

## **End of Chapter Exhibits for Republican River Basin Plan**

**Exhibit 12-1. in text**

**Exhibit 12-2. in text**

Exhibit 12-3. Republican River Basin and Major Tributaries

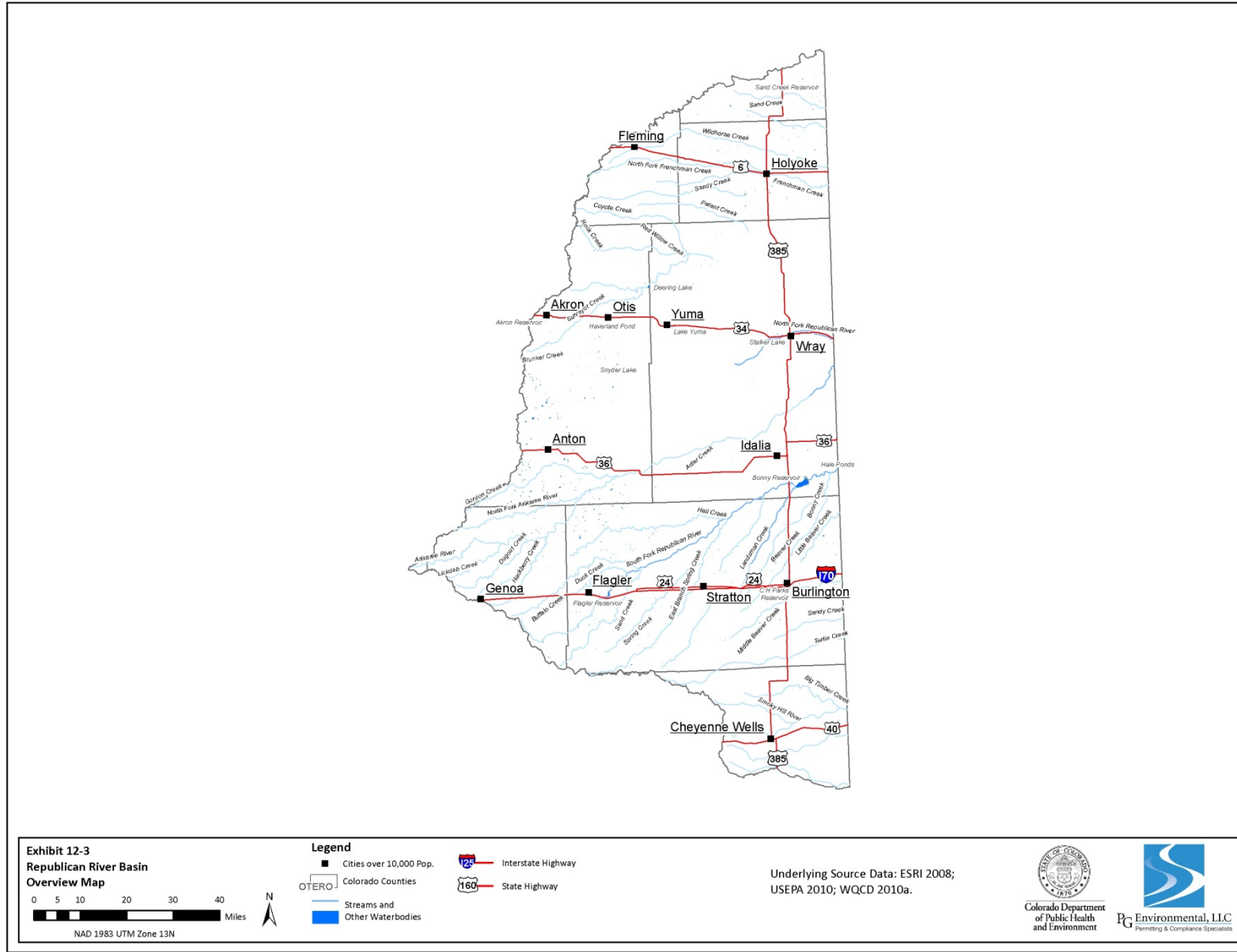


Exhibit 12-4. Republican River Basin Level III Ecoregions

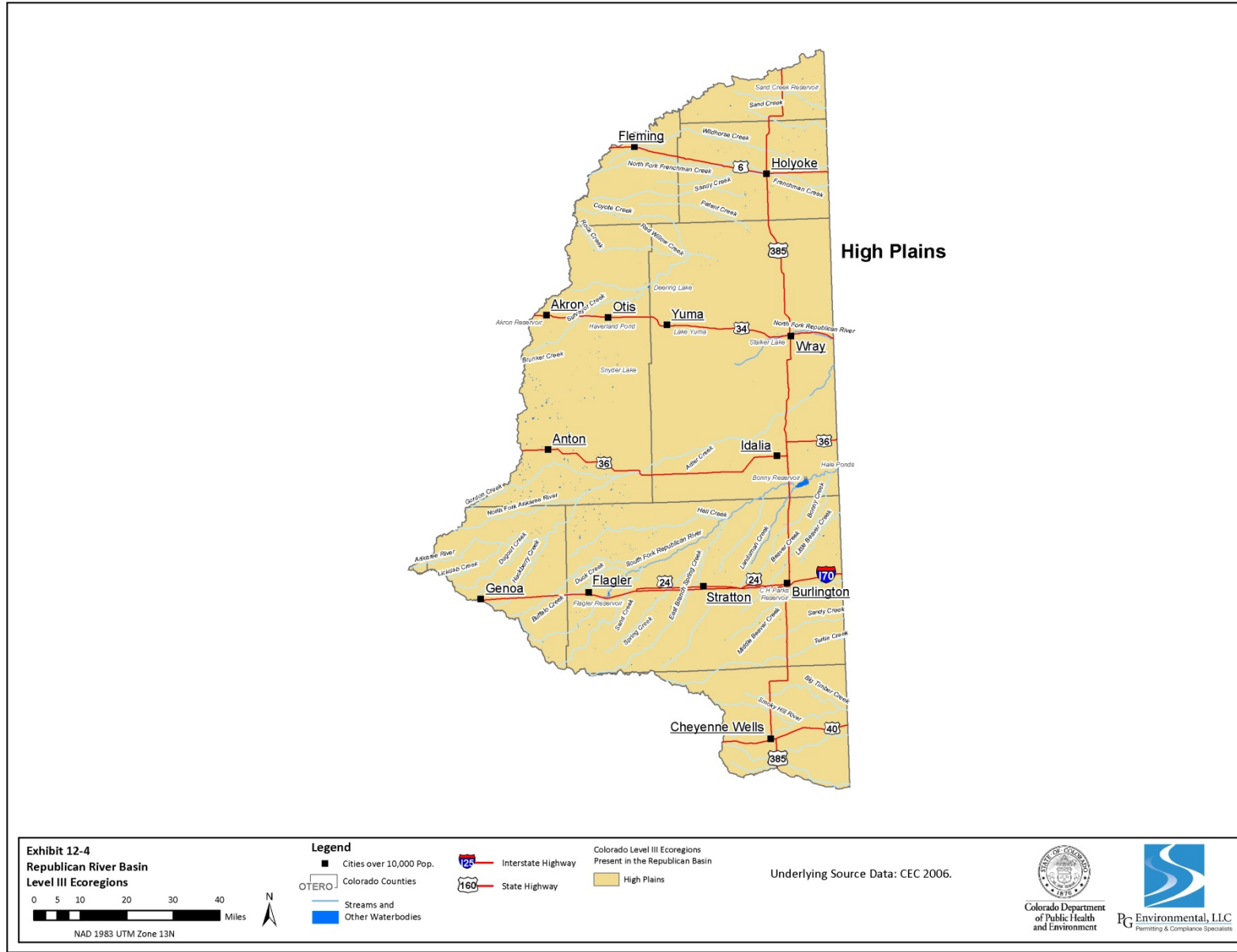


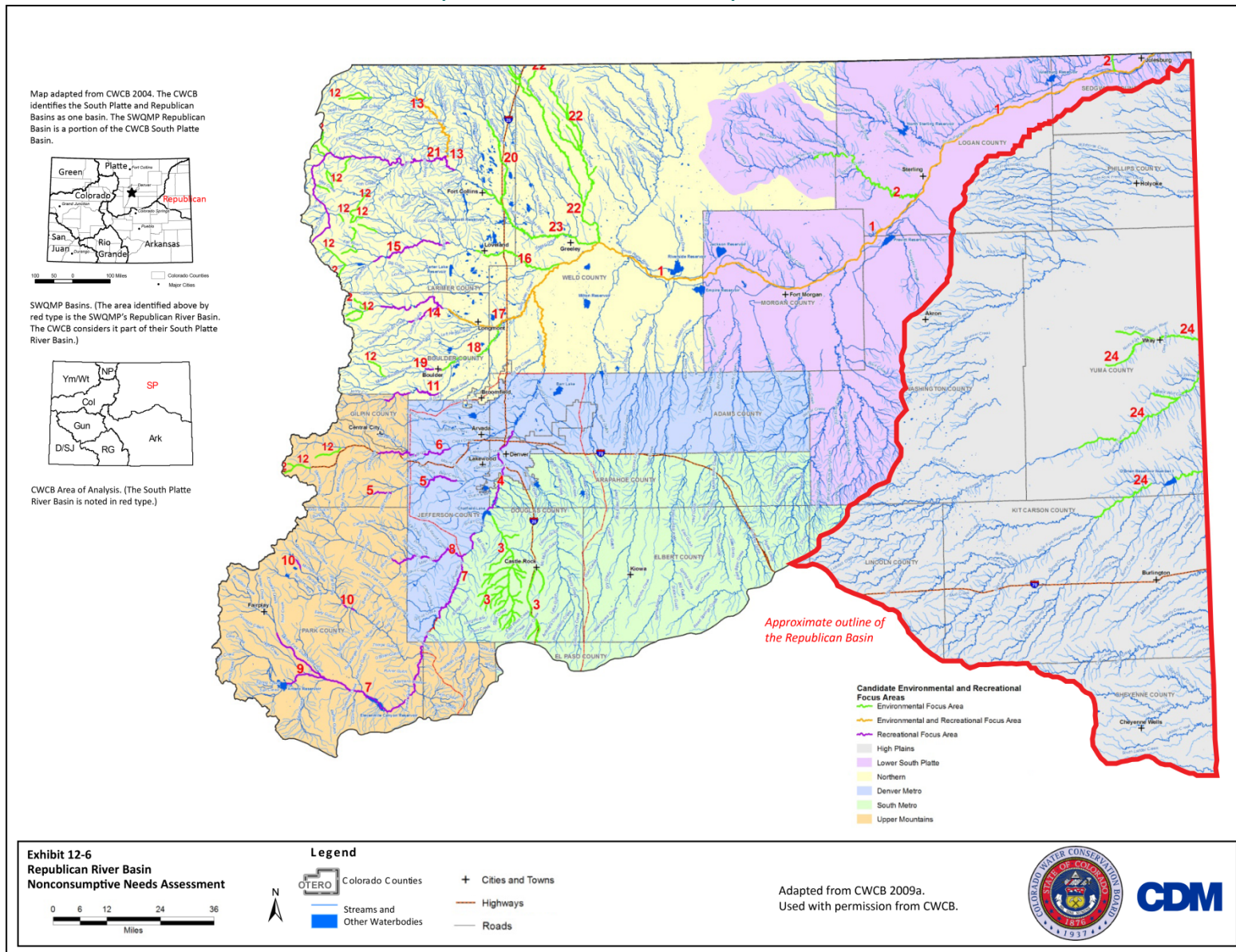


Exhibit 12-5. Republican River Basin Endangered and Threatened Species

Species		Status	
		Federal	State
<b>Endangered Species</b>		<b>Federal</b>	<b>State</b>
Fish	Plains Minnow ( <i>Hybognathus placitus</i> )		√
	Suckermouth Minnow ( <i>Phenacobius mirabilis</i> )		√
Birds	Whooping Crane ( <i>Grus americana</i> )	√	√
	Least Tern ( <i>Sterna antillarum</i> )	√	√
Total Endangered Species		2	4
<b>Threatened Species</b>		<b>Federal</b>	<b>State</b>
Fish	Brassy Minnow ( <i>Hybognathus hankinsoni</i> )	√	√
Birds	Piping Plover ( <i>Charadrius melodus circumcinctus</i> )	√	√
	Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	√	√
	Burrowing Owl ( <i>Athene cunicularia</i> )		√
	Lesser Prairie-chicken ( <i>Tympanuchus pallidicinctus</i> )		√
Total Threatened Species		3	5
<b>State Species of Special Concern (not a statutory category)</b>		<b>Federal</b>	<b>State</b>
Fish	Stonecat ( <i>Norturus flavus</i> )		√
	Plains Orangethroat Darter ( <i>Etheostoma spectabile</i> )		√
Amph.	Northern Cricket Frog ( <i>Acris crepitans</i> )		√
	Northern Leopard Frog ( <i>Rana pipiens</i> )		√
	Plains Leopard Frog ( <i>Rana blairi</i> )		√
Reptiles	Midget Faded Rattlesnake ( <i>Crotalus viridis concolor</i> )		√
	Yellow Mud Turtle ( <i>Kinosternon flavescens</i> )		√
	Massasauga ( <i>Sistrurus catenatus</i> )		√
