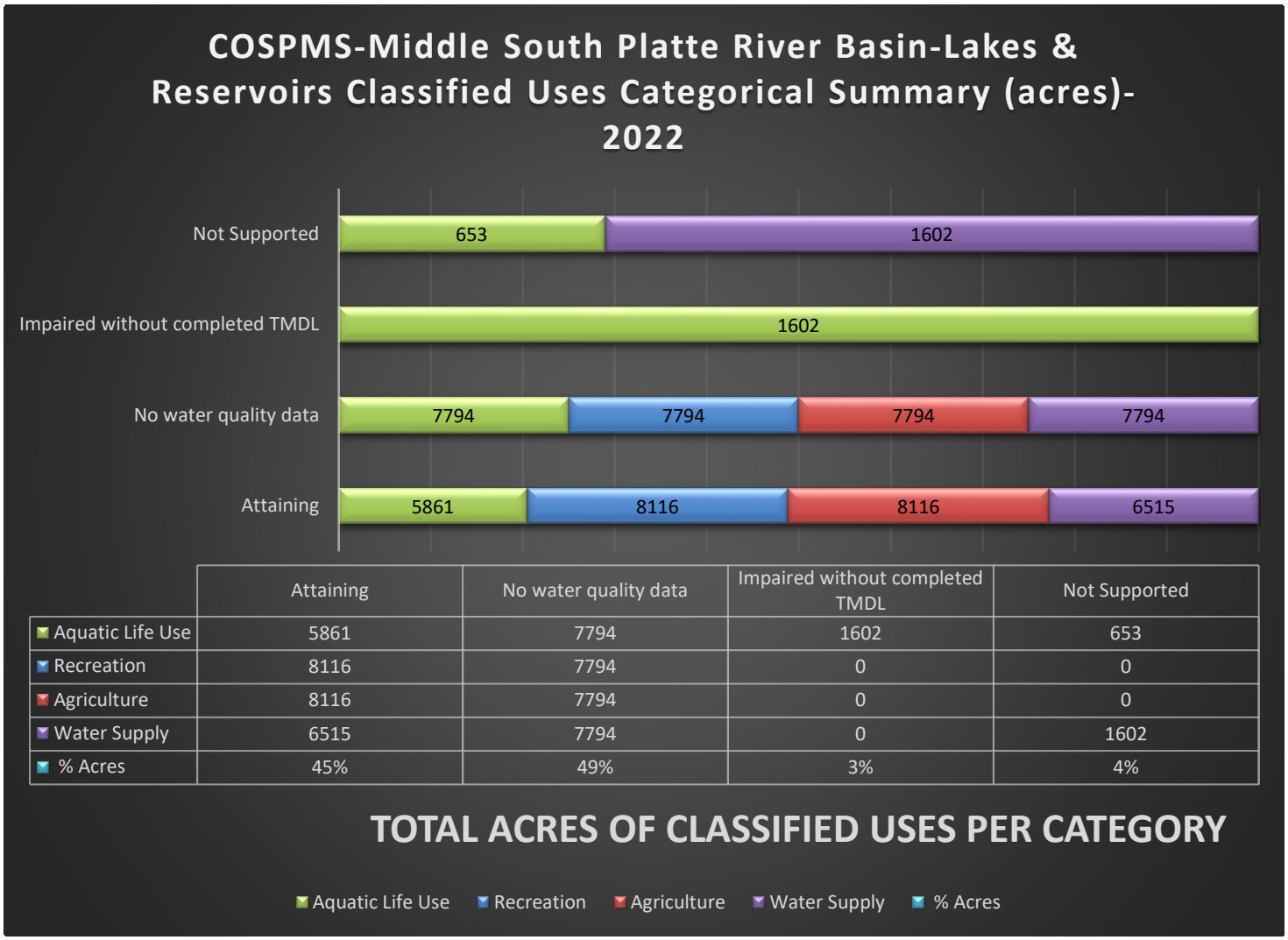


Figure 5-20 South Platte River Basin - Rivers & Streams Units & Miles Assessed



	Attaining	No water quality data	Impaired without completed TMDL	Not Supported
Aquatic Life Use	5861	7794	1602	653
Recreation	8116	7794	0	0
Agriculture	8116	7794	0	0
Water Supply	6515	7794	0	1602
% Acres	45%	49%	3%	4%

Figure 5-21 South Platte River Basin - Lakes & Reservoirs Designated Uses & Categories, 2022

Figure 5-21 presents the designated uses and category summary for lakes and reservoirs, in acres, of the Middle South Platte River basin within Region 2 only in 2022. Figure 5-21 sums the total number of acres for each category and divides each category by the whole total to determine the categorical percentages for the basin. For example, by totaling the number of acres in the watershed basin that is attaining standards, not each waterbody, the data shows that 45% of the lakes and reservoirs acres in the Middle South Platte River basin within Region 2 only are achieving attainment standards in 2022, respectively. Noting it takes a much larger effort to monitor lakes, by either the division or private agencies; therefore, much of this percentage is due to many lakes being unassessed.

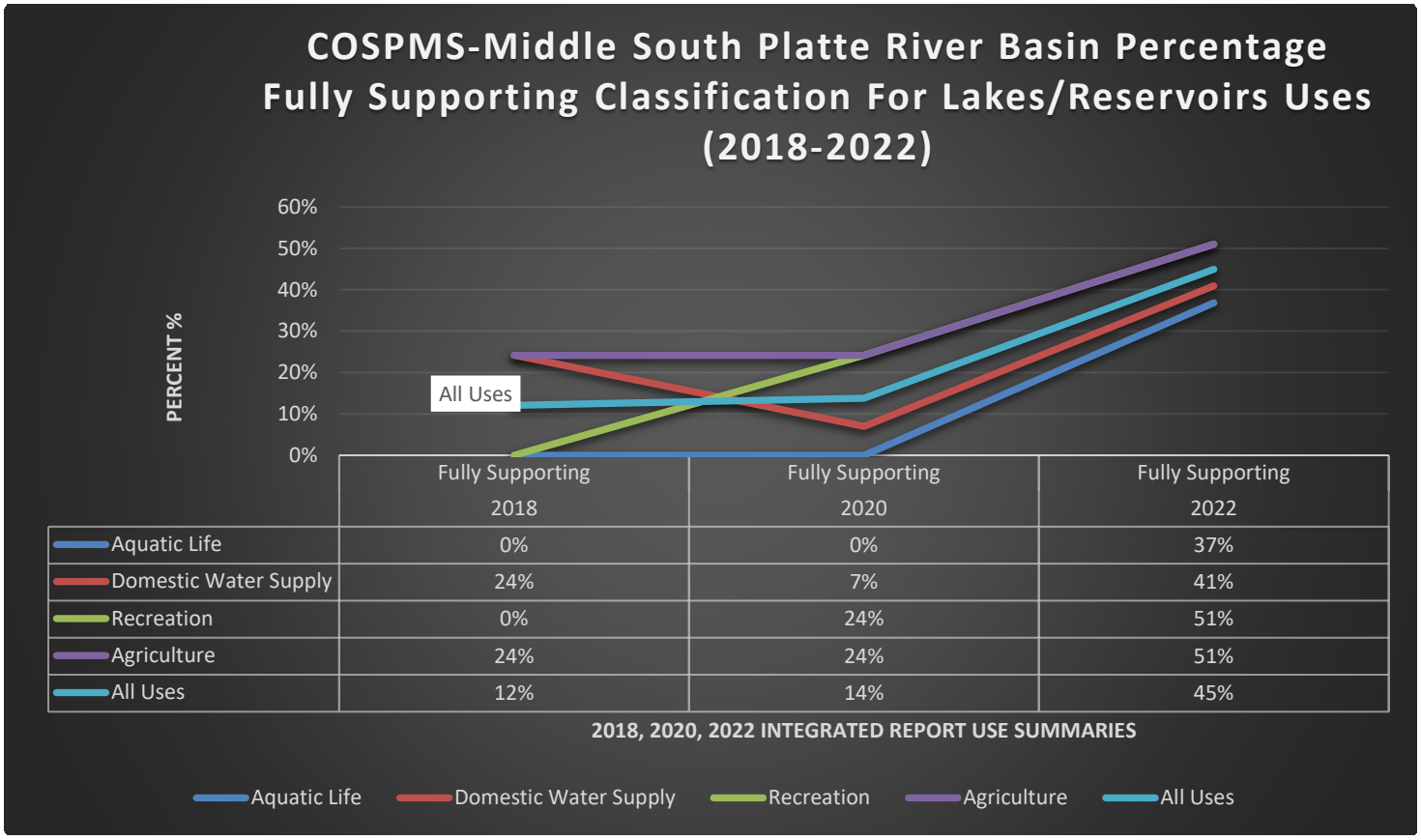


Figure 5-22 South Platte River Basin - Lakes & Reservoirs Designated Use Classifications, Fully Supporting, 2018-2022

For the Middle South Platte River basin assessment for rivers and streams within Region 2 only, the lakes and reservoirs within the Middle South Platte River basin also show an increasing number of miles attaining standards over time. Figure 5-22 illustrates that "all uses" are increasing, "fully supporting" uses displaying an increase in the number of acres attaining standards across the South Platte River Basin, 2018-12%, 2020-14%, and 2022-45% within Region 2 only. The percentages represent the total number of acres assigned a designated use divided by the number of acres fully supporting the designated use.

Again, it is great to see the reoccurring theme of increases in attainment of standards over time. However, the region must determine if these increases are actually due to water quality improvement and assess why the remaining use designations do not support their classifications in future 208 Planning. This is the only way the information can fully inform the 208 plan and prioritized, recommended actions in the plan. Figure 5-23 illustrates the Middle South Platte River basin lakes and reservoirs category results for the designated uses for 2022. The percentages are based on the actual number of acres of lakes and reservoirs in the river basin divided by the total number of acres for the category assessed. To further understand the category percentage results of Figure 5-23, Figure 5-24 illustrates how many waterbodies and acres were assessed for each category resulting percentage.

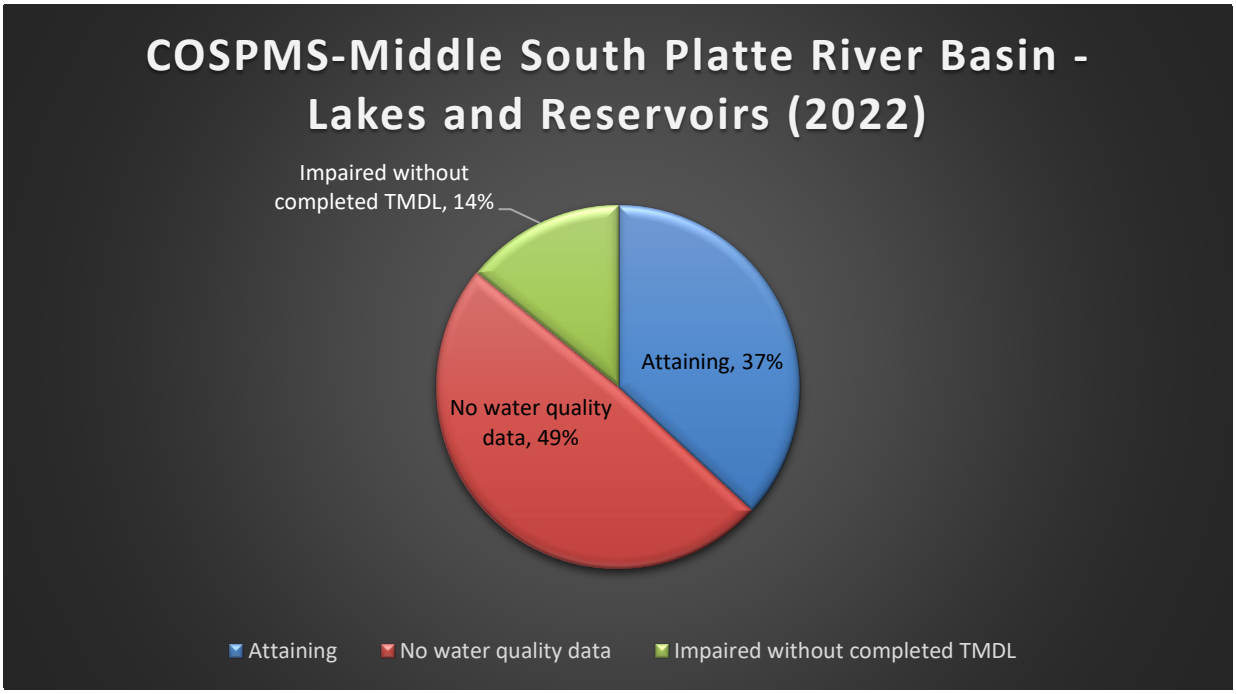


Figure 5-23 South Platte River Basin - Lakes & Rivers Category Percentages, 2022

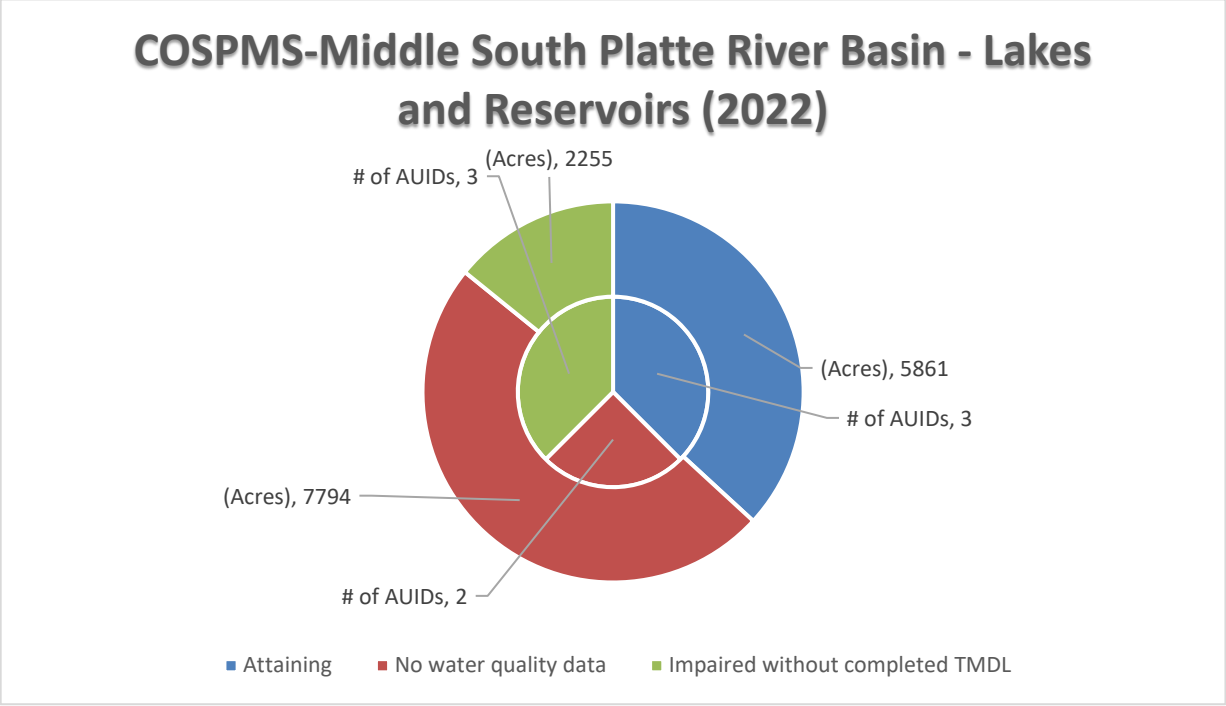
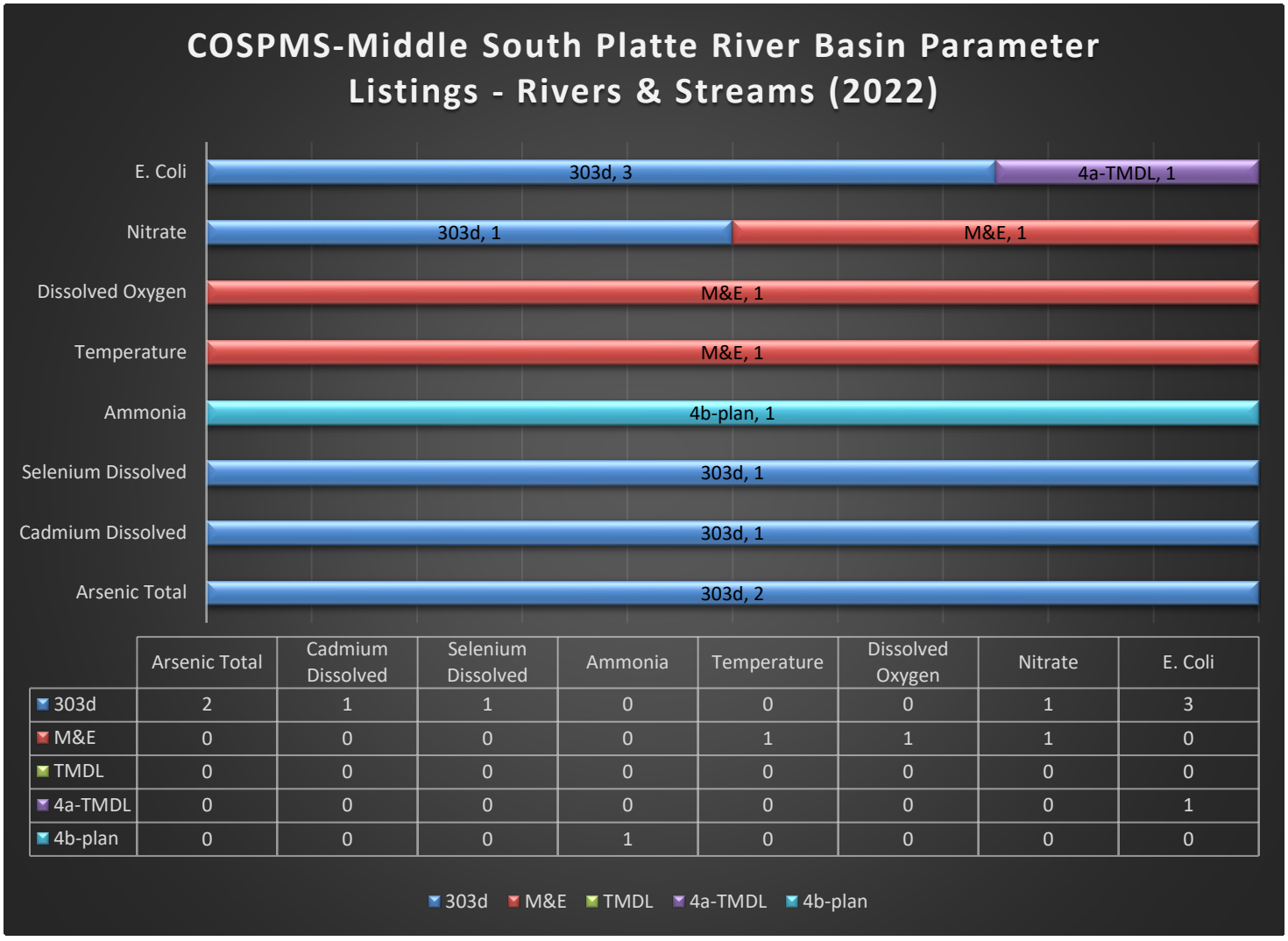


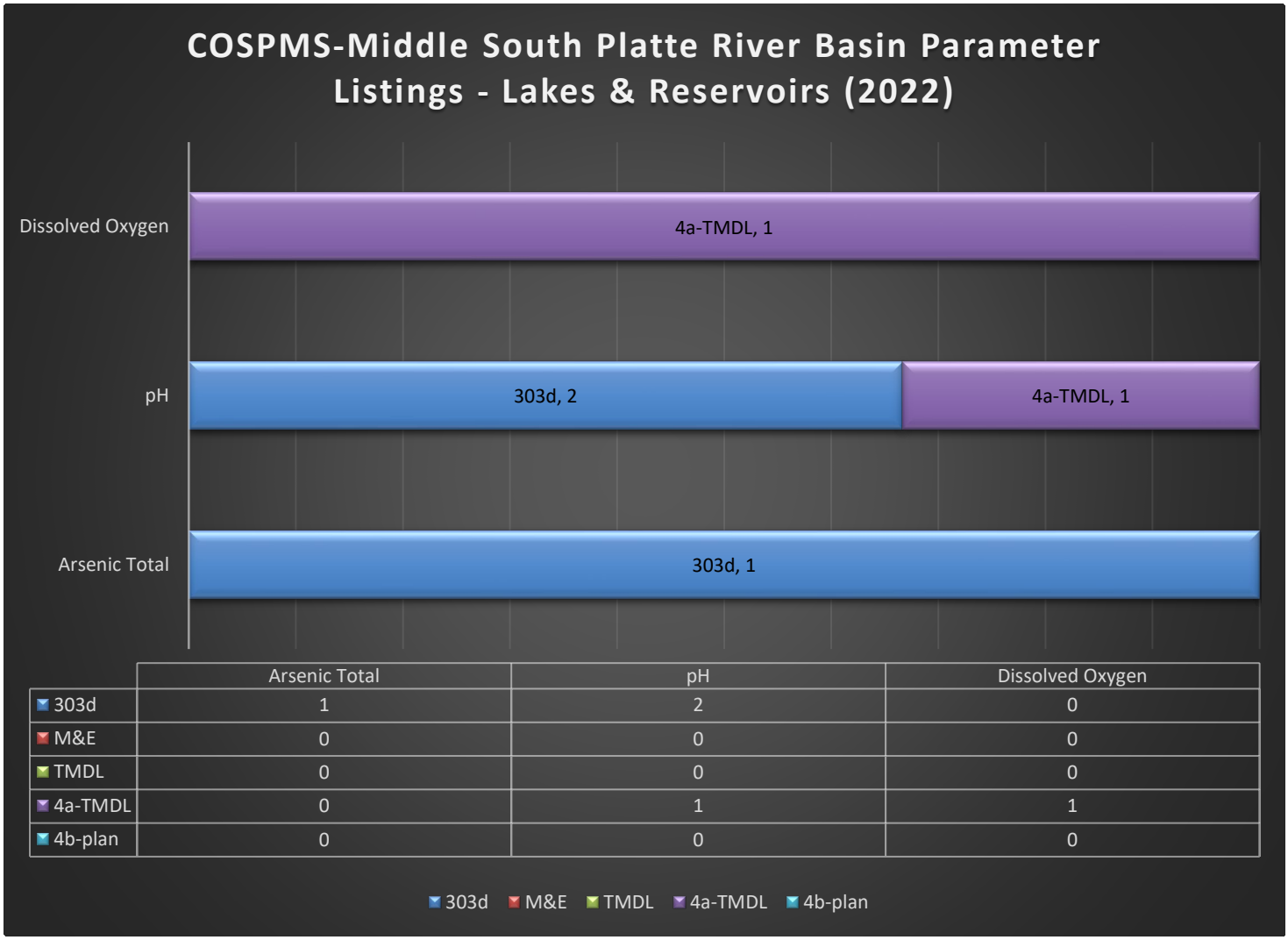
Figure 5-24 South Platte River Basin - Lakes & Reservoirs Units & Acres Assessed



	Arsenic Total	Cadmium Dissolved	Selenium Dissolved	Ammonia	Temperature	Dissolved Oxygen	Nitrate	E. Coli
303d	2	1	1	0	0	0	1	3
M&E	0	0	0	0	1	1	1	0
TMDL	0	0	0	0	0	0	0	0
4a-TMDL	0	0	0	0	0	0	0	1
4b-plan	0	0	0	1	0	0	0	0

Figure 5-25 Middle South Platte River Basin - Rivers & Streams Parameter Listings, 2022

The Division parameter listing to either the 303(d) list, the Monitoring and Evaluation (M&E) list, or a TMDL for the Middle South Platte River basin rivers and streams within Region 2 only is illustrated in Figure 5-25 for 2022.



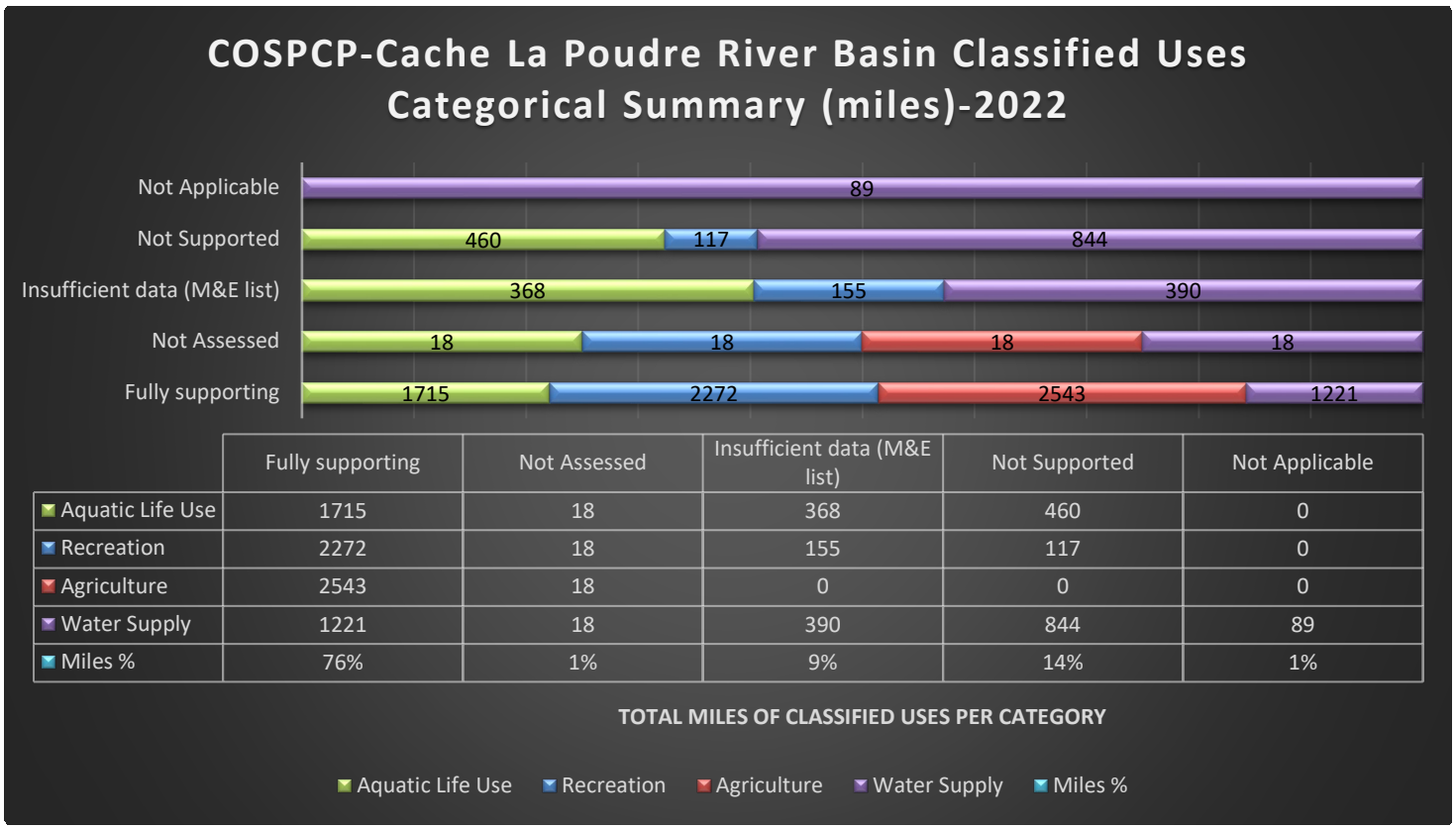
	Arsenic Total	pH	Dissolved Oxygen
303d	1	2	0
M&E	0	0	0
TMDL	0	0	0
4a-TMDL	0	1	1
4b-plan	0	0	0

Figure 5-26 Middle South Platte River Basin - Lakes & Reservoirs Parameter Listings, 2022

The Division parameter listing to either the 303(d) list, the Monitoring and Evaluation (M&E) list, or a TMDL for the Middle South Platte River basin lakes and reservoirs within Region 2 only is illustrated in Figure 5-26 for 2022.

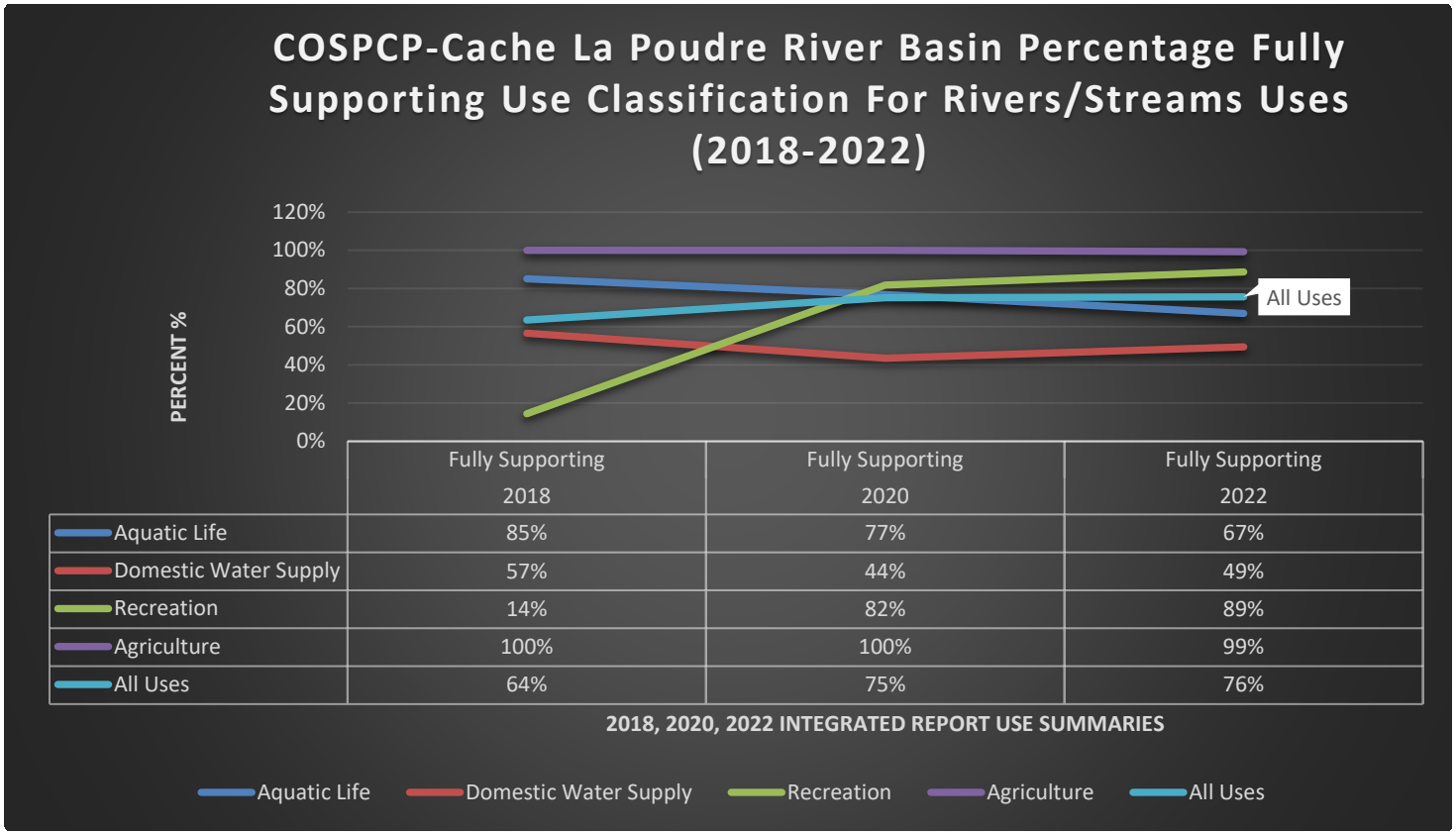
5.7 Cache la Poudre River Basin Assessment Results Summary

In the Cache la Poudre basin within Region 2 only, a total of 2,561 river miles and 16,945 lake acres were assessed. Figure 5-27 presents the designated uses and category summary for rivers and streams, in miles, of the Cache la Poudre basin in 2022. Figure 5-27 sums the total number of miles for each category and divides each category by the whole total to determine the categorical percentages for the basin. For example, by totaling the number of miles in the watershed basin that are attaining standards, not each segment, the data shows that 76% of the rivers and streams miles in the Cache la Poudre basin are achieving standards in 2022, respectively.



	Fully supporting	Not Assessed	Insufficient data (M&E list)	Not Supported	Not Applicable
Aquatic Life Use	1715	18	368	460	0
Recreation	2272	18	155	117	0
Agriculture	2543	18	0	0	0
Water Supply	1221	18	390	844	89
Miles %	76%	1%	9%	14%	1%

Figure 5-27 Cache la Poudre River Basin - Rivers & Streams Designated Uses Categorical Summary, 2022



	Fully Supporting 2018	Fully Supporting 2020	Fully Supporting 2022
Aquatic Life	85%	77%	67%
Domestic Water Supply	57%	44%	49%
Recreation	14%	82%	89%
Agriculture	100%	100%	99%
All Uses	64%	75%	76%

Figure 5-28 Cache la Poudre River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022

Similar to the assessment of the entire Region 2, Figure 5-28 illustrates that "all uses" across the Cache la Poudre River Basin are increasing in the number of miles, "fully supporting" uses or attaining standards, 2018-64%, 2020-75%, and 2022-76% within Region 2 only. The percentages represent the total number of miles assigned a designated use divided by the number of miles fully supporting the designated use.

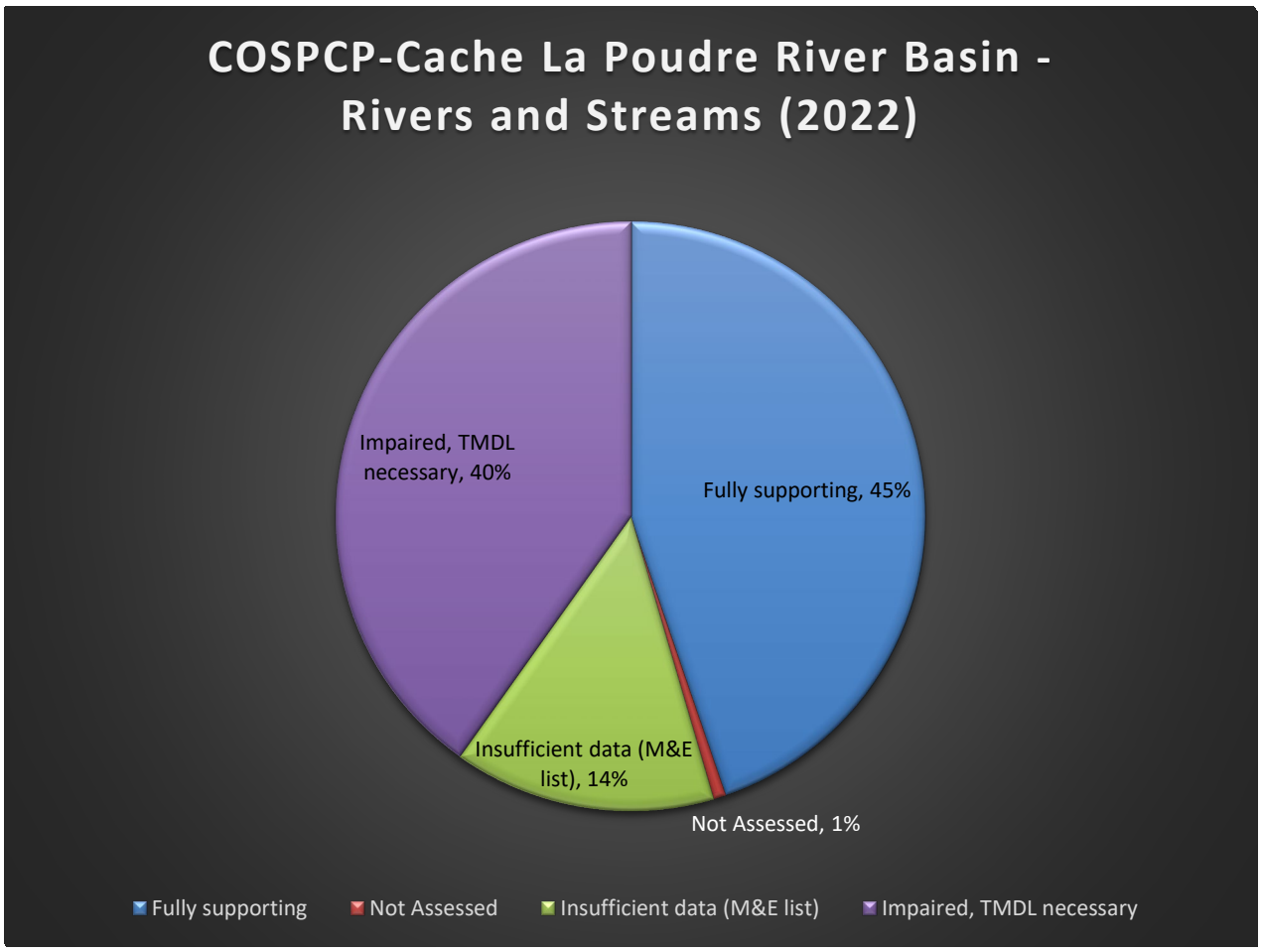


Figure 5-29 Cache la Poudre River Basin - Rivers & Streams Category Percentages, 2022

Figure 5-29 illustrates the Cache la Poudre River basin rivers and streams category results for the designated uses for 2022 within Region 2 only. The percentages are based on the total number of miles for the category assessed divided by the actual number of miles of rivers and streams in the river basin. To further understand the category percentage results of Figure 5-29, Figure 5-20 illustrates how many segments and miles were assessed for each category resulting percentage.

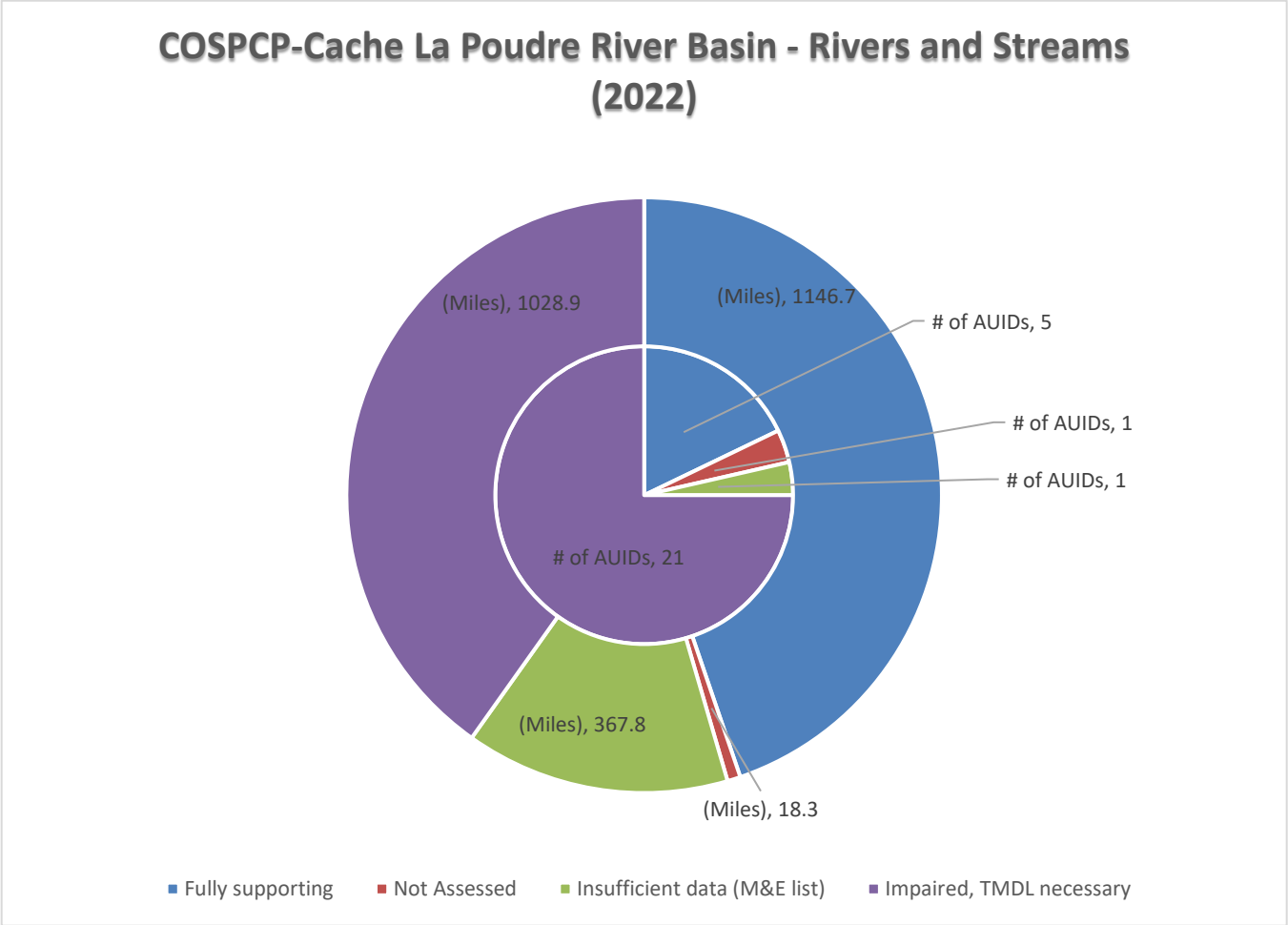


Figure 5-30 Cache la Poudre River Basin - Rivers & Streams Units & Miles Assessed

Figure 5-31 presents the designated uses and category summary for lakes and reservoirs, in acres, of the Cache la Poudre River basin in 2022 within Region 2 only. Figure 5-31 sums the total number of acres for each category and divides each category by the whole total to determine the categorical percentages for the basin. For example, by totaling the number of acres in the watershed basin that is attaining standards, not each water body, the data shows that 78% of the lakes and reservoirs acres in the Cache la Poudre River basin are achieving standards in 2022 within Region 2 only, respectively.