	Common Garter Snake ( <i>Thamnophis sirtalis</i> )		√
Birds	Greater Sandhill Crane ( <i>Crus Canadensis tabida</i> )		√
	American Peregrine Falcon ( <i>Falco peregrinus anatum</i> )		√
	Mountain Plover ( <i>Charadrius montanus</i> )		√
	Western Yellow-billed Cuckoo ( <i>Coccyzus americanus</i> )		√
	Ferruginous Hawk ( <i>Buteo regalis</i> )		√
	Western Snowy Plover ( <i>Charadrius alexandrinus</i> )		√
	Long-billed Curlew ( <i>Numenius americanus</i> )		√
Mammals	Black-tailed Prairie Dog ( <i>Cynomys hludovicianus</i> )		√
	Northern Pocket Gopher ( <i>Thomomys talpoides macrotis</i> )		√
	Swift Fox ( <i>Vulpes velox</i> )		√
Total State Species of Special Concern		NA	19

Sources: CDOW 2010; CWCB 2004.

Exhibit 12-6. Republican River Basin Nonconsumptive Needs Assessment



<sup>1</sup> The nonconsumptive needs assessment map focuses on environmental and recreational areas for the following purposes: (1) to serve as a guide for water supply planning to avoid future conflicts over environmental and recreational needs; (2) to assist in identifying environmental and recreational water needs status; (3) to help basins plan for the water needs of species of special concern; and (4) to provide opportunity for collaborative efforts for future multi-objective projects. The SWQMP Republican River Basin is included in the CWCB South Platte and the CWCB South Platte map was developed by splitting the basin into different geographic focus areas. The focus areas are color coded on the South Platte section of the exhibit. Additional information on the environmental and recreational areas included in the CWCB South Platte map can be found in appendix D of CWCB 2009a.

Exhibit 12-7. Republican River Basin Precipitation

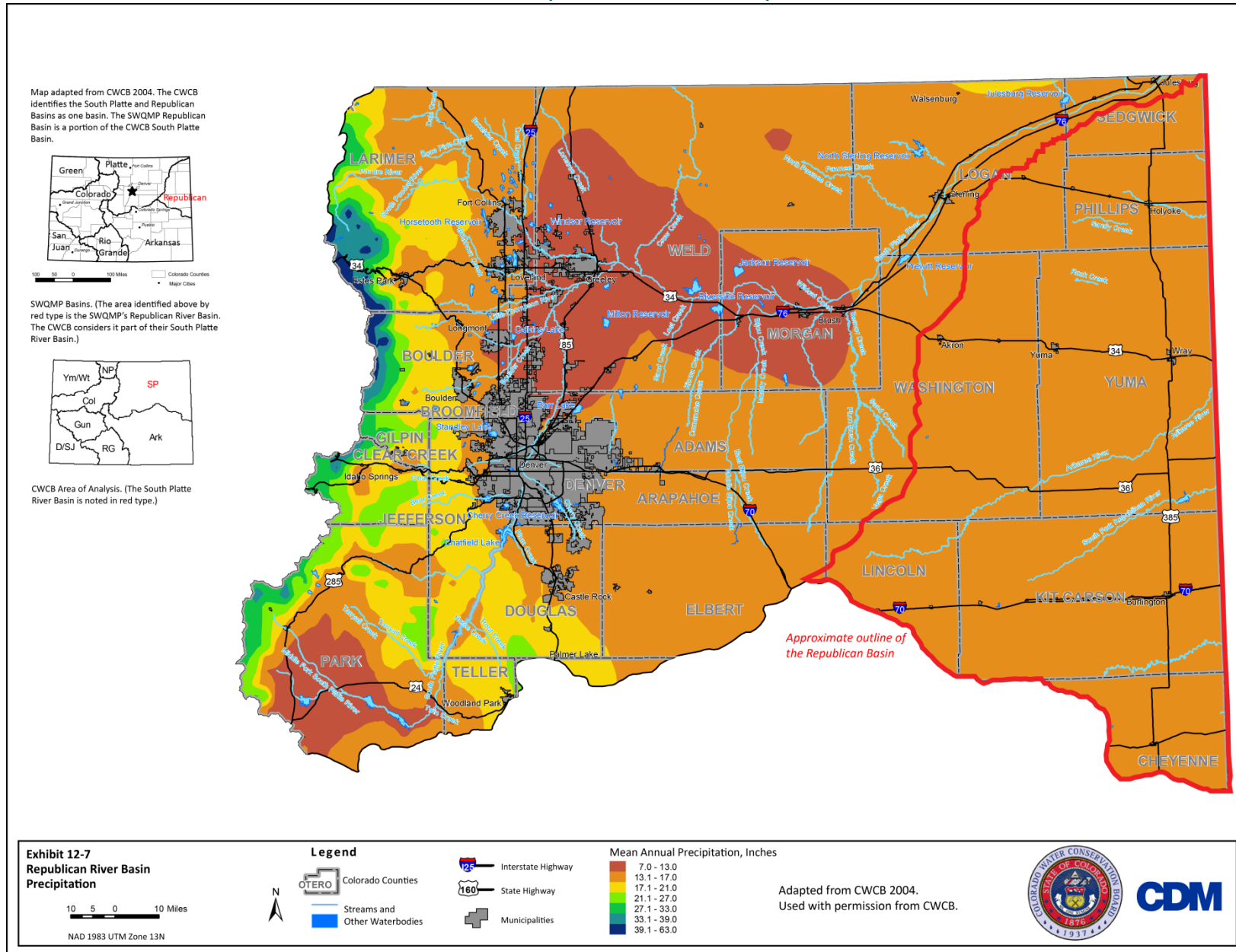


Exhibit 12-8. Republican River Basin Land Ownership

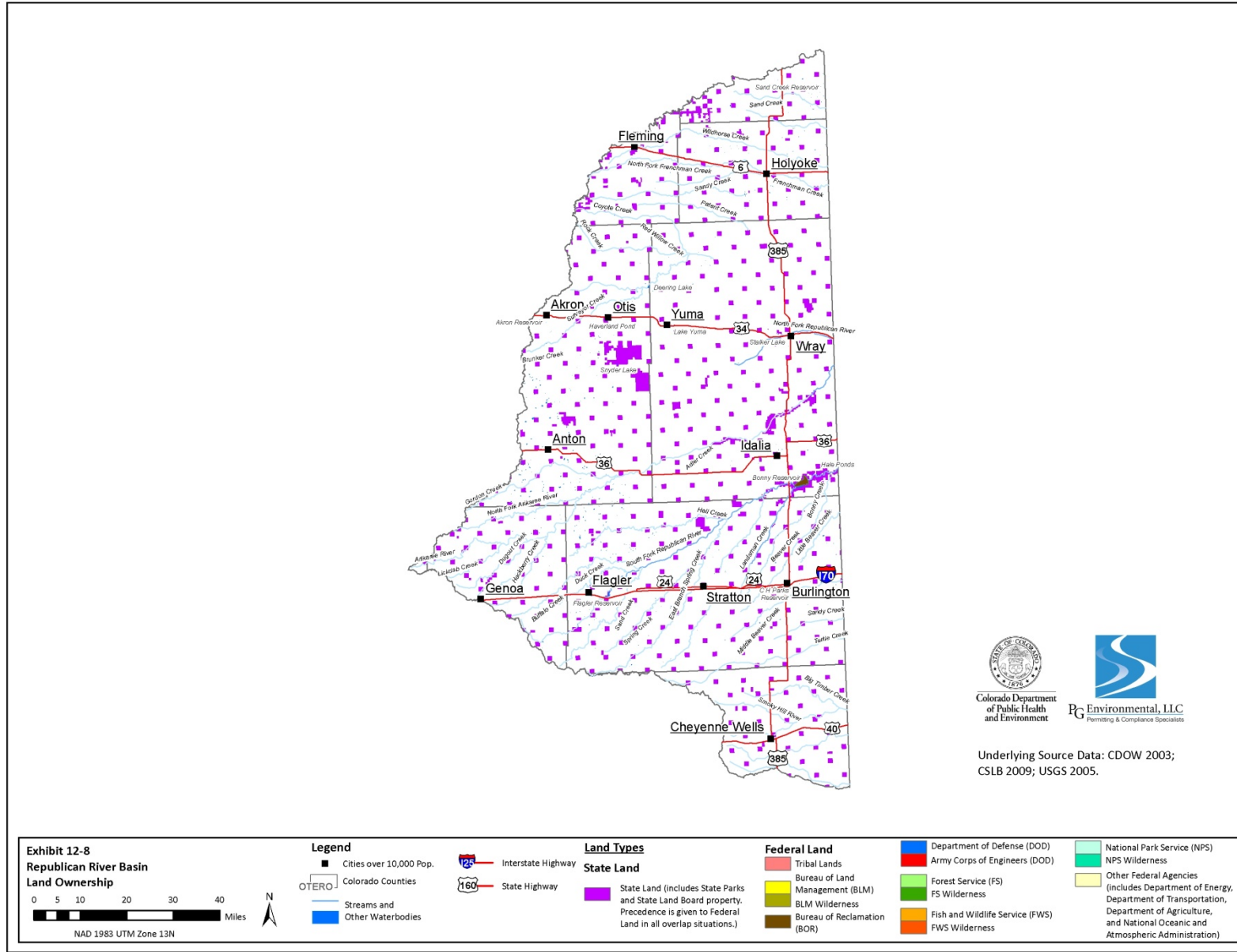
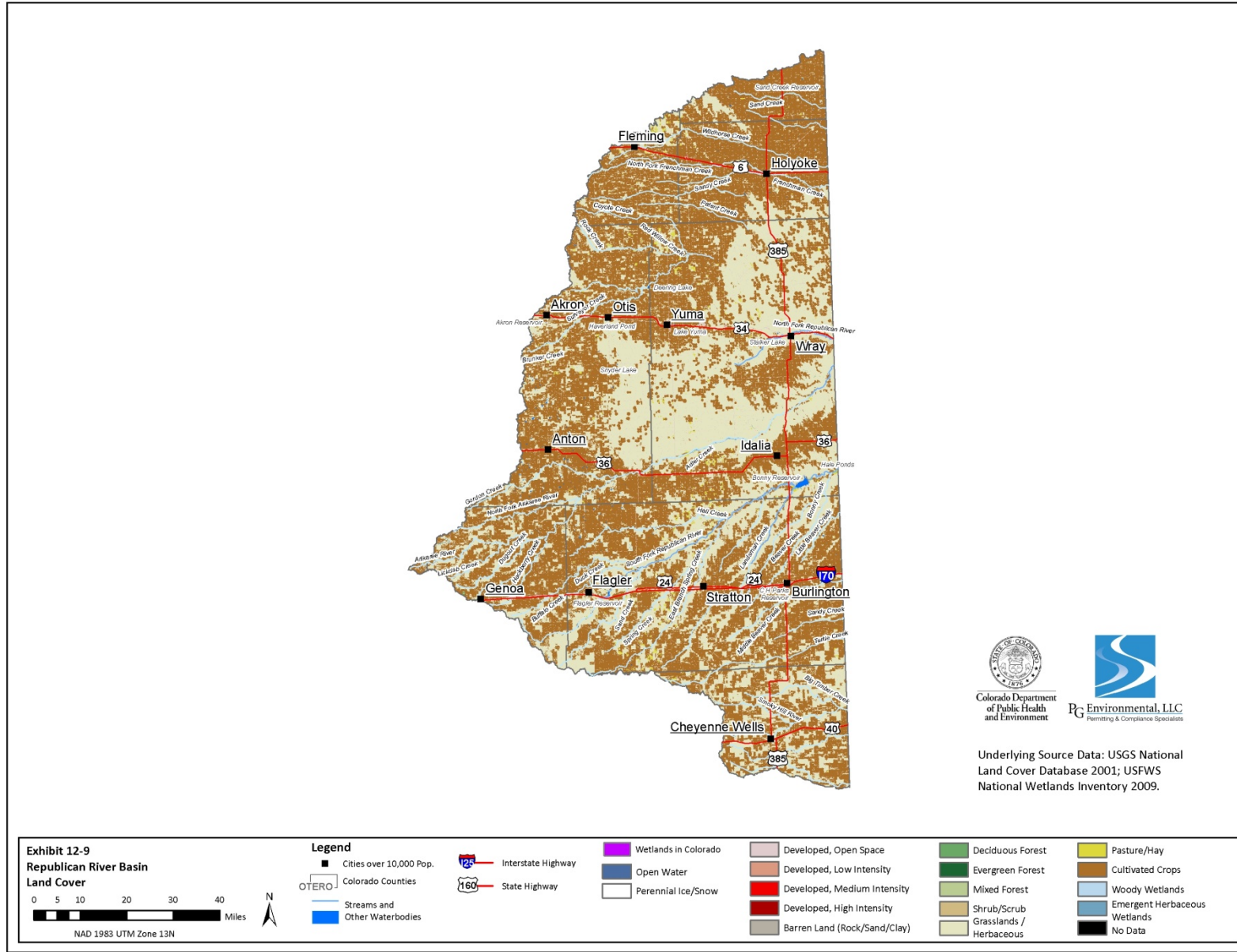