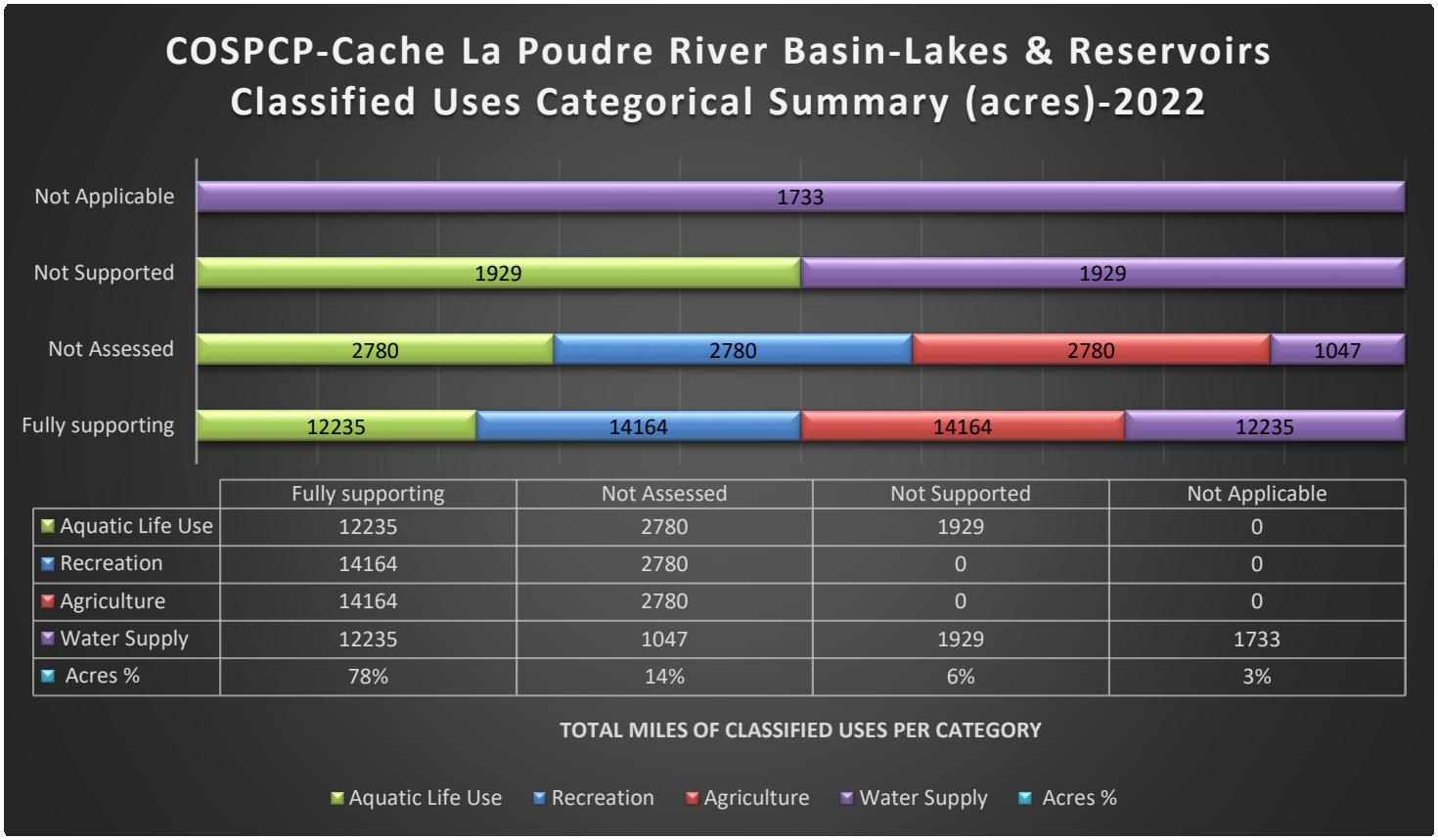
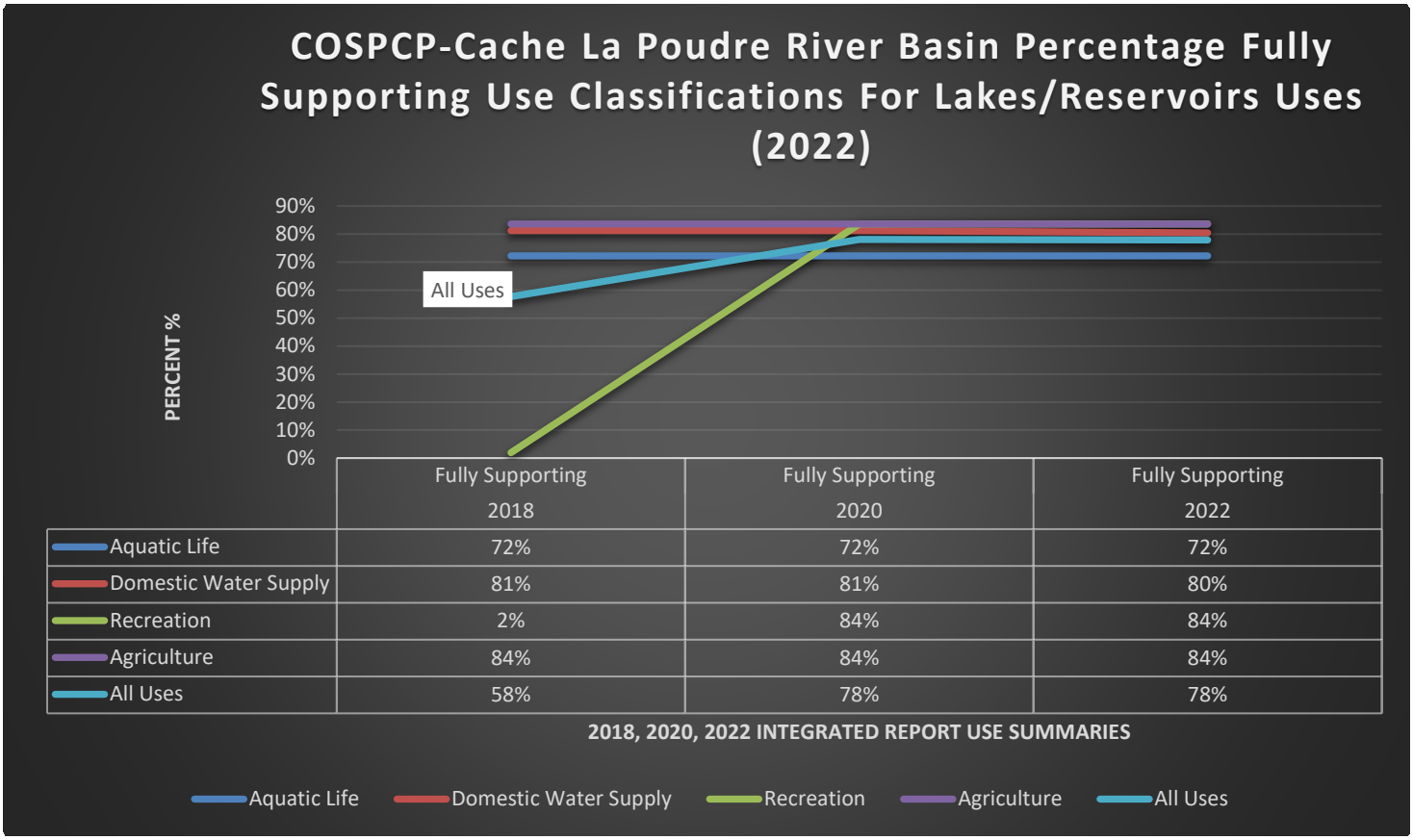


Figure 5-31 Cache la Poudre River Basin - Lakes & Reservoirs Designated Uses Categorical Summary, 2022



	Fully Supporting 2018	Fully Supporting 2020	Fully Supporting 2022
Aquatic Life	72%	72%	72%
Domestic Water Supply	81%	81%	80%
Recreation	2%	84%	84%
Agriculture	84%	84%	84%
All Uses	58%	78%	78%

Figure 5-32 Cache la Poudre River Basin - Lakes & Reservoirs Designated Use Classifications, Fully Supporting, 2018-2022

The lakes and reservoirs within the Cache la Poudre River basin within Region 2 only also show an increase in use attainment over time. Figure 5-32 illustrates that “all uses” are increasing, “fully supporting” uses displaying an increase in the number of acres attaining standards across the Cache la Poudre River Basin, 2018-58%, 2020-78%, and 2022-78% within Region 2 only. Although use attainment remained at 78% between 2020 and 2022, the general trend is upward. The percentages represent the total number of acres assigned a designated use divided by the number of acres fully supporting the designated use.

Still, the region must determine if these increases are actually due to water quality improvement and assess why the remaining use designations do not support their classifications in future 208 Planning. This is the only way the information can fully inform the 208 plan and prioritized, recommended actions in the plan. Figure 5-33 illustrates the Cache la Poudre River basin lakes and reservoirs category results for the designated uses for 2022 within Region 2 only. The percentages are based on the actual number of acres of lakes and reservoirs in the river basin divided by the total number of acres for the category assessed. To further understand the category percentage results of Figure 5-33, Figure 5-24 illustrates how many water bodies and acres were assessed for each use category resulting percentage.

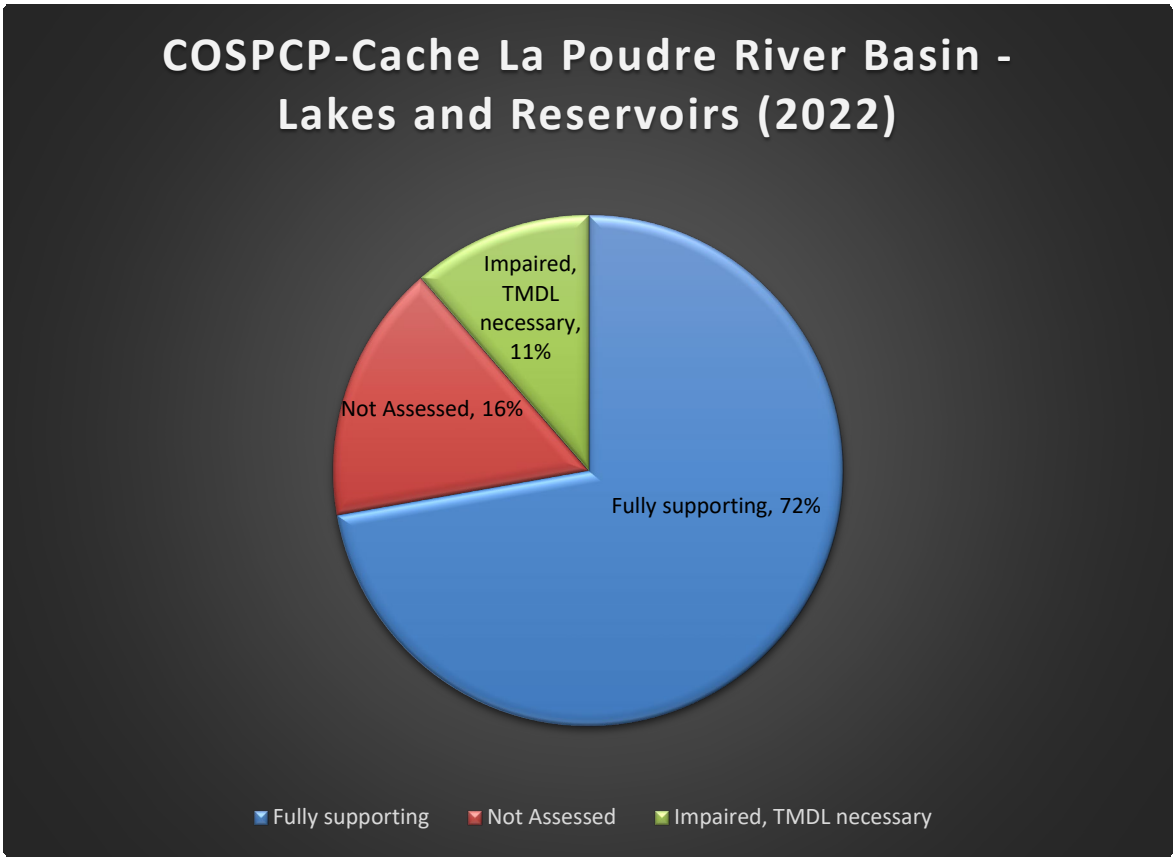


Figure 5-33 Cache la Poudre River Basin - Lakes & Reservoirs Category Percentages, 2022

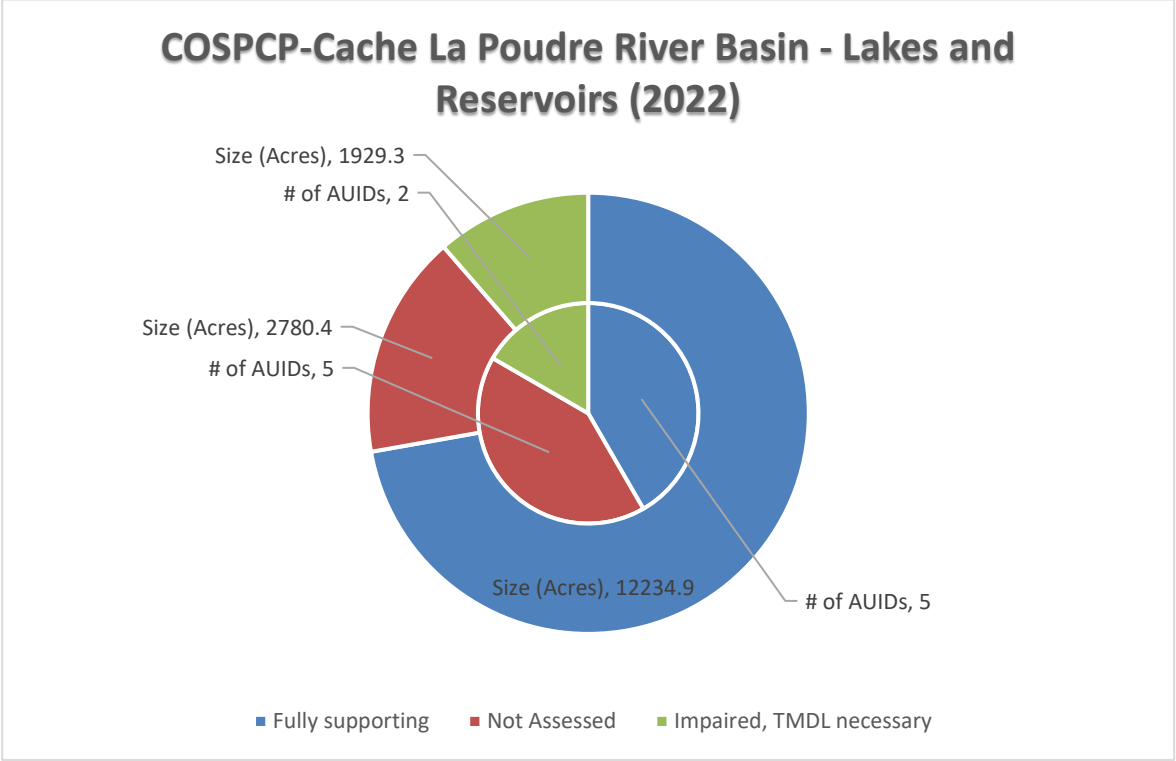
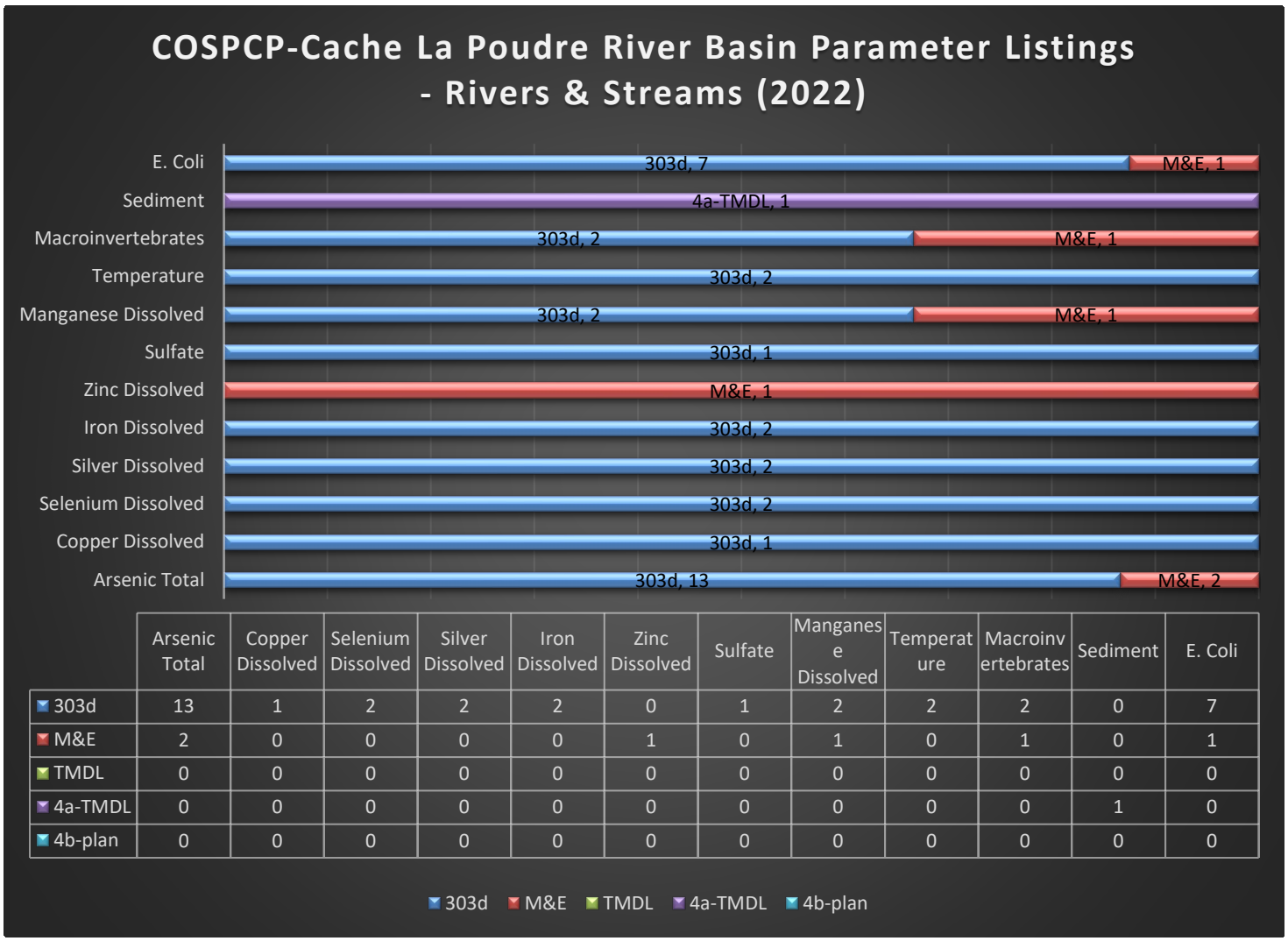


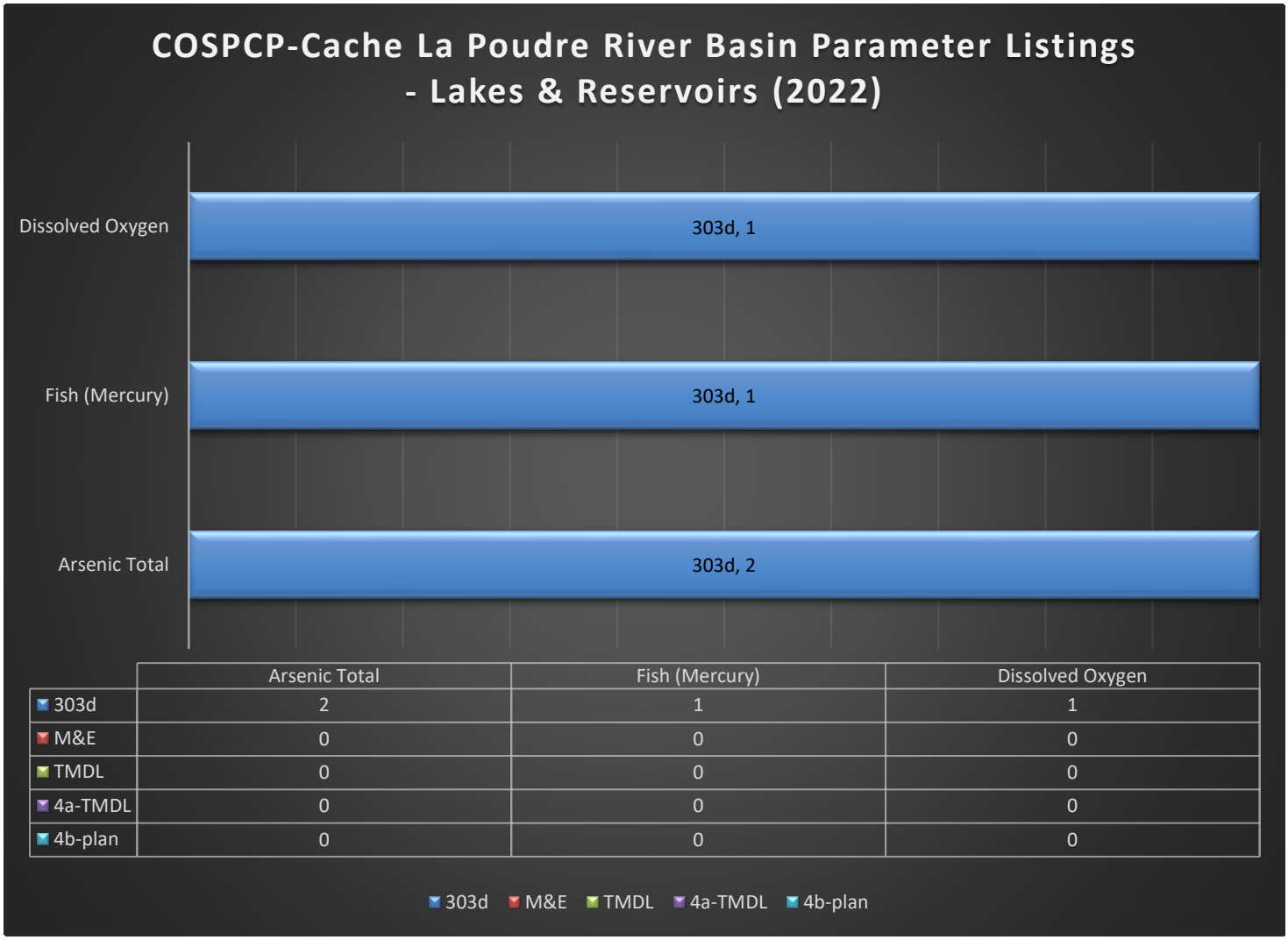
Figure 5-34 Cache la Poudre River Basin - Lakes & Reservoirs Units & Acres Assessed



	Arsenic Total	Copper Dissolved	Selenium Dissolved	Silver Dissolved	Iron Dissolved	Zinc Dissolved	Sulfate	Manganese Dissolved	Temperature	Macroinvertebrates	Sediment	E. Coli
303d	13	1	2	2	2	0	1	2	2	2	0	7
M&E	2	0	0	0	0	1	0	1	0	1	0	1
TMDL	0	0	0	0	0	0	0	0	0	0	0	0
4a-TMDL	0	0	0	0	0	0	0	0	0	0	1	0
4b-plan	0	0	0	0	0	0	0	0	0	0	0	0

Figure 5-35 Cache la Poudre River Basin - Rivers & Streams Parameter Listings, 2022

The Division parameter listing to either the 303(d) list, the Monitoring and Evaluation (M&E) list, or a TMDL for the Cache la Poudre River basin rivers and streams within Region 2 only is illustrated in Figure 5-35 for 2022.



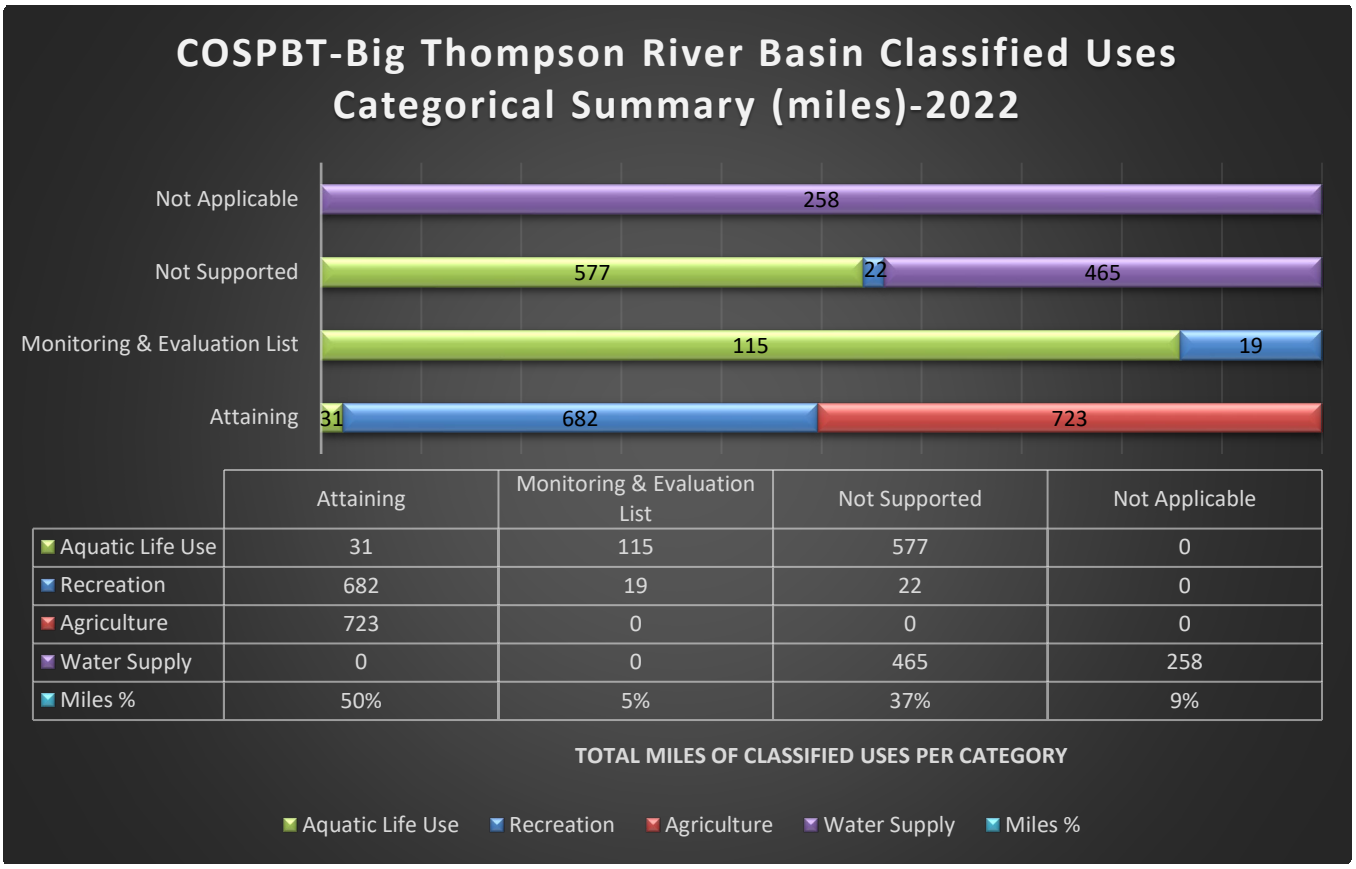
	Arsenic Total	Fish (Mercury)	Dissolved Oxygen
303d	2	1	1
M&E	0	0	0
TMDL	0	0	0
4a-TMDL	0	0	0
4b-plan	0	0	0

Figure 5-36 Cache la Poudre River Basin - Lakes & Reservoirs Parameter Listings, 2022

The Division parameter listing to either the 303(d) list, the Monitoring and Evaluation (M&E) list, or a TMDL for the Cache la Poudre River basin rivers and streams within Region 2 only is illustrated in Figure 5-36 for 2022.

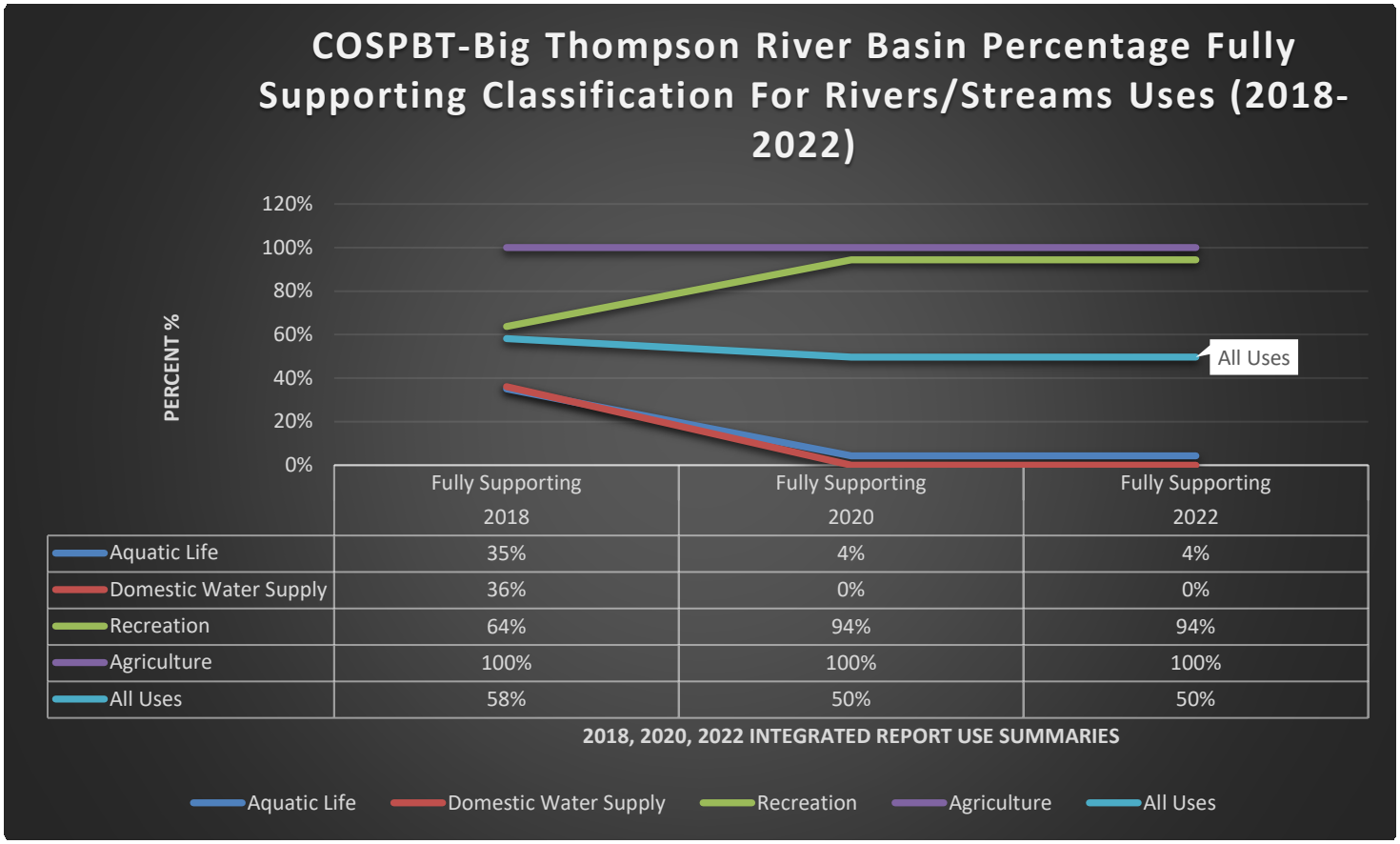
5.8 Big & Little Thompson River Basin Assessment Results Summary

In the Big & Little Thompson River basin, a total of 720 river miles and 8,911 lake acres were assessed within Region 2 only. Figure 5-37 presents the designated uses and category summary for rivers and streams, in miles, of the Big & Little Thompson River basin in 2022 within Region 2 only. Figure 5-37 sums the total number of miles for each category and divides each category by the whole total to determine the categorical percentages for the basin. For example, by totaling the number of miles in the watershed basin that are attaining standards, not each segment, the data shows that 50% of the rivers and streams miles in the Big & Little Thompson River basin are achieving standards in 2022 within Region 2 only, respectively.



	Attaining	Monitoring & Evaluation List	Not Supported	Not Applicable
Aquatic Life Use	31	115	577	0
Recreation	682	19	22	0
Agriculture	723	0	0	0
Water Supply	0	0	465	258
Miles %	50%	5%	37%	9%

Figure 5-37 Big & Little Thompson River Basin - Rivers & Streams Designated Uses Categorical Summary, 2022



	Fully Supporting 2018	Fully Supporting 2020	Fully Supporting 2022
Aquatic Life	35%	4%	4%
Domestic Water Supply	36%	0%	0%
Recreation	64%	94%	94%
Agriculture	100%	100%	100%
All Uses	58%	50%	50%

Figure 5-38 Big & Little Thompson River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022

The Big & Little Thompson River Basin miles of rivers and streams are maintaining use attainment as illustrated in Figure 5-38, 2018-58%, 2020-50%, and 2022-50%. The percentages represent the total number of miles assigned a designated use divided by the number of miles fully supporting the designated use.

Figure 5-39 illustrates the Big & Little Thompson River basin rivers and streams within Region 2 only category results for the designated uses for 2022. The percentages are based on the actual number of miles of rivers and streams in the river basin divided by the total number of miles for the category assessed. To further understand the category percentage results of Figure 5-39, Figure 5-40 illustrates how many segments and miles were assessed for each category resulting percentage in the Big & Little Thompson River basin within Region 2 only.

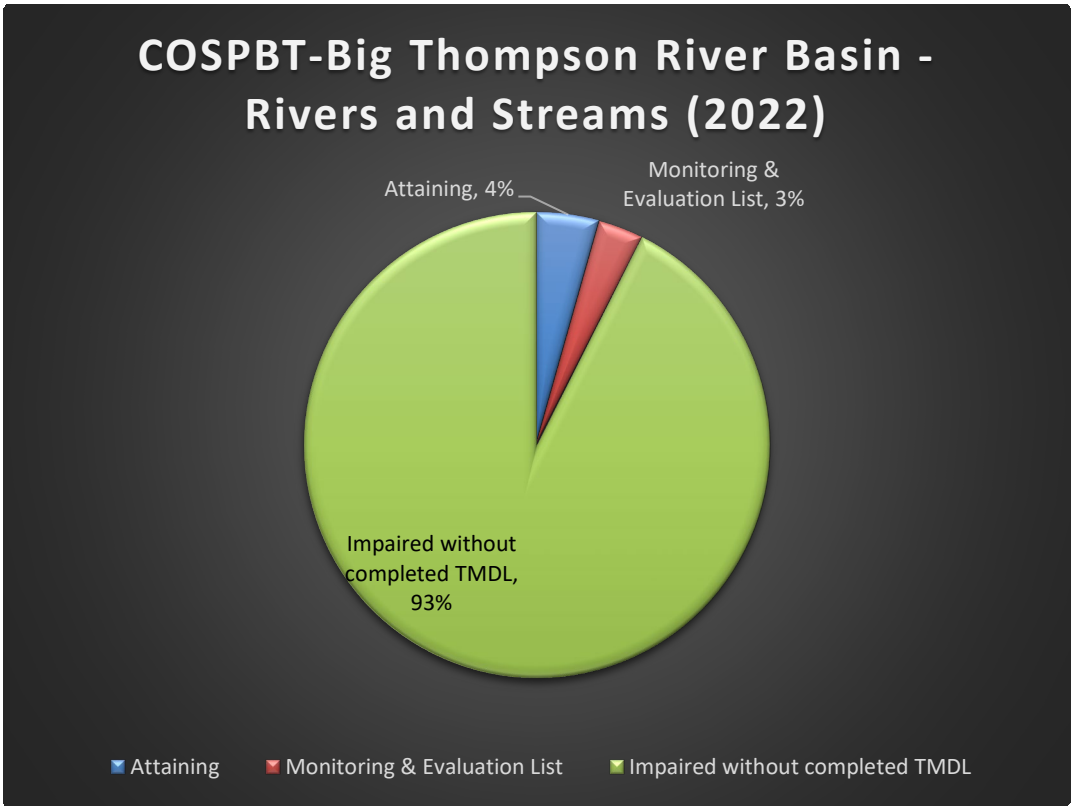


Figure 5-39 Big & Little Thompson River Basin - Rivers & Streams Category Percentages, 2022

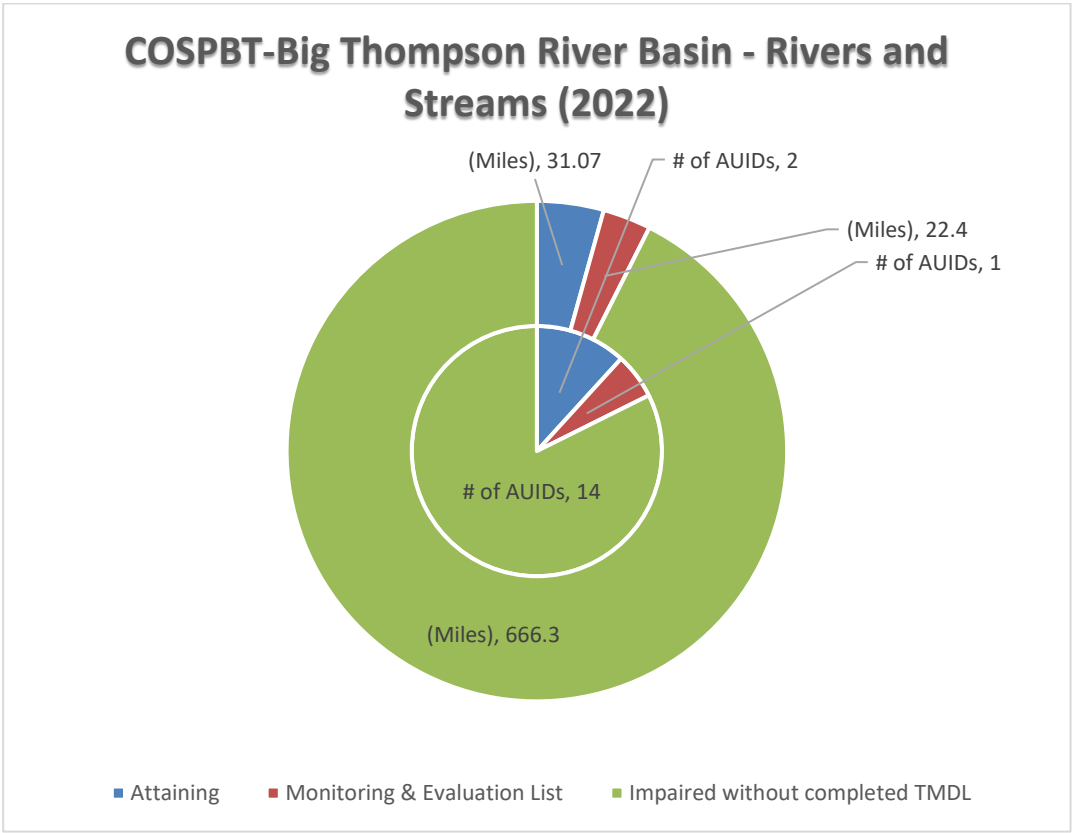
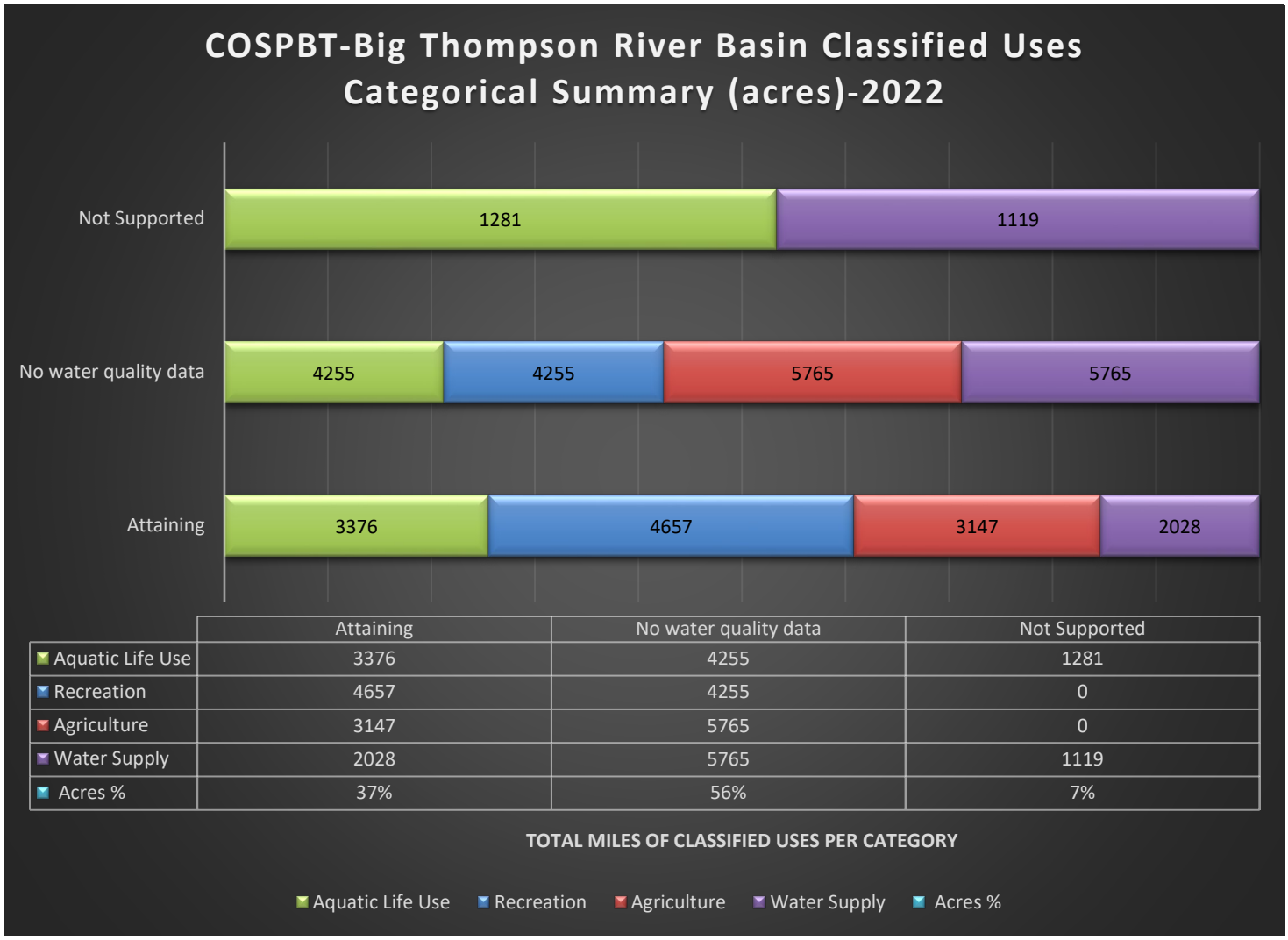


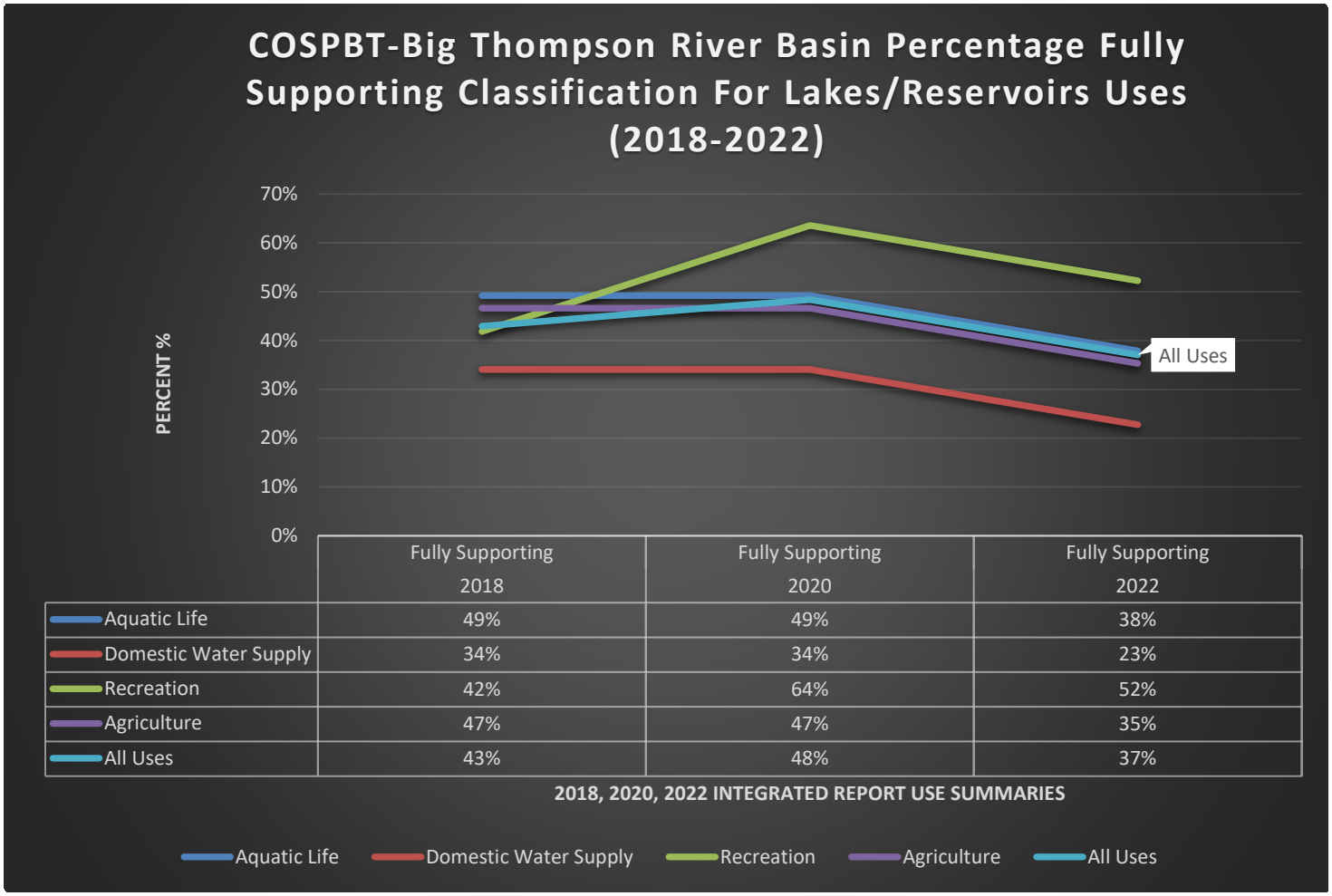
Figure 5-40 Big & Little Thompson River Basin - Rivers & Streams Units & Miles Assessed



	Attaining	No water quality data	Not Supported
Aquatic Life Use	3376	4255	1281
Recreation	4657	4255	0
Agriculture	3147	5765	0
Water Supply	2028	5765	1119
Acres %	37%	56%	7%

Figure 5-41 Big & Little Thompson River Basin - Lakes & Reservoirs Designated Uses Categorical Summary, 2022

Figure 5-41 presents the designated uses and category summary for lakes and reservoirs, in acres within Region 2 only, of the Big & Little Thompson River basin in 2022. Figure 5-41 sums the total number of acres for each category and divides each category by the whole total to determine the categorical percentages for the basin. For example, by totaling the number of acres in the watershed basin that is attaining standards, not each water body, the data shows that 37% of the lakes and reservoirs acres in the Big & Little Thompson River basin are achieving standards in 2022 within Region 2 only, respectively.



	Fully Supporting 2018	Fully Supporting 2020	Fully Supporting 2022
Aquatic Life	49%	49%	38%
Domestic Water Supply	34%	34%	23%
Recreation	42%	64%	52%
Agriculture	47%	47%	35%
All Uses	43%	48%	37%

Figure 5-42 Big & Little Thompson River Basin - Lakes & Reservoirs Designated Uses Categorical Summary, 2022

The lakes and reservoirs within the Big & Little Thompson River basin also show a decrease in the number of acres of surface water attaining standards over time within Region 2 only. Figure 5-43 illustrates that "all uses" are decreasing, "fully supporting" uses displaying a decrease of water body acres across the Big & Little Thompson River Basin, 2018-43%, 2020-48%, and 2022-37%. The percentages represent the total number of acres assigned a designated use divided by the number of acres fully supporting the designated use.

Still, the region must determine if these decreases are actually due to a decline in water quality and assess why the remaining use designations do not support their classifications in future 208 Planning. This is the only way the information can fully inform the 208 plan and prioritized, recommended actions in the plan. Figure 5-44 illustrates the Big & Little Thompson River basin lakes and reservoirs category results for the designated uses for 2022 within Region 2 only. The percentages are based on the actual number of acres of lakes and reservoirs in the river basin divided by the total number of acres for the category assessed. To further understand the category percentage results of Figure 5-44, Figure 5-44 illustrates how many water bodies and acres were assessed for each category resulting percentage within Region 2 only.

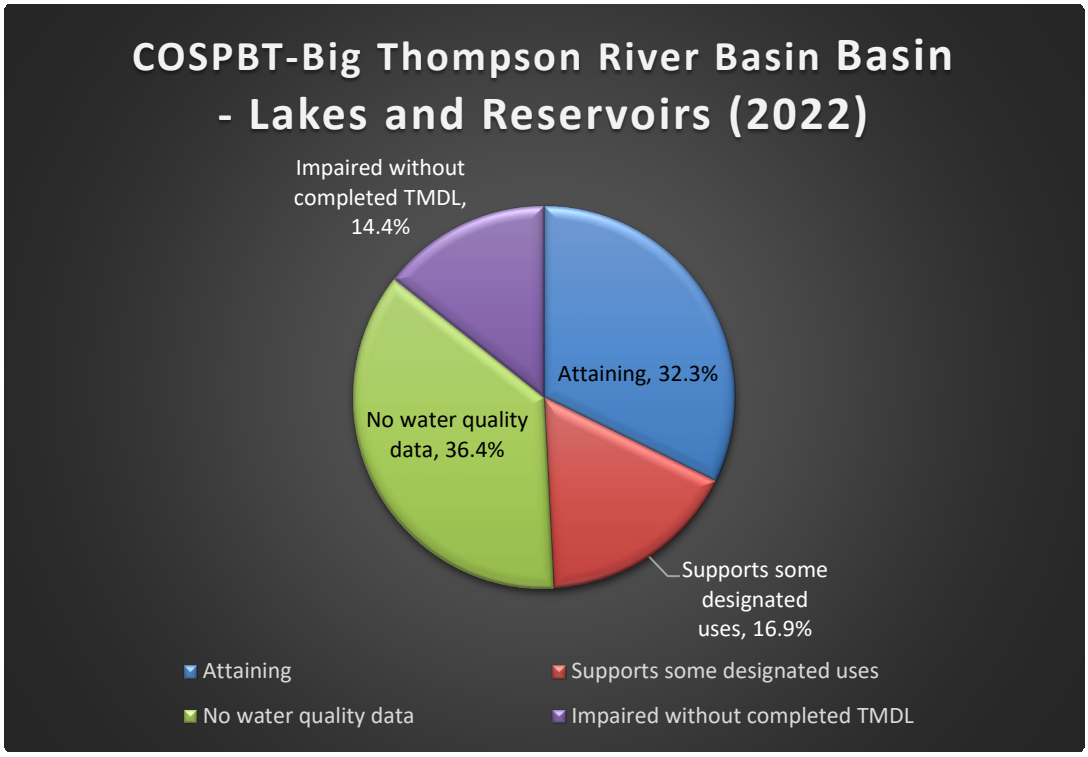


Figure 5-43 Big & Little Thompson River Basin - Lakes & Reservoirs Category Percentages, 2022

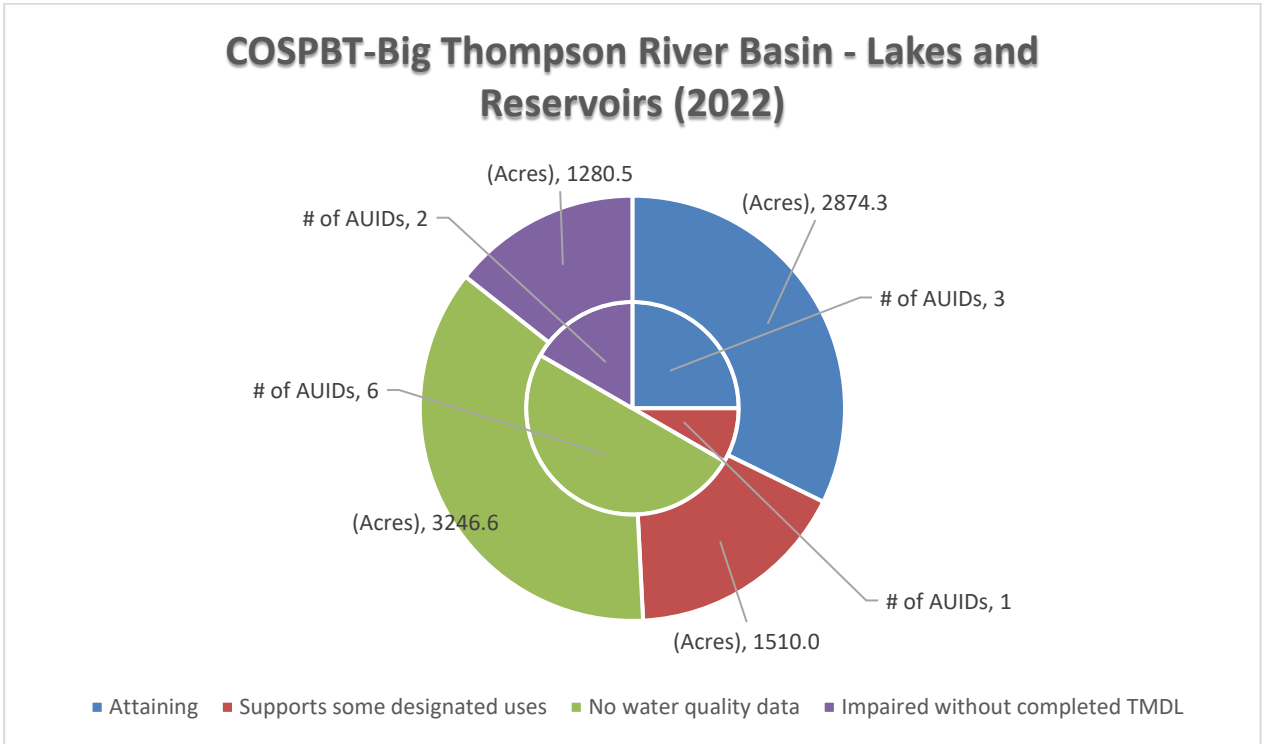
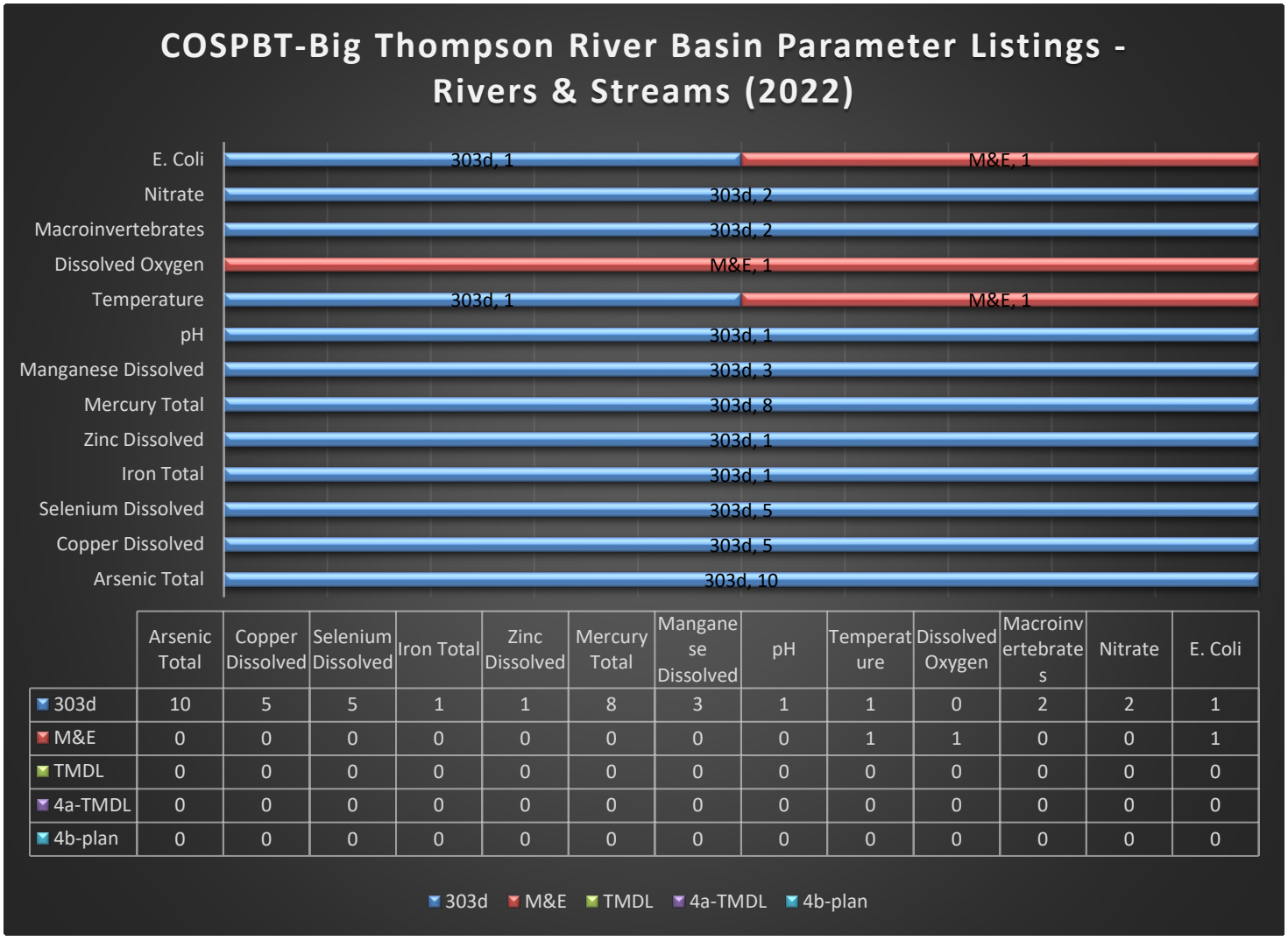


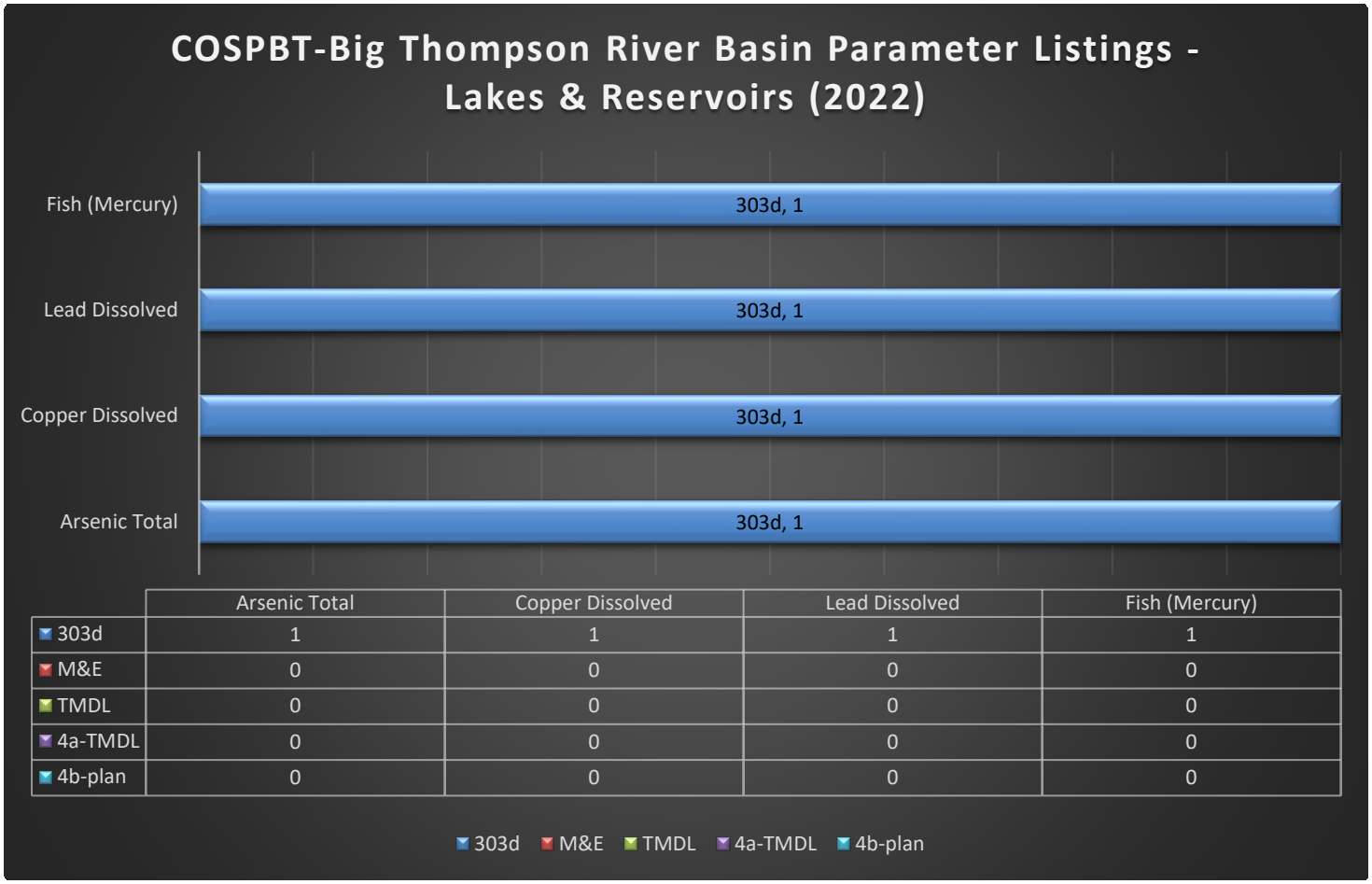
Figure 5-44 Big & Little Thompson River Basin - Lakes & Reservoirs Units & Acres Assessed



	Arsenic Total	Copper Dissolved	Selenium Dissolved	Iron Total	Zinc Dissolved	Mercury Total	Manganese Dissolved	pH	Temperature	Dissolved Oxygen	Macroinvertebrates	Nitrate	E. Coli
303d	10	5	5	1	1	8	3	1	1	0	2	2	1
M&E	0	0	0	0	0	0	0	0	1	1	0	0	1
TMDL	0	0	0	0	0	0	0	0	0	0	0	0	0
4a-TMDL	0	0	0	0	0	0	0	0	0	0	0	0	0
4b-plan	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 5-45 Big & Little Thompson River Basin - Rivers & Streams Parameter Listings, 2022

The Division parameter listing to either the 303(d) list, the Monitoring and Evaluation (M&E) list, or a TMDL for the Big & Little Thompson River basin rivers and streams within Region 2 only is illustrated in Figure 5-45 for 2022.



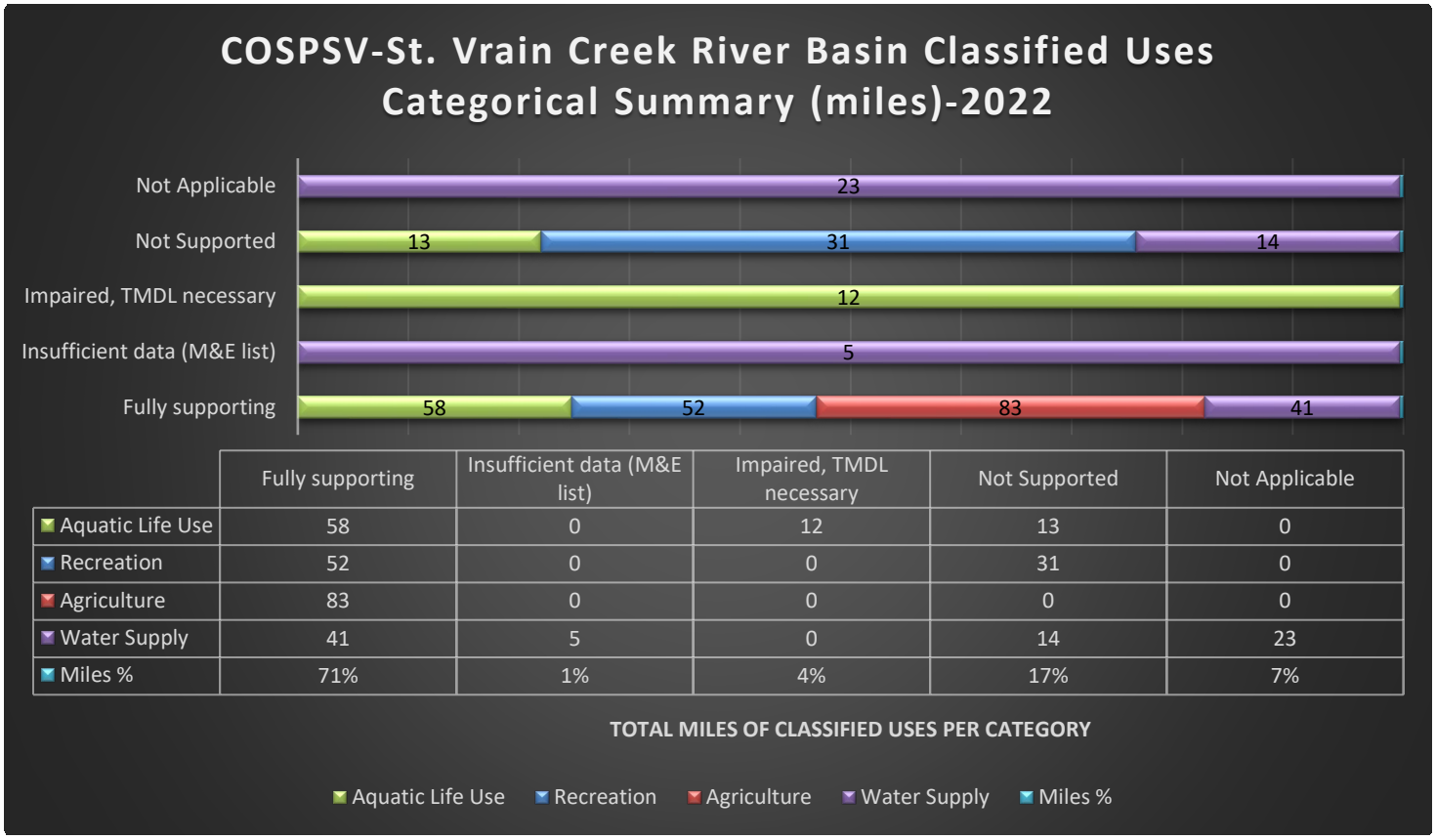
	Arsenic Total	Copper Dissolved	Lead Dissolved	Fish (Mercury)
303d	1	1	1	1
M&E	0	0	0	0
TMDL	0	0	0	0
4a-TMDL	0	0	0	0
4b-plan	0	0	0	0

Figure 5-46 Big & Little Thompson River Basin - Lakes & Reservoirs Parameter Listings, 2022

The Division parameter listing to either the 303(d) list, the Monitoring and Evaluation (M&E) list, or a TMDL for the Big and Little Thompson River basin lakes and reservoirs within Region 2 only is illustrated in Figure 5-46 for 2022.

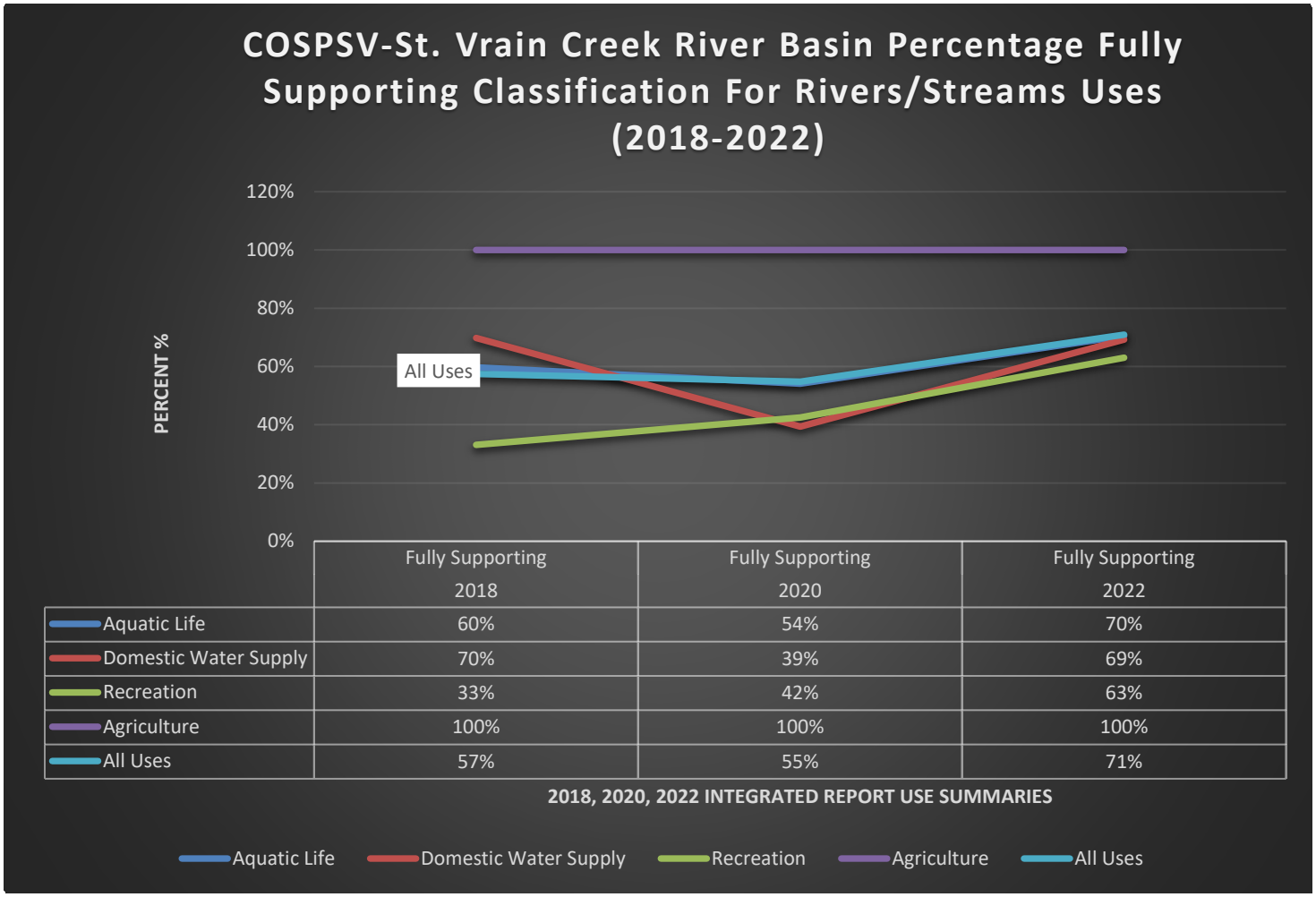
5.9 St. Vrain Creek River Basin Assessment Results Summary

In the St. Vrain Creek River basin, a total of 83 river miles and 1,904 lake acres were assessed within Region 2 only. Figure 5-47 presents the designated uses and category summary for rivers and streams, in miles, of the St. Vrain Creek River basin in 2022 within Region 2 only. Figure 5-47 sums the total number of miles for each category and divides each category by the whole total to determine the categorical percentages for the basin. For example, by totaling the number of miles in the watershed basin that are attaining standards, not each segment, the data shows that 71% of the rivers and streams miles in the St. Vrain Creek River basin are achieving standards in 2022 within Region 2 only, respectively.



	Fully supporting	Insufficient data (M&E list)	Impaired, TMDL necessary	Not Supported	Not Applicable
Aquatic Life Use	58	0	12	13	0
Recreation	52	0	0	31	0
Agriculture	83	0	0	0	0
Water Supply	41	5	0	14	23
Miles %	71%	1%	4%	17%	7%

Figure 5-47 St. Vrain Creek River Basin - Rivers & Streams Designated Uses Categorical Summary, 2022



	Fully Supporting 2018	Fully Supporting 2020	Fully Supporting 2022
Aquatic Life	60%	54%	70%
Domestic Water Supply	70%	39%	69%
Recreation	33%	42%	63%
Agriculture	100%	100%	100%
All Uses	57%	55%	71%

Figure 5-48 St. Vrain Creek River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022

The St. Vrain Creek River Basin shows the number of river and stream miles being protected or maintained as illustrated in Figure 5-48, 2018-57%, 2020-55%, and 2022-71% within Region 2 only. The percentages represent the total number of miles assigned a designated use divided by the number of miles fully supporting the designated use.

Figure 5-49 illustrates the St. Vrain Creek River basin rivers and streams category results for the designated uses for 2022 within Region 2 only. The percentages are based on the actual number of miles of rivers and streams in the river basin divided by the total number of miles for the category assessed. To further understand the category percentage results of Figure 5-49, Figure 5-50 illustrates how many segments and miles were assessed for each category resulting percentage in the St. Vrain Creek River basin within Region 2 only.

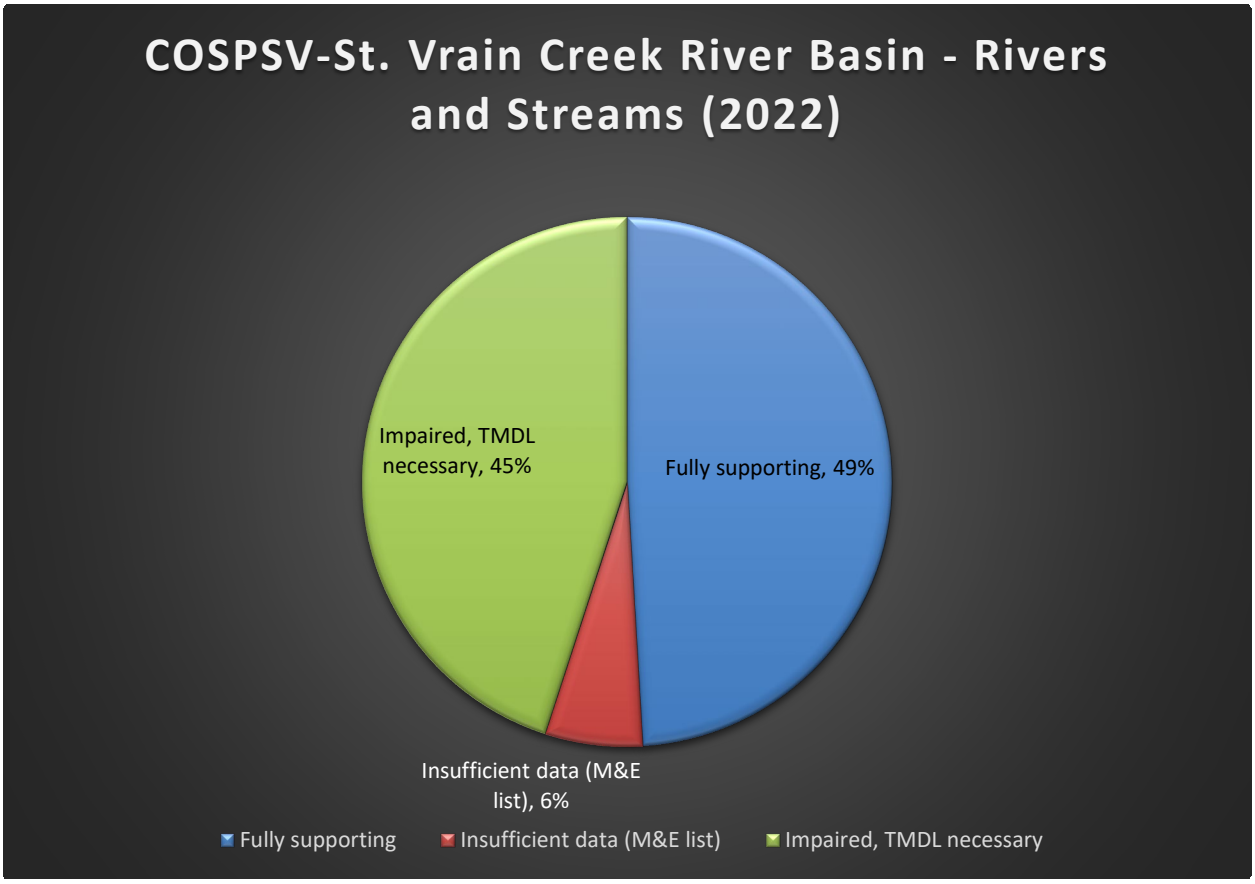


Figure 5-49 St. Vrain Creek River Basin - Rivers & Streams Category Percentages, 2022

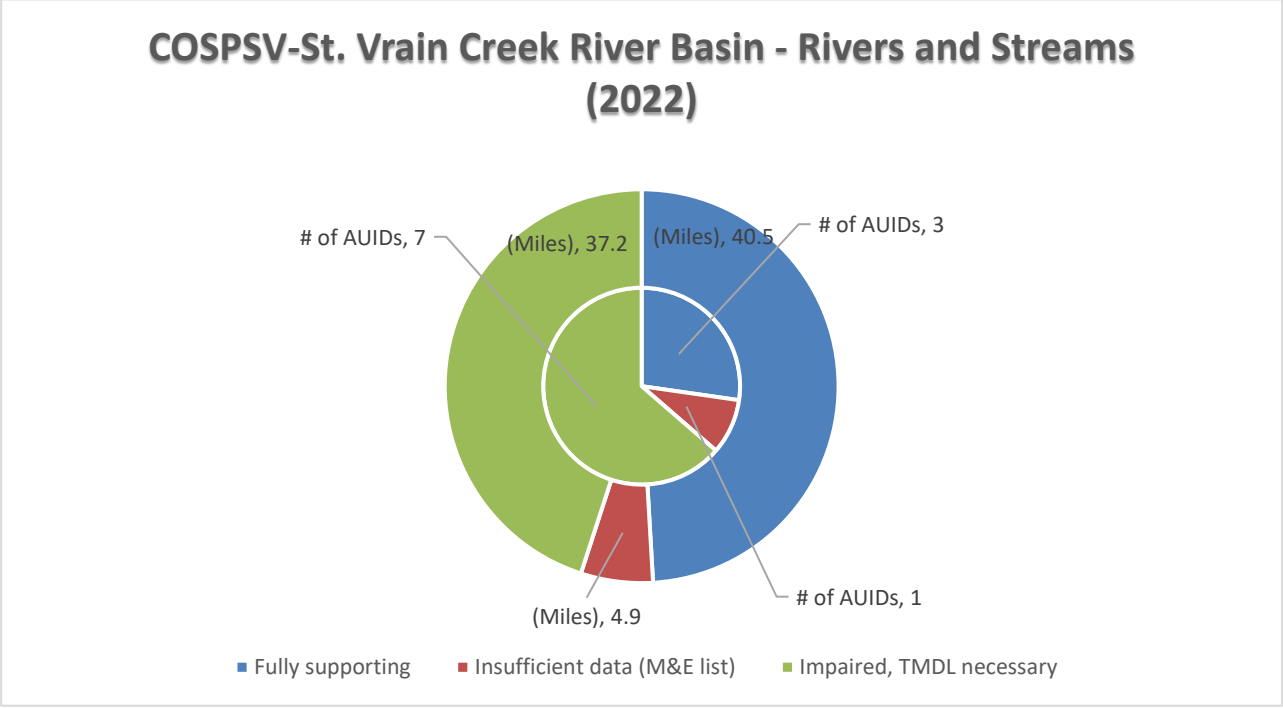
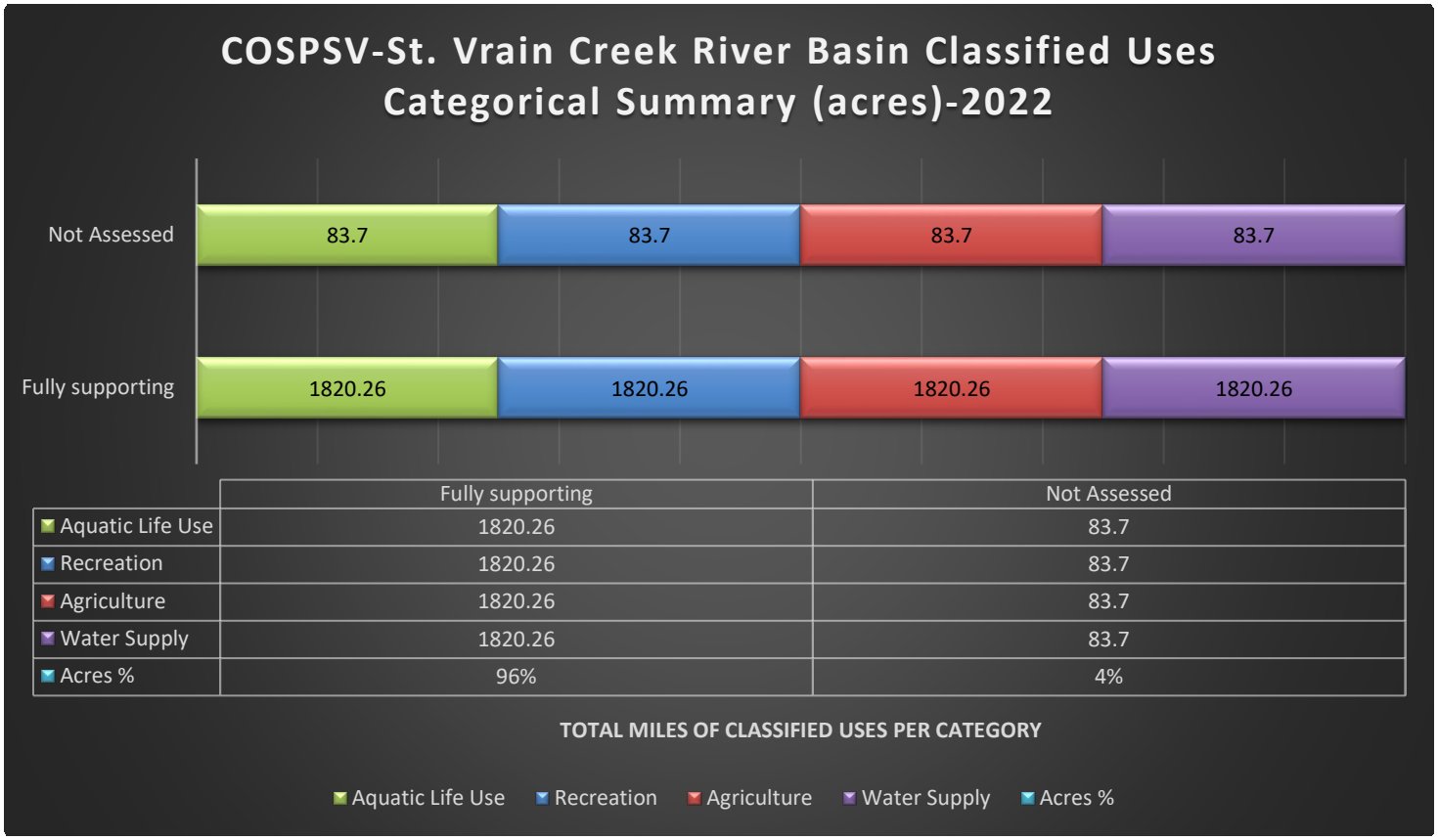


Figure 5-50 St. Vrain Creek River Basin - Rivers & Streams Units & Miles Assessed



	Fully supporting	Not Assessed
Aquatic Life Use	1820.26	83.7
Recreation	1820.26	83.7
Agriculture	1820.26	83.7
Water Supply	1820.26	83.7
Acres %	96%	4%

Figure 5-51 St. Vrain Creek River Basin - Lakes & Reservoirs Designated Uses Categorical Summary, 2022

Figure 5-51 presents the designated uses and category summary for lakes and reservoirs, in acres, of the St. Vrain Creek River basin in 2022 within Region 2 only. Figure 5-51 sums the total number of acres for each category and divides each category by the whole total to determine the categorical percentages for the basin. For example, by totaling the number of acres in the watershed basin that is attaining standards, not each water body, the data shows that 96% of the lakes and reservoirs acres in the St. Vrain Creek River basin are achieving standards in 2022 within Region 2 only, respectively.

Figure 5-52 illustrates that the number of acres of lakes and reservoirs within the St. Vrain Creek basin have increased, “fully supporting” use attainment standards across the St. Vrain Creek River Basin, 2018-9%, 2020-9%, and 2022-96% within Region 2 only. However, the great improvement is due to re-segmentation by the Division of the St. Vrain Creek River Basin waterbodies. The percentages represent the total number of acres assigned a designated use divided by the number of acres fully supporting the designated use.

Still, the region must continue to refine its determination about how many of the increases seen can actually be attributed to water quality improvement and assess why the remaining use designations do not support their classifications in future 208 Planning. This is the only way the information can fully inform the 208 plan and prioritized, recommended actions in the plan. Figure 5-53 illustrates the St. Vrain Creek River basin lakes and reservoirs category results for the designated uses for 2022 within Region 2 only. The percentages are based on the actual number of acres of lakes and reservoirs in the river basin divided by the total number of acres for the category assessed. To further understand the category percentage results of Figure 5-53, Figure 5-54 illustrates how many waterbodies and acres were assessed for each category resulting percentage.