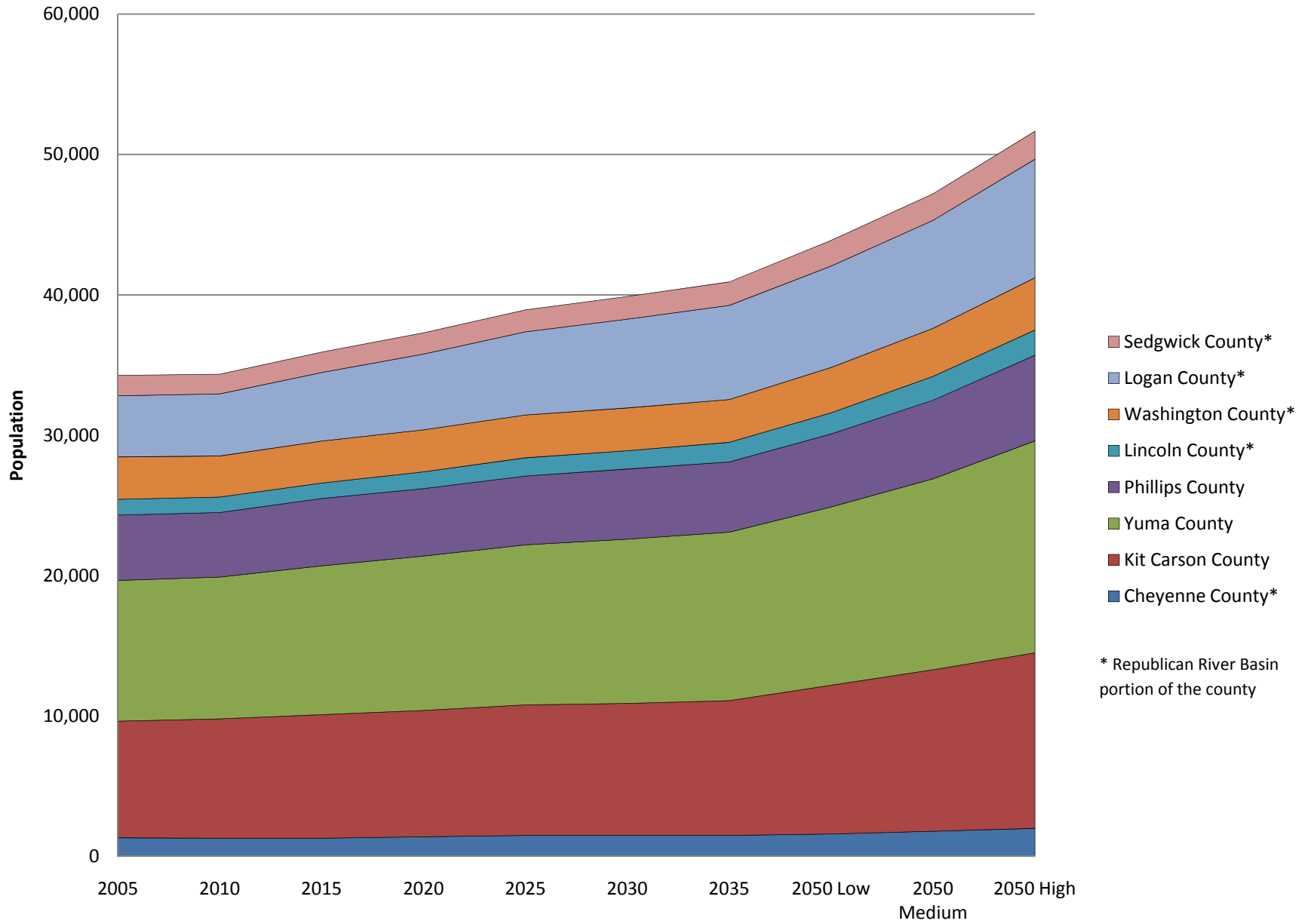


Exhibit 12-9. Republican River Basin Land Cover



**Exhibit 12-10. in text**

Exhibit 12-11. Republican River Basin Population Projections



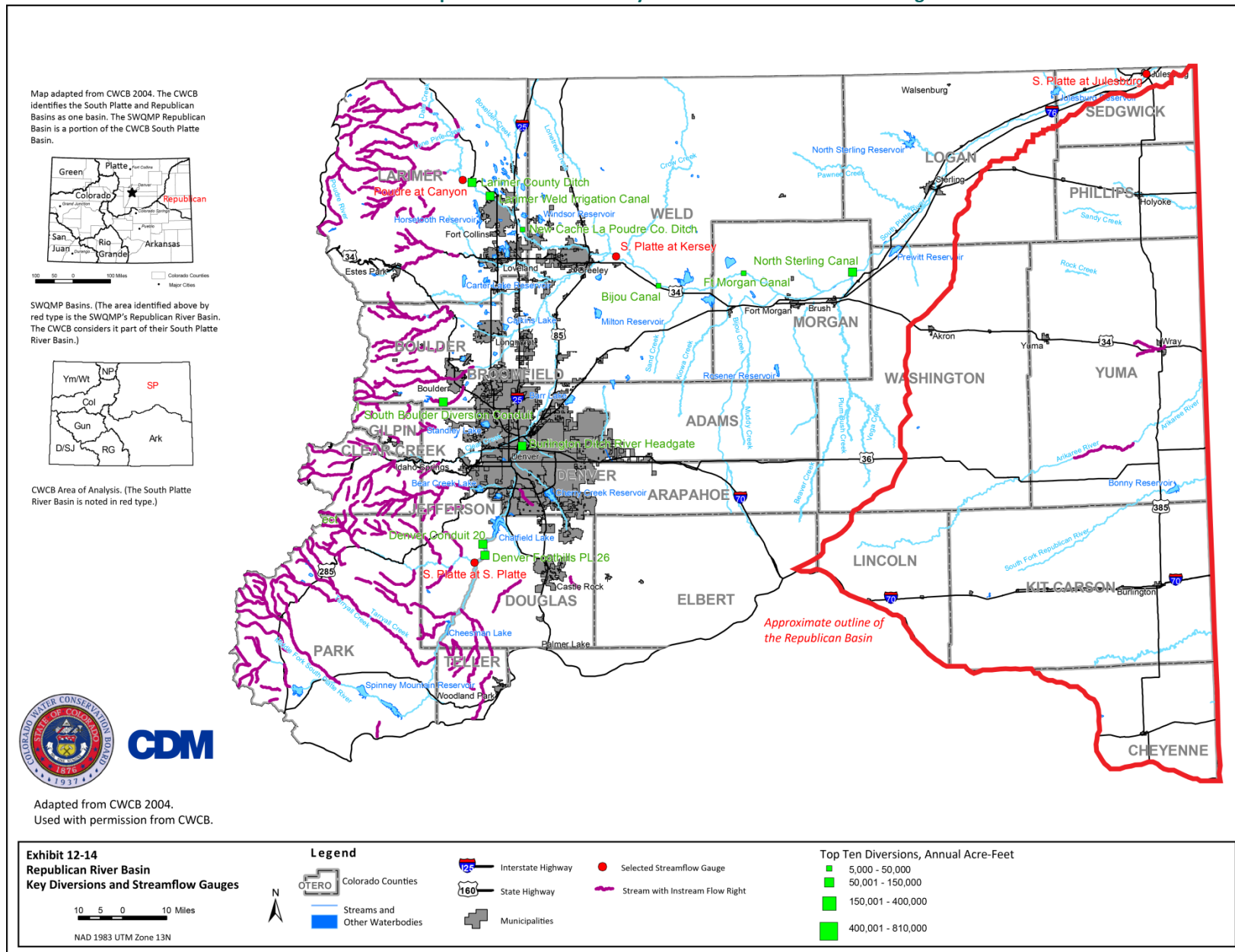
Source: CWCB 2010, DOLA 2010.