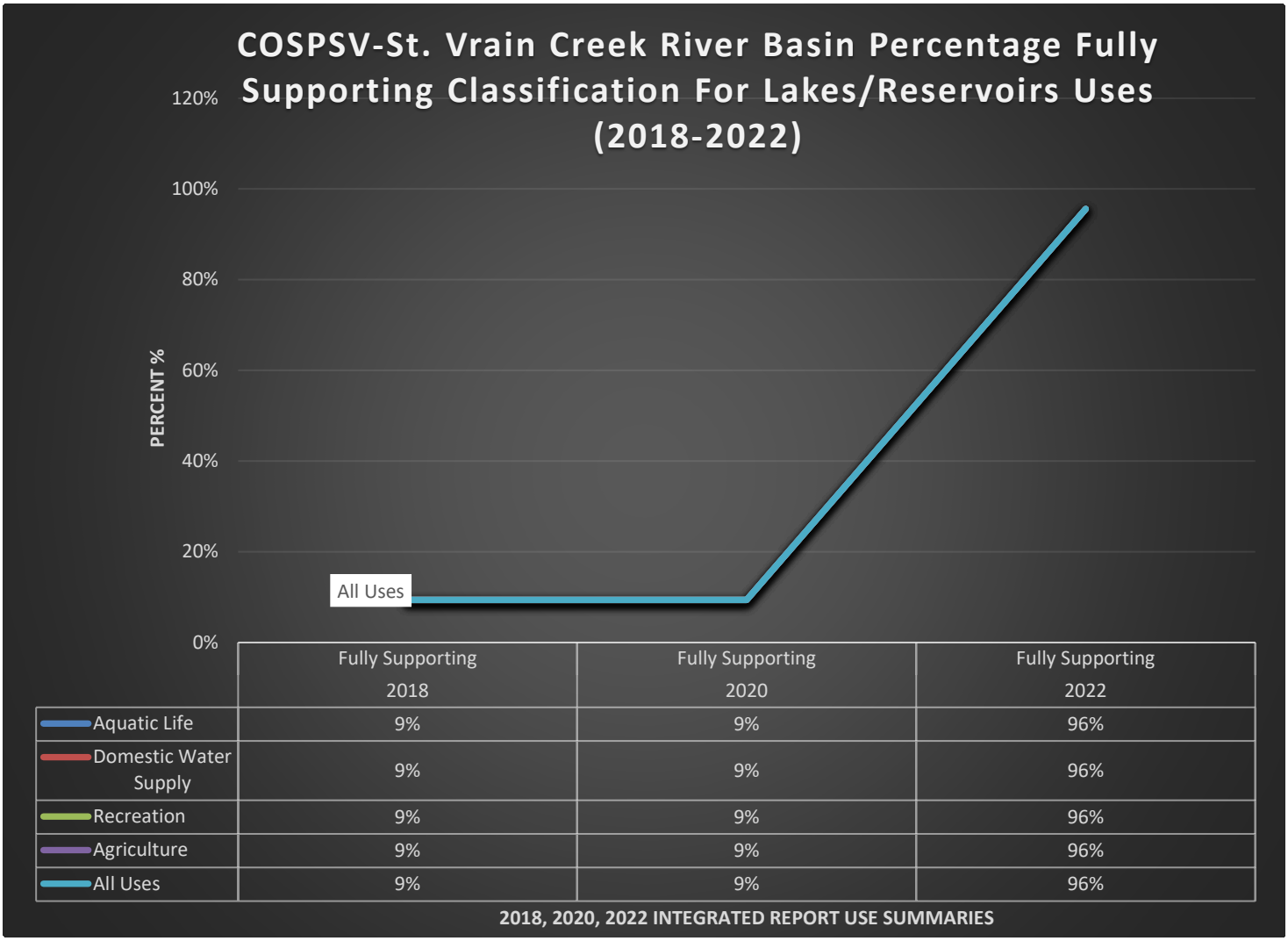


Figure 5-52 St. Vrain Creek River Basin - Lakes & Reservoirs Designated Use Classifications, Fully Supporting, 2018-2022

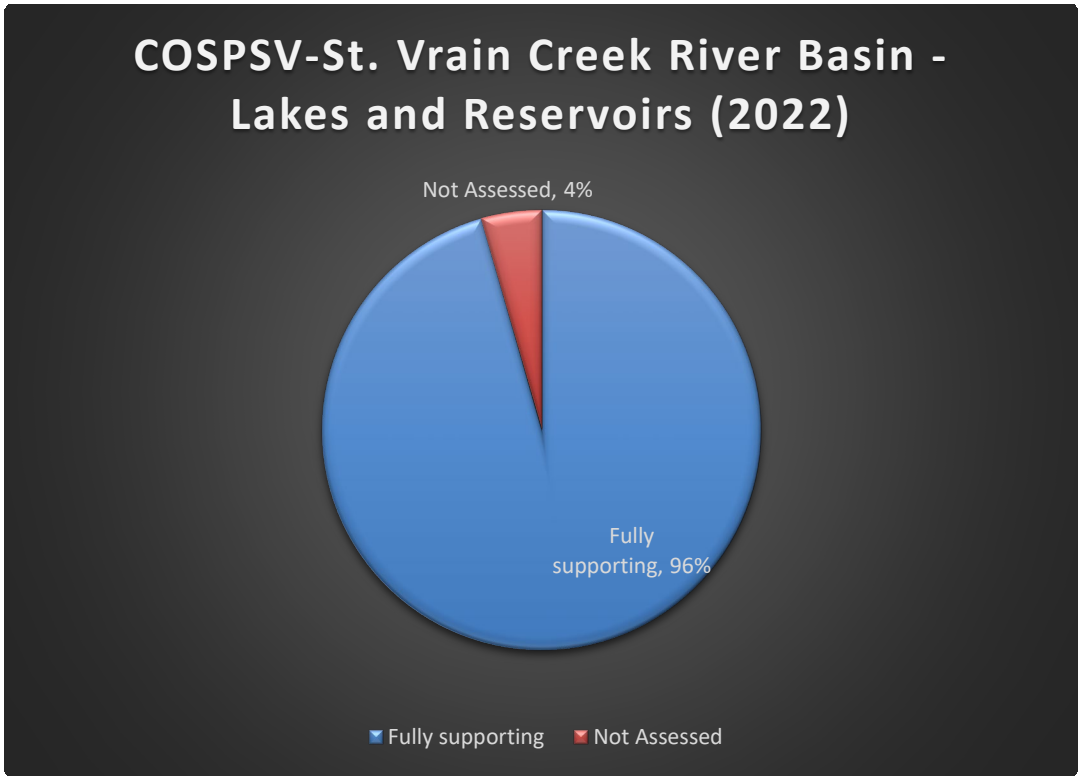


Figure 5-53 St. Vrain Creek River Basin - Lakes & Reservoirs Category Percentages, 2022

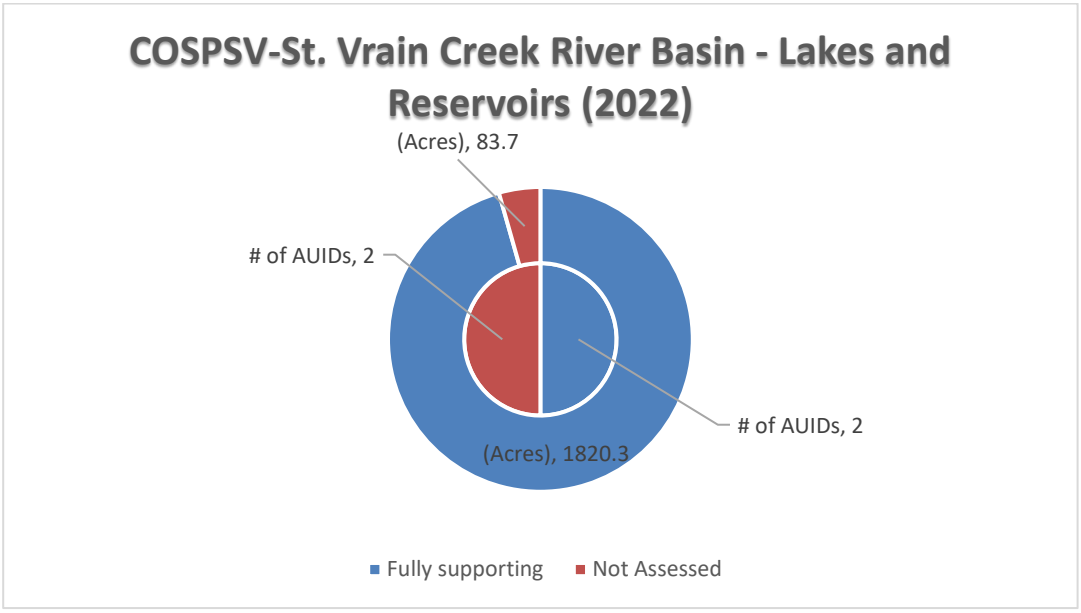
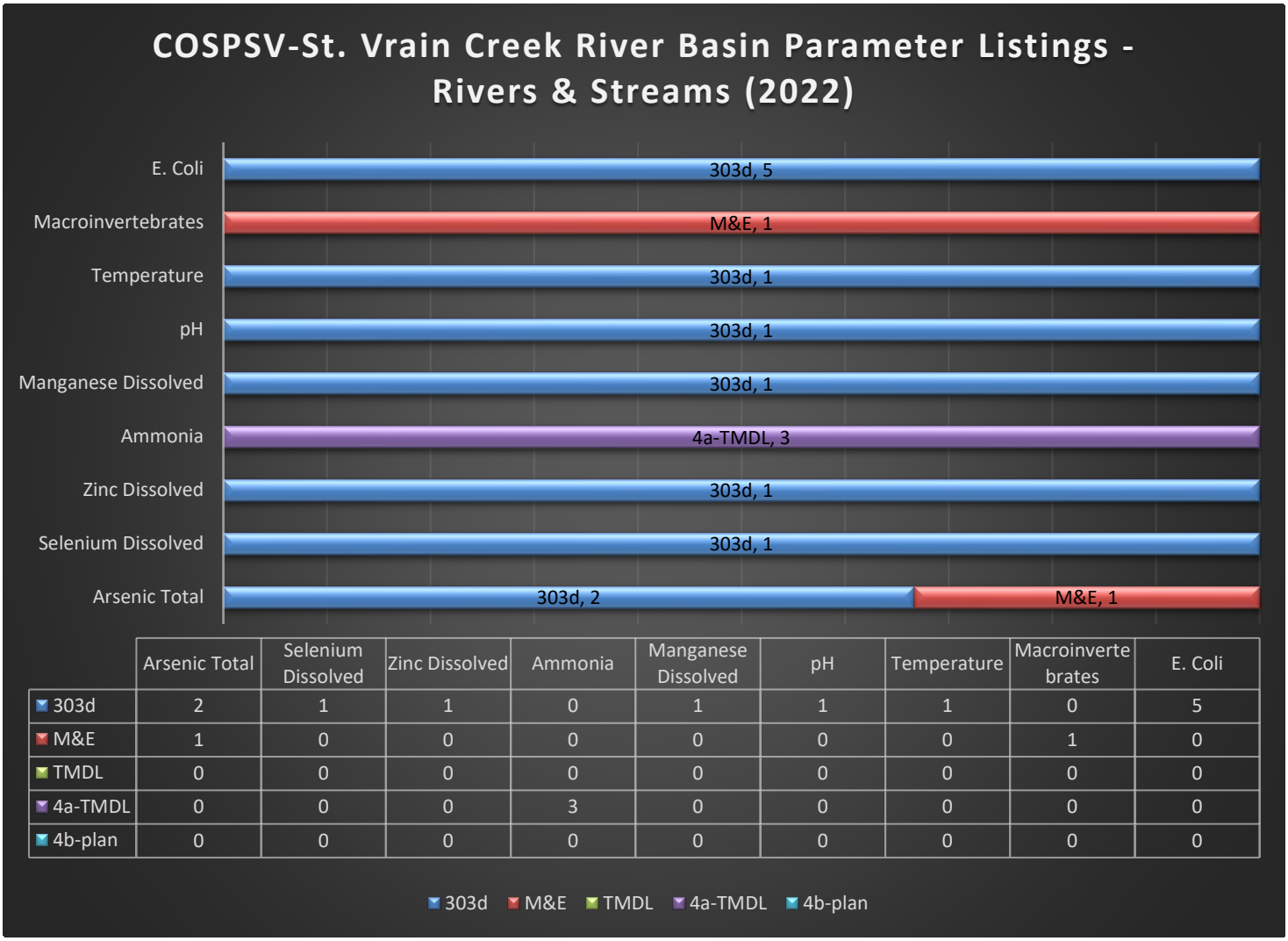


Figure 5-54 St. Vrain Creek River Basin - Lakes & Reservoirs Units & Miles Assessed



	Arsenic Total	Selenium Dissolved	Zinc Dissolved	Ammonia	Manganese Dissolved	pH	Temperature	Macroinvertebrates	E. Coli
303d	2	1	1	0	1	1	1	0	5
M&E	1	0	0	0	0	0	0	1	0
TMDL	0	0	0	0	0	0	0	0	0
4a-TMDL	0	0	0	3	0	0	0	0	0
4b-plan	0	0	0	0	0	0	0	0	0

Figure 5-55 St. Vrain Creek River Basin - Rivers & Streams Parameter Listings, 2022

The Division parameter rivers and streams listing to either the 303(d) list, the Monitoring and Evaluation (M&E) list, or a TMDL for the St. Vrain Creek River basin rivers and streams within Region 2 only is illustrated in Figure 5-55 for 2022.

There are no lakes or reservoirs water bodies identified for the St. Vrain Creek River basin within Region 2 only to either the 303(d) list, the Monitoring and Evaluation (M&E) list, or as a TMDL since all uses are being supported or the uses have not been assessed.

5.10 Big Dry Creek River Basin Assessment Results Summary

In the Big Dry Creek River basin, a total of 12.71 river miles (2 AUIDs) and 278 lake acres (1 AUID) were assessed within Region 2 only. Figure 5-56 presents the designated uses and category summary for rivers and streams, in miles, of the Big Dry Creek River basin in 2022 within Region 2 only. Figure 5-56 sums the total number of miles for each category and divides each category by the whole total to determine the categorical percentages for the basin. For example, by totaling the number of miles in the watershed basin that is attaining standards, not each segment, the data shows that 42% of the rivers and streams miles in the Big Dry Creek River basin are achieving standards in 2022 within Region 2 only, respectively.

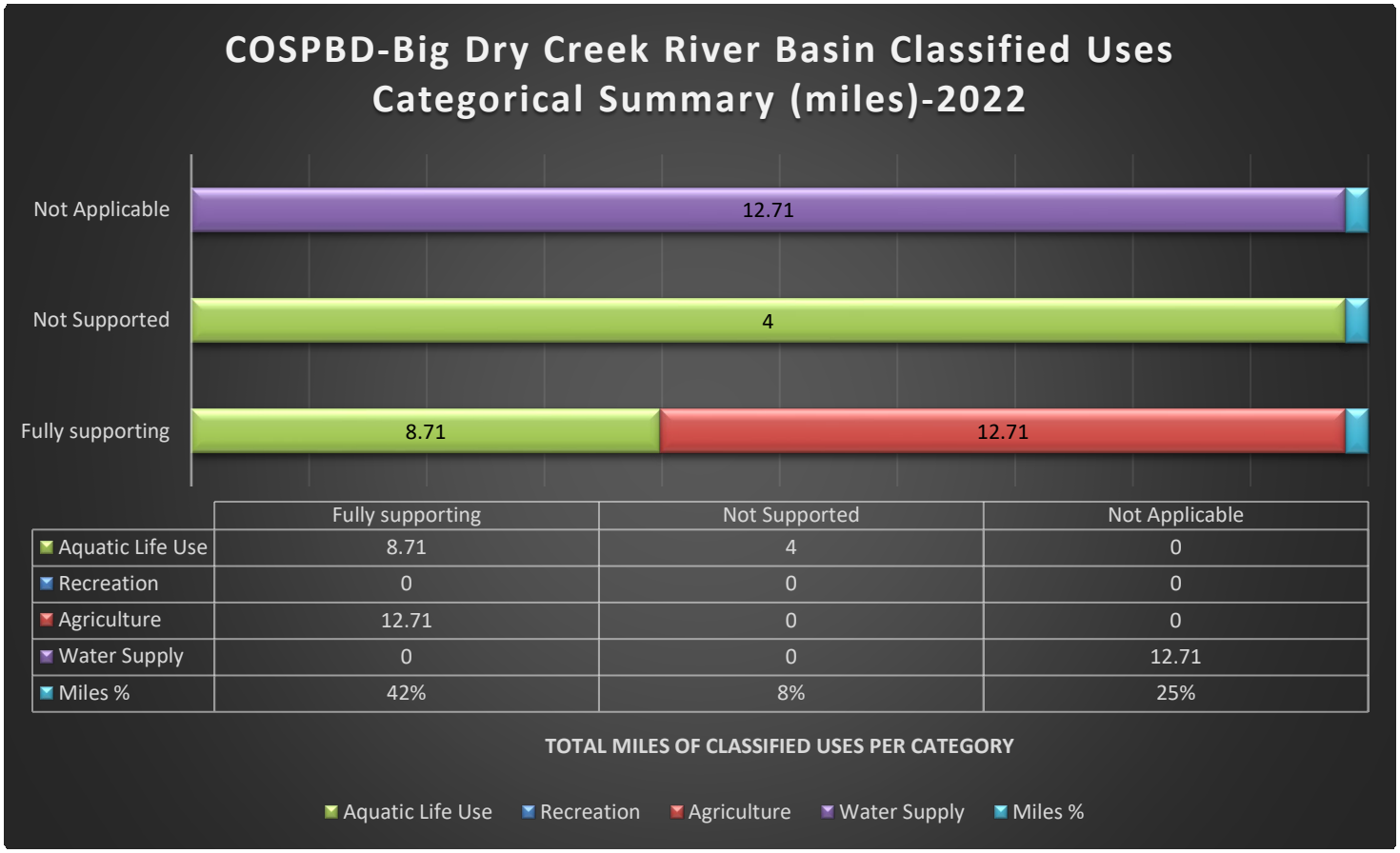


Figure 5-56 Big Dry Creek River Basin - Rivers & Streams Designated Uses Categorical Summary, 2022

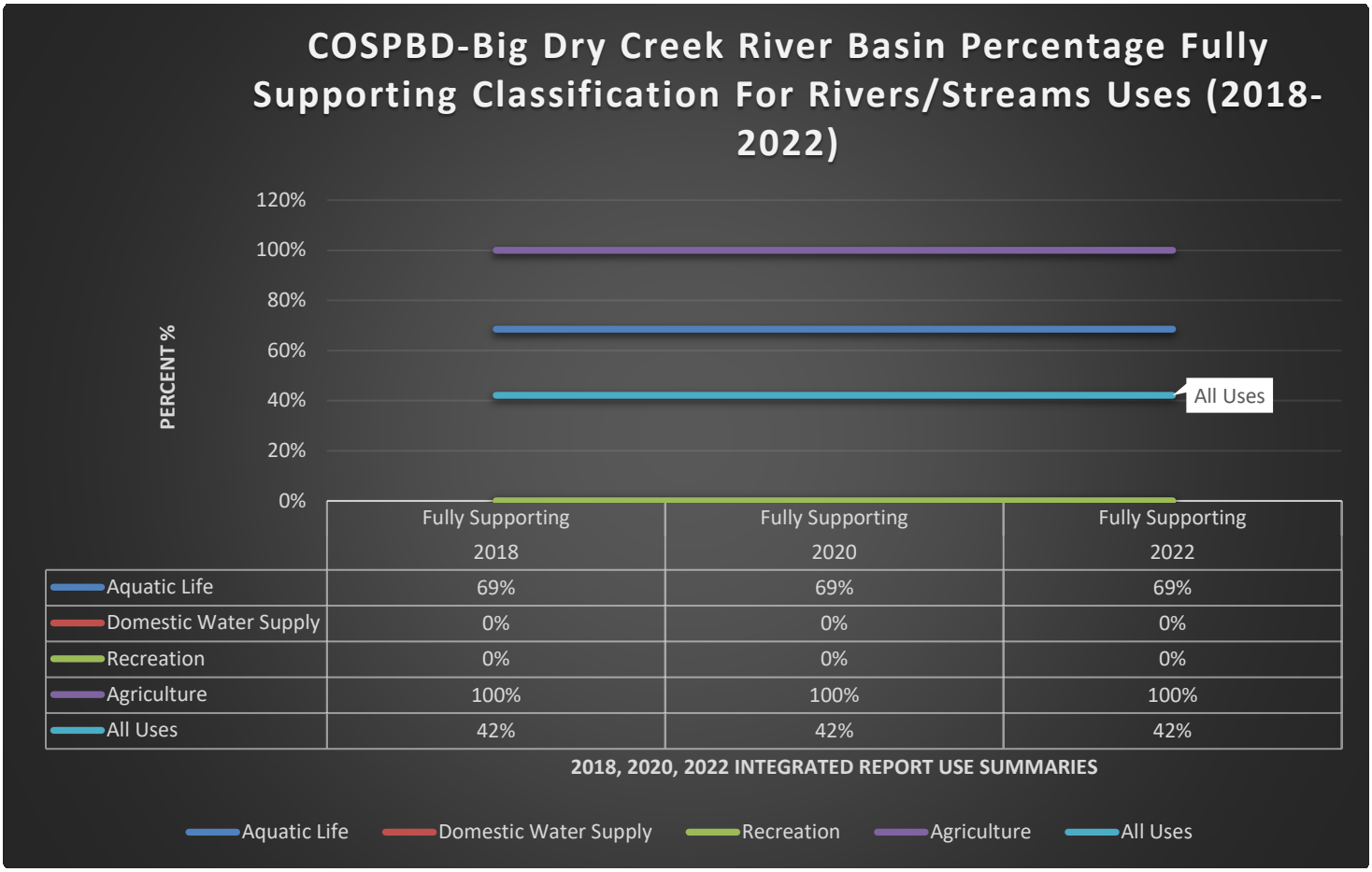


Figure 5-57 Big Dry Creek River Basin - Rivers & Streams Designated Use Classifications, Fully Supporting, 2018-2022

The Big Dry Creek River Basin number of river and stream miles achieving use attainment standards are maintained as illustrated in Figure 5-57, 2018-42%, 2020-42%, and 2022-42% within Region 2 only. The percentages represent the total number of miles assigned a designated use divided by the number of miles fully supporting the designated use.

Figure 5-58 illustrates the Big Dry Creek River basin rivers and streams category results for the designated uses for 2022 within Region 2 only. The percentages are based on the actual number of miles of rivers and streams in the river basin divided by the total number of miles for the category assessed. To further understand the category percentage results of Figure 5-58, Figure 5-59 illustrates how many segments and miles were assessed for each category resulting percentage in the Big Dry Creek River basin within Region 2 only.

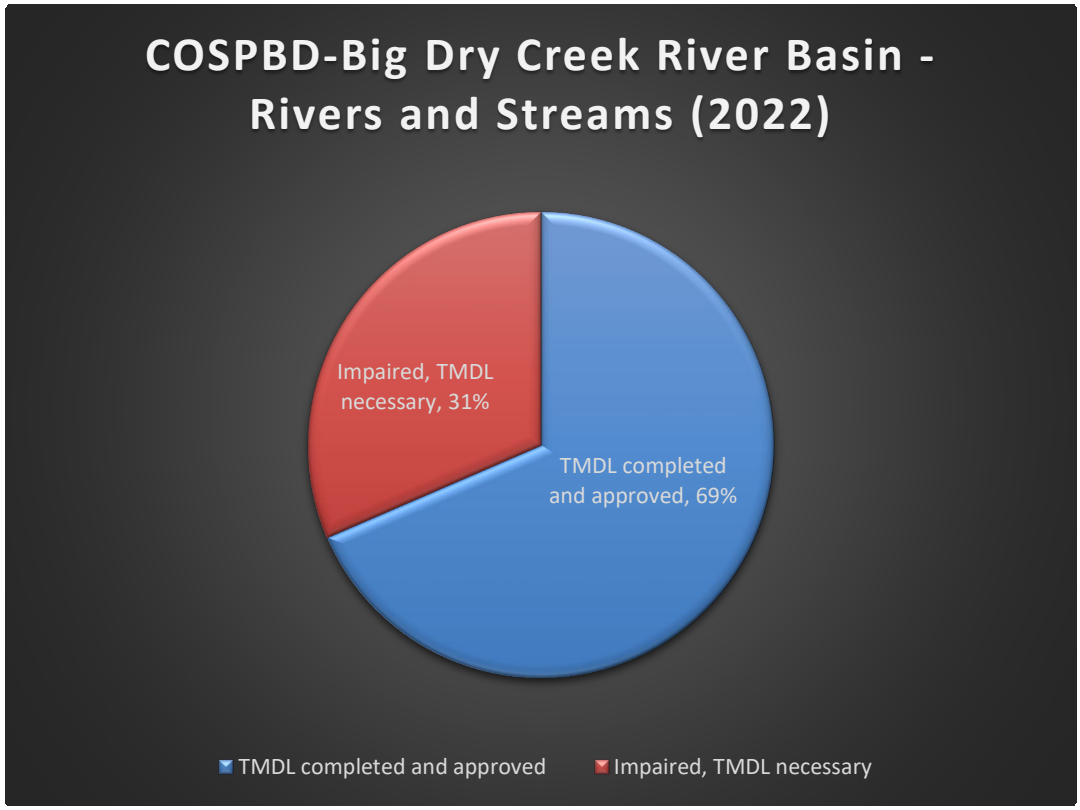


Figure 5-58 Big Dry Creek River Basin - Rivers & Streams Category Percentages, 2022

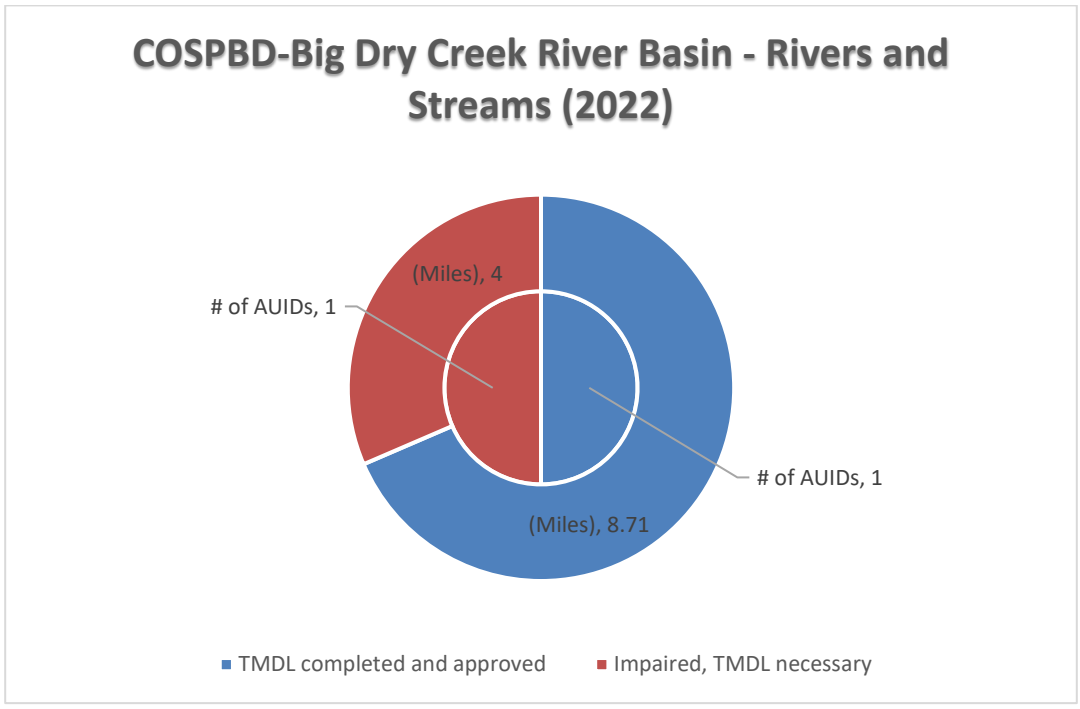


Figure 5-59 Big Dry Creek River Basin - Rivers & Streams Units & Miles Assessed

Since there was only one waterbody for the Big Dry Creek River basin within Region 2, Figure 5-60 illustrates that that water body has not been assessed. For consistency in the report, Figure 5-61 illustrates that the one waterbody assessed was 278 acres.

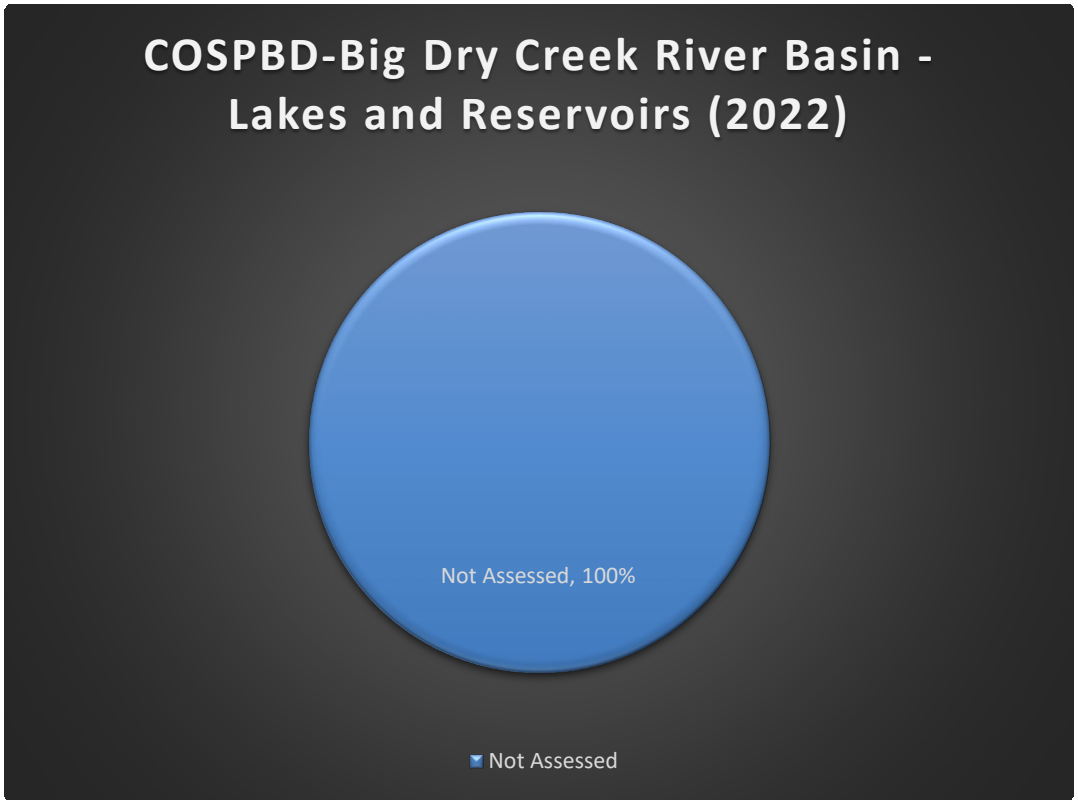


Figure 5-60 Big Dry Creek River Basin - Lakes & Reservoirs Category Percentages, 2022

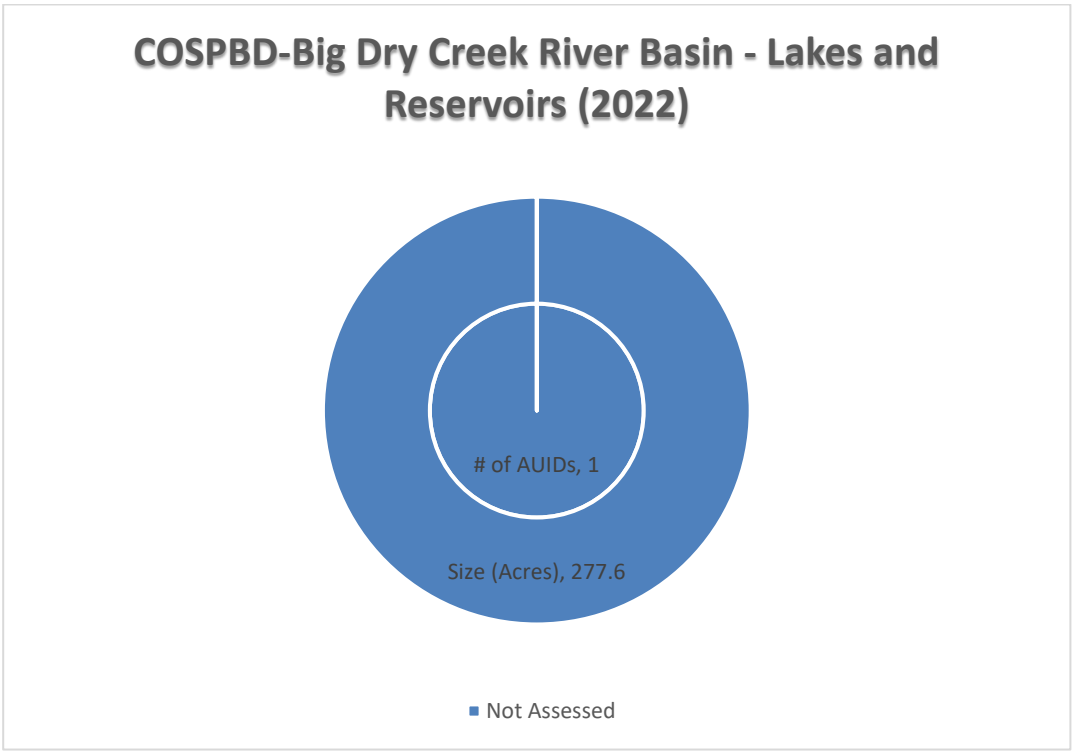
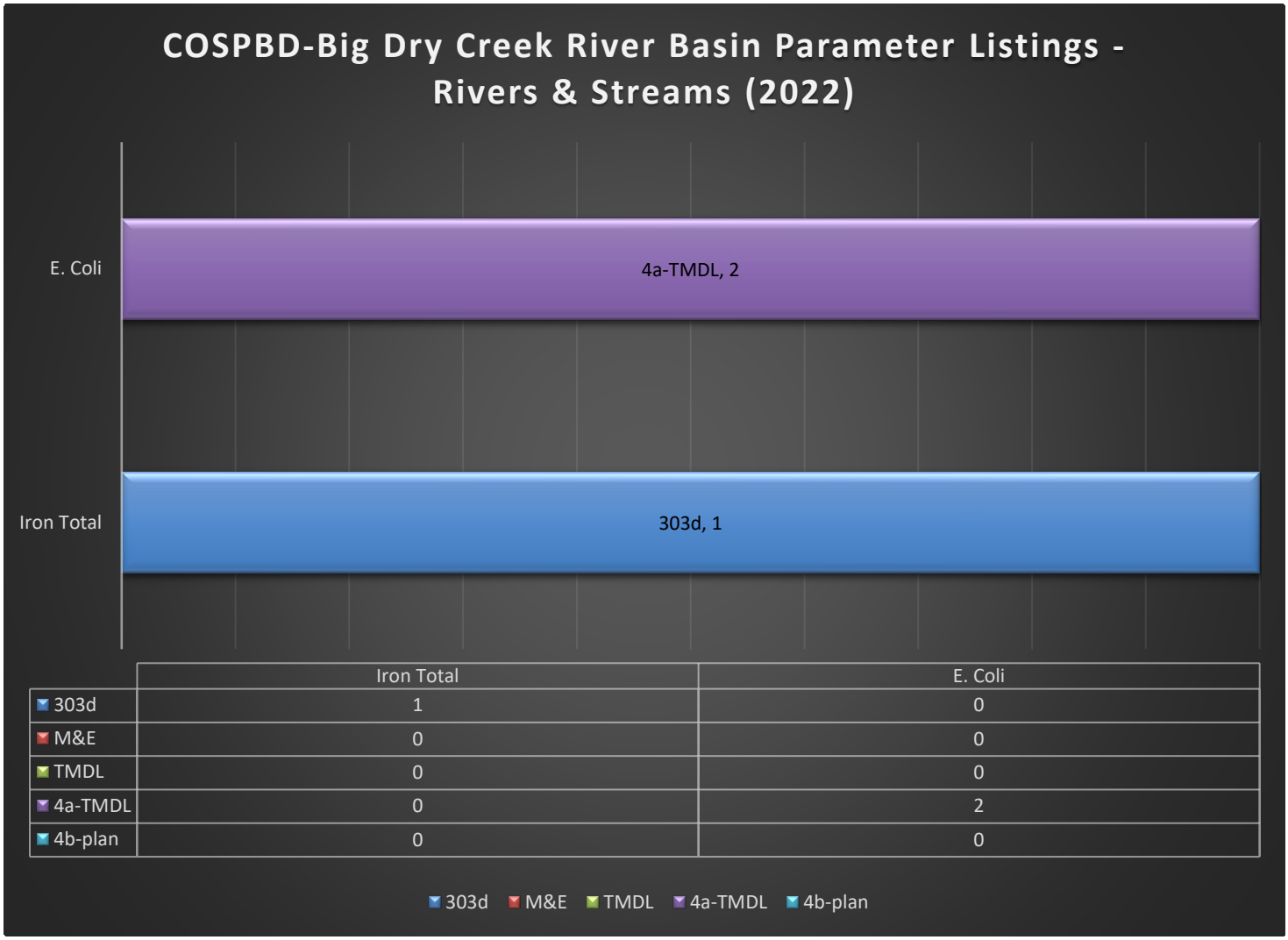


Figure 5-61 Big Dry Creek River Basin - Lakes & Reservoirs Units & Miles Assessed



	Iron Total	E. Coli
303d	1	0
M&E	0	0
TMDL	0	0
4a-TMDL	0	2
4b-plan	0	0

Figure 5-62 Big Dry Creek River Basin - Rivers & Streams Parameter Listings, 2022

The Division parameter river and stream segment listing to either the 303(d) list, the Monitoring and Evaluation (M&E) list, or a TMDL for the Big Dry Creek River basin rivers and streams within Region 2 only is illustrated in Figure 5-62 for 2022.

As illustrated before in Figure 5-60, the Big Dry Creek River basin single water body within Region 2 was not assessed, therefore there are no identified parameter listings within Regulation #93.

5.11 Regional Parameter Listing Summary

The most common causes of impairments in the 2022 listing cycle were compared to the 2018 and 2020 listing cycles of the Integrated Water Quality Monitoring & Assessment Report. The most common causes of impairments are arsenic, *E. coli*, dissolved selenium, and dissolved copper. Those common impairments are listed in Table 5-2 for 2018-2022. Parameter listings, parameter impairments, and segments, can change over time as the WQCD updates or modifies water quality standards within regulations by adding or removing parameters because of the triennial review process.

Table 5-3 Region 2 - Impairment Summary

Total Rivers & Streams, & Lakes & Reservoirs							
		2018		2020		2022	
NFRWQPA Impairments		Total	%	Total	%	Total	%
1	Arsenic Total	19	22%	25	24%	31	27%
2	Copper Dissolved	6	7%	8	8%	7	6%
3	Cadmium Dissolved	2	2%	3	3%	1	1%
4	Selenium Dissolved	5	6%	9	9%	9	8%
5	Lead Dissolved	3	3%	3	3%	1	1%
6	Silver Dissolved	0	0%	0	0%	2	2%
7	Iron Dissolved	0	0%	1	1%	2	2%
8	Iron Total	1	1%	2	2%	2	2%
9	Zinc Dissolved	0	0%	2	2%	2	2%
10	Ammonia	7	8%	2	2%	4	3%
11	Sulfate	2	2%	0	0%	1	1%
12	Fish (Mercury)	2	2%	2	2%	2	2%
13	Mercury Total	0	0%	8	8%	8	7%
14	Manganese Dissolved	4	5%	7	7%	6	5%
15	pH	5	6%	5	5%	5	4%
16	Temperature	3	3%	3	3%	4	3%
17	Dissolved Oxygen	3	3%	1	1%	2	2%
18	Macroinvertebrates	5	6%	4	4%	4	3%
19	Sediment	1	1%	1	1%	1	1%
20	Nitrate	1	1%	3	3%	3	3%
21	E. Coli	17	20%	16	15%	19	16%
	Total	**86**	100%	**105**	100%	116	100%

5.12 Regional Nutrients Estimates Results Summary

Colorado State University's Center for Comprehensive, optimal and Effective Abatement of Nutrients (CLEAN Center) dashboard can retrieve nutrient loading estimates for both point (WWTPs) and nonpoint sources given a defined region. The CLEAN dashboard was funded and constructed by CDPHE's WQCD to assess nutrient load estimates concerning Regulation No. 85. CLEAN can be accessed here: http://onewatersolutions.com/our-software/tools/nutrient-control/. By utilizing CLEAN, the Association can estimate each basin's nutrient loading and establish sustainable solutions for reductions of nutrient pollution for either point or nonpoint pollution sources. Nutrient load estimates are the results of large-scale calibrated modeling and can never mimic reality,

so they must be digested accordingly. Additionally, nutrient source allocation is based on nutrient load generated not delivered to watershed outlets so a complete assessment of fate and transport of nutrients should be considered before actions based on source amounts only. DMOAs are required within Utility Plans to assess their wastewater utility service area nutrients loading and inform their recommended nonpoint source BMPs. As a result, the Association anticipates a reduction of nutrient loading regionally over time. This section helps fulfill the Association's requirements according to the CWA Section 208 to assess regional water quality issues related to nonpoint and point sources due to urban and nonurban developments.

Nutrient contribution is aggregated per sector by source 'type' (stormwater, wastewater, agriculture, background) and not by management type (permitted/unpermitted/non-point source). Within these sector-based aggregations are individual summaries of the contributing 'areas' within that type. In the case of background loading, these values are generated from USGS SPARROW estimates for runoff from forested and rangeland areas as well as groundwater contributions from the South Platte MODFLOW model (flow rate) combined with regional well observations of nitrate values (concentration) and aggregated per stream segment (flow * concentration = load per year). In the case of wastewater, the combined values are from the individual Reg. 85 permitted discharge monitoring data (there are more WWTF than just the ones included in Colorado's Reg. 85 but minimal observation data is available in databases like EPA's Water Quality Portal (WQP) for summary use). Agricultural data was modeled per field and aggregated based on irrigation and tillage type (the two primary management adjustments of a field with observed crop rotations from 2008-2018, note CSU is working on updating this for 2020). This aggregation illustrates differences in management actions (which are ultimately assumed, not known) while also not singling out single fields as trouble spots which can be contentious. Aggregation for stormwater is based on calculating urban area runoff (based on NLCD land-use type = urban/developed) and is clipped to the area assessed. These individual stormwater values (per grid cell in NLCD) are then aggregated based on where they reside. They are first aggregated to urban MS4 boundaries representing Colorado permitted MS4 systems. These represent a single pie wedge in the summary chart of 'permitted' stormwater. They are then additionally aggregated for city boundaries to represent political jurisdictions in which the stormwater originates that may fall outside of a permitted MS4 boundary. These are represented as a pie wedge per city boundary. The remaining stormwater from NLCD developed/urban areas outside of a city (politics) or urban area (MS4) are aggregated as 'other'. This typically includes sections of road or highway that have high imperviousness to be recognized as 'developed' on satellite imagery but do not belong to an urban area/city.

Urban MS4 Boundaries

The urban MS4 boundaries that CLEAN uses are from the U.S. Census Bureau describing MS4 areas. Most of the boundaries are summarized in pdf maps in an FTP site link halfway down the page "Census 2010 Urban Area Reference Maps": https://www2.census.gov/geo/maps/dc10map/UAUC_RefMap/ua/. These pdfs are based on original data from the Census Bureau with a link at the bottom of the page "Census 2010 Urban Area website": https://www.census.gov/programs-surveys/geography.html A raw shapefile of these boundaries is available through a link in the middle of the page "Cartographic Boundary Files - Shapefiles": https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.html The urban area shapefile (that CLEAN uses) is available at the bottom of the page in a link "db_2018_us_ua10_500k.zip": https://www2.census.gov/geo/tiger/GENZ2018/shp/cb_2018_us_ua10_500k.zip.

Stormwater estimates do not include permitted nonpoint agricultural sources permitted as CAFOs but do include other non-regulated, nonpoint sources of pollution as discussed above. The CLEAN database was also constructed to assess nutrients within the parameters of Regulation No. 85, therefore DMOAs or discharge permits <1 MGD are not included. The ultimate future 208 Planning goal would be to theoretically track and evaluate trends in the region's nutrient loading over time.

The CLEAN user guide defines background to include atmospheric deposition, groundwater, and forest-rangeland contributions. Users of the eRAMS CLEAN database may further investigate the CLEAN estimates by clicking on any pie wedge to reveal the main source types permitted/unpermitted/point/non-point sub-sources. CLEAN at the highest assessment level combines point and nonpoint sources to estimate nutrients into a single characterization to estimate all urban contributions, including stormwater runoff (MS4 permitted or not) and

wastewater treatment plant contributions. Users may then select CLEAN's subcategories (Ag/Stormwater/WWTF/Background) that will highlight the source contributors, which may be defined and categorized as permitted/unpermitted/non-point sources. Understanding and as explained above, CLEAN, is based on calculating ***ALL*** urban area contributions (permitted, unpermitted, and other nonpoint sources), clipped to the area assessed, including city boundaries to represent political jurisdictions in which stormwater originates (represented as a pie wedge per city boundary-nonpoint sources) including those municipalities that are permitted MS4 systems represented as single pie wedge in the summary chart of 'permitted' stormwater point sources. The remaining urban contributions are aggregated as “other” or “background.”

In Figure 5-63, CLEAN estimates a regional nutrient loading of 5,909,220 lbs./yr. Nitrogen and 919,117 lbs./yr. Phosphorus between Agriculture (tillage practices), Stormwater (MS4s and nonurban areas), Wastewater facilities > 1MGD, and various backgrounds for Region 2.

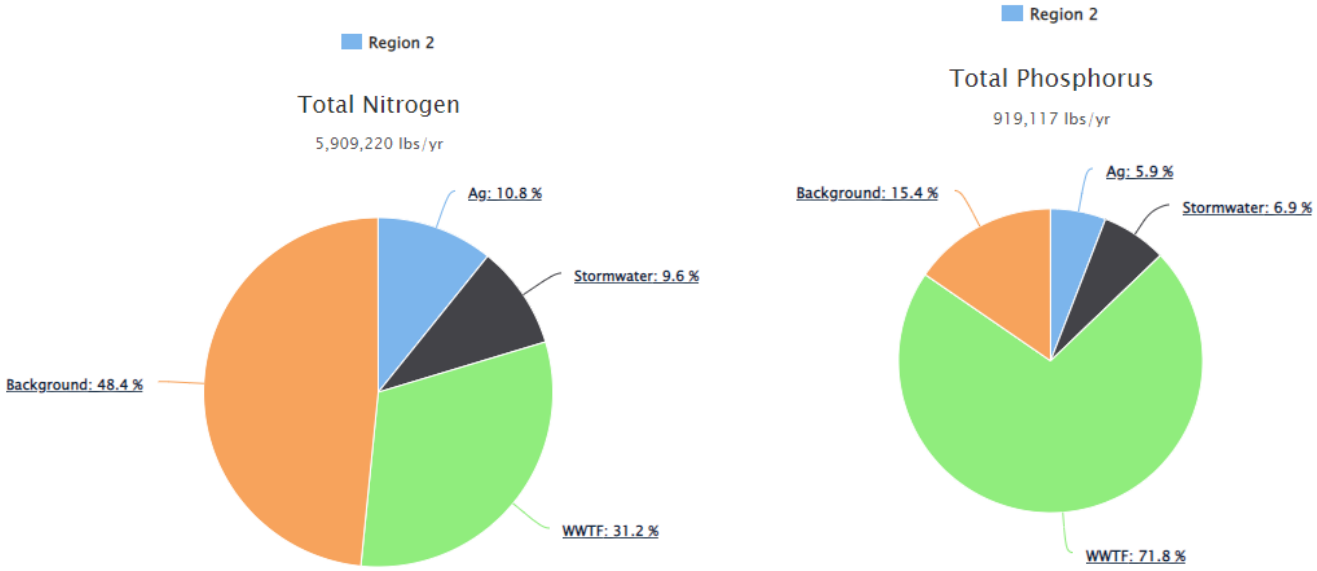


Figure 5-63 Region 2 - Total Nitrogen & Phosphorus

5.13 Cache la Poudre River Basin Nutrients Estimate

The Cache la Poudre River basin nutrients estimate illustrates that permitted WWTFs point sources are the main contributors for Nitrogen and Phosphorus loadings in the river basin, as shown in Figure 5-64.

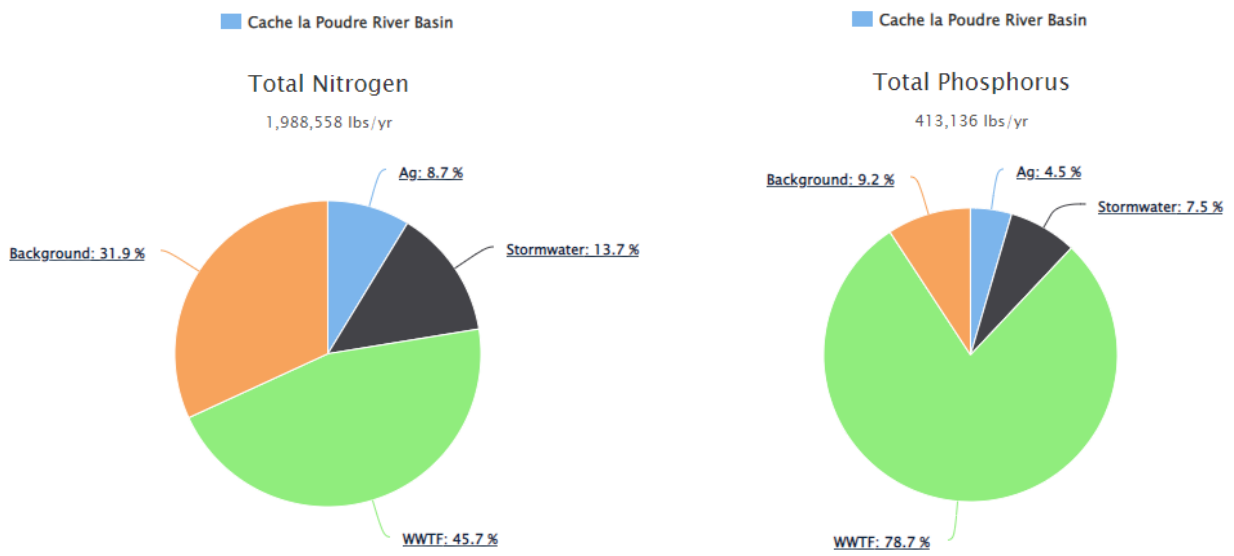


Figure 5-64 Cache la Poudre - Total Nitrogen & Phosphorus

The main Total Nitrogen WWTF permitted point source contributors in the Cache la Poudre River basin, as shown in Figure 5-65 are the City of Greeley at 34.8% or 316,466 lbs./yr. and City of Fort Collins-Drake Facility at 42.8% or 389,217 lbs./yr.

The main Total Phosphorus WWTF permitted point source contributors in the Cache la Poudre River basin as shown in Figure 5-66 is the City of Greeley at 30.6% or 99,510 lbs./yr. and Leprino Foods at 35.1% or 114,144 lbs./yr.

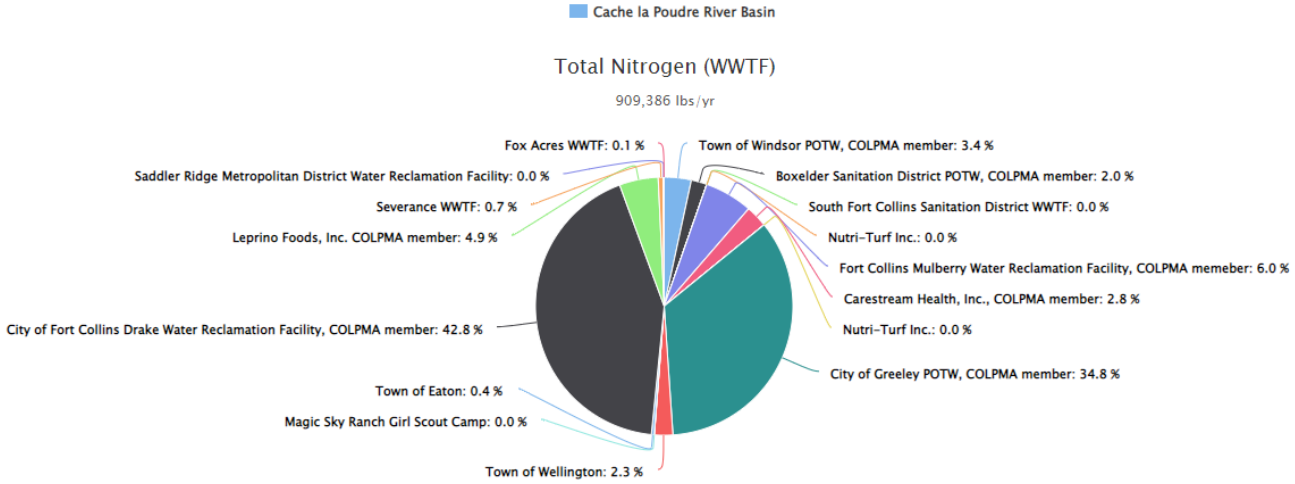


Figure 5-65 Cache la Poudre – Total Nitrogen (WWTF)

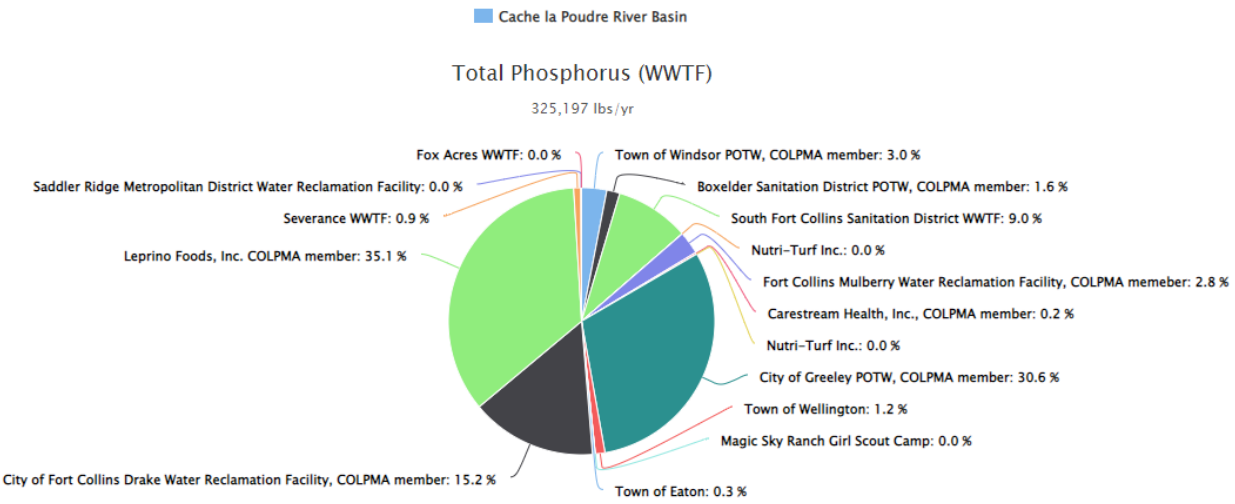


Figure 5-66 Cache la Poudre – Total Phosphorus (WWTF)

CLEAN's urban area runoff estimate shows that 74.1% of the Nitrogen load in the Cache la Poudre basin is from permitted point source MS4s, 17.6% from other contributions, and 8.3% of the Nitrogen load from unpermitted MS4 municipal sources, as shown in Figure 5-67. Related to Phosphorus, CLEAN's urban area runoff estimate shows that 75.6% of the Phosphorus load in the Cache la Poudre basin is from permitted point source MS4s, 16.5% from other contributions, and 7.9% of the Phosphorus load from unpermitted MS4 municipal sources, as shown in Figure 5-68.

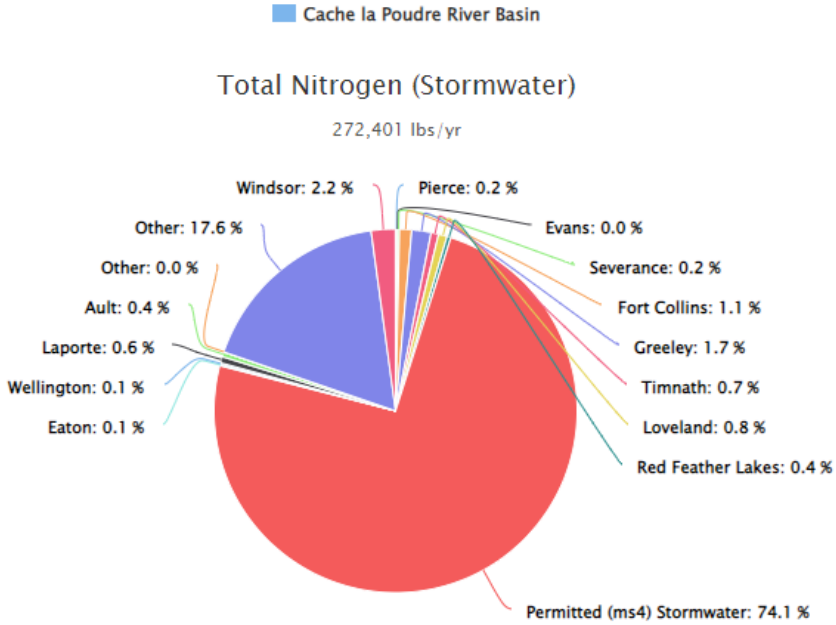


Figure 5-67 Cache la Poudre - Total Nitrogen (Stormwater)

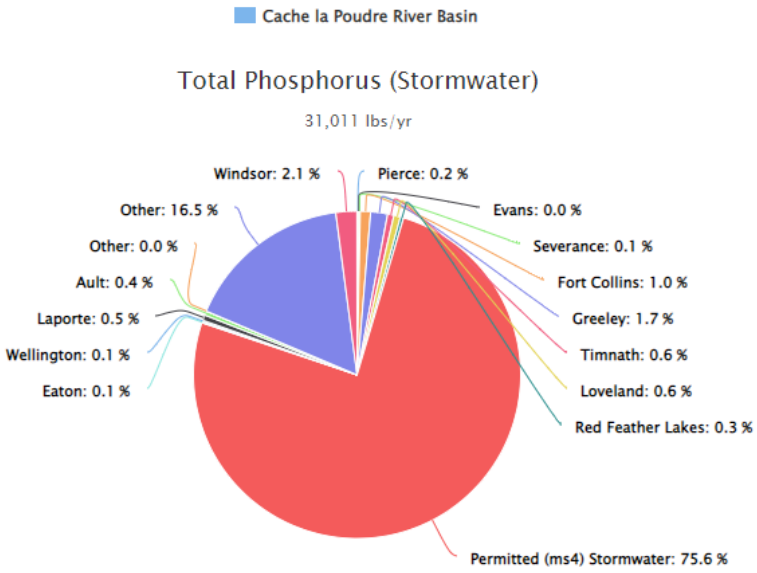


Figure 5-68 Cache la Poudre - Total Phosphorus (Stormwater)

5.14 Middle South Platte River Basin Nutrients Estimate

The Middle South Platte River basin nutrients estimate illustrates that WWTFs are the main contributors for Nitrogen and Phosphorus loadings in the river basin as shown in Figure 5-69. Metro Water Recovery is not included in the analysis of the Middle South Platte as its effluent outfall is in Adams County.

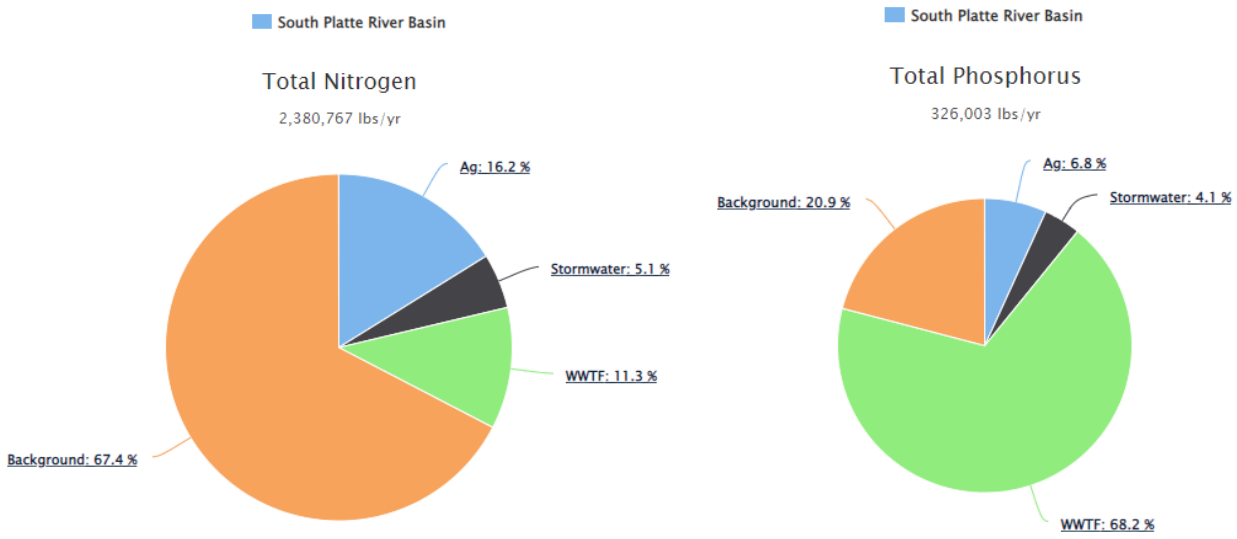


Figure 5-69 Middle South Platte River Basin – Total Nitrogen & Phosphorus

The main Total Nitrogen WWTF permitted point source contributor in the Middle South Platte River basin, as shown in Figure 5-70 is the JBS Lone Tree Facility at 72.5% or 195,496 lbs./yr.

The main Total Phosphorus WWTFs permitted point source contributor in the Middle South Platte River basin, as shown in Figure 5-71 is the JBS Lone Tree Facility at 90.6% or 201,484 lbs./yr.

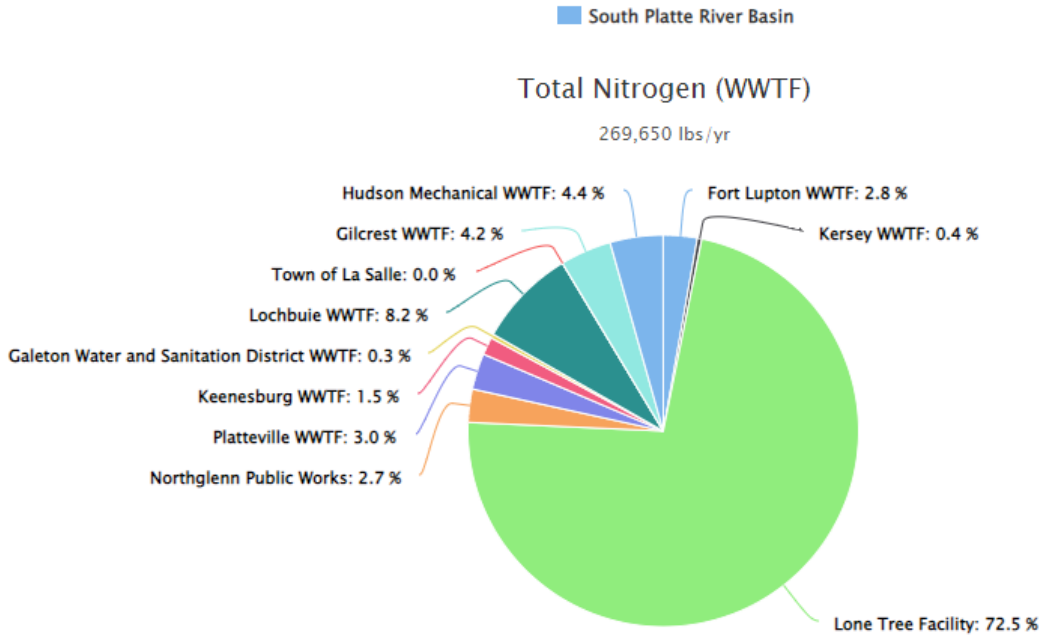


Figure 5-70 Middle South Platte River Basin - Total Nitrogen (WWTFs)

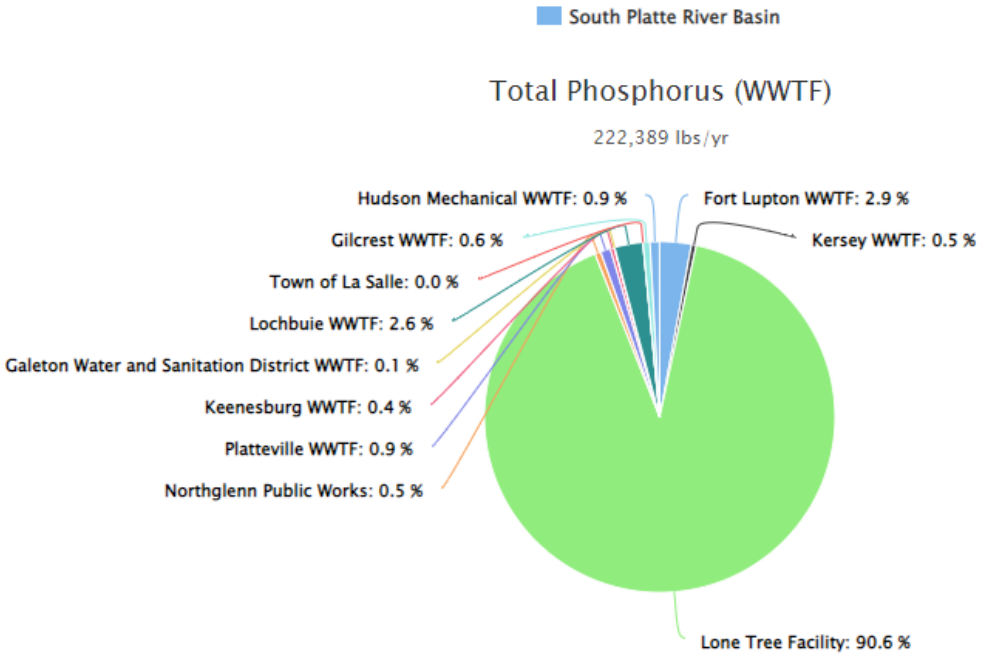


Figure 5-71 Middle South Platte River Basin - Total Phosphorus (WWTFs)

CLEAN's urban area runoff estimate shows that 63.2% of the Nitrogen load in the Middle South Platte basin is from other contributions, 26.2% from permitted point source MS4s, and 10.6% of the Nitrogen load from unpermitted MS4 municipal sources, as shown in Figure 5-72. CLEAN's Phosphorus urban area runoff estimate shows that 60.6% of the Phosphorus load in the Middle South Platte basin is from other contributions, 28.5% from permitted point source MS4s, and 10.9% of the Phosphorus load from unpermitted MS4 municipal sources, as shown in Figure 5-72 .

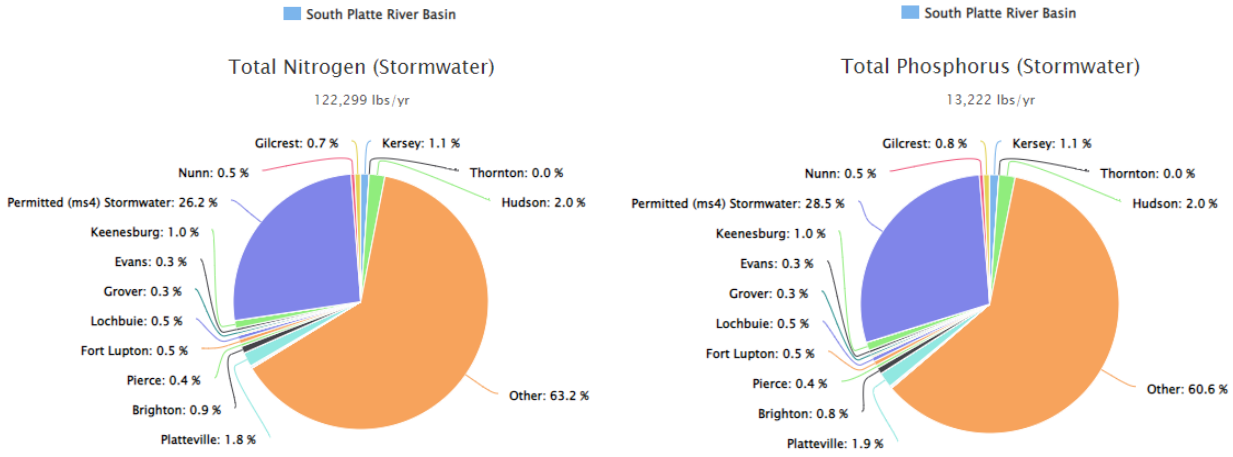


Figure 5-72 Middle South Platte River Basin - Total Nitrogen & Phosphorus (Stormwater)

5.14 Big & Little Thompson River Basin Nutrients Assessment

The Big and Little Thompson River basin nutrients assessment illustrates that permitted point source WWTFs are the main contributors for nitrogen and phosphorus loadings in the Big and Little Thompson River basin as shown in Figure 5-73.

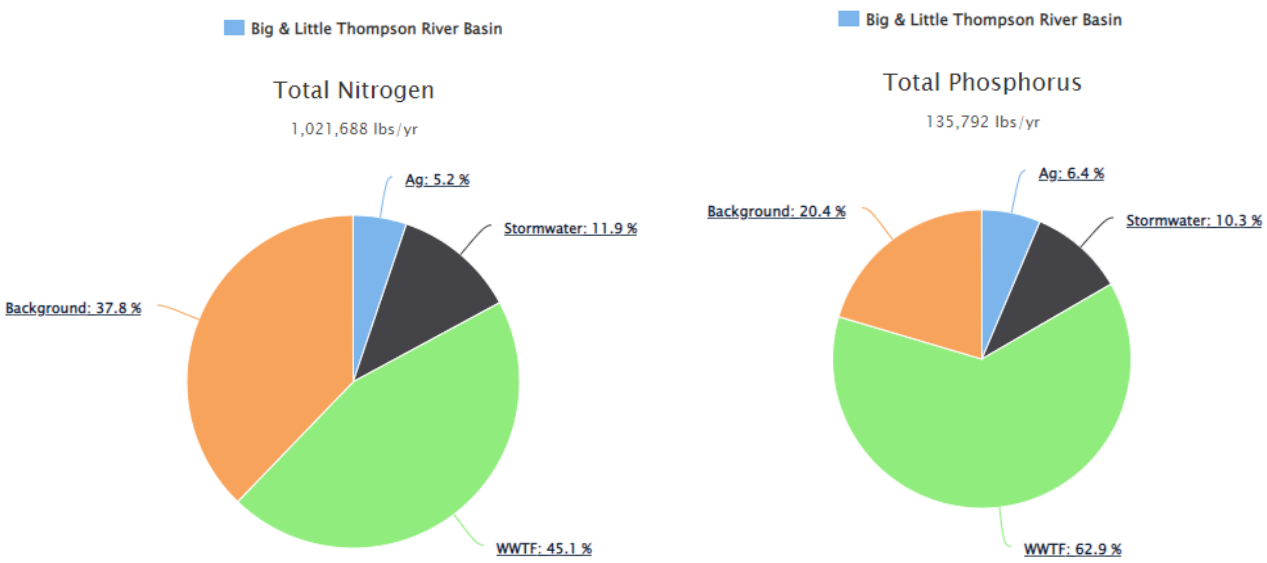


Figure 5-73 Big & Little Thompson River Basin - Total Nitrogen & Phosphorus

The main Total Nitrogen WWTF permitted point source contributor in the Big and Little Thompson River basin, as shown in Figure 5-74 is the City of Loveland at 80.5% or 370,861 lbs./yr. The City of Loveland just started a new plant in 2019, so these numbers should decrease dramatically due to the upgraded BNR treatment process. As of 2021, the City of Loveland has supporting evidence that the upgraded BNR treatment process has reduced total nitrogen by 16%, Figure 5-75.

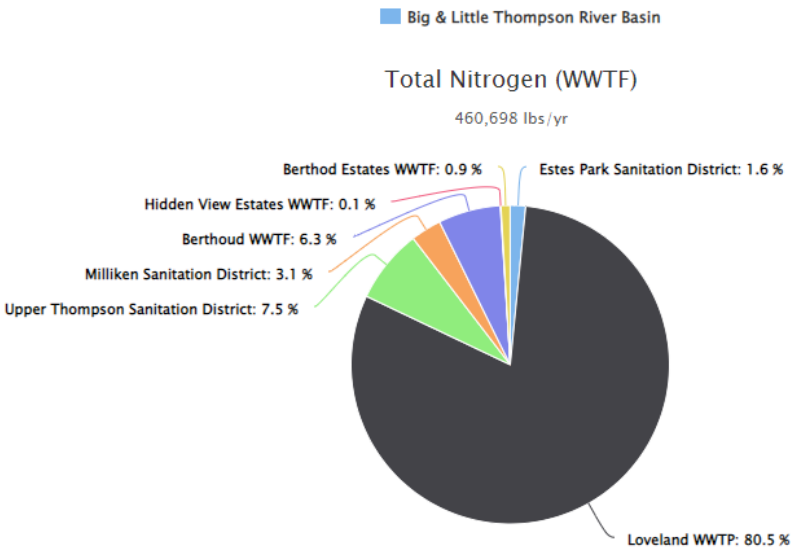


Figure 5-74 Big & Little Thompson River Basin - Total Nitrogen (WWTFs)

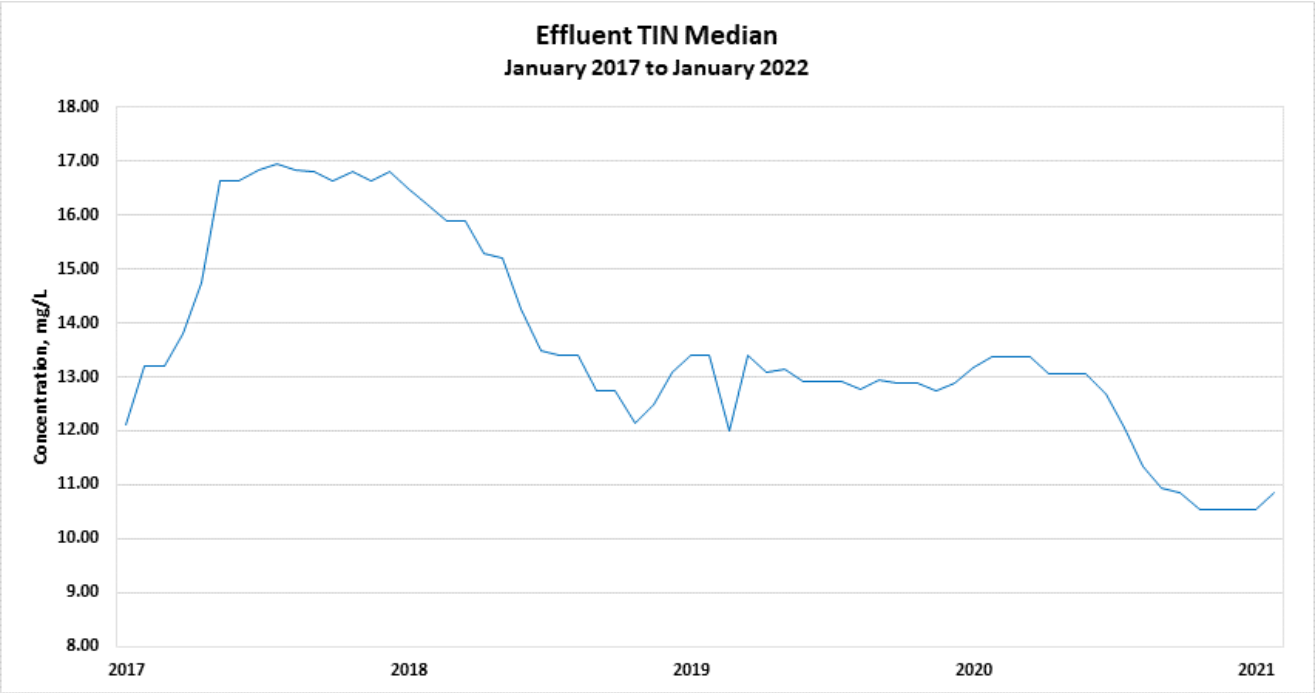


Figure 5-75 City of Loveland TIN Reduction-16%

The main Total Phosphorus WWTF permitted point source contributor in the Big and Little Thompson River basin as shown in Figure 5-76 is the City of Loveland at 78.8% or 67,357 lbs./yr. The City of Loveland just started a new plant in 2019 so these numbers should decrease dramatically due to the upgraded BNR treatment process. As of 2021, the City of Loveland has supporting evidence that the upgraded BNR treatment process has reduced total phosphorus by 93%, Figure 5-77. The City of Loveland's efforts to reduce their nutrient load on the Big Thompson River Basin are an excellent example of the Utility Planning process, and a 208 AWQMP endorsed project that restored water quality.

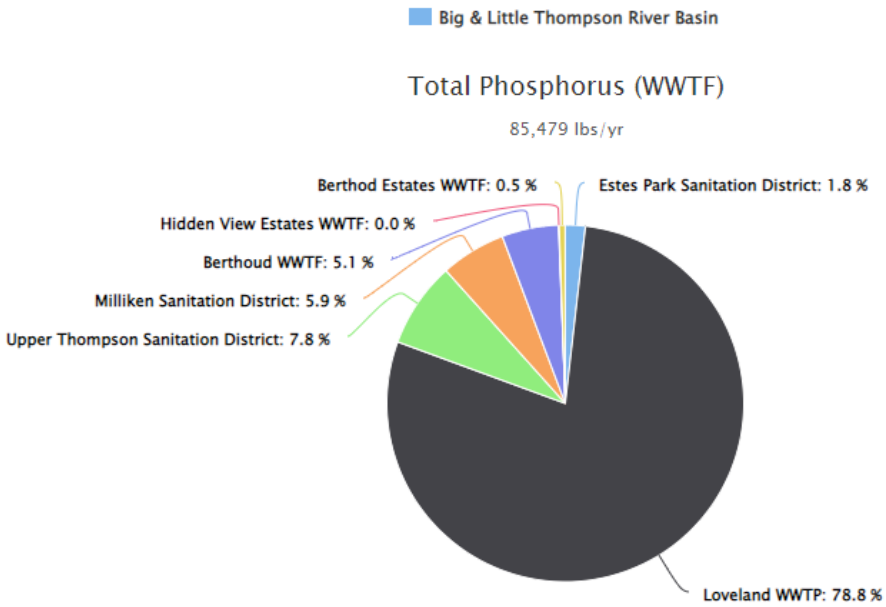


Figure 5-76 Big & Little Thompson River Basin - Total Phosphorus (WWTF)

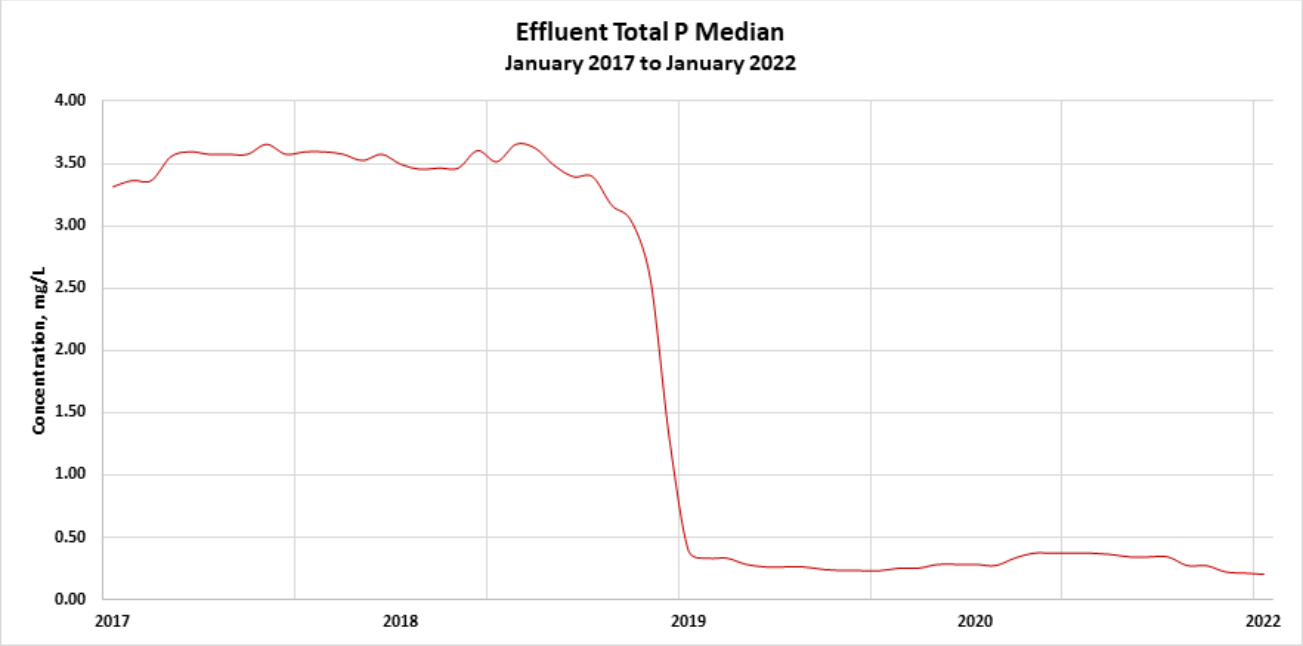


Figure 5-77 City of Loveland Total P Reduction-93%

CLEAN's urban area runoff estimate shows that 68.8% of the Nitrogen load in the Big and Little Thompson basin is from permitted point source MS4s, and 31.2% of the Nitrogen load from unpermitted MS4 municipal sources, as shown in Figure 5-78. CLEAN's Phosphorus urban area runoff estimate shows that 70.3% of the Phosphorus load in the Big and Little Thompson basin is from permitted point source MS4s, and 29.7% of the Phosphorus load from unpermitted MS4 municipal sources, as shown in Figure 5-79.

As for 0% "other" stormwater areas, the other locations that contribute to stormwater are any areas in the watershed outside MS4 or municipal boundaries. For any area, outside MS4 and urban areas, if the NLCD land use has 'urban' land use categories (i.e., highway and other 'developed' areas), those get lumped into the other category. If the land use does not have an NLCD 'developed' category, CLEAN ignores it during calculations and adds it to either agriculture or background (rangeland, forest, etc.). Thus, since there are no other developed/urban areas outside of an MS4 or a city boundary within the Big and Little Thompson basin, CLEAN's urban runoff estimate did not include any aggregated category as "other," and the result is 0%. This can happen in two different ways, 1) if there are no non-MS4/non-urban areas in your watershed or selected area of interest (this is common near Denver) or 2) if there are no (or minimal) stormwater NLCD areas resulting in minimal stormwater compared to the urban areas so that when it gets added to the pie chart, it is something like 0.03% of the total.

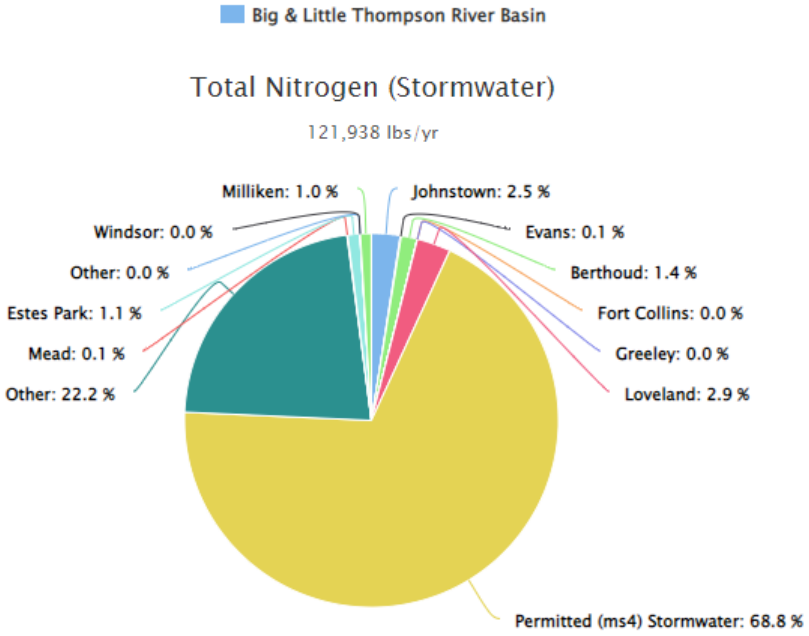


Figure 5-78 Big & Little Thompson River Basin - Total Nitrogen (Stormwater)

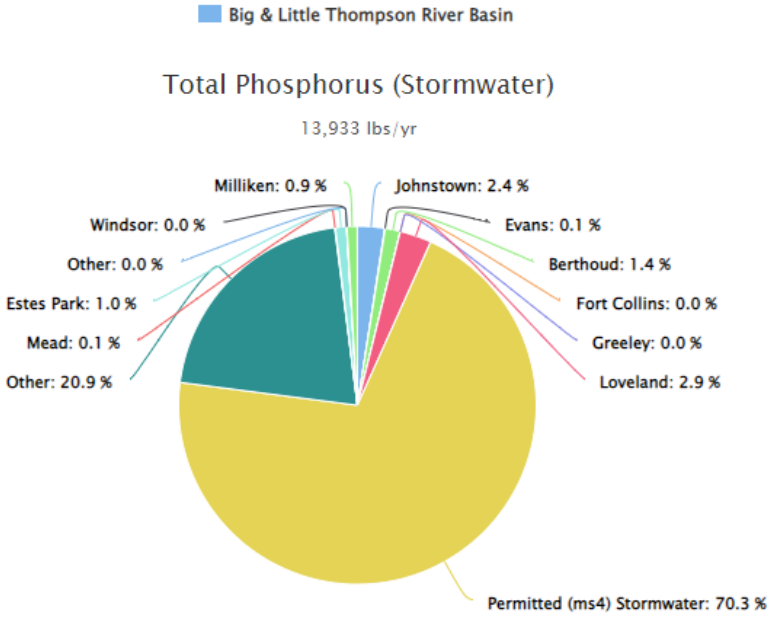


Figure 5-79 Big & Little Thompson River Basin - Total Phosphorus (Stormwater)

5.15 Saint Vrain Creek River Basin Nutrients Assessment

The Saint Vrain Creek River basin nutrients assessment illustrates background sources account as the main contributor for nitrogen, and permitted WWTFs account as the main point source contributors for phosphorus loadings in the river basin as shown in Figure 5-80.

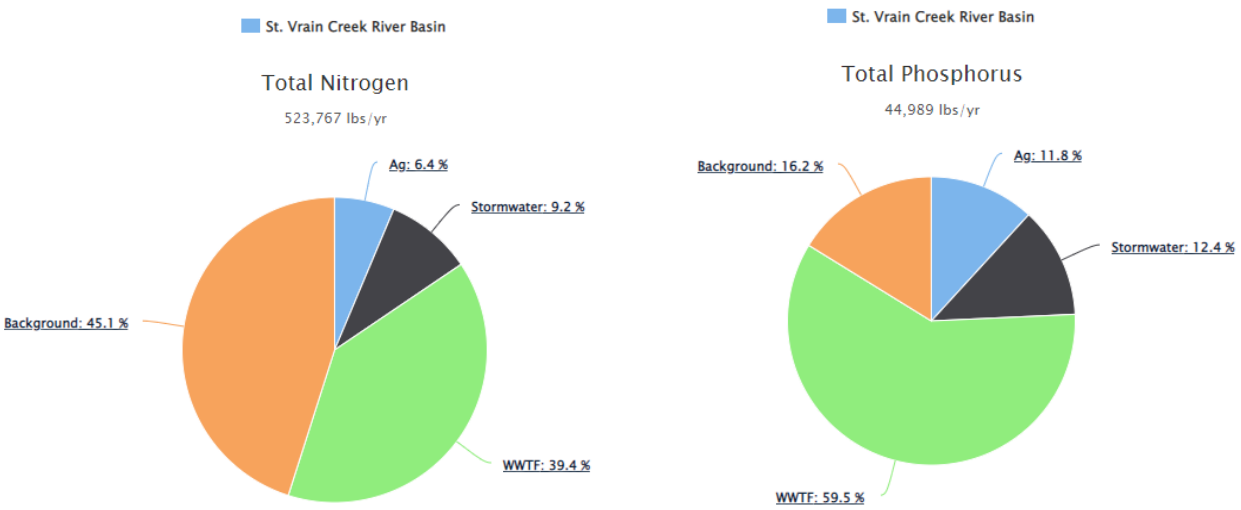


Figure 5-80 St. Vrain Creek River Basin - Total Nitrogen & Phosphorus

The main Total Nitrogen WWTF permitted point source contributor in the St. Vrain Creek River basin, as shown in Figure 5-81 is the St. Vrain Sanitation District at 73.0% or 149,734 lbs./yr. and the City of Erie's North Reclamation facility at 26.8% or 55,274 lbs./yr. The main Total Phosphorus WWTF permitted point source contributor in the St. Vrain Creek River basin, as shown in Figure 5-82 is the St. Vrain Sanitation District at 95.1% or 25,466 lbs./yr. and the City of Erie's North Reclamation facility at 2.0% or 536 lbs./yr. Noting both the St. Vrain Sanitation District and the City of Erie have recently updated their Utility Plan with endorsed Association 208 projects to install enhanced treatment for nutrients.

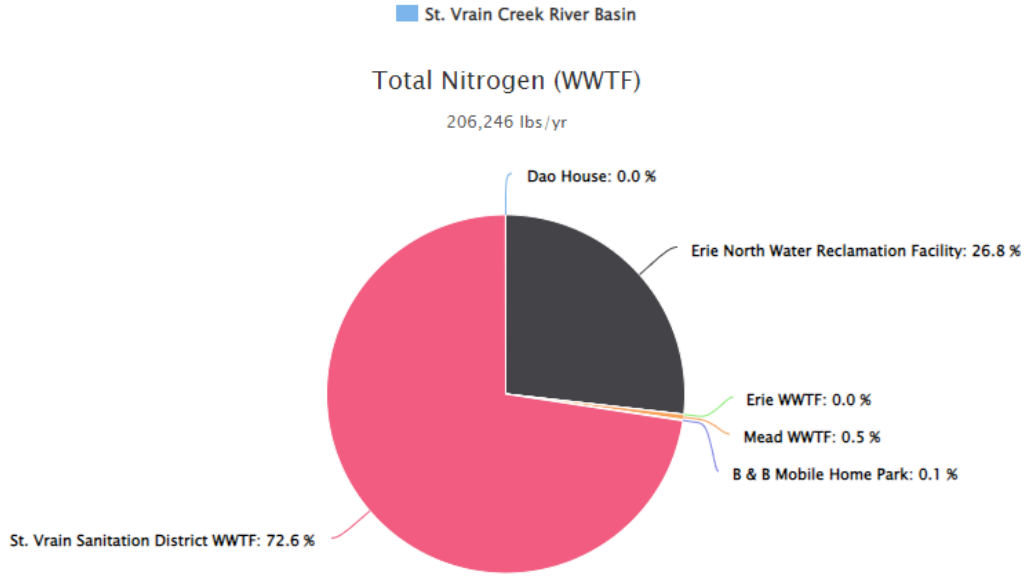


Figure 5-81 St. Vrain Creek River Basin - Total Nitrogen (WWTFs)

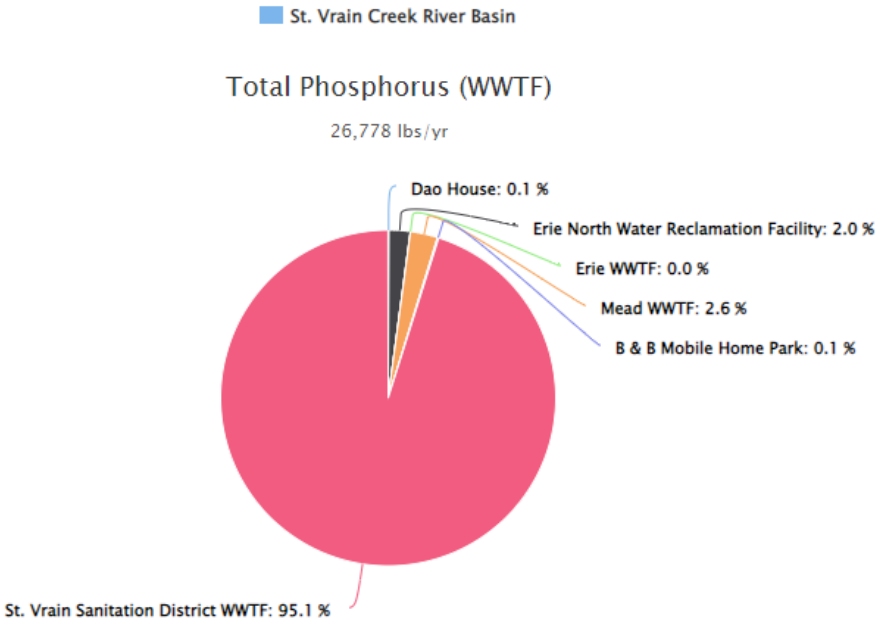


Figure 5-82 St. Vrain Creek River Basin - Total Phosphorus (WWTFs)

CLEAN's urban area runoff estimate shows that 51.6% of the Nitrogen load in the St. Vrain Creek basin is from unpermitted MS4 municipal sources, and 48.6% from permitted point source MS4s, as shown in Figure 5-83. CLEAN's Phosphorus urban area runoff estimate shows that 52.1% of the Phosphorus load in the St. Vrain Creek basin is from permitted point source MS4s, and 47.9% of the Phosphorus load from unpermitted MS4 municipal sources, as shown in Figure 5-84.