**Exhibit 12-12. in text**

**Exhibit 12-13. in text**



Exhibit 12-14. Republican River Basin Key Diversions and Streamflow Gauges<sup>1</sup>



<sup>1</sup>The CWCB did not select any stream gauges in the Republican River Basin as part of its study.

Exhibit 12-15. Republican River Basin Wells and Aquifers

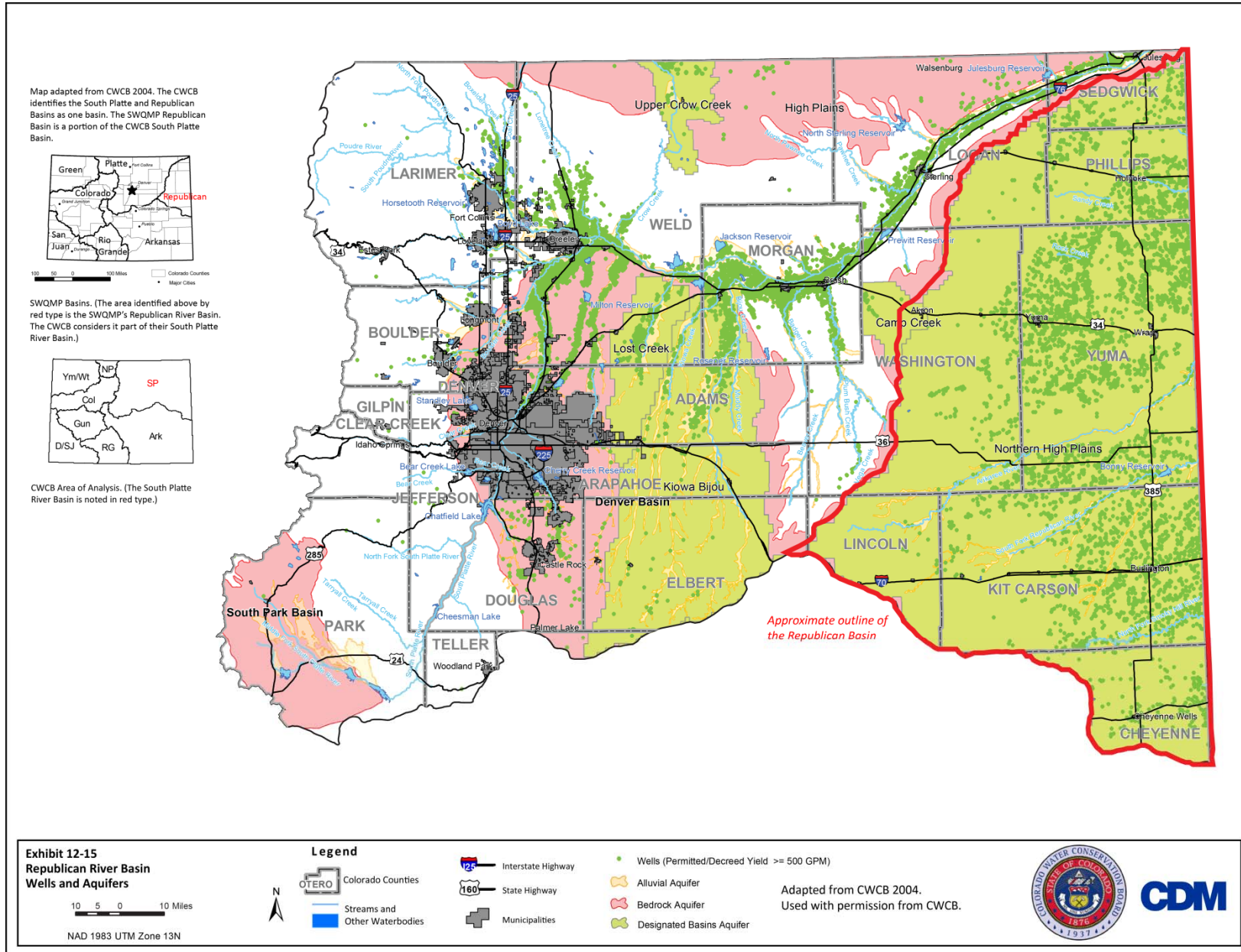
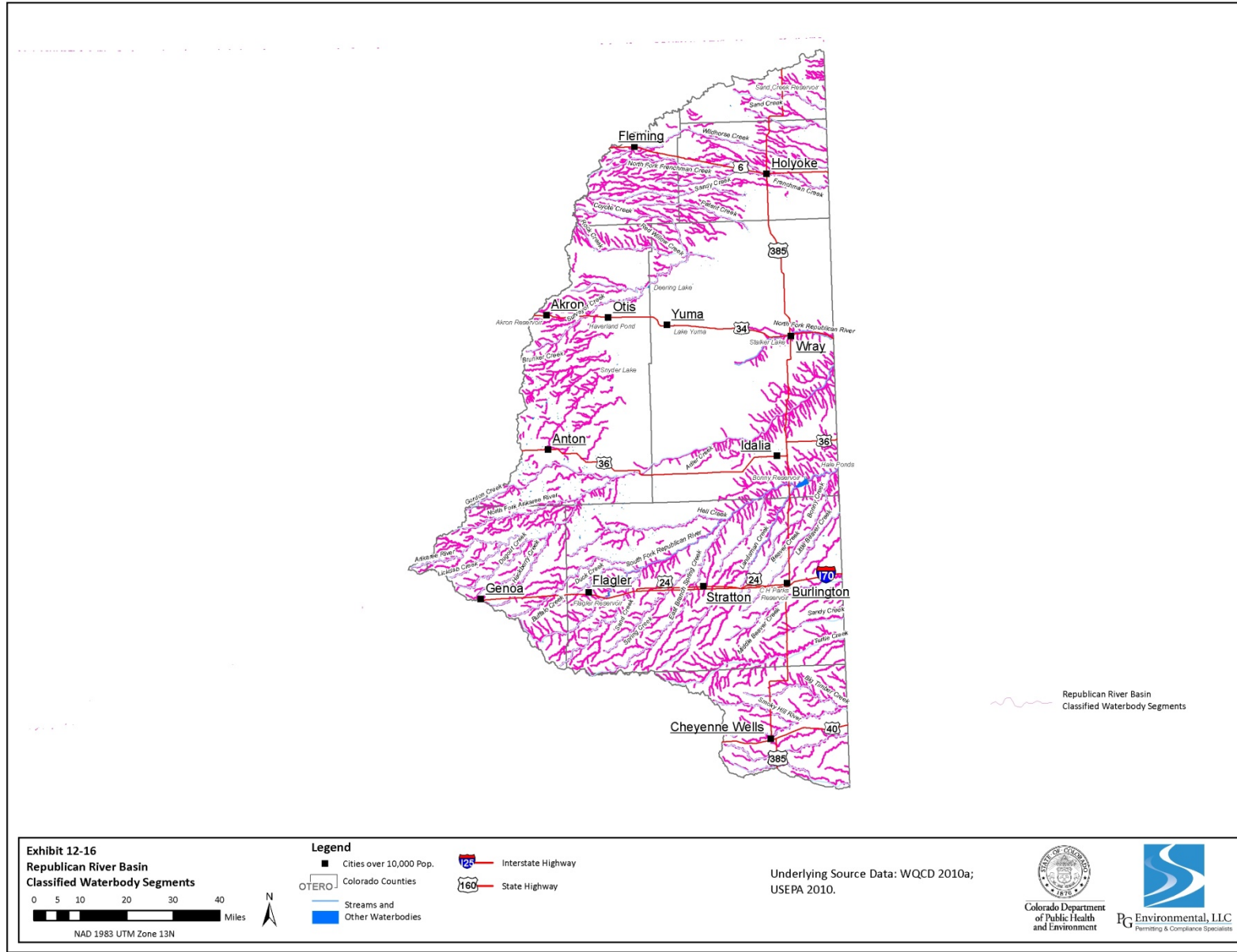


Exhibit 12-16. Republican River Basin Classified Waterbody Segments



**Exhibit 12-17. Republican River Basin Use Classifications for Waterbody Segments**

Sub-Basin	Aquatic Life				Recreation				Water Supply	Agriculture	Designations	
	Cold 1	Cold 2	Warm 1	Warm 2	Existing	Potential	Not Suitable	Undetermined			Outstanding Waters	Use Protected
<b>Totals Basin-Wide</b>												
Segments (n=8)	1	0	3	4	5	0	2	1	5	8	0	2
Segments as Percent of Total	13%	0%	38%	50%	63%	0%	25%	13%	63%	100%	0%	25%
Miles (n=5,655.10) <sup>1</sup>	46.00	0	107.90	5,501.20	171.30	0	5,483.80	0	83.70	5,655.10	0	5,483.80
Miles as Percent of Total <sup>1</sup>	1%	0%	2%	97%	3%	0%	97%	0%	1%	100%	0%	97%

<sup>1</sup> Lake acres are not shown.

Sources: WQCC 2010b; WQCD 2010a.

Exhibit 12-18. Republican River Basin Use Classifications by Waterbody Segment

Stream Segment <sup>1</sup> (COSPRE)	Segment Description <sup>1</sup>	Stream Miles <sup>1</sup>	Aquatic Life <sup>1</sup>				Recreation <sup>1</sup>				Water Supply <sup>1</sup>	Agriculture <sup>1</sup>	Designation <sup>1</sup>
			Cold 1	Cold 2	Warm 1	Warm 2	Existing	Potential	Not Suitable	Undetermined			
1	Mainstem of the South Fork of the Republican River from a point 10 miles above Bonny Reservoir to the Colorado-Kansas border.	20.30			•		•				•	•	
2	Bonny Reservoir, Stalker Lake.	<sup>2</sup>			•		•				•	•	
3	Mainstem of the North Fork of the Republican River from the source to the Colorado/Nebraska border and the mainstem of Chief Creek.	46.00	•				•				•	•	
4	Mainstem of the Arikaree River from the confluence of the North and South Forks to the Colorado/Kansas border.	87.60			•		•					•	
5	Mainstem of the Black Wolf Creek from the source to the confluence with the Arikaree River.	17.40				•	•				•	•	
6	All tributaries to the Republican River system in Colorado, including all wetlands, except for specific listings in Segments 1, 3, 4, and 5.	4,753.40				•				•		•	UP <sup>3</sup>
7	Mainstem of the North Fork of the Smoky Hill River and mainstem of the Smoky Hill River, including all tributaries and wetlands, from the source to the Colorado/Kansas border.	730.40				•				•		•	UP
8	All lakes and reservoirs tributary to the Republican and Smoky Hill Rivers in Colorado, except for specific listings in Segment 2.	<sup>4</sup>				•					•	•	
<b>Total Segments</b>		8	1	0	3	4	5	0	2	1	5	8	2
<b>Total Miles<sup>5,6</sup></b>		5,655.10	46.00	0	107.90	5,501.20	171.30	0	5,483.80	0	83.70	5,655.10	5,483.80

<sup>1</sup> WQCC 2010b; WQCD 2010a.

<sup>2</sup> Lake-only segment. Lake acres = 1,846.63.

<sup>3</sup> UP = Use Protected.

<sup>4</sup> Lake-only segment. Lake acres = 5,821.20.

<sup>5</sup> Totals might not add due to rounding.

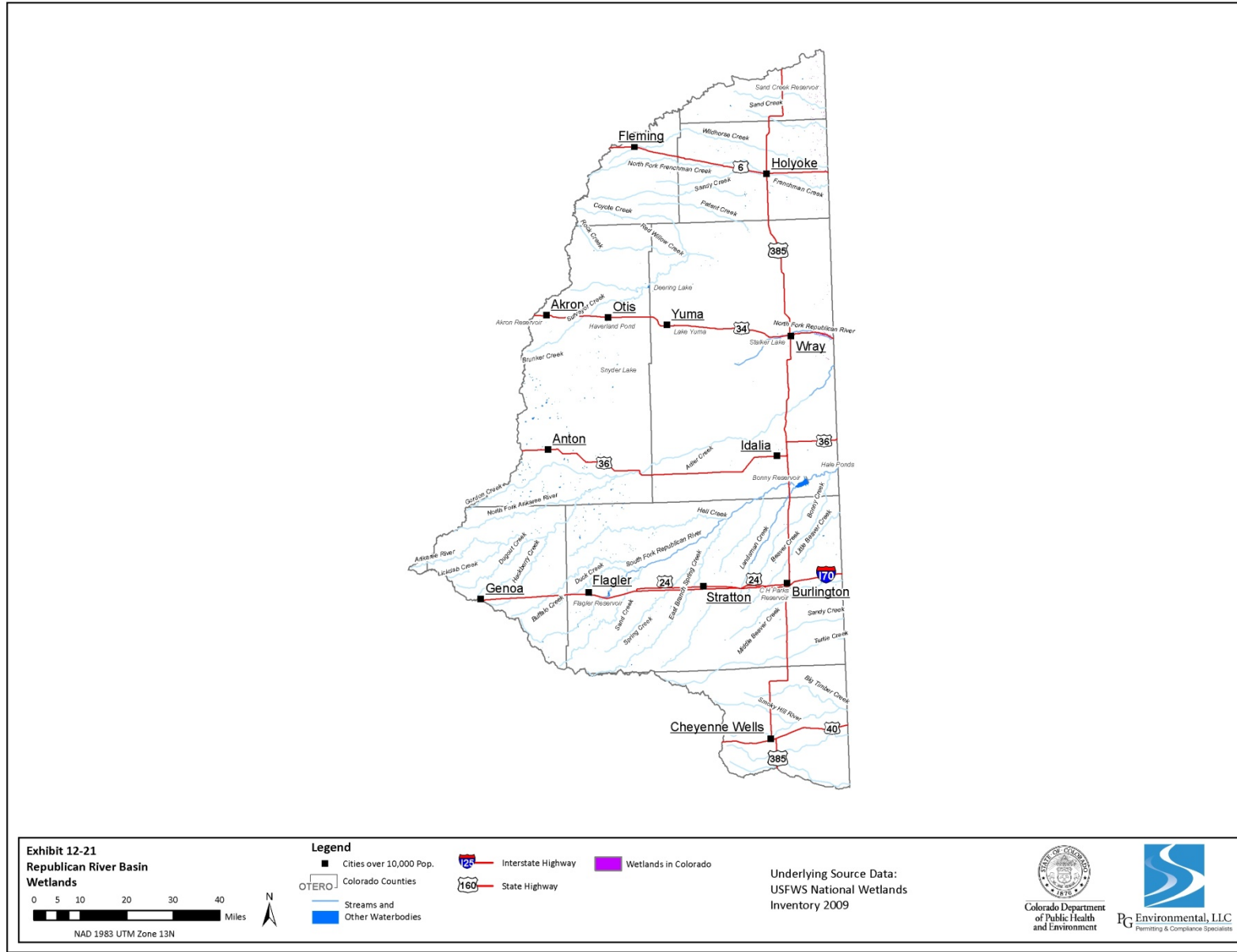
<sup>6</sup> All acres for lake-only segments and lakes that are part of a segment with streams or wetlands and that have been assessed have been individually footnoted and are not included in the segment miles.