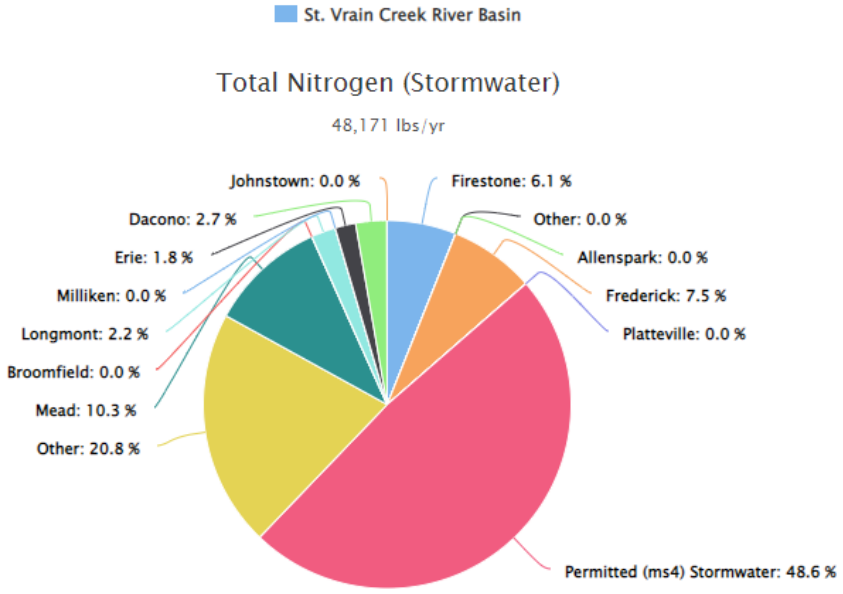


Figure 5-83 St. Vrain Creek River Basin - Total Nitrogen (Stormwater)

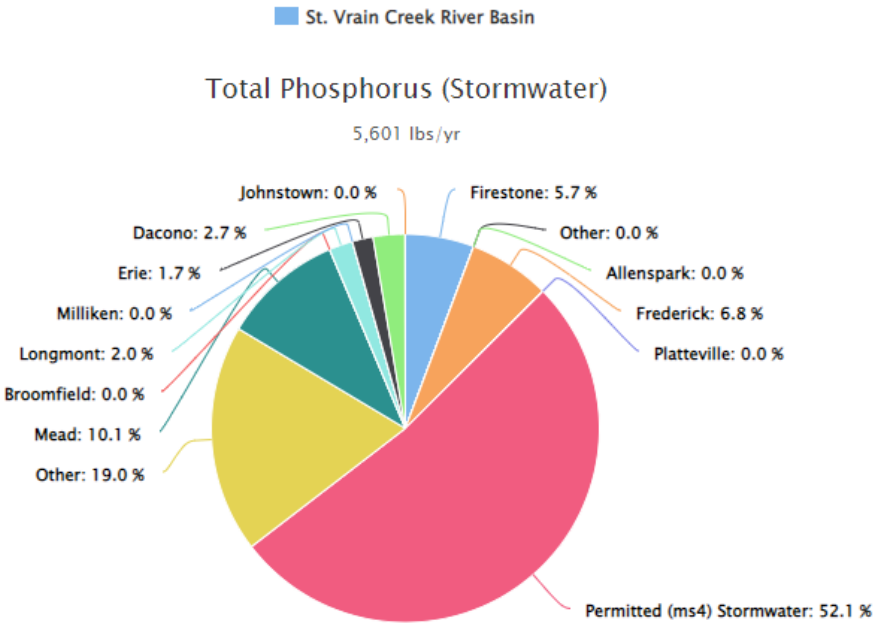


Figure 5-84 St. Vrain Creek River Basin - Total Phosphorus (Stormwater)

5.16 Nutrients Assessment Summary

Significant WWTFs identified above have approved Utility Plans with Capital Improvement Projects identified to mitigate nutrients as required by Regulation No. 85 and eventually Regulation No. 31. These planned capital improvement projects proposed and approved within DMOAs' Utility Plans become endorsed projects of the Association's 208 AWQMP. Further action by the Association needs to include investigating and identifying critical watersheds in Region 2 using the Non-Point Source Priority Dashboard and Community-enabled Life-cycle Analysis of Stormwater Infrastructure Costs (CLASSIC) GIS systems to then choose BMPs associated with the nonpoint source pollution categories to target water quality improvements. Given that permitted MS4 stormwater dischargers are under the jurisdiction of the WQCD, the Association will address the signification contributions from unpermitted nonpoint sources within its EPA 9 Element Watershed Plan being developed from (2022-2025).

Stormwater runoff from urbanized areas covered under municipal separate storm sewer system permits (stormwater runoff in larger cities in Colorado is regulated through discharge permits) and runoff from unpermitted nonpoint source pollution impacts water quality in the region. Treatment of runoff at the end of drainage pipes, channels or at other points of entry to waterways can be extremely difficult, expensive and is not cost effective. Therefore, the preferred approach is locally based implementation programs based on common-sense practices called "control measures" or "best management practices" to improve the quality of runoff. Other nonpoint sources, include abandoned mine lands, agricultural return flows and water quality changed by diversions or impoundments called hydro-modification. Local control (e.g., zoning regulations, subdivision ordinances, building permits, development code) and implementation of *best management practices* (BMP), is the most effective, least expensive way to prevent runoff pollution problems.

The Association will assess and develop prioritized actions and projects within its planned EPA 9 Element Watershed Plan that will be written between 2022 and 2025 to reduce nonpoint source nutrient loading in Region 2.

5.17 Watershed Rapid Assessment Program (WRAP)

The Watershed Rapid Assessment Program (WRAP) is a summary tool by CSU's One Water Solutions that extracts, organizes, and analyzes data and information at various watershed scales, including watersheds or other defined areas of interest. Utilizing the extracted data, the WRAP tool calculates a number of watershed health indicators to create an overall summary of the watershed condition including stream flow, water quality, segment information, and nonpoint source data. WRAP allows users to conduct a variety of analyses ranging from simple watershed summaries to more complex analyses such as planning in support of TMDL implementation. WRAP is now required to be included in all Utility Plans. The Association uses WRAP as a crosschecking tool to ensure DMOA Utility Plans include and assess all the waterbody segments within their service areas. The tool can be accessed here: http://onewatersolutions.com/our-software/tools/colorado/watershed-assessment/.

Chapter 6 SECTION 208 PLANNING REQUIREMENTS

The WQCD of CDPHE, under the authority of federal and Colorado statutes, administers state programs implementing two major federal statutes: The Clean Water Act and the Safe Drinking Water Act. The Federal Clean Water Act activities protect the quality of Colorado's ambient water bodies – its rivers, streams, lakes, reservoirs, and groundwaters. To assist agencies, the division created A Guide to Colorado Programs for Water Quality Management and Safe Drinking Water Policy 98-2 (Guide) to describe how these objectives are related. Still, separate statutes are implemented in Colorado. Also, the Guide is intended to help satisfy the requirements in Section 303(e) of the federal Clean Water Act—that Colorado is to maintain a water quality "continuing planning process." Section 208 of the federal Clean Water Act provides that the governor of a state must identify areas of the state that have substantial water quality problems as a result of urban or industrial concentration or other significant factors. Section 208 requires the preparation of "areawide waste treatment management plans," which are now more commonly referred to as "regional areawide water quality management plans." Specific plan components must be amended periodically for the plans to remain useful. Amendments to plans recommended by planning agencies must be made per the Federal Clean Water Act and the Colorado Water Quality Control Act. The regional water-quality management plan elements that need to be kept current through updates and amendments are as follows in Table 6-1. The table also includes the action the Association takes or intends to take to fulfill the requirement.

Table 6-1 WQCD Policy 98-2 Section 208 Planning Requirements

Regional Planning Elements That Need to Be Kept Current	Elements Updated
The identification of treatment works necessary to meet the anticipated municipal and industrial waste treatment needs of the area over a twenty-year period	1. Chapter 3 - River Basin Population & Loading Projections. 2. Management & Operation Agencies Data Inventory Sheets. 3. 208 AWQMP Endorsed Project Schedule.
Necessary wastewater collection and urban stormwater runoff systems	Utility Plans, & 208 AWQMP Endorsed Project Schedule.
Necessary financial arrangements	Utility Plans, & 208 AWQMP Endorsed Project Schedule.
Land acquisition needs, and recreational use considerations associated with these treatment works	Utility Plans, & 208 AWQMP Endorsed Project Schedule.
The establishment of construction priorities for such treatment works and time schedules for the initiation and completion of all treatment works	Utility Plans, 208 AWQMP Endorsed Project Schedule, & Management & Operation Agencies Data Inventory Sheets.
The identification of regulatory programs to manage waste treatment, including applicable pretreatment requirements and the location, modification, and construction of any facilities that may result in any discharge in an area	Utility Plans, & 208 AWQMP Endorsed Project Schedule.
The identification of those agencies necessary to construct, operate, and maintain all facilities required by the plan and otherwise to carry out the plan	1. Chapter 3 - River Basin Population & Loading Projections. 2. Management & Operation Agencies Data Inventory Sheets. 3. 208 AWQMP Endorsed Project Schedule.

The identification of the measures those agencies deem necessary to carry out the plan, the period of time necessary to carry out the plan, and the costs of carrying out the plan within such time;	1. Chapter 1 - DMOA Responsibilities & Duties. 2. Utility Plans, & 208 AWQMP Endorsed Project Schedule. document the measures and costs to protect, maintain, or restore water quality.
Processes to identify nonpoint source pollution (including from agricultural, silvicultural and unregulated mining activities), control the disposition of all residual waste generated in an area which could affect water quality and control the disposal of pollutants on land or in subsurface excavations within an area to protect ground and surface water quality.	1. Chapter 5 - eRAMS CLEAN database assessments for point & nonpoint source pollution, i.e., agricultural, stormwater, WWTF, permitted MS4s, etc. 2. The Association promotes & recommends updates to DMOA local comprehensive plans, nonpoint water quality control protection standards in municipal codes, WUSA development standards, & consolidation standards - Chapter 7.

Chapter 7 NFRWQPA 2022 - 208 AWQMP RECOMMENDATIONS OR ACTIONS

The Association organized its recommendations for the 2022-208 AWQMP into sections regarding general actions for DMOAs or the entire membership, specific actions for identified DMOAs, and actions for the Association itself. DMOAs will adopt, strengthen, and enforce land-use regulations designed to address water quality impacts of land use developments, including adopting and implementing local comprehensive plans, nonpoint water quality protection standards, WUSA development standards, and consolidation standards. The process is to draw upon existing and projected water quality assessments at the watershed level to identify priority point, nonpoint and stormwater quality problems. The 208 AWQMP recommends appropriate measures and solutions, including the system of treatment works or facilities, management agencies, financial, institutional measures and management strategies, necessary for the implementation of recommended solutions. Recommendations in the 208 AWQMP are consistent with the objectives and goals of the federal Clean Water Act, Colorado Water Quality Control Act and regional watershed programs. The objective of the federal Clean Water Act ...is to restore and maintain the chemical, physical and biological integrity of the nation's waters. Based on this federal objective and consistent with the State Water Quality Control Act, the goal for the region is to restore and maintain the chemical and physical integrity in order to assure a balanced ecological community in waters associated with the region. Stakeholders within the region have a wide variety of interpretations on the meaning of restoring and maintaining the chemical and physical integrity, and a balanced ecological community. As a result, meeting the regional goal to the satisfaction of all stakeholders (DMOAS) is probably not achievable by the planning horizon. However, the quality of the region's water bodies and surrounding land uses will be preserved and enhanced through the implementation of strategies recommended in this 208 AWQMP. Solving wastewater collection and treatment regional problems through watershed management will result in better long-term solutions, more cost-effective solutions, and involves all of the areas regional DMOAs.

- Adopt watershed protection regulations to protect the area located upstream of drinking water intake point(s) for municipal water supply pursuant to C.R.S. § 31-15-7070(1)(b), commonly referred to as watershed protection regulations.
- Within the Land Use Code of the County or Municipality Adopt watershed protection regulations found within this 208 Plan.
- Require compliance with this 208 Plan when issuing water and/or land development project permits.
- Construct a Nonpoint Source Watershed Plan for Region 2 and each watershed basin.

- Further investigate and evaluate the status of water quality within Region 2 related to the assessments within this 208 AWQMP.
- Assess all Monitoring and Evaluation (M&E) segments within Region 2.

7.1 208 AWQMP General DMOA Recommendations or Actions

The Association recommends the following general actions for DMOAs in the 2022 208 AWQMP.

1) DMOAs should update, amend, or include water quality protections within their local comprehensive plans or land use code – Section 7.3.
    i. Local comprehensive plans that promote regional 208 planning efforts that consider future population projections and urban growth considering optimizing sewer collection systems and treatment facilities examining consolidation to protect, maintain, or restore regional point and nonpoint source water quality.
2) DMOAs should update, amend, or adopt construction nonpoint water quality protections standards in their municipal code or land use code – Section 7.4.
    i. DMOAs that adopt construction nonpoint water quality protection standards will protect, maintain, and restore nonpoint source water pollution identified by CLEAN assessments related to MS4s.
    ii. Effective and balanced stormwater and nonpoint source management can best be achieved through local DMOA processes.
3) DMOAs should adopt WUSA development standards – Section 7.5.
    i. Adopting WUSA development standards would protect point source water quality by promoting the collaboration and coordination of sewer services in Region 2.
    ii. Effective, optimized, and affordable wastewater collection and treatment will be identified through a regional process, with local DMOA implementation and strategies.
4) DMOAs should adopt consolidation standards within their municipal code or land use code – Section 7.6.
    i. Adopting consolidation standards would protect point source water quality by promoting the collaboration and coordination of treatment facilities to examine economies of scale in Region 2.
5) It is a recommendation that DMOAs with established and approved WUSAs coordinate and collaborate with smaller minor systems inside their WUSAs and pursue opportunities and partnerships to optimize existing DMOA collection systems and regional treatment facilities. For example:

DMOA	Minor System
Wellington, City of	Harvest Farm, Denver Rescue Mission
Fort Collins, City of	Davies Mobile Home Park
Fort Lupton, City of	New Vision Mobile Home Park
Eire, City of	B and B Mobile Home Park
Loveland, City of	Best Western Coach House

6) DMOAs that do not update or adopt any of the above recommendations can provide a statement within their local comprehensive plans, municipal code, or land-use code concerning water quality protection standards, WUSA development standards, and consolidation standards all shall be consistent with the local 208 Areawide Water Quality Management Plan.

7.2 208 AWQMP Specific DMOA Recommendations or Actions

The Association recommends the following specific actions for DMOAs in the 2022 208 AWQMP. Consolidation of wastewater treatment facilities is encouraged, where appropriate. Wastewater utility planning can identify opportunities for facility consolidation. Often, larger wastewater treatment facilities can provide service more effectively while providing a higher degree of treatment than can be achieved through smaller treatment facilities. Consolidation of facilities can eliminate smaller treatment facilities which may not be financially capable of operating properly and may be exceeding their discharge permits. The decision for facility consolidation is determined in the utility planning process and is based on economies of scale, economics, cost effectiveness, maintenance, operations, effluent water quality, water quality impacts, physical constraints and water rights.

1) The Association recommends the Town of Johnstown and the Town of Milliken continue to examine the consolidation of their sewer collection systems and treatment facilities. Optimizing wastewater collection and treatment alternatives that are economically feasible based on cost and long-term user rate studies considering economies of scale and beneficial water quality. Including examining the assimilative capacity of the Little Thompson and Big Thompson Rivers regarding future water quality concerning population and loading projections.

2) The Association recommends the Town of Mead and St. Vrain Sanitation District continue to examine the consolidation of their sewer collection systems and treatment facilities. Considering the Town of Mead Lake Thomas WWTF could merge with the St. Vrain Sanitation District given its flagpole location within the St. Vrain Sanitation District WUSA separate from Mead's WUSA. Optimizing wastewater collection and treatment alternatives that are economically feasible based on cost and long-term user rate studies considering economies of scale and beneficial water quality.

3) The Association recommends the City of Fort Lupton continue to examine the consolidation of its sewer collection systems and treatment facilities with Metro Water Recovery or the St. Vrain Sanitation District. Optimizing wastewater collection and treatment alternatives that are economically feasible based on cost and long-term user rate studies considering economies of scale and beneficial water quality.

4) The Association recommends the Town of Estes Park, Estes Park Sanitation District, and Upper Thompson Sanitation District continues to examine the consolidation of their sewer collection systems and treatment facilities. Optimizing wastewater collection and treatment alternatives that are economically feasible based on cost and long-term user rate studies considering economies of scale and beneficial water quality.

5) The Association recommends that the Town of Hudson, Keenesburg, and Resource Colorado Water and Sanitation Metro District continue to examine the consolidation of their sewer collection systems and treatment facilities. Optimizing wastewater collection and treatment alternatives that are economically feasible based on cost and long-term user rate studies considering economies of scale and beneficial water quality.

7.3 208 AWQMP Association Recommendations and Actions

Membership recommends the following actions as responsibilities of the Association.

1) Construct an OWTS GIS platform with depth to groundwater to assess regional groundwater quality. Groundwater quality is considered in the development of long-range management plans. Those activities, which have the potential to adversely affect groundwater resources, need to be properly managed. Groundwater recharge zones must be protected from water quality degradation.

2) Construct a GIS platform that illustrates all current OWTSs, DMOA sewer collection systems, treatment facilities, proposed DMOA sewer collection systems and treatment facilities, and proposed Association

DMOA sewer collection systems and treatment facilities.

3) Perform testing and analysis on the M&E stream segment listings within Region 2 to assess current water quality. DMOAs are willing to spend funds on water quality data collection if this data is used in the state water quality characterization report (305(b)) and subsequent stream segment impairment listing (303(d)).

4) Construct a Nonpoint Source Watershed Plan for Region 2 to prioritize and prepare DMOAs as permitted MS4s to aid in managing nonpoint source pollution in areas projected to experience growth.

To foster actions of the Clean Water Plan, the EPA, and WQCD Policy 98-2 planning requirements, NFRWQPA developed the following priorities and corresponding measurable outcomes.

1) Measure how many DMOAs construct or amend their local comprehensive plan or land use code with a water quality section.

2) Measure how many DMOAs adopt or amend their local county or municipal codes or land use code with nonpoint source water quality protection standards.

3) Measure how many DMOAs adopt or amend their local county or municipal codes or land use code WUSA development standards.

4) Measure how many DMOAs submit consolidation examinations for inclusion into the 208 AWQMP.

5) Document the progress of the OWTS GIS platform and completion date.

6) Document the progress of the sewer collection systems GIS platform illustrating all current OWTSs, sewer collection systems, all future sewer collection and treatment facilities, and completion date.

7) Measure how many M&E stream segment listings the Association assesses for current water quality and is able to delist from the M&E listing.

8) Document the progress of the Nonpoint Source Watershed plan for Region 2.

7.4 Municipality & County Local Comprehensive Plan Development

The Association recommends that all DMOAs develop a local comprehensive plan that supports regional 208 planning efforts that consider future population projections and urban growth while protecting, maintaining, or restoring regional water quality. If a DMOA already has a local comprehensive plan, the Association endorses incorporating the following recommendations.

A comprehensive plan (or master plan) articulates a community's vision for the future and, as such, offers a significant opportunity to connect land use and water. As an official policy advisory document, comprehensive plans play a crucial role in guiding planning boards, elected officials, property owners, developers, and business owners as they make decisions about future land development that can significantly impact water resources. When integrated into local regulations, the comprehensive plan also ensures development is consistent with the community vision outlined in the comprehensive plan.[1] Development of a comprehensive plan also offers local government one of its best opportunities to (1) engage community members in substantive dialogue about stewarding water resources and (2) build public support for desired policy changes and community investments.

When drafting a comprehensive plan, there are two structural options for incorporating water into the plan:

1) By creating a standalone water plan.

2) By integrating water and wastewater planning throughout the comprehensive plan.

Neither option is better than the other. The approach most often depends upon how urgently a community needs to address water-related issues and whether or not a comprehensive plan update is pending. A standalone water/wastewater plan can be completed to supplement the existing plan when the current comprehensive plan is unlikely to be updated within a year to address current or known water issues. [2] For cases in which the comprehensive plan is being updated in its entirety, the decision to create a stand-alone plan or integrate water or wastewater issues throughout the comp plan depends upon the degree to which a community wants to call out and focus on integrated water-resource management.

Regardless of the chosen structure, the water-related topics in a community's plan should address all the following connections between water-resource management and land-use planning.

Colorado does not currently require a water or wastewater element for either municipal or county master plans. [3] More than any other community planning process, comprehensive plan development offers the best opportunity to educate the public about water or wastewater, and growth trends and how the two correlate. Comprehensive plans link population growth, water supply and water demand, and wastewater needs or trends to where and how future development occurs. No other water-related planning process can make this connection. This chapter outlines considerations for strengthening the link between land use and water or wastewater in comprehensive planning in our region.

---

1 Comprehensive plans are usually non-legally binding and considered official advisory documents. However, Colorado statutes allow for comp plan adoption into the development code: "*The master plan of a county or region shall be an advisory document to guide land development decisions; however, the plan or any part thereof may be made binding by inclusion in the county's or region's adopted subdivision, zoning, platting, planned unit development, or other similar land development regulations after satisfying notice, due process, and hearing requirements for legislative or quasi-judicial processes as appropriate.*" *CRS* § 31-23-206(1) and § 30-28-106(3)(a).

Communities wanting to make a master plan binding must include language within their development code that requires consistency with the comprehensive plan vision, goals and future land-use plan. Clear statements should be included in relevant code sections. For example, the general provisions can include language about the role of the plan, such as: "*These Regulations are intended to be consistent with the Master Plan. Should any provisions of these regulations be determined inconsistent with the Master Plan, the Master Plan shall prevail. The planning commission and elected body shall have the authority to determine the extent of any such inconsistency. A decision may be appealed in accordance with the appeal procedures in this code.*" Within the zoning and subdivision code, a statement should clearly state compliance with the master plan, for example: "*The Planning Commission and elected body shall use the Master Plan as a guideline in the evaluation of a development proposal for consistency. Development proposals shall be consistent with the Master Plan.*" Colorado case law on this matter can be reviewed in *Board of County Commissioners v. Condor, 927 P.2d 1339 (1996)*.

2 To view an example of a standalone water plan, see Butte County, Calif., and El Paso County. The City/County of Broomfield Comprehensive Plan provides an example of an integrated plan.

3 C.R.S. § 30-28-106(3)(a)(IV) and §31-23-206(1)(d). The master plan guidance provided for municipalities and counties states that, while not required, if a community selects to include a water-supply element, the process to develop the element should include coordination across all the entities that provide water for development to ensure there is a sufficient water supply and necessary infrastructure to meet future needs.

Integrating Water into the Comprehensive Plan		
Plan Components	**Definition and Description**	**Opportunities to Connect to Water**
Vision	A statement of the community's desired future and the ideals the community aspires to achieve.	• Integrate principles of sustainability and resiliency into the community's vision for water supply and optimize sanitary sewer collection and treatment systems regionally.
Community Profile	An overview of the community's trends and future demographics.	• Ensure the water supply projections and population projects are aligned, regardless of the number of water providers, concerning optimizing regional sanitary sewer collection and treatment systems. • Inventory and evaluate water infrastructure, potable and sanitary, for conveyance, treatment, and resiliency. • Assess watershed health-point & nonpoint sources. • Identify challenges and opportunities with managing water supply, demand, optimizing

		regional sanitary sewer collection and treatment systems, watersheds, and aquatic ecosystems.
Goals, Objectives, and Strategies	A statement of desired community conditions, targets for achieving goals, and courses of action or tasks to achieve each objective.	• Identify water-resource-related goals and desired policy actions, including regulatory recommendations for potable and sanitary water systems.
Future Land Use Plan	A map and/or plan identifies the types of land uses desired for different districts in the future.	• Identify specific geographic areas where future development should be mitigated to protect critical water resources. • Foster more efficient land-use development patterns through the compact form limiting flagpole developments. • Ensure future growth is designated in areas where potable water is available, and regional sanitary sewer collection and treatment systems are sustainable, resilient, and utilized.
Implementation Plan	A work plan that prioritizes future actions and investments.	• Ensure implementation of priority water-wastewater collection and treatment related projects, policies and programs by creating a detailed action plan.

7.5 Creating a Comprehensive Plan Water Element

The comprehensive plan provides a significant opportunity to host a community dialogue about current community conditions, future trends that most likely will happen, and what residents want the community to be like in the future. A community should identify priority questions very early in the process so that data gathering will include the full range of issues considered necessary. Local plans have been the driving force behind changes to water supply and/or wastewater service areas. In-fill development could be limited in some areas because of insufficient capacity in existing infrastructure and limited opportunities to upgrade these sanitary collection and treatment systems. The list presented below provides subjects that can be explored while developing a comprehensive plan.

Water-related Research Questions for Comprehensive Plans	
Theme	**Questions to Explore**
What are our current water supply and demand conditions and resulting wastewater trends for the future?	• How much water does our community currently have available, where does it come from, and how is it treated and distributed? • How much water will be needed in the future and how will it be provided? • What is our projected water supply and demand balance? • What are the current and projected costs of providing water and sanitary services combined to our community? • How much wastewater capacity does our community currently have available, when will capacity need to be increased, are there opportunities for consolidation, and how and where is wastewater collected and treated? • Do our sanitary collection and treatment systems have the capacity to support the water demand projections? • Do our sanitary collection systems have to be expanded to support new urban growth? • Do our sanitary treatment facilities have to be expanded to support new urban growth? • Can or should our sanitary collection system or sanitary treatment facilities merge or consolidate with adjacent agencies?
How resilient is our watershed?	• Do we have any issues in our watershed, point or nonpoint source pollution sources? • What areas are critical to water-source protection, including water sources and recharge zones? • What aquatic or riparian habitats are essential to protect biodiversity and ecosystem health? How much water do they need to remain healthy?
How are water resources and development connected?	• What are the different patterns and trends in the different sectors and land-use types in our community? What types are most water and wastewater efficient/inefficient? • Where are water sources and sanitary systems limited or becoming an issue in ways that limit future growth potential, including the presence or threat of declining streams, groundwater drawdowns, water quality, well depths and well density? • What areas can accommodate future growth without negatively impacting water resources in terms of water quality, water quantity and costs of services? • Where should development be limited to protect water quality? • How much growth are we predicting for the future, and how much water and additional wastewater collection and capacity will this future land use pattern require? • How can future water demand be reduced in new development? • Are there opportunities for wastewater re-use in new development? • How can site-level planning tools contribute to overall water-resource management, including low-impact design (LID), rainwater harvesting, landscaping plans, stormwater management, erosion control, etc. • Where can future development be served by sanitary collection systems by gravity, and where is future development needed to be served by lift stations, or can gravity serve future developments to adjacent agencies more efficiently?

How are agriculture and water resources related?	• What irrigated agricultural lands should be prioritized for protection because they play a key role in the water cycle and ecosystem? • How can we use the tools available to us to support how agricultural water is managed (water banks, alternative transfer methods, 1041 powers, 208 Planning Watershed Management Plans, etc.)
Is access to water resources equitable in our community?	• How are vulnerable populations impacted by the costs of water and sanitary sewer collection and treatment systems? • Are vulnerable populations more likely to be exposed to public health or safety dangers?

The comprehensive plan plays an essential role in integrating disparate information from multiple sources into a holistic assessment of a community's water resources. Preparing the summary of current conditions requires an assessment of what data is currently available, identifying priorities for new analyses, and determining what information is critical to the planning process.

Summarize Current Conditions and Trends

The comprehensive plan plays an essential role in integrating disparate information from multiple sources into a holistic assessment of a community's water resources. Preparing the summary of current conditions requires assessing what data is currently available, identifying priorities for new analyses, and determining what information is critical to the planning process.

For water supply and demand information, most communities in the headwaters region need to look no further than existing water supply plans, sustainability plans, water efficiency plans, climate action plans, watershed studies and infrastructure plans to find information on current conditions, trends and recommendations.

Project Future Population and Water and Wastewater Demand

Connecting water-demand trends to land use requires agreement on population projections to produce a community-wide water-demand and sanitary sewer systems projection. There are many different methodologies for calculating population forecasts, and depending upon the context, some are more appropriate than others. It is not uncommon for water providers to use their methods and datasets to calculate future demand and resulting sanitary flows and loading projections. Aligning these datasets can take time and necessitate collaboration among water providers. This also requires capacity in data analysis for water demand and sanitary sewer collection and treatment facilities.

Working with consultants requires clarity regarding the assumptions and methodology applied during this phase.

Connect Projected Demand to Land Use

With clarity about how much water will be required in the future, the next step is to connect water supply to where growth should occur, considering optimized regionalization of sanitary sewer collection and treatment systems. At a minimum, a plan should explain the spatial distribution of adequate water infrastructure and supplies and link that capacity to future growth and the regionalization of sanitary sewer systems. More advanced analysis may use growth trends to project how different types of development (residential, commercial, industrial) and the pattern of development (compact or dispersed) could affect water supplies and sanitary sewer systems.

Draft Goals and Strategies

Goals articulate desired future conditions while strategies articulate how to achieve desired outcomes. The list of potential strategies is endless. A frequently asked question is, "Which strategies will result in the biggest water-saving bang for the buck?" The short answer is. "It depends." A goal of net-neutral growth over the next decade, for example, would drive a different set of strategies than a goal of maintaining the current water conservation reduction trend. Clarity and agreement on specific targeted outcomes will make selecting the right strategy easier regarding water demand and optimizing future sanitary sewer systems.

Develop a Water Smart Future Land-use Plan

Integrating water should try to align future supply and demand and the resulting sanitary sewers and consider what mix or percentage of the development pattern will be more compact and support the community being

built water-smart from the start. Over the past decade, research from Intermountain West has proven that more compact development patterns are as much as 30 percent more water-efficient, principally because smaller lots correlate to less outdoor watering. While research supporting the water-saving benefits are more recent, the many other benefits of compact development have been touted for some time:

- Reduced costs for infrastructure resulting from a reduced need for constructing new water and sanitary sewer infrastructure.
- Reduced pollution from stormwater runoff and increased water infiltration due to the reduced area of impervious surfaces.
- Increased health benefits from decreased vehicle trips and increased walking and biking.

These benefits are achieved primarily by integrating the following strategies into the comprehensive plan:

- Designated priority growth areas for future development.
- Designated infill areas.
- Designated areas for cluster or conservation development.
- Designated areas for mixed-use and diverse housing types.
- Limit flagpole developments.

The comprehensive plan also drives the content for development code revisions. The future land use plan (FLUP) identifies future zoning districts, purposes, densities, uses, and unique development standards. During this phase, areas with limited water supply, costly inefficient sanitary sewer systems, and designated growth areas are all identified.

The greater the detail with which the comprehensive plan addresses desired changes to the regulatory framework – whether zoning, subdivision ordinances, or development standards – the easier it will be to execute policy changes in the future. Western Resource Advocates' guide, Integrating Water Efficiency Into Land Use Planning in the Interior West, includes invaluable information in Chapter 5: The Comprehensive Plan on how to better incorporate water concerns into a comprehensive plan. In Region-2, water supply is and will remain a limited resource. Some type of coordinated water supply planning involving the water providers will be needed to maximize water supply capacities. It cannot be assumed that all water providers will find enough water to meet all development expectations, or that development will have enough wastewater capacity. Those water providers with surplus water resources could outgrow those providers with limited capacities dictating projected urban development which will require expanded sanitary services.

Case Studies from Colorado Communities

The **City of Westminster** has long linked land use and water in its comprehensive plan. Their water supply plan explicitly connects to the land-use plan in the comprehensive plan as the basis for the utility department's water supply projections. Because of Westminster's leadership in the state, many case studies, cited in the footnotes, document their successful approach.

In 2018, the **City of Fort Collins** worked with Clarion and Associates, a community-planning consulting firm, to use decision support software and scenario planning to develop their comprehensive plan, City Plan. The scenario analysis assessed how different future development patterns would impact prioritized sustainability indicators of water demand. The consultant, utilities, and planning departments worked together to develop three different land-use futures with different densities and their associated water savings. The results demonstrated that water savings by 2040 ranged from 2 to 14 percent depending on the development pattern selected, with the most compact development pattern resulting in the most significant water savings. (*See graphic on next page.*)

El Paso County completed a stand-alone Water Master Plan in 2018. The plan includes a countywide strategy for collaboration among all the water providers to meet future water supply needs and to use water more sustainably. Goals within the chapter include collaboration, water supply resiliency, water conservation, and efficiencyprograms, water source protection, and Water Smart land use. This is an award-winning example from Coloradoof a standalone comprehensive plan element for water could be expanded to include wastewater.

The City of Pagosa Springs and the surrounding area in **Archuleta County** have been a popular second home and tourist destination since the 1990s. At one point, Archuleta County was one of the fastest-growing places in the state. As regional partners came together to discuss water, they realized significant disagreement about how much the area was likely to grow in the future. A working group was formed to develop a population projection adopted by consensus by all the partnering boards, including the water district, a large property owners association, the fire district, the Town of Pagosa Springs, and Archuleta County. To accomplish this, the group:

- Compared the different sources and growth projections used by different entities.
- Learned about population projection methodologies.
- Developed assumptions about the drivers and limits of growth.
- Employed a consultant to create population projections with high, medium and low ranges.
- Created a report with recommendations for the next steps.

A consultant developed a population projection to help the community understand the impact of second homes and short-term rentals on future water demand. The consultant determined the best approach to understanding the linkage between water, house production, and the population was to utilize wastewater production data since water demand in the project area incurs significant fluctuations in the summer due to increased visitors and outdoor watering. This analysis revealed that population growth and housing production are linked, but a delay between housing production and increased demand on the water system. The study also revealed that the most reliable growth rate for the planning areas was likely the past 18 years' growth trends, not the longer historical trend from the 1970s. The community agreed to adopt an adaptive management approach utilizing high, medium, and low projections for planning rather than a single forecast.

An identified potential source of nonpoint source nutrients within some watersheds is derived from on-site wastewater treatment systems (OWTSs) where these systems are sited at or near urban densities. Based on general literature data, calculations of accumulative phosphorus and nitrogen loadings from OWTSs show these systems could be a significant nonpoint source nutrient contributor in urbanized watersheds. However, there is considerable disagreement from OWTS users and some professionals on the general literature values and load calculations. Local, state and federal agencies have identified pollutant discharges from OWTS sources in urbanized watersheds as an area of concern. OWTSs are an acceptable means of waste disposal, assuming they are designed and maintained properly. A well-engineered and maintained OWTS can be protective of groundwater quality criteria, while not contributing to surface water degradation. However, poorly designed or failed OWTSs frequently contribute to nonpoint source pollution in planning watersheds. In addition to the proper design and operation, a big factor in whether OWTS impacts nutrients in an area is the density of the development and the associated with OWTS density, with a higher density more likely to impact nutrients. From a regulatory perspective, OWTSs under 2000 gallons per day flow are the responsibility of state and local health departments rather than designated planning or management agencies. These OWTSs are designed, operated, inspected, and maintained according to local health department regulations and recommendations. OWTSs designed for flows over 2000 gallons per day within existing service areas require approval from the appropriate management agency or state health departments. OWTSs over 2000 gallons per day are regulated as wastewater treatment works as defined in the state site application process. Where feasible, areas served by OWTSs will be encouraged to connect to a centralized treatment system that maximizes the system's use and avoids groundwater contamination resulting from OWTS failure. In some cases, watershed water quality studies can make specific recommendations for OWTSs. In these situations, the recommendations of the watershed studies can become the policy regarding OWTSs within a specific watershed.

General OWTS Case Study Evaluation Related to Groundwater

Phase I – OWTS Assessment

The assessment phase is an overview of the existing and expected OWTS situation within watersheds or septic assessment regions. Each county should conduct a septic assessment review program. The minimum requirements of a septic assessment review include:

- Listing unit density and/or total number of units per defined unit area with associated maps;
- Listing of system types and variances allowed;
- Listing known surface water and or groundwater problems including but not limited to any existing or potential water quality problems within the watershed as identified in the local 208 Watershed Management Plan, Colorado 305(b) Report or on the Colorado 303(d) List;
- Identifying sensitive areas within the septic assessment area that may be critically affected by the existing or potential presence of septic systems as identified in local comprehensive plans or the local 208 Watershed Management Plan;
- Reference any regulatory framework that might be applied to management planning (e.g., control regulations);
- Prepare a forecast of expected new septic systems over the next 20 years. To prepare that forecast, the management agency will use information from both the local comprehensive plans and the local 208 Watershed Management Plan.

Phase II - Septic Management Plan

The septic management plan phase is undertaken if the assessment phase determines a local need or if there is an existing or potential water quality or health risk problem within specific non-urban areas that are designated as *septic service areas*. The county as the management agency determines the appropriate entity or entities to undertake a septic management plan. An important component to maintenance of OWTSs is periodic pumping of the septic tank. Proximity to nearby septage receiving facilities is an important factor in whether this cost-sensitive OWTS maintenance is conducted by the owners. Longer distances to a treatment facility that accepts septage increases the cost. As part of the septic management plan, it would be good for treatment entities to work on plans to receive septage from the surrounding areas that are predominantly designated as OWTSs. Septic management plans will be recognized as such in the local 208 Watershed Management Plan.

Guidance Document

The septic management planning process should include the following elements:

Review Process and Responsibilities

- Management agencies are responsible for development of septic management plans (can include watershed association, cities or counties, but generally would exclude special districts; however, new septic service special districts could be formed in the future). A county health department may be listed as a septic management agency within a county jurisdiction and thereby replace the county as the management agency.
- Evaluation by a management agency requires development of a water quality assessment that accounts for major sources or potential sources and characterizations of non-urban development patterns. The management agency should consider the relationship to the new Colorado source water protection program and show how this effort may affect management strategies.
- Target known surface water and/or groundwater problems associated with specific septic service areas in non-urban areas of the region. If a potential for a water quality problem with septic systems identified as one of the potential sources, then a management agency should recommend a septic management plan. Additionally, if any regulatory framework might be applied to an associated stream segment, such as through the TMDL process or control regulations, then a management agency should recommend a septic management plan.

Recommended Thresholds for Action

A septic service area designation and subsequent septic management plan is recommended when:

1) There is identification or listing of a water quality problem in the local 208 Watershed Management Plan*; or*.

2) The household density exceeds 200 households on septic systems within a subdivision or adjacent subdivisions; or

3) The number of households in a specific watershed (U.S. Geological Survey 11-digit watersheds) exceeds 2,000 households on septic systems; or

4) A discrete semi-urban or semi-rural area reaches 2,000 households on septic systems; or

5) A county defined threshold as included in comprehensive plans or through intergovernmental agreements or memorandum of understanding is exceeded.

Recommended Septic Management Plan Elements

II. Defined geographic region

a) Hydrology of defined geographic region
b) Geology and soil of defined geographic region
c) Water quality characterization of defined geographic region

III. Unit density, development pattern and adjacent development patterns

a) Relationship to urban growth boundary, semi-urban lands, semi-rural lands, and those areas that should remain rural
b) Timing and schedule

IV. Types of septic systems, alternate technology needs and other operational components

a) Alternatives to using ISDSs (e.g., cluster systems)
b) Maintenance and septage pumping strategy

V. Management agency or responsible agencies defined in an intergovernmental agreement (includes anticipated roles and responsibilities)

VI. Monitoring needs and responsibilities

VII. Education needs and responsibilities

a) Developer expectations

Groundwater quality is considered in the development of long-range management plans. Those activities, which have the potential to adversely affect groundwater resources, need to be properly managed. Groundwater recharge zones must be protected from water quality degradation. There are many municipalities in the Region-2 which rely on groundwater to meet their water needs. Groundwater quality is currently a significant water quality issue in some of these localities and is thus recognized in local 208 Watershed Management Plans as a regional water quality issue. Groundwater quality associated with watersheds should be considered in the development of long-range local comprehensive plans. The water quality protection industry has documented that the use of OWTS disposal has resulted in biological contamination of rural and other water supplies. Contamination associated with urbanization, including nonpoint source runoff, can change groundwater quality.

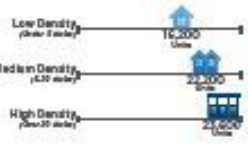
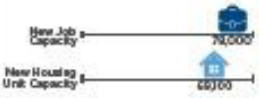
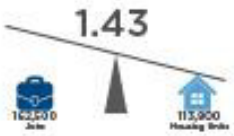
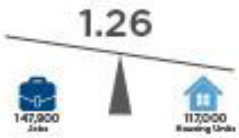
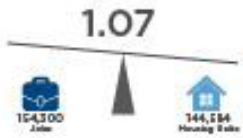
As a result of rural urban development these groundwater supplies need to be protected due to the increased use as the primary water supply for individual homes. The WQCD has proposed classifying all alluvial groundwater aquifers within the state for domestic use. The contamination of some existing portions of the South Platte alluvial aquifer would make these areas unsuitable for domestic supply. A number of regulatory issues were presented to the WQCD in regards to this classification. As a result, the WQCC is involved in an ongoing effort to evaluate groundwater classifications and standards on a site-by-site basis.

FORT COLLINS
CITY PLAN
PLANNING OUR FUTURE. TOGETHER.

PUTTING IT ALL TOGETHER

How do the scenarios compare?

The metrics below illustrate how well each scenario would meet our future needs for housing, jobs, and transportation. The metrics also show how much the proposed transportation improvements could cost and how much progress we could make toward achieving community goals for climate action and access to amenities and services.

	SCENARIO 1	SCENARIO 2	SCENARIO 3
Diversity of Housing Types Scenario 1 maintains the historic trend with a large majority of the residential land continuing a low density development pattern. Scenario 2 and 3 reflect the recent construction trends with Scenario 3 shifting towards higher density multifamily development.			
Average Density in Mixed-Use Areas The scenarios assume that the greatest amount of infill and redevelopment will occur in the four mixed-use districts. Average densities assumed to occur in mixed-use districts increases from Scenario 1 to Scenario 3, to help support the community's desire for more robust transit system.			
Character of Mixed-Use Development Scenario 1 largely maintains the suburban character of existing centers and corridors while scenarios 2 and 3 show redevelop with a more urban character, supporting a greater mix of uses and less surface for parking lots.			
New Job and New Housing Unit Capacity While Scenarios 1 and 2 both add significant new job capacity, they provide significantly less new housing capacity than Scenario 3. As a result of this housing focus, Scenario 3 translates to a job-to-housing ratio that is much lower than the current ratio.			
Jobs/Housing Balance Fort Collins currently has a job-to-housing unit ratio of 1.27, meaning the number of jobs available in the city is larger than the number of housing units. At buildout, the city's job-to-housing unit ratio would vary significantly by scenario.			
Household Water Consumption Since the largest source of water consumption in single-family housing is irrigation, any scenario that promotes increased density and a higher overall proportion of multifamily housing will reduce the community's irrigation and overall water consumption.			