**Exhibit 12-19. in text**

**Exhibit 12-20. in text**



Exhibit 12-21. Republican River Basin Wetlands

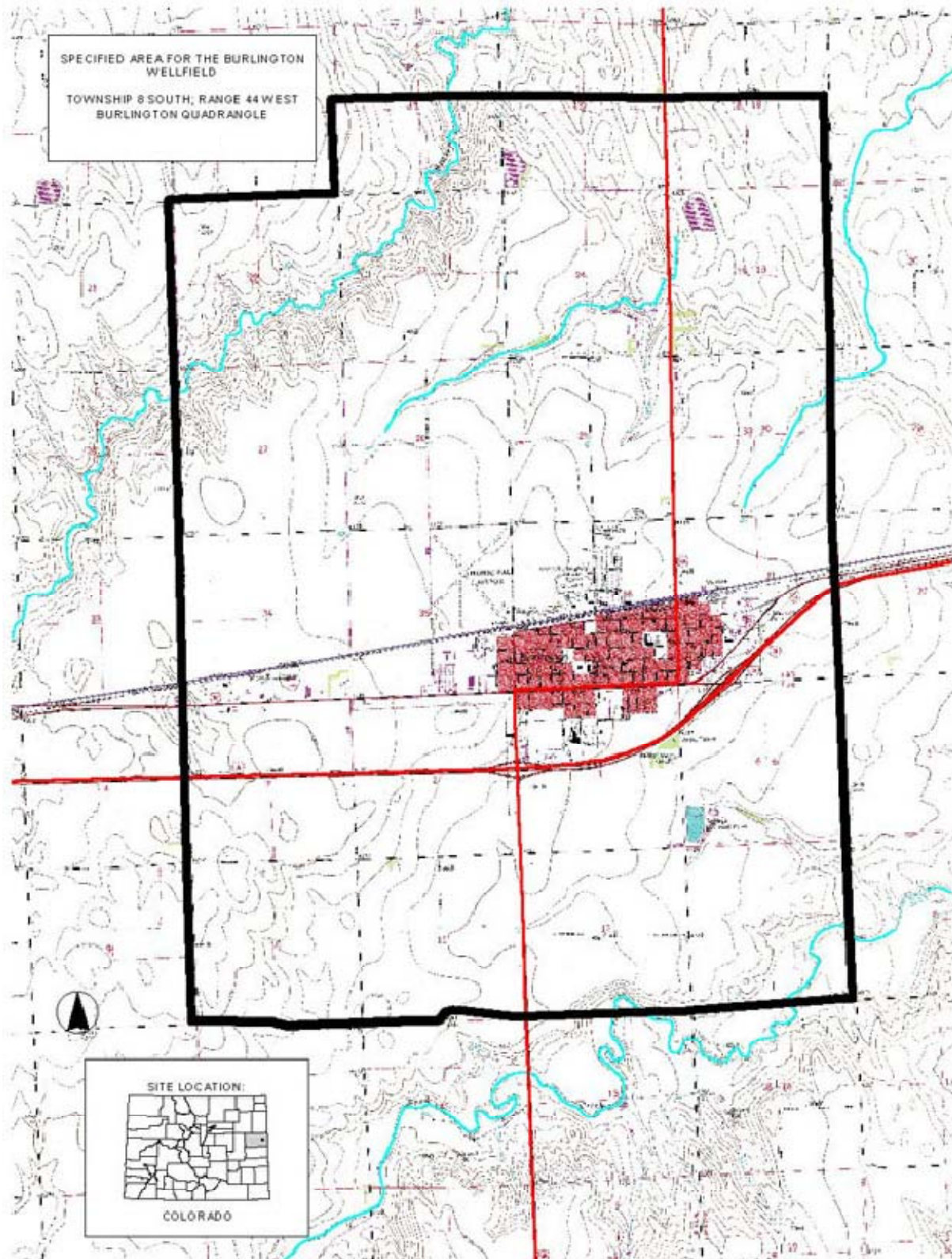


**Exhibit 12-22 in text**

**Exhibit 12-23. in text**



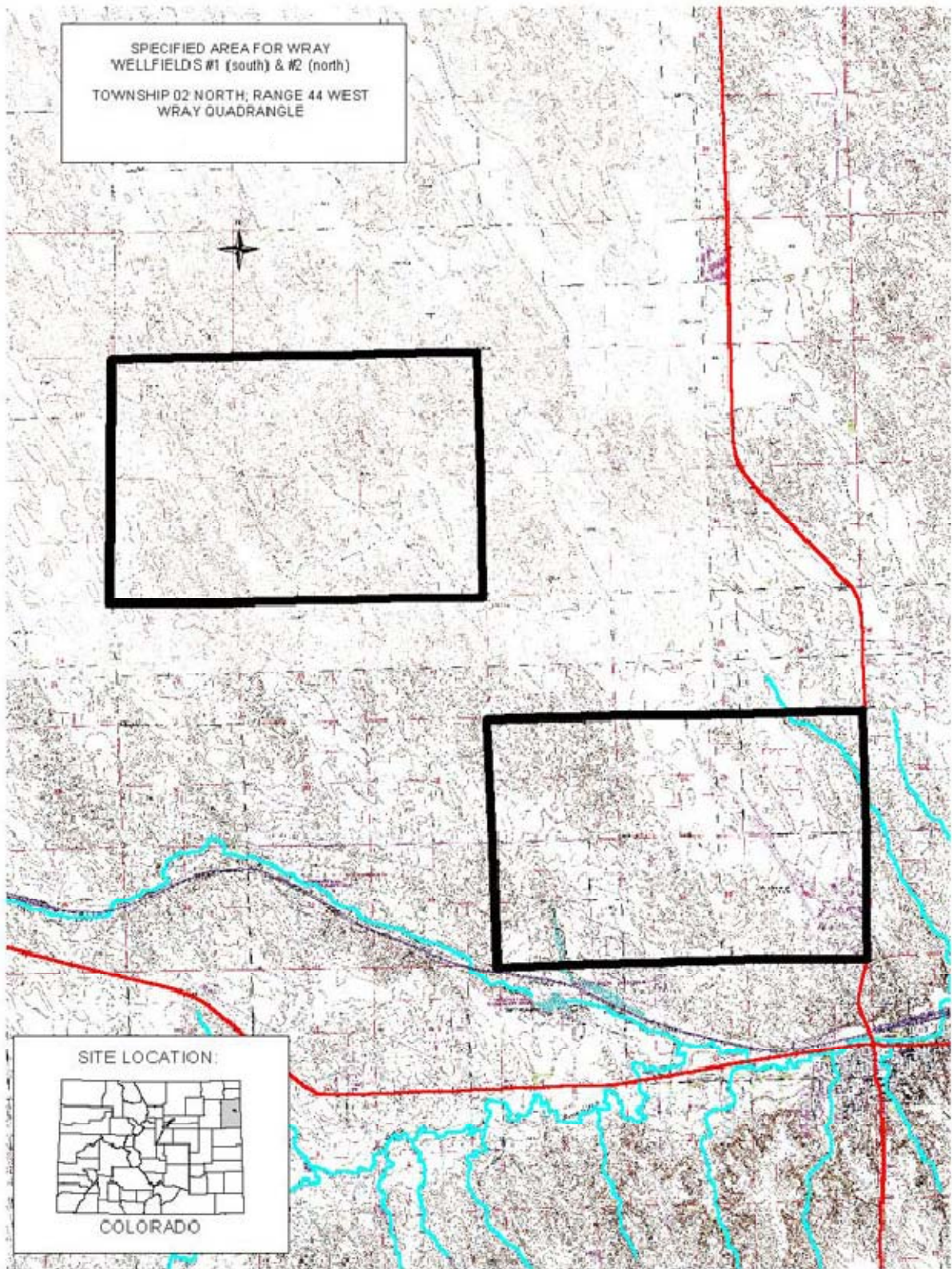
Exhibit 12-24. Republican River Basin; City of Burlington Wellfield, Kit Carson County



Source: WQCC 2006b.