City of Fort Collins

Comprehensive Plan Water Resources Outline Example

Regardless of the structure, integrating water into a comprehensive plan should include the topics listed below. *

A. Current Conditions

1) The Water System
   - Description of Water Sources and Supplies
   - Ownership of Water Distribution Systems
   - Water Systems Capacity
   - Water Infrastructure and Financing
2) Current Water Demand
   - Water Use Measurement
   - Non-revenue Water
   - Water Conservation Programs
   - Water Reuse
3) Current Sanitary Sewer Infrastructure & Treatment
   - Sanitary Sewer Collection Systems
   - Sanitary Sewer Treatment Systems
   - Sanitary Sewer Collection and Treatment Capacity
   - Sanitary Sewer Infrastructure and Financing
   - Onsite Wastewater Treatment Systems
4) Water Quality
5) Stormwater Management
6) Watershed Health and Management
   - Point Sources
   - Nonpoint Sources

B. Resiliency Considerations for the Future

1) Population Growth and Development Expectations
2) Projected Water Demand
   - Future Water Demand Scenarios
3) Water Supply Sustainability
   - Climate Trends and Drought Planning
   - Transferable/Acquirable Water Rights and Groundwater Management
   - Recharge/Recovery/Storage Program(s)
   - Conservation and Efficiency Programs
   - Water Equity
4) Projected Sanitary Sewer Infrastructure & Treatment, Flows, and Loads
   - Future Sanitary Sewer Collection System needs, Interceptors, & Lift Stations
   - Future Sanitary Sewer Treatment System needs, Flows and Loads, Increased Capacity
   - Future Onsite Wastewater Treatment Systems development needs
   - Future Considerations for Regionalization of Sanitary Sewer Infrastructure & Treatment

C. Sustainable Water Resources: Goals, Objectives, Strategies

1) Summary of Challenges and Opportunities
2) Vision for Sustainable Management of Water Resources and Sanitary Sewer Services
3) Goals and Objectives
4) Action Plan
5) Short- and Long-term Priorities

* The Lincoln Institute For Land Policy is developing a resource guide, Incorporating Water Into Comprehensive Plans in Colorado Communities. This outline was developed from an early draft of that resource. A revised resource will be available in mid2020. Additionally, in 2019 El Paso County won a Colorado APA Planning Award for their excellent work in developing a water resources master plan. This document serves as a good example for other communities.

Vision Statement for Water Resources

Our water resources are resilient and sustainably managed to support the ecological, social and economic goals of our community.

Goals

1) Effectively manage water resources to ensure a resilient and sustainable water supply and regionally optimized sanitary sewer systems that support residents and ecosystems.
2) Promote water conservation and efficiency across all sectors.
3) Protect and enhance water quality.
4) Effectively manage stormwater to protect public safety and enhance ecological functions.
5) Restore watershed health and habitat by protecting rivers, streams, and riparian resources.
6) Maintain well-functioning and cost-efficient water and wastewater collection and treatment systems.
7) Address water equity issues of affordability, infrastructure investments, and climate resilience.
8) Protect agricultural water rights and uses where they significantly contribute to hydrological and ecological functions.
9) Ensure water efficiency and conservation are incorporated into future development while regionally optimizing future sanitary sewer systems exploring water reuse opportunities.
10) Adopt an integrated water-resource management approach and collaborate on implementation across sectors, jurisdictions, and agencies.

Strategies

Possible implementation strategies are too numerous to list here; however, strategies typically fall into these categories:

- Data and evidence.
- Funding.
- Projects.
- Best Management Practices.
- Policy.
- Education.
- Collaboration.
- Regionalism.

Plan strategies should also thoughtfully integrate water resource management into zone districts. For example:

- Identify service areas where new development can connect to existing and proposed water and sanitary sewer infrastructure.
- Identify areas along declining streams with limits for future augmentation.
- Identify areas of growth where wells are being supported by agricultural recharge.
- Quantify potential water demand, total number of wells and augmentation availability based on average water use. Use this information to allocate growth spatially to inform appropriate zoning densities.

7.6 Water Quality Protection Standards for Construction

The purpose of these model Water Quality Protections standards (WQPS) is to demonstrate that the Association expects municipal county governments to follow industry standards and requirements for land use development to protect water quality and quantity from regulated and unregulated nonpoint source pollution and incorporation of these standards into local DMOA land-use codes are recommended and will be considered in the future as the Association makes its recommendations. In situations when a discharge permit is required (for example, stormwater construction or municipal separate stormwater sewer system permits), these standards can be used to ensure permit requirements are met. Examples of WQPS are erosion and sediment control, stormwater control, hazardous materials management, snow storage, and removal standards, and post-construction inspection and maintenance requirements.

These WQPS are based on model water quality protection standards proposed by academic and professional organizations, standards imposed by jurisdictions outside of the region with similar environments and economies. Processes need to be in place by the DMOA to ensure that the WQPS remain consistent with the state water quality rules and regulations and requirements associated with these regulations as developed and implemented by the Water Quality Control Commission and the Water Quality Control Division.

Because the types of requirements that can mitigate water quality impacts are often scattered throughout different sections of municipal or county land use codes and do not always pinpoint water quality as their purpose, developers, decision-makers, and the public may not always understand the purpose of the requirements. When requirements that protect water quality are scattered throughout a land use code, water quality monitoring is not always imposed as a permit condition, and it becomes difficult to measure water quality impacts of development or the effectiveness of mitigation techniques. The Association's recommendation is to organize WQPS into one section of the local DMOA land-use code.

If all requirements that affect water quality are detailed in one section of a land-use code, their importance to protecting water quality is highlighted. Chapter 7 ofthe Summit County Land Use and Development Code, *Water Quality Control Regulations*, is an excellent example. The approach allows local governments to demonstrate how water quality protection is being implemented and evaluate whether the requirements are helping to protect water quality.

Depending on a local government’s land-use policies and regulations, these WQPS also be separated and inserted into existing sections of local land use codes rather than combined in one section. Where local governments haveadopted a Unified Development Code, the WQPS would fit nicely in the development standards section.

Require applicants for land use permits to submit plans. The plans described in Section III of the WQPSs are the backbone of application submittal materials and require a developer to demonstrate how it will satisfy each WQPS. Local governments can decide which of these plans to require based on the intensity of the proposed development. Land use codes should include a provision that requires a developer to pay for the local government toretain outside experts to review these plans as part of the application review process.

Local governments determine what type of development requires compliance with the standards. Local governments generally review and approve development through an approval system designed to ensure developers have addressed the development’s impacts on public health, safety,and the environment. Land use codes come in many shapes and sizes.[5]

Under a traditional land use regulatory system, the code is divided into zoning and subdivision regulations. According to the designated zoning category, zoning establishes uses allowed by right or by special review. Some types of development require special review because of potential harmful impacts, such as traffic or environmental impacts.[6] Where a proposed use is a use-by-right, site plan and building permit processes afford an opportunity for additional requirements to mitigate impacts. Subdivision regulations, which apply to divisions of land into parcels of less than 35 acres in size, establish lot layout anddesign, infrastructure requirements, land dedication, and related specifications. Subdivision regulations are an additional opportunity to regulate the

water qualityimpacts of a project.[7]

A Unified Development Code integrates subdivision and zoning requirements intoa single document. In unified codes, natural resource protection, floodplain regulation, wildlife protection, and related concerns are often addressed.[8] Various development standards, typically organized into a chapter of the unified code, are triggered based on the intensity of proposed development.

Local governments approve land use changes through a variety of mechanisms.These model WQPS do not address what type of local approval might trigger compliance with water quality protection requirements. Each local government should determine what types of permits and approvals would require compliance with WQPS. Examples of approvals that might trigger compliance are:

1) Site plan review
2) Special use or conditional use permits
3) Subdivision approval
4) Rezoning
5) Planned Unit Development approval (PUDs)
6) Watershed protection permits
7) Overlay district permits
8) Building permits

The following water quality protections standards may be adopted into DMOA land use directly or with minimal edits. The local county or government should also determine the location, size, nature, and intensity of a land use change that would trigger compliance with these standards. For example, certain WQPS might be required based on the area and grade of disturbed soil, proximity to sensitive areas like wetlands and waterbodies, or the use of hazardous materials.

[5] Colo. Mun. League (CML) and Colo. Department of Local Affairs (DOLA),*Small Town Solutions: A Practical Guide for Municipal Leaders* (2013), at 14, https://www.cml.org/Issues/Government/Municipal/Small- Town-Solutions--A-Practical-Guide-for-Municipal-Leaders/.

[6] Donald L. Elliott, General Ed., *Colorado Land Planning and Development Law, Tenth Ed.* (CLE in Colo.,Inc. 2015), at 85.

[7] *Id.* at 117.

[8] CML and DOLA, *supra* note 3, at 14.

WATER QUALITY PROTECTION STANDARDS

The following water quality protection standards are mandatory unless a waiver is granted. The applicant may submit a request for a waiver, including alternate best management practices or technology if it's more protective of public health, safety, welfare, and the environment than the [insert local county or government name] standard.

TIP: *Local governments should consider the size of disturbance, volume of disturbed soil, and proximity to sensitive areas that trigger the need to comply with WQPS. See Part I, Users Guide for more information.*

Recommended elements of referenced plans are found in Part III.

A. STANDARDS FOR DESIGNING THE SITE

1) **Stormwater runoff.** Design site in accordance with a stormwater management plan to avoid direct discharge to waterbodies from development and so that the following standards are satisfied:

   a. Maximize the use of on-site landscape-based [or Low Impact Development (LID)] stormwater controls.

   b. Prevent the direct discharge of stormwater to a waterbody.

   c. Ensure that watercourses or drainageways on the site will be kept free of trash, debris, excessive vegetation and other obstacles that pollute, contaminate or significantly retard the flow of water through waterbodies.

   d. Maintain structures located in or adjacent to the watercourse so that the structure will not become a hazard to the use, function, or physical integrity of waterbodies.

2) Stormwater detention or treatment facilities. Design stormwater detention or treatment facilities in accordance with a stormwater management plan so that the following standards are satisfied:

TIP: *Check out DOLA's model stormwater management standards and commentary: https://www.planningforhazards.com/stormwater-ordinance- model-and-commentary.*

a. Construct permanent stormwater facilities concurrent with land development to minimize water quality impacts from stormwater.

b. Develop stormwater facilities to be multipurpose, i.e., attenuate flows to historic peak discharge rates and provide water quality benefits.

c. Detention facilities can be either on-site or regional in nature. Design regional stormwater conveyance and detention facilities to accommodate the projected annual additional flows from the development.

d. Ensure the post-development discharge rate for detention facilities does not exceed the pre-development peak discharge rate for both the 2-year and 25-year return frequency, 24- hour duration storm.

e. Utilize existing drainage ways to direct offsite run-off through the development site rather thantreating or detaining it onsite.

f. Consider the entire area contributing runoff, including any off-site contribution (when it is not routed through the site), to determine run-off rates. Use fully developed potential, based upon existing zoning, of the area draining into the detention facility.

g. Design detention facilities for safe passage of a 100-year storm event without causing property damage.

> ***TIP: Low Impact Development (LID)*** *is a stormwater control technique that manages stormwater as close to its source as possible. LID aims to mimic natural, pre-development hydrological patterns on the development site to protect water quality by minimizing pollutant loads into waterways from developed areas. Examples include:*
>
> - *vegetated swales,*
> - *permeable pavement*
> - *play areas, parks, and ball fields,*
> - *constructed wetlands,*
> - *infiltration basins,*
> - *infiltration devices,*
> - *road, parking, and driveway design requirements*
> - *rain barrels in accordance with CRS 37-96.5-101 (allowing for upto 110 gallons of rain barrel storage on a single-family residence).*

Some communities incentivize LID techniques and developLID guidebooks of best practices. Examples and resources are provided in Section IV.

h. Preserve and retain wetlands in their natural state as drainageways. Preserve low lying lands along watercourses subject to flooding or overflowing during storm periods.

i. Protect channels downstream from the stormwater detention pond discharge from increased channel scour, bank instability, and erosion and sedimentation from the 25-year return frequency, 24-hour design storm.

j. Design stormwater facilities like detention basin outlets to remove pollutants.

k. The developer is responsible for costs associated with proposed off-site drainage or treatment systems and associated rights-of-way.

3) **Impervious surfaces.** Minimize the extent of impervious areas, especially directly-connected impervious areas, consistent with the stormwater management plan, so that the following standards are satisfied:

a. Design the site, so the impervious surface of the land disturbed by the proposed development, not mitigated by on-site vegetated swales, infiltration basins, or other techniques, will not exceed the percentage of the total acreage draining to each drainage discharge point, as indicated in Figure 1.

b. Design the site so runoff is drained from fifty percent (50%) of all developed impervious surfaces (rooftops, parking lots, sidewalks, etc.) over stable, vegetated pervious areas before reaching stormwater conveyance systems. The requirement that fifty percent (50%) of the impervious area drain to vegetated pervious areas may be reduced if the outflow from the vegetated pervious area is directed to other stormwater treatment methods.

Maximum impervious lot coverage shall not exceed the following percentages:

Size of Development Project	R-1 district Low Density	R-2 district Medium Density	R-3 district High Density
Less than 15,000 sf	50 percent	50 percent	60 percent
Between 15,000 sf and 49,999 sf	40 percent	50 percent	60 percent
Between 50,000 and 200,000 sf	25 percent	50 percent	60 percent
More than 200,000 sf	10 percent	50 percent	60 percent

Figure 1. ***Impervious surface limitations****: Colorado Department of Local Affairs, https://www.planningforhazards.com/stormwater-ordinance-model-and-commentary.*

4) **Slope limitations.**

a. Avoid cut and fill on slopes. Where cut and fill cannot be avoided, determine the slope of cut and fill banks by taking into account soil characteristics of the site to avoid erosion and promote revegetation opportunities and long-term stability.

b. No development on slopes of thirty percent (30%) or greater. Where this limitation would prevent all reasonable use of the site, low intensity development might be approved based on site-specific considerations evaluated in a geotechnical analysis.

c. Divide large grade changes into a series of benches and terraces.

5) **Waterbody buffers.** Construct and develop outside of the inner and outer waterbody buffers.

a. **Inner buffer.** Maintain inner buffer of at least twenty-five feet (25') from streams, wetlands, and other waterbodies.

i. Development is prohibited in the inner buffer.

ii. Measure the buffer horizontally from the nearest ordinary high-water mark in average hydrologic years on each side of the water feature or from the wetland boundary identified in the site plan to the edge of any disturbed area. When no ordinary high-water mark is discernible, measure from the top of the streambank.

TIP: *Check out the City of Boulder's study of various waterbody buffer systems with lots of great examples from local governments: https://drive.google.com/file/d/1q_1KX4j0HaOJm5In59RdEjBh7oZvF88h/view?usp=sharing*

DOLA also has model stream buffer regulations and commentary: https://www.planningforhazards.com/stream-buffers- and-setbacks-model-and-commentary.

b. **Outer buffer.** Maintain a variable outer buffer of up to one hundred feet (100'), measured from the outer boundary of the inner buffer (125' total), unless a larger

buffer is required to protect riparian functions and values. The size of the outer buffer may vary based on site conditions such as:

i. Slopes steeper than 15% and draining into a wetland or other water feature;

ii. Highly erodible soils;

iii. The area is needed to protect trees shrubs or other natural features that provide for streambank stability, habitat and enhancement for aquatic environments, riparian area protection, or to maintain predevelopment riparian plant or animal communities;

iv. The area provides important habitat for plants or wildlife;

v. The area is within the 100-year floodplain using best available data;

vi. The area is needed to prevent or minimize flood damage by preserving the storm water and flood water storage capacity;

vii. The area is needed to protect fish spawning, breeding, nursery and feeding grounds; or

viii. The area is needed to preserve areas of special recreational, historical, archeological, scenic, or scientific interest.

c. **Exemptions from water body buffers**. The following structures, improvements, and activities are exempt from the inner and outer water body buffers standards, subject to applicable local, state or federal permits:

i. Structures necessary to use decreed water rights, docks, piers, and watercraft launches and ramps.

ii. Activities and structures in wetlands associated with agriculturaloperations.

iii. Structures necessary for water resource protection orrestoration.

iv. Emergency flood control measures.

v. Maintenance, repair, or replacement of existing roads and bridges.

vi. Single track dirt trails, allowed within the outer buffer only, if measures are taken to protect and preserve adjacent riparian areas and the proposed trails will not negatively impact the adjacent riparian areas.

vii. Stream habitat enhancement features.

viii. Bank stabilization structures.

d. **Buffers for activities deemed water pollution hazards**. Activities deemed water pollution hazards such as storage of hazardous materials, storage of sand and salt for road traction, routine vehicle or mobile machinery maintenance, or concentrated animal feeding operations will be setback from water bodies and wetlands at a distance necessary to prevent nonpoint pollution caused by those activities.

e. **Deed Restrictions**. Prepare and file approved deed restrictions with the County Clerk

and Recorder to protect the waterbodies and waterbody buffers in perpetuity.

> ***TIP:*** *Facilities storing oil have required reporting under the EPA's Spill Prevention, Control and Countermeasure (SPCC) Regulation, 40 CFR 112. Smaller "qualitied" facilities may self-report while larger facilities have additional requirements. See https://bit.ly/2qSyisH for more information from the EPA.*

6) **Hazardous materials storage and use.** Conduct hazardous material storage and use in compliance with the hazardous materials plan. If a spill occurs it should be cleaned up immediately and disposed of properly. Notify emergency response personnel immediately of spills in accordance with the plan. All events should be reported to CDPHE's spill hotline 1-877-518-5608 within 24 hours of discovery.

7) **Revegetation.** Implement the revegetation plan to ensure site is stabilized and revegetated after construction according to the following standards:

> ***TIP:*** *Make sure any required performance guarantees cover the cost of revegetation.*

   a. Revegetate within seven (7) days after final grade is reached.

   b. Provide vegetation cover equal or greater than the extent of cover to the natural vegetation of the surrounding area.

   c. Provide vegetation cover adequate to prevent soil erosion and invasion of weeds after one (1) growing season.

   d. Provide vegetation cover of diverse, effective, long-lasting plant material capable of self-regeneration without continued dependence on irrigation, soil amendments, or fertilizer.

   e. Utilize site-appropriate native seed mixes.

   f. Crimp, track, or tack grass or straw much in place to promote surface anchoring.

   g. Reduce any irrigation to regular watering practices after one (1) growing season.

   h. Leave temporary measures for soil stability like mulch or silt fences in place until the re-vegetative cover has reached seventy percent (70%) of the disturbed area.

   i. Monitor and report on the effectiveness of revegetation in accordance with the Revegetation Plan.

> ***TIP:*** *A smaller percentage may be more appropriate for areas receiving less snow. Vail and Crested Butte require 30%, while Summit County, Silverthorne, and Breckenridge require 25%.*
>
> ***TIP:*** *Coordinate snow storage requirements and landscaping requirements for a given site so that landscaping does not interfere with snow storage.*

8) Snow storage.

   a. **On-site snow storage.** Set aside an area equal in size to thirty percent (30%) of the area to be plowed for on-site snow storage (i.e., within boundaries of lot and not within the right of way).

      i. Uphill slopes greater than 20% may not be counted in determining compliance with snow storage requirements. Uphill slopes of five to ten percent (5-10%) count as 50% of their area.

TIP: Some local governments do not allow for a reduction in snow storage area for heated drives, citing icing issues and enforcement difficulties.

Also, percentages vary. For example, the Town of Vail allows 10% storage area with heated drives and 30% without.

ii. For every four hundred (400) feet of public right-of-way on avenues and streets, one (1) space at least fifty (50) by one hundred twenty (120) feet is required within each block for snow storage.

iii. If driveways are heated, then a reduction in the size of the snow storage area may be approved. Provide assurances that the systems will not be turned off.

iv. Snow storage areas are not allowed in waterbodies or within waterbody buffer areas or on compacted or poorly draining soil.

v. Contain runoff from snow storage areas so that it is directed through a detention or infiltration facility or other best managementpractice that removes pollutants, including vegetated areas.

b. **Off-site snow storage.** In lieu of on-site snow storage, off-site snowstorage may be approved if:

TIP: Some communities, such as the Town of Crested Butte, do not allow off-site snow storage.

i. An appropriate off-site snowstorage site is available;

ii. Arrangements for the off-site removal have been made in a manner assuring the continued availability of such storage;

iii. Placement of the snow storage off-site will achieve important design objectives such as consolidating or better coordinating snowstorage areas, increasing landscaped areas and buffering of buildings or reducing visual obstructions caused by snow stacking on the project site; and

iv. The alternative snow storage site provides adequate water quality protection using appropriate snow storage treatment practices.

B. STANDARDS FOR CONSTRUCTING THE SITE.

1) **Sediment control.** Conduct surface disturbance activities in accordance with an erosion and sediment control plan to minimize surface disturbance, prevent erosion, and so that the following standards are met:

a. Phase staging and scheduling of earth disturbing construction activities to minimize soil disturbance and exposure.

b. Install sediment control measures before site grading or other construction.

c. Perform surface disturbing activities in existing disturbed areasto the greatest extent practicable.

d. Stabilize or protect disturbed areas or stockpiles to effectively control erosion.

TIP: The design of driveways in mountain communities deserves special attention, as runoff can be a source of sediment and pollutants such as oil, grease, and household chemicals.

The Mountain Driveway Best Practices Manual may assist in ensuring driveways meet these model water quality standards: http://www.wrightwater.com/assets/8-mountain-driveway-bmps.pdf

e. Limit grading to areas approved for infrastructure improvements, stormwater management, drainage improvements, and building envelopes unless unique topographical, geotechnical, or environmental conditions require grading outside these areas.

f. Design sedimentation basins or other sediment trapping to empty the storage volume in no less than 12 hours. Install sedimentation basins prior to any construction and remove only after successful revegetation of the site.

2) **Erosion control**. Construct and conduct activities in accordance with the erosion and sediment control plan and stormwater management plan so that thefollowing standards are satisfied:

a. Minimize runoff from roads and driveways.

b. Protect adjacent properties from runoff.

c. Protect storm sewer inlets from entry of sediment-laden water.

d. Divert off-site runoff around construction sites.

e. Protect irrigation ditches, swales, receiving channels, and streams from accelerated erosion until conveyance system has established vegetation and is stable under flows for which the feature was designed.

f. Protect culvert outlets from erosive flows by installing velocity reducer such as gravel dikes, riprap, level spreaders, or similar measures.

3) **Construction de-watering**. Comply with the Colorado Discharge Permit System (CDPS) construction de-watering permit requirements.[9] Minimize discharges from construction de-watering activities.

4) **Dust control.** Implement measures to manage dust and minimize wind erosion in accordance with the Dust Control Plan.

5) **Inspection and maintenance.** Perform routine inspection, maintenance, and reporting during construction to measure effectiveness of sediment and erosion control measures, consistent with the erosion and sediment control plan.

C. POST-CONSTRUCTION STANDARDS

1) **Inspection of erosion and sediment control devices.** Inspect and maintain erosion and sediment control devices according to the erosion and sediment control plan. Unless the approved plan provides otherwise, the following requirements for inspection apply:

a. For sites where construction has not been completed, inspect all erosion and sediment control devices after any precipitation that creates runoff, and make necessary repairs. At a minimum, inspect erosion and sediment control devices every 14 days.

b. For sites where all construction activities are completed but final stabilization has not been achieved because vegetative cover is not established, inspect the erosion and sediment control measures at least once every month.

c. Always maintain a record of inspections on the project site.

2) **Revegetation monitoring.** Monitor revegetation efforts in accordance with the revegetation plan to prevent erosion, limit sediment loading in nearby waterways,and ensure proper transition to non-revegetation irrigation practices.

3) **Inspection of permanent on-site stormwater detention facilities.** On-site stormwater detention facilities require a written arrangement which ensures that the facility is regularly inspected to ensure it is functioning properly and to provideany necessary maintenance.

Structural and Nonstructural Best Management Practices

Best Management Practice	Planning Considerations
STRUCTURAL BEST MANAGEMENT PRACTICES	
1. Minimizing Directly Connected Impervious Areas	Design site drainage flow path to maximize flow over vegetated area; minimize ground slopes to limit erosion and slow down flow; select vegetation for survival values and water quality benefit
2. Irrigated Grass Buffer Strips	Design is based on maintaining sheet-flow conditions across a uniformly graded, irrigated, dense grass cover strip
3. Grass-lined Swales	Use grass-lined swales to decrease runoff volumes and pollutant loads; design is based on directing runoff to low gradient, vegetated swales that are irrigated
4. Extended Detention basins (dry basins)	Rely on an outlet designed to extend the emptying time of the basins capture volume; design embankment-spillway-outlet system to prevent catastrophic failure; design to empty capture volume over a 40-hour period
5. Retention Ponds (wet ponds)	Requires a base flow to maintain and to flush a permanent pool; designed to empty capture volume over a 12-hour period; design embankment-spillway-outlet system to prevent catastrophic failure
6. Constructed Wetlands	Can be constructed as a wetland basin or set into a drainage way to form a wetland bottom channel; requires a base flow to maintain wetland vegetation; pollutant removal efficiencies of constructed wetlands vary significantly; removal efficiency design factors include influent concentrations, hydrology, soils, climate, vegetative type, growth zonation, maintenance and harvesting
7. Modular Block Porous Pavement	Design for even flow distribution over the entire porous surface; assume permeable pavement area are 30 percent impervious with subsoil infiltration and 60 percent impervious with no subsoil infiltration

Structural and Nonstructural Best Management Practices, cont.	
NONSTRUCTURAL BEST MANAGEMENT PRACTICES	
8. Stormwater Quality Control Planning	The implementation of this BMP is in the form of adoption or promulgation of ordinances, resolutions or executive orders granting authority to local government staff to review stormwater quality control plans and to either approve or present recommendations to elected officials for their approval; requires a commitment of staff and fiscal resources of the local government to follow through with review, approval and enforcement of site-specific plans; regulations must be adopted specifying the content of stormwater quality control plans
9. Adoption of Criteria and Standards	The adoption by local governments of criteria and standards for the selection, planning and design of stormwater facilities
10. Source Reduction and Disposal of Household Waste and Toxics	The goal of household waste disposal is to contain all refuse, reduce litter and encourage proper waste disposal practices through public education programs; encourage and coordinate with recycling, resource recovery programs, alternative approaches and product selection programs
11. Use of Pesticides/ Herbicides/ Fertilizer/ Alternative Management	The development of an ongoing educational program is the basis of this BMP; encourage proper application technologies, composting, alternative pest control practices and integrated landscape management programs and practices
12. Illicit Discharge Controls	Activities designed to reduce entry of pollutants into municipal stormwater systems during dry-weather periods; educational and information dissemination programs which address illegal dumping, accidental spill response and illicit connections
13. Landscaping and Vegetative Practices	Development and distribution of guidelines and educational materials on landscaping and vegetative utilization for urban development area; fugitive dust and bare-ground re-vegetative local ordinances; Integrated landscape management practices
14. General Education Programs	All of the above nonstructural best management practices have an educational component; Additionally, general education programs directed toward construction-caused nonpoint source runoff, stormwater management and urban runoff as necessary as a type of source prevention

Erosion and Sediment Control Practices

Control Type	Summary of Practice Criteria
1. Sediment / Erosion Control Plan	Erosion and sediment control planning should occur early in the site development process and be adjusted throughout site development as needed; These plans should define the erosion and sediment control practices and include a drainage way protection plan, if necessary
2. Erosion Control	Surface roughening provides temporary stabilization of disturbed areas from wind and water erosion; surface roughening should be performed after final grading to create depressions 2 to 4 inches deep and 4 to 6 inches apart
	Mulching of all disturbed areas should occur within 14 days after final grade is reached on all portions of site not permanently stabilized
	Revegetation of a viable vegetative cover should occur within one year on all disturbed areas and stockpiles not permanently stabilized; Temporary vegetation is required on all disturbed areas having a period of exposure to final stabilization of one to two years; permanent vegetation is required on all disturbed areas having an exposure period longer than two years
	Roads and soil stockpiles should be covered as early as possible with the appropriate aggregate base; all non-paved road portions should be seeded and mulched within 14 days after final grading; stockpiles in place over 60 days should have temporary vegetation; stockpiles with 100 feet of drainageways need additional sediment control structures
3. Sediment Control	Vehicle tracking of mud and dirt onto paved surfaces should result in cleaning of paved surfaces at the end of each day; for sites greater than two acres, a rock pad should be built at points of ingress and egress
	Slope diversion dikes located above disturbed areas may discharge to a permanent or temporary channel; diversion dikes located mid-slope on a disturbed area must discharge to temporary slope drains; diversion dikes located at the base of a disturbed area must discharge to a sediment trap or basin

Erosion and Sediment Control Practices, cont.	
Control Type	Summary of Practice Criteria
	Roads and roadside swales should be provided for when road areas are not paved within 30 days of final grading; terracing and slope drains can be used in steep slope areas Sediment entrapment facilities include terracing, slope drains, straw bale barriers, silt fences, filter strips, sediment traps and sediment basins; at least one entrapment facility should capture run off leaving a disturbed area
4. Topsoil Preservation and Reuse	As a minimum, topsoil preservation and reuse involves the removal, stockpiling, and re-spreading of the surface six to eight inches of natural soil.
5. Drainage-way Protection	Waterway crossing practices should limit construction vehicles in waterways to the maximum extent practicable
	Temporary crossing or diversions are needed for actively-flowing water courses with regular crossing of construction vehicles
	Outlet protection temporary slope drains, culverts, sediment traps and sediment basins must be protected from erosion and scour; check dams can be used in swales and ditches to protect these from down-cutting
	Inlet protection, all stormwater sewer inlets, made operable during construction must have sediment entrapment facilities installed to prevent sediment-laden water from entering the inlet
6. Material Storage Practices	Chemicals, petroleum products and waste storage practices should be designed to prevent discharge of any stored material into the runoff from a construction site
7. Underground Utility Construction	Trench dewatering devices must discharge in a manner not to adversely affect flowing streams, wetlands, drainage systems or off-site property; limit the amount of open trench to 200 feet
8. Disposition of Temporary Measures	All temporary erosion and sediment control measures must be removed within 30 days after final stabilization
9. Maintenance	All temporary BMPs shall be maintained and repaired as needed to assure continued performance during the construction phase of a project

All of the nonstructural best management practices have an educational component. There is also a need for general education programs related to construction nonpoint source runoff, stormwater discharge and other urban runoff. Specific education programs need to be directed toward the construction industry and throughout Colorado. Sediment is one of the most prevalent nonpoint source runoff components associated with urban development and construction activities. Similar best management practices are applicable to both stormwater runoff in urban areas and construction site runoff.

[9] Permit requirements and other resources available at https://www.colorado.gov/pacific/cdphe/wq-construction-general-permits.

RECOMMENDED PLANS AND APPLICATIONSUBMITTAL MATERIALS

One or more of these materials may be waived when the submittal information would not be relevant to whether the project complies with the applicable approval standards.

> ***TIP:*** *Local governments will decide which of these recommended plans are required based on the intensity of the proposed development.*

A. Site plan. Narrative description and map of site conditions, including:

> *These recommended site plan elements are only those that relate to water quality and are not intended to replace other site plan elements that should be part of an application.*

1) Existing topography at two-foot (2') contour intervals on site map. The map should extend a minimum of one hundred feet (100') beyond the property line and show thelocation of the property line.

2) Physical characteristics of the site, including the location of water bodies, intermittent water features, wetlands, and the 100-year floodplain boundaries, inner and outer buffer boundaries, and a narrative description of soil characteristics. If wetlands are present on the site, they must be described according to the applicable U.S. Army Corps of Engineers delineation map.

3) Total area of disturbance, including any construction phasing plans and temporary roads that may affect soils or create soil erosion and location of excavation, scrubbing, clearing, stockpiling, or vegetation removal.

4) Proposed development and grading. The map should show elevations, dimensions, location, extent and slope of all proposed clearing and grading,including building site and driveway grades.

5) Map and analysis of any proposed development occurring on more than 15percent (15%) slope.

B. Stormwater Management Plan (SWMP). A plan that demonstrates how the project will be designed to meet the standards for stormwater control on the site, including the following:

> ***TIP:*** *State and federal law requires a* ***Stormwater Construction Permit*** *for stormwater discharged from any construction activity that disturbs at least one acre of land (or is part of a larger common plan of development or sale that will disturb at least one acre). 5 CCR1002-61.2(f)(ii). A stormwater permit is also required for industrial activity and discharge from a regulated municipal separate storm sewer system (MS4). 5 CCR 1002-61.2(e)(ii); 61.2(e)(vi); 61.2(f)(v).*
>
> *These permits include completion of a Stormwater Management Plan. The SWMP for the State should include compliance with local regulations and standards.*

1) Narrative description and site map of drainage features and basin boundaries, including locations of existing and proposed detention facilities, drainage structures, stormwater sewer inlets, or natural drainage features on the site, or adjacent to the site if the features may be impacted by stormwater runoff.

2) Description of receiving waters and neighboring areas, including land uses and existing pertinent features such as lakes, streams, structures, roads, etc.

3) Impervious surfaces**.** Narrative description and site map for minimizing and controlling runoff from impervious surfaces to meet impervious surface standards.

C. **Erosion and Sediment Control Plan.** A plan that demonstrates how the project will be designed to meet the standards for sediment and erosion control.

1) Narrative description and scaled drawings of specific erosion and sediment control measures, including approximate locations of drainage facilities and site drainage patterns. Typical erosion control measures should be depicted using standard map symbols.

2) Construction schedule, indicating the anticipated starting and completion time periods of the site grading and/or construction sequence including the installation and removal of erosion and sediment control measures, and the estimated duration of exposure of each area prior to the completion of temporary erosion and sediment control measures.

3) Estimated total cost of the required temporary soil erosion and sediment control measures to determine performance guarantees for the proposed plan.

4) Calculations made for determining rainfall, runoff, and sizing of any sediment basins, diversions, conveyance, or detention/ retention facilities.

D. **Revegetation Plan.** A plan that demonstrates how the project will be designed to meet the standards for revegetation and revegetation monitoring.

1) Describe anticipated seed source (reputable nursery is requisite).

2) Use site-appropriate native seed mixes based on hydrology, elevation, biophysical characteristics, and reference areas.

E. **Dust Control Plan.** Narrative description and site map of dust control measures.
Measures may include:

> ***TIP**: The Fort Collins Dust Prevention and Control Manual is a good reference: https://www.fcgov.com/airquality/pdf/dust-prevention-and-control-manual.pdf.*

1) Minimizing the disturbed area.

2) Reducing vehicle speeds.

3) Instituting a high wind restriction on construction activities.

4) Sprinkling access and haul roads and other exposed dust-producing areas with water or chemical stabilizers using manufacturer's recommended application rates. Avoid over-application and prevent runoff of chemical stabilizers into any public right-of-way, storm drainage facility, or waterbody.

5) Planting vegetation appropriate for retaining soils or creating a wind break.

6) Installing cover materials during periods of inactivity or during local windspeeds greater than 30 miles per hour and properly anchor the cover.

7) Placing wood chips, gravel or other effective mulches on vehicle and pedestrian use areas.

8) Maintaining the proper moisture condition on all fill surfaces.

9) Pre-wetting cut and fill surface areas.

F. Hazardous Materials Plan. A plan describing the use and disposal of hazardous materials including:

1) Containment measures for all fuel storage areas to prevent release to any waterbody.

2) Measures to prevent spilled fuels, lubricants, or other hazardous materials from entering a waterbodies and groundwater during construction or operation of equipment and/or facility.

3) Areas used for the collection and temporary storage of solid or liquid waste that are designed to prevent discharge of these materials in runoff from the site.

G. Snow Storage Plan. A plan describing snow storage and removal for the site designed to meet the standards.

H. Inspection and Maintenance Plan. A narrative description of all proposed inspection, monitoring, maintenance, and reporting to ensure compliance with the construction, site design, and post-construction standards is effective.

OTHER WATER QUALITY PROTECTION CONSIDERATIONS

The following is a list of other tools local governments may use to protect water quality.This list is not meant to be exhaustive.

A. Water quality in comprehensive plans. Water quality elements of master or comprehensive plans help to incorporate water quality protection and water resource management into a community's vision of the future. Most, if not all, NFRWQPA member jurisdictions reference the importance of water quality in their comprehensive or masterplan. Strong water elements will:

- Establish goals for water quality protection
- Set targets to objectively measure progress
- List strategies to achieve the targets.[10]

B. Water quality as a "purpose" in land use regulations. Many land use regulations delineate the various purposes of permit requirements. Pitkin County, for example, describes the purpose of its land use code this way:

> *(a) It is the policy of the County to preserve and protect its present water resources, recognizing the county's semi-arid character and that significant transmountain and transbasin diversions and the vested rights of senior appropriators have materially curtailed the availability of water resources. Furthermore, wetlands and riparian ecosystems, which are important to maintaining the overall balance of ecological systems, and are important plant communities, wildlife habitat and movement corridors, should be conserved, protected and restored. The County seeks to protect citizens' rights to permanently protected minimum stream flows in rivers and creeks, and to the preservation of remaining natural riparian areas and wetlands.*
>
> *(b) Land uses within the region should be designed to preserve and protect present water resources, including surface and groundwater, and to avoid significant adverse effects on the quantity, quality, or dependability of water resources in the County. Land uses should protect against significant increased salinization of water, loss of minimum instream flows, and the need for future major public expenditures to reacquire or redistribute water resources.*
>
> *(c) To protect water resources and/or riparian habitat, development in areas adjacent to water bodies, functional irrigation ditches and natural water course areas should maintain adequate setbacks where necessary.*[11]

C. Watershed protection ordinances. Colorado law gives local governments authority to regulate within five miles upstream of its drinking water intakes to protect its waterworks from pollution or other injury.[12] These ordinances include water quality protection standards. See Appendix A, Crested Butte's excerpted model watershed protection ordinance, as an excellent example.

---

[10] Adapted from *Coordinated Planning Guide: A How-to for Integrating Alternative Water Supply and LandUse Planning, Brendle Group and Western Resource Advocates, 2018,* *http://www.waterrf.org/PublicReportLibrary/4623B.pdf*.

[11] Pitkin County Land Use Code, Section 8 of its Code, Ch. 1-60-280, available at http://www.pitkincounty.com/DocumentCenter/View/3464.

D. **Low Impact Development (LID).** Low Impact Development (LID) is a stormwater control technique that aims to mimic natural, pre-development hydrological patterns on the development site to protect water quality by minimizing pollutant loads into waterways. LID can also protect riparian corridors, wildlife habitat, baseflow, and groundwater recharge. According to the City of Aspen, "the goal is to manage stormwater as close to its source as possible. In the past, the driving force behind stormwater management was exclusively to move water away from buildings and streets as quickly as possible without any regard to water quality. This meant using pipes and gutters to direct water to detention ponds, retention basins and rivers. This technique has caused significant damage to water quality and the environment."[13]

   The City of Long Beach, CA incentivizes LID in its Municipal Code, providing reductions in its off-site runoff mitigation fee based on the percentage of stormwater that is managed on-site through infiltration. On-site stormwater runoff management between 50 and 74% earns a 25% fee reduction, between 75 and 89% earns a 50% fee reduction, and between 90 and 99% earns a 75% fee reduction.[14] Other good resources for incorporating LID into local codes and planning include a manual of Green Infrastructure for Southwestern Neighborhoods and the Low Impact Development Toolkit for Mesa, AZ, and the City of Aspen website.[15]

E. **Overlay districts.** Overlay districts can protect riparian corridors, flood plains, orenvironmentally sensitive areas. The Town of Breckenridge, for example, instituted the Cucumber Gulch Protection Overlay District to protect sensitive wetlands systems, fenwetlands, and wildlife habitat. Eagle County has a floodplain overlay district to instituteadditional development requirements within the floodplain.[16] Within the District is a designated "preventative management area" with development and activity restrictionsabove and beyond the rest of the Town. Overlay districts can include water quality protection standards.

F. **Transfer of development rights (TDR) programs.** Communities may provide for the transfer of development rights away from areas designated for special protection,such as environmentally sensitive areas, to a different parcel of land. Local regulations may incentivize the transfer of development rights away from areas of specific protection through density bonuses, reduced tap fees, exemptions from certain code standards, or other incentives. Pitkin County has a well-developed Transfer of Development Rights program in conjunction with its Growth Management Quota System.[17]

---

[12] C.R.S. § 31-15-707(b).
[13] City of Aspen website, Low Impact Development, accessed April 5, 2018,https://www.cityofaspen.com/358/Low-Impact-Development.
[14] Long Beach (California), City of. Municipal Code, Chapter 18.74, Low Impact Development Standards; Section 18.74.040(C)(2), LID Plan Review.
[15] *https://www.cityofaspen.com/358/Low-Impact-Development*.
[16] Eagle County Land Use Code, 3-350, available at http://www.eaglecounty.us/Planning/Documents/Article_3_-_Zone_Districts_Revisions_10_20_15_AEW/.
[17] Regulations for both programs are found in Chapter 6 of Pitkin County's Land Use Code, available at http://www.pitkincounty.com/DocumentCenter/View/13604.

G. **"208" Regional Water Quality Plan.** Section 208 of the federal Clean Water Act requires plans for coordinated regional approaches to water quality management ("208 Plan"). NWCCOG is the designated regional water quality management agency for Region 12, and as such NWCCOG prepares and implements the 208 Plan, which functions as a Master Plan for water quality management in Region 12.[18] It provides demographic information, descriptions of wastewater treatment facilities, summaries of transmountain diversions, recommendations for state water quality standards and classifications, and an overview of the Region's water quality over time. Most importantly, it provides policy recommendations for future water quality management in the region.[19] NWCCOG regularly receives requests from member municipalities and counties to evaluate land use and development proposals for compliance with the 208 Plan. Because 208 Plans are adopted pursuant to federal law, and authorized by the State of Colorado, local regulations incorporating 208 policies are less vulnerable to preemption challenges.

H. **Plans for protecting river and stream corridors from land use impacts**. Local plans such as the Brush Creek Water Management Plan in the Town of Eagleidentify values in the stream and riparian corridor that should be protected and thenrequire new development to preserve those values in order to be approved for a development permit.

I. **Stream Management Plans (SMPs).** Developed collaboratively with other local stakeholders, SMPs provide a framework for protecting and improving overall stream or river health, grounded in biology, hydrology, channel morphology, and alternative wateruse and management strategies. Grand County developed the first and best-known stream management plan,[20] and many others in the headwaters are following suit.

J. **Impact fees.** Local governments routinely require developers to pay for the impact of their projects on the community infrastructure.

[18] NWCCOG, *2012 NWCCOG Regional Water Quality Management Plan ("208 Plan)* (updated 2012),available at http://nwccog.org/programs/watershed-services/.
[19] NWCCOG, *208 Plan, Vol. 1: Policy Plan,* http://nwccog.org/wp-content/uploads/2015/04/Vol-1_Policy-Plan-2012-208-Plan.pdf.

[20] http://co.grand.co.us/412/Stream-Management-Plan

K. **River restoration and protection.** Local governments commonly support the restoration and protection of waterways damaged from past land use practices. Abandoned mines, permitted before environmental regulation imposed clean up requirements, are a common source of water quality and riparian damage. *See* Figure 4; *see also* the Colorado Emergency Watershed Protection Program's Guidance on Revegetation Plans for Stream Restoration Projects.

L. **Invasive species regulations or best management practices (BMPs).** Non-native plants such as tamarisk and purple loosestrife, are highly aggressive invaders of wetland and streams, and can destroy wildlife habitat and crowd native vegetation. Landscape regulations may prohibit planting non-native plants or require compliance with BMPs, often in conjunction with a revegetation plan. Planning departments can coordinate with the local noxious weed department or vegetation management department to ensure their noxious weed protections also protect water quality.

M. **Coordination with recreation planning.** Localplanning departments may coordinate with recreationalplanning and open space departments to ensure recreation planning near water resources, such as mountain biking or hiking trails, protect water quality and riparian corridors.

Figure 4 Swan Creek restoration, top photo in 2015, pre-restoration of mine tailings, and bottom photo during restoration in 2017. Courtesy of Summit County, CO, available at http://www.co.summit.co.us/Blog.aspx?CID=5.

N. **Regulations for areas and activities of state interest ("1041 Regulations").** House Bill 1041 (CRS § 24-65.1-101 et seq.), also known as the Areas and Activities of State Interest Act, allows counties and municipalities to designate and regulate areas and activities of state interest. Permit regulations are developed by the local jurisdiction to address such concerns as impacts to water quality, wildlife, local government service delivery, and land use. The purpose of 1041 Regulations is to mitigate the environmental and socio-economic impacts of a designated matter of state interest. After designating a matter of state interest in a public hearing, no development in a designated area and no designated activity can proceed without a local government permit.

O. **Additional regulations for intensive industrial development.** Local governments may establish requirements for particular uses to reduce contaminated runoff. See Gunnison County's excerpted oil and gas regulations, Appendix B, as an excellent example.

P. **Incentivizing clustered development.** Counties may enact regulations that encourage rural development to be clustered in a central area instead of spreading out over a larger acreage to maximize water efficiency, avoid development in hazard areas, preserve agricultural land, protect open space and wildlife habitat, and reduce infrastructure costs. Incentives are utilized in Colorado because subdivisions of 35-acres or larger are allowed by right.[21] *See* Routt County Land Preservation Subdivision Exemptions, Appendix C; *see also* DOLA's model cluster development regulations.[22]

Q. **Traffic and parking regulations.** Traffic and parking regulations may minimize impervious surfaces and potential runoff through low impact development (LID) techniques including requiring alternative residential street layouts with narrower, open section streets; limiting on-street parking to one side of the street where possible; incorporating vegetated swales, permeable paving, vegetated curb extensions, and tree-lined streets; encouraging shared driveways for specific residential uses, and reducing minimum driveway widths.

[21] C.R.S. § 30-28-101(10)(b).

22 https://www.planningforhazards.com/cluster-subdivision-model-and-commentary.

7.7 208 AWQMP WUSA Development Policy

Development standards encourage regional collaboration between Designated Management and Operating Agencies (DMOAs) to build easy-to-maintain treatment and collection systems that are economically feasible rather than costly short-term solutions driven by urban development demands. Local governments recognize that water pollution is caused by and has adverse effects on regional development. Even as wastewater and other treatment facilities have improved, water quality goals have become more difficult to meet. Significant regional issues include stormwater management, construction and nonpoint source pollution, biosolids management, wasteload allocations as part of the TMDL setting processes, watershed implementation and screening, water quality monitoring, and use of OWTSs require innovative, cooperative and affordable long-term regional solutions. Since established local government municipal boundaries or special district boundaries frequently do not follow hydrologic boundaries, there can be an increased cost of service associated with this type of urban growth. The wastewater treatment facility for a given municipality or special district can treat wastewater flows from multiple watersheds using force mains and lift stations at a higher cost than gravity flow systems. Due to multiple service area designations, the duplication of infrastructure can occur within a watershed. Duplication of infrastructure can also result in the underutilization of many transmission, collection, and treatment systems. Local plans have been the driving force behind changes to water supply and/or wastewater service areas. In-fill development could be limited in some areas because of insufficient capacity in existing infrastructure and limited opportunities to upgrade these systems. Two critical components for urban development are wastewater service and supply. Along with transportation facilities, these utilities form the skeleton built by a region. Typical wastewater treatment or water supply systems are designed to accommodate projected development through at least a 20-year time period, with some long-range system designs established for 50 years or more. Individual facilities are often sized to meet growth projections for the next 10 or 20 years. Some facilities, such as major interceptors, may be sized for the ultimate development anticipated in a sanitary sewer service area. Excess capacity in transmission, collection or treatment facilities has sometimes been used by some communities to subsidize development. As a result, population and employment projections developed for some facility plans became self-fulfilling and resulted in population and flow increases occurring faster than anticipated. Since the tax base from commercial development and the desire for new growth have been two driving factors in urban development, competition has been fierce among local governments and special districts for service area designations. The advent of the *WUSA Development Standards* changed the approach so that infrastructure decisions could be made beyond the 20-year planning horizon and, in some instances, consider the region's projected ultimate development. Water and wastewater planning must develop long-range, staged utility plans for the most feasible future service area incorporating these WUSA Development Standards. Although future development patterns can affect water management decisions, these standards allow the focus to be on ensuring protection and maintenance of clean lakes and streams, not using water quality regulation to force some predetermined land-use configuration. Instead, WUSA Development Standards support local decisions at a regional level, rather than water quality regulations potentially affecting where and when urban development occurs. Therefore, WUSA Development Standards establish BMPs for DMOAs, in cooperation with the general-purpose governments they serve and surrounding or adjacent DMOAs to:

1) Identify the areas they intend to serve in the long-term (30-50years); and
2) Provide a means to resolve territorial issues related to wastewater service areas before facilities are designed and constructed.
3) Establish accepted practices across the region to ensure that the North Front Range Water Quality Planning Association supports projects as they proceed through regulatory processes overseen by the Water Quality Control Division and Water Quality Control Commission.
4) Ensure compliance with water quality rules and regulations overseen by the Water Quality Control Division and Water Quality Control Commission.

The following Wastewater Utility Service Area (WUSA) development standards for the Association optimize

regional collection systems using the best available technology at the lowest cost options while providing the general public with economically feasible solutions. The WUSA Development standards shall also adhere to those construction standards within the WQCD Policy DPR-1, as well as requirements in other WQCC and WQCD regulations, policies and guidance. In Region-2, water supply is and will remain a limited resource. A local DMOA coordinated water supply planning involving the water providers will be needed to maximize water supply capacities. It cannot be assumed that all water providers will find sufficient quantities of water to meet all development expectations. Those water providers with surplus water resources could outgrow those providers with limited capacities dictating projected urban development, which will require sanitary services. The foundation of water quality planning is forecasting expected wastewater collection and treatment needs, which is tied to future population projections and urban development. Forecasts define wastewater flow rates and the capacity needed to collect and treat the projected volume of wastewater. Datasets and forecasts for WUSAs are included in the 208 AWQMP.

1) **Nonproliferation of Wastewater Treatment Facilities.** Prior to siting new facilities, existing wastewater treatment facilities should be expanded or consolidated instead of developing new facilities unless not legally or technically feasible.
    a. New WWTFs are not supported within a 5-mile radius of existing WWTFs.
    b. New Regional WWTFs may be built following decommissioning of one or more WWTFs within a 5-mile radius.
    c. New Regional WWTFs may not be built when adjacent collection system service sewer lines are available within two miles of each other.
    d. A maximum of two lift stations are preferred over building new WWTFs.
    e. Existing WWTFs within a 5-mile radius of each other are required jointly to explore consolidation in the Utility Plan process, considering current treatment facilities' life cycle costs and the ability for consolidation regarding their sewer collections systems, i.e., line sizing or capacity. Submitting a thorough examination/assessment report with a record of public consideration and decision for inclusion into the 208 Areawide Water Quality Management Plan (208 AWQMP). Including providing a chosen mechanism for how the regional DMOAs will keep exploring consolidation over the 20-year planning period and provide periodic reports to the Association documenting activities.
    f. WUSAs with collection sewer systems within 2.5-miles of each other are encouraged to examine partnerships and consolidation over WWTF capacity increases or lift stations to provide the general public with economically feasible solutions.
    g. Partnerships and Consolidation of WUSAs are encouraged to optimize regional collection systems by topography and significant landmarks.
    h. Consolidation can result in economies of scale for wastewater treatment and better planning to meet increasingly stringent water quality regulations. Additionally, consolidation generally results in lower user rates over time.
    i. Before siting new facilities, existing wastewater treatment facilities should be expanded or consolidated instead of developing new facilities unless not legally or technically feasible.
    j. The Project will not result in excess capacity in existing water or wastewater treatment services or create duplicate services.

2) The following additional criteria apply to any development of major new domestic water and wastewater treatment systems or major extensions of existing domestic water and wastewater treatment systems:
    a. The Project shall be reasonably necessary to meet projected community development and population demands in the areas to be served by the Project or comply with regulatory or technological requirements.
    b. To the extent feasible, water and wastewater treatment facilities shall be consolidated with existing facilities within the area.
    c. New domestic water and sewage treatment systems shall be constructed in areas which will result in the proper utilization and optimization of existing treatment plants and the orderly development of domestic water and sewage treatment systems of adjacent communities.
    d. The Project shall be permitted in those areas in which the anticipated growth and development that may occur as a result of such extension can be accommodated within the financial and environmental capacity of the area to sustain such growth and development.

e. New domestic water and sewage treatment systems shall be permitted in those areas in which the anticipated growth and development that may occur as a result of such extension outside of current urban development can be accommodated within the financial and environmental capacity of the area to sustain such growth and development.

3) Gravity sewers are preferred over lift stations.
   a. If it can be served by gravity, it shall be served by gravity.
   b. Including examining if an adjacent DMOA WUSA may serve a sewered area by gravity more efficiently, it shall be preferred.

4) Interceptors shall be sized for consolidation sited within 2-miles of an adjacent service area. Interceptors may be staged for ultimate build-out with appropriate economic or right-of-way justification.

5) Lift Stations are allowed when economically infeasible to a gravity sewer within a 5-mile radius.
   a. Proposed lift stations shall include topographical maps illustrating the proposed force main elevations in an elevation profile; additionally, proposed lift stations shall include a gravity line elevation profile displaying sewer line sizes and cost comparisons.
   b. No Lift Stations are allowed when gravity sewer service is available within a 2.5-mile radius.
   c. Lift Stations shall be designed for the build-out capacity for the regional service area intended to be served in the long-term.
   d. Proposed Lift Stations within 2.5 miles of an adjacent sewer service agency that is down gradient must provide a letter of agreement for construction documenting that the area in question cannot be served by the adjacent agency that is down gradient. Agreements must confirm public meeting minutes and the decision.

6) OWTSs are not allowed when a sewer service line is available, according to the local county health department code and Regulation #43.

7) DMOAs must serve new urban developments that flow by gravity within their approved WUSA. Economic hardship is not considered regarding the DMOA or the Developer.

8) Private Wastewater Operations are Discouraged. The ownership and management of wastewater treatment facilities by homeowner associations or private wastewater operators should not be allowed unless there is no other option. The preferred choice is for the local DMOA to assume ownership and operation of lift stations.

9) Economic Feasibility. The Term Economic Feasibility goes beyond the upfront capital cost of the Project being considered. Economic Feasibility should include the long-term maintenance and operation costs of the Project and the financial burden on ratepayers and residents. The Financial burden consists of the existing tax burden and fee structure for government services, including but not limited to assessed valuation, mill levy, rates for water and wastewater collection and treatment, and costs of water supply. Thus, the Project's net effect is the residents' financial burdens and is considered part of the Economic Feasibility of projects. Beyond the financial burden of the ratepayers and residents, the Project should consider the impacts on the local economy. Description of the local economy including but not limited to revenues generated by the different economic sectors and the value of productivity of different lands. Local economic impacts and net effects of the Project on the local economy and opportunities for economic diversification can be illustrated by examining regional opportunities for consolidation. The determination of technical and financial feasibility of the Project may include but is not limited to the following considerations:

   a. Amount of debt associated with the Project.
   b. Debt retirement schedule and sources of funding to retire the debt.
   c. Estimated construction costs and construction schedule with the Project.
   d. Estimated annual operation, maintenance, and monitoring costs with the Project.
   e. Estimated user rates over the 20-year planning period of the Project.
   f. Changes in costs of water and wastewater treatment.

g. Estimated local economy impacts over the 20-year planning period of the Project.
h. Changes in assessed valuation.
i. Changes in Tax revenues and fees to local governments that will be generated by the Project.
j. Changes in tax revenues caused by agricultural lands being removed from production.
k. Changes in opportunities for economic growth and diversification.

10) The Project will not create an undue financial burden on existing or future residents of the Association 208 Planning-Region 2.

11) The Project will not significantly degrade any current or foreseeable future sector of the local economy of the Association 208 Planning-Region 2.

12) The Project will not have a significant adverse effect on the quality or quantity of recreational opportunities and experience of the Association 208 Planning-Region 2.

13) The project's planning, design, and operation shall reflect principles of resource conservation, energy efficiency, and recycling or reuse.

14) The Project shall emphasize the most efficient use of water, including the recycling, reuse, and conservation of water.

15) The Project will not result in excess capacity in existing water or wastewater collection and treatment services or create duplicate services.

16) The Project shall be necessary to meet community development and population demands in the areas to be served by the Project.

17) The Project will not significantly degrade air quality.

18) The Project will not significantly degrade existing visual quality.

19) The Project will not significantly degrade surface water quality.

20) The Project will not significantly degrade groundwater quality.

21) The Project will not significantly degrade wetlands, and riparian areas.

22) The Project will not significantly degrade terrestrial or aquatic animal life or its habitats.

23) The Project will not significantly deteriorate terrestrial plant life or plant habitat.

24) The Project will not significantly deteriorate soils and geologic conditions.

25) The Project will not cause a nuisance.

26) The Project will not significantly degrade areas of paleontological historic, or archaeological importance.

27) The Project will not result in unreasonable risk of releases of hazardous materials.

28) The Project will/will not cause or contribute to urban sprawl or “leapfrog or flagpole” development.

29) Promotes contiguity of development associated with the Project to existing growth centers.

30) The benefits accruing to the County and its citizens from the Project outweigh the losses of any natural, agricultural, recreational, grazing, commercial or industrial resources within the County, or the losses of opportunities to develop such resources.

31) Urban development, population densities, and site layout and design of stormwater and sanitation systems shall be accomplished in a manner that will prevent pollution of surface water and the pollution of aquifer recharge areas.

Pertinent factors relating to the appropriate land use pattern and support the WUSA Development Policy for the Region include:

1) Dispersed land uses necessitate a more extensive utility service network than concentrated patterns, incurring costs considerably higher than would be attributable to a concentrated pattern of development. The greater the dispersion, the greater the linear length of roadways required to connect residences with destination points (employment, shopping, entertainment, etc.). In addition, the effectiveness of public transportation systems depends on concentration of potential users. Lower concentrations and densities result in higher operating costs and generally lead to a greater reliance on the automobile to serve the needs of residents.

2) On a per capita basis, at first glance it would appear that the costs of providing public services (police and fire protection, health, and educational facilities, etc.) would be constant for dispersed and concentrated land use patterns. However, the costs of providing services to a dispersed population can be considerably higher than the costs of providing equal services to a concentrated population. To maintain adequate levels of police and fire protection additional facilities must be built and maintained in the local areas thus increasing the capital operating and maintenance cost of providing such services over the costs that would be incurred in providing a similar level of service to a concentrated population from centralized facilities. For those services where the provision of additional facilities is not necessary to protect the health and welfare of the residents, the costs are still higher for providing services to a dispersed population versus a concentrated one. In these cases, the residents must incur transportation costs of getting to and from the service location, and the farther from the facility they live, the higher the transportation cost.

   In addition, dispersed development may incur inequities in the financial support of public service systems. Those residing in outlying areas may use libraries, museums, parks, and other services in urban areas without appropriate compensation to the municipality providing the service. Hence, the resident of the municipality assumes the burden of costs for others' benefits.

3) As a general rule, the greater the dispersion of land uses, the greater the capital costs of providing utility service systems (water, sewer, energy, and communication). Collection and distribution systems would have to cover more distance to service a dispersed versus a concentrated population; therefore, the capital costs of providing such services would be higher. In addition, concentrated land use patterns provide for the construction of centralized water and sewage treatment plants which can realize the economics of scale and treat water or sewage at a lower per-gallon cost than smaller plants providing treatment for a dispersed population.

4) The economic viability of a recycling and maintenance program for older community areas is directly related to the intensification of use in the area. The outward shift of uses often accounts for the deterioration of the older areas. Recent shifts in residential and commercial activity along the Front Range have occurred at the expense of the downtown areas in these cities.

5) A decreasing supply of land available for development accompanied by a commensurate increase in the value of developable land. In general, the greater the scarcity of developable land, the higher the price such land will bring. If land uses are concentrated, land values for developable land on a per-acre basis would be higher than they would be for a dispersed pattern.

6) Air quality is directly correlated to the distance and number of daily automobile trips. Dispersed land use patterns encourage longer trips; hence, heightening air pollution, while concentrated patterns minimize total vehicle miles traveled thus lessening pollution.

7) Water consumption is directly related to the density of land uses. Per capita consumption ratios are lower in concentrated urban areas than in dispersed suburban communities. Suburban developments use more water than urban developments to irrigate extensive lawn and garden areas. The per capita consumption rate of apartment house dwellers is roughly half that of suburban dwellers [Milne 1976].

8) Noise levels are impacted by the pattern and density of land uses. In a dispersed pattern, the lengths of highways and local streets would be greater than in a concentrated pattern. Consequently, noise impacts would be spread over a larger area. A concentrated pattern would result in increased noise levels at centralized activity points and reduced levels in outlying areas. Therefore, exposure to noise varies significantly with the land use patterns. It should be noted, however, that actual noise exposure is a function of the specific siting of land uses (i.e., a concentration of residents in a high-noise area would expose a greater number of residents than a dispersed pattern). It is the greater opportunity for avoidance of high noise that can be attributed to a concentrated pattern.

9) A dispersed land use pattern will disrupt native vegetation and wildlife to a greater extent than a concentrated pattern. The degree of disruption will depend on the extent of fragmentation of the dispersed uses. The greater the dispersion, the greater the amounts of land that are utilized; consequently, the greater the potential for disruption.

   Development in a concentrated urban pattern would be focused primarily in and around existing urban and suburban areas where vegetation and wildlife have already been disturbed. Species that are less sensitive have adapted to the presence of man. Those of greater sensitivity have migrated to locations away from existing communities or become locally extinct. Continued concentrations of urban uses would have a minimum impact on existing species, while a dispersed pattern would affect outlying areas where sensitive species have migrated, causing substantial disruption.

10) Consumption of natural gas and electricity is a function of housing type, distribution and orientation, and industrial demand. Apartment units consume less energy than single-family units. Consequently, the increasing densities of a concentrated pattern require less energy per unit than a dispersed pattern. Additionally, there is a correlation between the length of a transmission system and the loss of electrical energy. Because a dispersed pattern requires longer transmission systems than a concentrated pattern, it results in higher losses in energy during transmission.

    Gasoline usage is a function of total vehicle miles traveled. In a dispersed land use pattern, vehicle miles traveled are higher than in a concentrated pattern. Therefore, dispersed land-use patterns create higher gasoline consumption on a per capita basis than do concentrated patterns.

11) A dispersed land use pattern would tend to perpetuate fragmentation of public services. As population and land-uses grow and disperse, attempts to consolidate individual special districts and governmental units would be hindered.

    Fragmentation of services often results in a low level of effectiveness and efficiency, and overlapping jurisdictions hinder a coordinated effort to provide for and guide growth. Agencies often compete for available funding, and tax dollars can be spent on capital improvements that contradict improvements made by other agencies. In some cases, improvements bear no relationship to either existing or potential concentrations of population.

    A concentrated pattern of urban and suburban uses would tend to increase the consolidation of the public service districts and their boundaries. Consolidated districts reflecting concentrations of development, whether urban or rural, contribute to the efficiency and effectiveness of guiding growth.

    All of the factors discussed above indicate advantages that could be gained by directing future development in the Region in a concentrated pattern and the disadvantages of allowing development to occur in a dispersed manner. Based on these factors, it is obvious that the Region would benefit through the development and adoption of a land-use strategy that resulted in a concentrated land use pattern promoting consolidation of wastewater collection and treatment based on concentrated urban patterns.

Throughout the Region are numerous communities located along the principal north-south and east-west highways and railroads. Most are located along U.S. Highway 287 (Laporte, Fort Collins, South Fort Collins Sanitation District, Loveland, and Berthoud), U.S. Highway 85 (Nunn, Pierce, Ault, Eaton, Greeley, Evans, LaSalle, Gilcrest, Platteville, Fort Lupton, and Metro Water Recovery), Colorado Highway 60 (Johnstown and Milliken), and U.S. Interstate 76 (Lochbuie, Hudson, Resource Colorado Metro District, and Keenesburg). Others along I-25 include Wellington, Boxelder Sanitation District, Timnath, South Fort Collins Sanitation District, Loveland, Johnstown, Berthoud, Mead, St. Vrain Sanitation District, Erie, and Broomfield. U.S. Highway 34 starting in Rocky Mountain National Park includes Estes Park Sanitation District, Upper Thompson Sanitation District, Loveland, Johnstown, and Greeley.

It is a recommendation of the Association that these agencies along major highways explore opportunities for collection and/or treatment consolidation as well as other opportunities to improve treatment processes with partnerships. Fort Lupton and Metro Water Recovery are trending towards consolidating treatment. Johnstown and Milliken along Colorado Highway 60 are located in close proximity to one another and are trending towards convergence. Others most recently to explore consolidations are Mead and St. Vrain Sanitation District, and Resource Colorado Metro District, Hudson, and Keenesburg.

7.8 208 AWQMP Consolidation Policy

In evaluating the suitability of a proposed site for a domestic wastewater treatment facility the WQCD must consider any approved regional wastewater management plan for the designated area. State law encourages the consolidation of wastewater treatment facilities as part of the approval process. Do not go about consolidation alternatives alone, agencies must involve others and collaborate on alternative solutions and examine them thoroughly. At the request of a Designated Management and Operation Agency (DMOA) the Association will facilitate consolidation meetings. In agreement with Regulation No. 22 Implementation Policy, Consolidation analysis; if it is demonstrated to the satisfaction and the parties involved that any one of the following factors would make consolidation infeasible, no further investigation of consolidation is required.

Not limited to which DMOA is consolidated. The most common response to consolidation is "Consolidation is not feasible at this time." A thorough consolidation examination and analysis answers the fundamental question, "When is consolidation feasible then?" Including DMOAs providing consolidation recommendations to consolidate or for consolidating other DMOAs regionally. Understanding Utility Plans projects and planning recommendations are adopted into the regional 208 planning process. Even though Utility Plans are typically 20-year planning periods consolidation recommendations could be beyond planning horizons. Including providing a chosen mechanism for how the regional DMOAs within a 5-mile radius will keep exploring consolidation in and beyond the 20-year planning period and provide periodic reports to the Association documenting activities and outcomes.

The Association requires the following subjects be thoroughly examined and followed within the Utility Plan report considering regional (DMOA) partnerships or consolidation with the final decision and recommendations being approved by a public process:

1) **WUSA Consolidation or subdivision**

WUSA consolidation and partnership options must be thoroughly assessed considering long-range WUSAs and GMAs to optimize service areas. As adjacent WUSAs or GMAs boundaries encroach or meet, the economic feasibility of service area consolidation improves over more costly treatment facility capacity increases to serve the same local area population. Overloaded collection systems or treatment facilities should consider subdividing their WUSA with local DMOAs with suitable treatment capacity. DMOAs that can provide the same area sewered service by gravity should also be considered to eliminate current or future planned lift stations. Non-urban areas where collection systems are to be constructed should be constructed and sized considering long-term consolidation options. The Association prefers and encourages WUSA partnerships or consolidation for DMOAs within a 5-mile radius over creating additional WWTFs, and gravity sewers over lift

stations. DMOAs have a duty and responsibility to evaluate the best regional solutions for collections systems under the CWA Section 208.

The Project shall be reasonably necessary to meet projected community development and population demands in the areas to be served by the Project, or to comply with regulatory or technological requirements. The determination of whether the Project is reasonably necessary may include but is not limited to the following considerations:

a. Relationship to reasonable growth projections and local land use plans.
b. Relationship to other water and wastewater provider's service area.
c. Whether the Project is not in compliance with regulatory or technological requirements or will not be in compliance in the near future.

2) <u>Treatment Consolidation or Partnership within a 5-mile radius of WWTFs</u>

Larger wastewater treatment facilities can often provide service more effectively while providing a higher degree of treatment than can be achieved through smaller treatment facilities. Consolidation potentially offers significant capital and operational cost savings through economies of scale, reduced points of failure that can lead to SSOs, improve effluent water quality, and improved management and administration through shared resource availability. Based on rates, economics, cost-effectiveness, operations, water quality impacts, physical constraints (topography), and water rights. The Association prefers and encourages WUSA partnerships or consolidation for DMOAs within a 5-mile radius over creating additional WWTFs, and gravity sewers over lift stations. DMOAs have a duty and responsibility to evaluate the best regional solutions for treatment systems under the CWA Section 208.

The Project will not result in excess capacity in existing water or wastewater treatment services or create duplicate services. The determination of whether the Project will result in excess capacity or create duplicate services may include but is not limited to the following considerations:

a. Whether the Project creates overlapping or competing service areas.
b. Whether the Project differs significantly from the provider's facility plan.
c. Whether the Project impacts other water and wastewater permits.

To the extent feasible, wastewater and water treatment facilities shall be consolidated with existing facilities within the area. The determination of whether consolidation is **feasible** shall include but is not limited to the following considerations:

a. Whether there is an opportunity for consolidation.
b. The environmental, financial and social feasibility of consolidation.

New domestic water and sewage treatment systems shall be constructed in areas which will result in the proper utilization of existing treatment plants and the orderly development of domestic water and sewage treatment systems of adjacent communities. The determination shall include but is not limited to the following considerations:

a. Relationship to reasonable growth projections and local land use plans.
b. Proximity to other water and wastewater provider's service area.

3) <u>Population Projections of DMOAs within a 5-mile radius</u>

Discuss consolidation opportunities within and beyond the 20-year horizon period as regional planning alternatives for WWTFs and modifications of WUSAs to be documented within the 208 AWQMP. As population projections demonstrate pinch points, overloaded collection systems or treatment facilities should consider subdividing their WUSA with local DMOAs with suitable treatment capacity. WUSA consolidation opportunities should examine the portion of the UPA boundary beyond the GMA or WUSA currently anticipating consolidation opportunities beyond the 20-year planning horizon. Map and description of other

municipal and industrial water projects in the vicinity of the Project, including their capacity and existing service levels, location of intake and discharge points, service fees and rates, debt structure and service plan boundaries and reasons for and against hooking on to those facilities.

a. Description of existing domestic water and wastewater treatment facilities in the vicinity of the Project, including their capacity and existing service levels, location of intake and discharge points, service fees and rates, debt structure and service plan boundaries, and reasons for and against hooking on to those facilities.
b. Description of how the Project will affect urban development, urban densities, and site layout and design of stormwater and sanitation systems.
c. Description of other water and wastewater management agencies in the Project area and reasons for and against consolidation with those agencies.
d. Description of how the Project may affect adjacent communities and users on wells.

4) Assimilative Stream Segment Capacity Comparison of DMOAs within a 5-mile radius

Within the 20-year planning period and beyond, partnerships and consolidation options should consider population projections and resulting stream segment assimilative capacity projections at 5, 10, 15, & 20-year intervals. Overloaded stream segments and WWTPs (85-95%) should consider partnerships and consolidation options above increasing treatment plant capacities. The Association prefers and encourages consolidation or partnerships above increasing treatment plant capacities within a 5-mile radius. DMOAs have a duty and responsibility to evaluate the best regional solutions to protect, maintain, or restore water quality under the CWA Section 208.

5) Surface Water Quality

Map and/or description of all surface waters to be affected by the Project, including:

a. Description of provisions of the applicable regional water quality management plan that applies to the Project and assessment of whether the Project would comply with those provisions.
b. Existing data monitoring sources.
c. Descriptions of the immediate and long-term impact and net effects that the Project would have on the quantity and quality of surface water under both average and worst-case conditions.

The Project will not significantly degrade surface water quality. The determination of effects of the Project on surface water quality may include but is not limited to the following considerations:

a. Changes to existing water quality, including patterns of water circulation, temperature, conditions of the substrate, extent and persistence of suspended particulates and clarity, odor, color or taste of water.
b. Applicable narrative and numeric water quality standards.
c. Changes in point and nonpoint source pollution loads.
d. Increase in erosion.
e. Changes in sediment loading to waterbodies.
f. Changes in stream channel or shoreline stability.
g. Changes in stormwater runoff flows.
h. Changes in trophic status or in eutrophication rates in lakes and reservoirs.
i. Changes in the capacity or functioning of streams, lakes or reservoirs.
j. Changes in flushing flows.
k. Changes in dilution rates of mine waste, agricultural runoff and other unregulated sources of pollutants.

6) Ground Water Quality

Map and/or description of all groundwater, including any aquifers. At a minimum, the description should include:

a. Seasonal water levels in each subdivision of the aquifer affected by the Project.
b. Artesian pressure in aquifers.
c. Groundwater flow directions and levels.
d. Existing aquifer recharge rates and methodology used to calculate recharge to the aquifer from any recharge sources.
e. For aquifers to be used as part of a water storage system, methodology and results of tests used to determine the ability of aquifer to impound groundwater and aquifer storage capacity.
f. Seepage losses expected at any subsurface dam and at stream-aquifer interfaces and methodology used to calculate seepage losses in the affected streams, including description and location of measuring devices.
g. Existing groundwater quality and classification.
h. Location of all water wells and their uses.
i. Description of the impacts and net effect of the Project on groundwater.

The Project will not significantly degrade groundwater quality. The determination of effects of the Project on groundwater quality may include but is not limited to the following considerations:

a. Changes in aquifer recharge rates, groundwater levels and aquifer capacity including seepage losses through aquifer boundaries and at aquifer-stream interfaces.
b. Changes in capacity and function of wells within the impact area.
c. Changes in quality of well water within the impact area.

7) Water Quantity

a. Map and/or description of existing stream flows and reservoir levels.
b. Map and/or description of existing Colorado Water Conservation Board held minimum stream flows.
c. Descriptions of the impacts and net effect that the Project would have on water quantity.
d. Statement of methods for efficient utilization of water.

8) Floodplains, Wetlands, and Riparian Areas

a. Map and/or description of all floodplains, wetlands, and riparian areas to be affected by the Project, including a description of the types of wetlands, species composition, and biomass.
b. Description of the source of water interacting with the surface systems to create each wetland (i.e., side slope runoff, over-bank flooding, groundwater seepage, etc.).
c. Description of the impacts and net effect that the Project would have on the floodplains, wetlands and riparian areas.

The Project will not significantly degrade wetlands and riparian areas.
The determination of effects of the Project on wetlands and riparian areas may include but is not limited to the following considerations:

a. Changes in the structure and function of wetlands and riparian areas.
b. Changes to the filtering and pollutant uptake capacities of wetlands and riparian areas.
c. Changes to aerial extent of wetlands and riparian areas.
d. Changes in species' characteristics and diversity.
e. Transition from wetland to upland species.
f. Changes in function and aerial extent of floodplains.

9) Regional DMOA Credit Trading.

Partnerships and consolidation options may include water quality trading credits for water quality-based permitted limits, parameters of concern, and assimilative capacity. As population and loading projections demonstrate water quality-based limit pinch points, overloaded stream segments should consider credit trading with local DMOAs with suitable treatment or assimilative capacity.

10) CIP Economic Feasibility Studies of DMOAs within a 5-mile radius.

Within the 20-year planning period and beyond, DMOA CIP projects must provide economic feasibility studies compared to consolidation and partnership options for DMOAs within a 5-mile radius. DMOAs have a duty and responsibility to evaluate the best regional solutions to ensure that present and future wastewater needs are financially feasible for the general public as ratepayers under the CWA Section 208. Economic Feasibility. The Term Economic Feasibility goes beyond the upfront capital cost of the project being considered. Economic Feasibility should include the long-term maintenance and operation costs of the project as well as the financial burden on ratepayers and residents. The Financial burden includes the existing tax burden and fee structure for government services including but not limited to assessed valuation, mill levy, rates for water and wastewater collection and treatment, and costs of water supply. Thus, the project's net effect is the residents' financial burdens and is to be considered part of the Economic Feasibility of projects. Beyond the financial burden of the ratepayers and residents the project should consider the impacts on the local economy. Description of the local economy including but not limited to revenues generated by the different economic sectors, and the value of productivity of different lands. Local economic impacts and net effects of the project on the local economy and opportunities for economic diversification can be illustrated by examining regional opportunities for consolidation.

11) User Rate Studies of DMOAs within a 5-mile radius.

Within the 20-year planning period and beyond, including the known ratepayer DMOA increases provided here within, provide ratepayer economic feasibility studies compared to consolidation and partnership options for DMOAs within a 5-mile radius. DMOAs have a duty and responsibility to evaluate the best regional solutions to ensure that present and future wastewater needs are financially feasible for the general public as ratepayers under the CWA Section 208.

12) Consolidation Record of Public Participation.

Provide a discussion of public meetings, dates, and public hearings, including a general review, comment, and approval component. If a public hearing was held to consider partnerships or consolidation, provide minutes of that meeting in the appropriate appendix as outlined within the checklist, including the economic feasibility options presented for consideration during the public hearing. Confirm regional consolidation decisions, including the reasons for or against, with meeting minutes by the involved agencies' decision-making authorities. Meeting minutes should identify legally responsible personnel with decision-making authority (i.e., mayor, president/chair of the council/board, town or city council/board, public works director, owner, corporate officer, other authorized officials, etc.) with the business, organization, or municipality. The Association and its member DMOAs aspire to be a highly respected regional leader resolving wastewater regional water quality planning issues. DMOAs are a source of reliable information and data utilizing the administrative public comment and decision process. This Association’s vision cannot happen without public participation.

a. In the event that multiple attempts have been made to engage DMOAs, provide documentation and timelines in which those DMOAs have declined to participate in consolidation discussions.

Works Cited

Boulder County. (n.d.). *Boulder County, Colorado Stream, Wetland, and Water Body Regulations.* Retrieved from https://bouldercolorado.gov/plan-develop/stream-wetland-water-body-protection

Brendle Group and Western Resource Advocates. (2018). *Coordinated Planning Guide: A How-to for Intergrating Alternative Water Supply and Land Use Planning.* Retrieved from https://www.waterrf.org/PublicReportLibrary/4623B.pdf

Center for Watershed Protection and United States Environmental Protection Agency. (2005). *Wetlands and Watersheds: Adapting Watershed Tools to Protect Westlands.* Retrieved from

https://www.northinlet.sc.edu/training/media/resources/Article3Adapting%20Tools%20Protect%20Westlands.pdf

Chandler City, Arizona. (n.d.). *LUC, 35-1900.* Retrieved from http://www.municode.com/resources/gateway.aspx?production=10158

City of Aspen, Colorado. (n.d.). *LCU 26-435.* Retrieved from https://www.cityofaspen.com/DocumentCenter/View/359

CIty of Bozeman, Montana. (n.d.). *Unified Development Code, 38.06.010et seq.* . Retrieved from https://library.municode.com/mt/bozeman/codes/code_of_ordinances?nodeId=PTIICOOR_CH38UNDECO

City of Flagstaff, Arizona. (n.d.). *Code, Titles 11-14.* Retrieved from http://www.codepublishing.com/AZ/Flagstaff/

City of Fort Collins, Colorado. (n.d.). *Colorado LUC, 3.4.* Retrieved from https://www.fcgov.com/cityclerk/codes.php

City of Reno, Nevada. (n.d.). *Land Development Code, Public Works Design Manual.* Retrieved from https://library.municode.com/nv/reno/codes/land_development_code

City of South Lake Tahoe, California. (n.d.). *City of South Lake Tahoe, California Code.* Retrieved from https://www.codepublishing.com/CA/SouthLakeTahoe/

City of Vail, Colorado. (n.d.). *City Code, 9-1-2, Water Quality, and 14-1-2, Development Standards.* Retrieved from https://codelibrary.amlegal.com/codes/vailco/latest/vail_co/0-0-0-21600

Colorado Department of Local Affairs. (2016). *Planning for Hazards Guide: Land USe Solutions for Colorado.* Retrieved from https://www.planningfor hazards.com/home

Colorado Emergency Watershed Protection Program. (2016). *Restoration Plans for Stream Restoration Projects.* Retrieved from https://coloradowp.com/sites.colorado.com/files/document/pdf/EWP_RevegetationPlans_20160705_FINAL.pdf

Colorado Emergency Watershed Protection Program. (n.d.). *Plant Restoration Matrix.* Retrieved from https://coloradoewp.com/document/plant-restoration-matrix

Colorado Municiple League and Colorado Department of Local Affairs. (2013). *Small Town Solutions: A Practical Guide for Municpal Leaders.* Retrieved from https://www.cml.org/Issues/Government/Municipal/Small-TownSolutions--A-Practical-Guide-for-Municpal-Leaders/

Colorado State University. (2020). *Environmental Resource Assessment and Management System (eRAMS).* Retrieved from CLEAN Dashboard: https://erams.com/map/

Colorado State University. (2022). *Environmental Resource Assessment and Management System (eRAMS).* Retrieved from Watershed Rapid Assessment Program (WRAP): https://erams.com/map/

Colorado Water Conservation Board. (2015). *Colorado's Water Plan.* Retrieved from https://cwcb.colorado.gov/read-plan

CWQCC. (2018). *A Guide to Colorado Programs for Water Quality Management and Safe Drinking Water.* Denver.

Donal L. Elliot, G. E. (2015). *Colorado Land Planning and Development Law, Tenth Ed. CLE in Colo., Inc.* Retrieved from http://cle.cobar.org/Books/Product-Info/product/ACLPAD15B

Forest, C. /. (2011). *Water and Its Relationship to the Economies of the Headwaters Counties, Northwest Colorado Council of Governments.* Retrieved from https://nwccog.org/wp-content/uploads/2015/03/QQStudy_Report_Jan-2012.pdf

National Association of Counties. (2001). *Protecting Water Resources: Local Government Roles and Options for the*

Rocky Mountation and Northern Great Plains.

Northwest Colorado Council of Governments. (n.d.). *Municipality & County Local Comprehensive Plan Development.*

Northwest Colorado Council of Governments. (n.d.). *Water Quality Protection Standards for Construction.*

Orgen Department of Land Conservation and Development. (2000). *Water Quality Model Code and Guidebook* . Retrieved from http:/www.orgen.gov/LCD/pages/waterqualtiygb.aspx

Pitkin County, Colorado. (n.d.). *Colo. LUC, 7-22-80.* Retrieved from https://pitkincounty.com/DepartmentCenter/View/13605

Salt Lake City, Utah. (n.d.). *Utah Code of Ordinances, Stormwater Guidance Documents.* Retrieved from https://library.municode.com/ut/salt_lake_county/codes/code_of_ordinances?nodeId=16602

San Miguel County, Colorado. (n.d.). *LUC, 5-22.* Retrieved from https://www.sanmiguelcountyco.gov/DocumentCenter/View/214/Article-5---Standards-Updated-1221-PDF?bidId=

Summit County, Colorado. (n.d.). *Land Use and Development Code, Ch. 7.* Retrieved from https://www.summitcountyco.gov/255/Land-Use-Development-Code

Tahoe Regional Planning Agency. (2014). *Best Management Practices Handbook.* Retrieved from http://tahoe.org/Documents/BMPHandbook/BMP_Handbook.pdf

Teton County, Wyoming. (n.d.). *LUC, 5.1.1.* Retrieved from http://www.tetoncountywy.gov/656/Wetland-Stream-River-Setback-Violations

Town of Breckenridge. (n.d.). *Colorado Development Code, Title 9.* Retrieved from http://www.sterlingcodifiers.com/codebook/index.php?book_id=878

Town of Crested Butte. (n.d.). *Colorado Municipal Code, Chs. 14, 16-17.* Retrieved from https://library.municode.com/co/crested_butte/codes/municipal_code

Town of Eagle, Colorado. (n.d.). *Brush Creek Management Plan.* Retrieved from https://www.townofeagle.org/DocumnetCenter/View/5651

Town of Jackson, Wyoming. (n.d.). *Wyo. LUC, Art. 5-7.* Retrieved from http://www.tetoncoutnywy.gov/DocumentCenter/Home/View/1670

Urban Drainage and Flood Control District. (1969, update 2016). *Urban Storm Drainage Criteria Manual, Vols. 1-3.* Retrieved from http://udfcd.org/criteria-manual

US EPA . ([As Amended Through P.L. 107–303, November 27, 2002], May 27). *History of the Clean Water Act.* Retrieved from FEDERAL WATER POLLUTION CONTROL ACT: https://www.epa.gov/sites/default/files/2017-08/documents/federal-water-pollution-control-act-508full.pdf

US EPA. (1976). *Handbook for Coordination of State and Designated Areawide Water Qualtiy Management Agencies.* Washington, D.C.

US EPA. (2012). *The Economic Benefits of Protecting Health Watersheds.*

US EPA. (2016). *Intergrating Watershed Assessment and Protection across EPA.*

US EPA. (2018, January 24). *Urban Runoff: Model Ordinances to Prevent and Control Nonpoint Source Pollution.* Retrieved from https://www.epa.gov/nps.urban-runoff-model-ordinances-prevent-and-control-nonpointsource-pollution

US EPA. (n.d.). *Aquatic Buffer Model Ordinance*. Retrieved from https:www.epa.gov/sites/production/files/2015-12/documents/2002_09_19_nps_ordinanceuments_buffer_model_ordinance1.pdf

US EPA Office of Water Nonpoint Source Control Branch. (2008). *Handbook for Developing Watershed Plans to Restore and Protect Our Waters*. Washington D.C.: EPA 841-B-08-002.

WQCD. (2018). *Integrated Water Quality Monitoring & Assessment Report*.

WQCD. (2020). *Integrated Water Quality Monitoring & Assessment Report*.

WQCD. (2020). *Regulation 22 Site Location and Design Regulations for Domestic Wastewater Treatment Works*.

WQCD. (2022). *Integrated Water Quality Monitoring & Assessment Report*.

Wright Water Engineers & Denver Regional Council of Governments. (1999, September). *Mountain Driveway Best Management Practices Manual, Colorado Nonpoint Source Council*. Retrieved from http://www.wrightwater.com/assest.8-mountain-driveway-bmps.pdf

208 Areawide Water Quality Management Plan Requirements Crosswalk	
WQCC Policy 98-2 Regional Water Quality Management Plans Key Component	**NFRWQPA 208 Areawide Water Quality Management Plan**
1. The identification of treatment works necessary to meet the anticipated municipal and industrial waste treatment needs of the area over a twenty-year period, necessary wastewater collection and urban stormwater runoff systems, necessary financial arrangements, land acquisition needs, and recreational use considerations associated with these treatment works;	Chapter 3 – River Basin Population and Loading Projections Chapter 4 – Agency Regional Financial Summary Chapter 7 – NFRWQPA 2022 – 208 AWQMP Recommendations or Actions
2. The establishment of construction priorities for such treatment works and time schedules for the initiation and completion of all treatment works;	Chapter 1 – Introduction (The 208 AWQMP Endorsed Project Construction Listing online)
3. The identification of regulatory programs to manage waste treatment, including applicable pretreatment requirements and the location, modification, and construction of any facilities that may result in any discharge in an area;	Chapter 1 – Introduction Chapter 2 –Chapter 2 – Areawide Water Quality Management Plan(s) Chapter 4 – Agency Regional Financial Summary Chapter 5 – Water Quality Chapter 6 – Section 208 Planning Requirements Chapter 7 – NFRWQPA 2022 – 208 AWQMP Recommendations or Actions
4. The identification of those agencies necessary to construct, operate, and maintain all facilities required by the plan and otherwise to carry out the plan;	Chapter 1 - Introduction
5. The identification of the measures those agencies deem necessary to carry out the plan, the period of time necessary to carry out the plan, and the costs of carrying out the plan within such time;	Chapter 2 – Areawide Water Quality Management Plan(s)
6. Processes to identify nonpoint source pollution (including from agricultural, silvicultural and unregulated mining activities), control the disposition of all residual waste generated in an area which could affect water quality and control the disposal of pollutants on land or in subsurface excavations within an area to protect ground and surface water quality.	Chapter 5 – Water Quality Chapter 7 – NFRWQPA 2022 – 208 AWQMP Recommendations or Actions