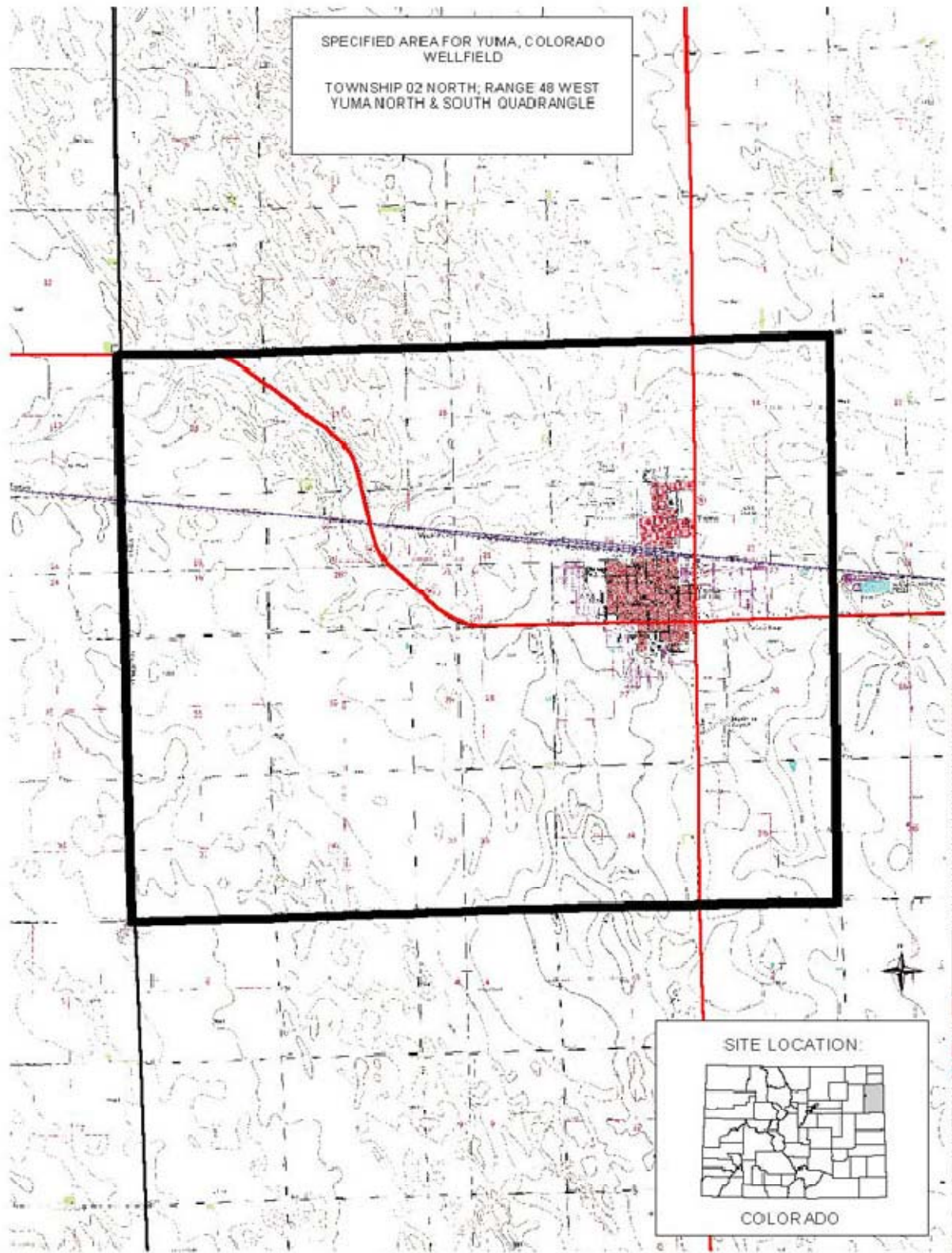
Exhibit 12-25. Republican River Basin; City of Wray Wellfield, Yuma County



Source: WQCC 2006b.



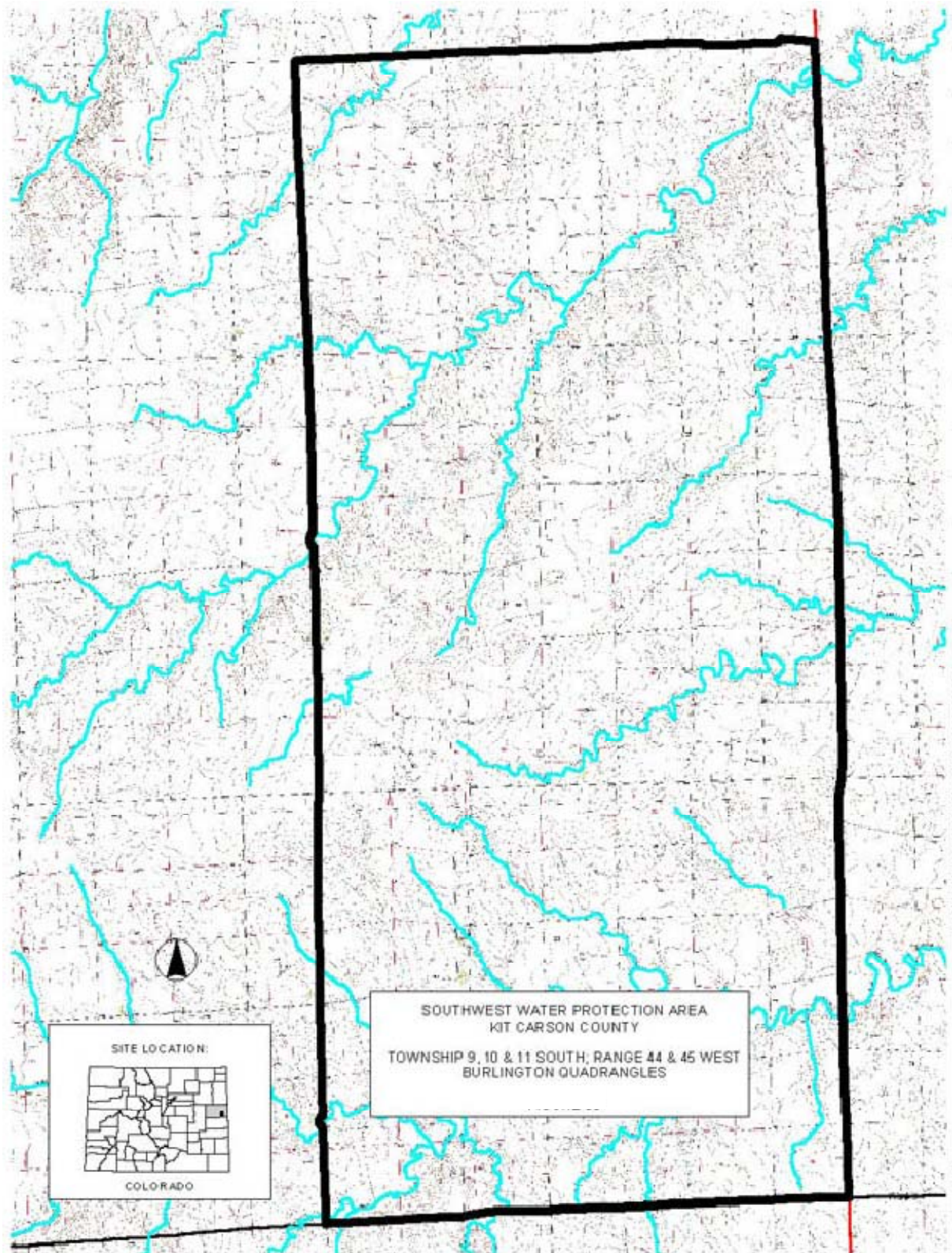
Exhibit 12-26. Republican River Basin; City of Yuma Wellfield, Yuma County



Source: WQCC 2006b.



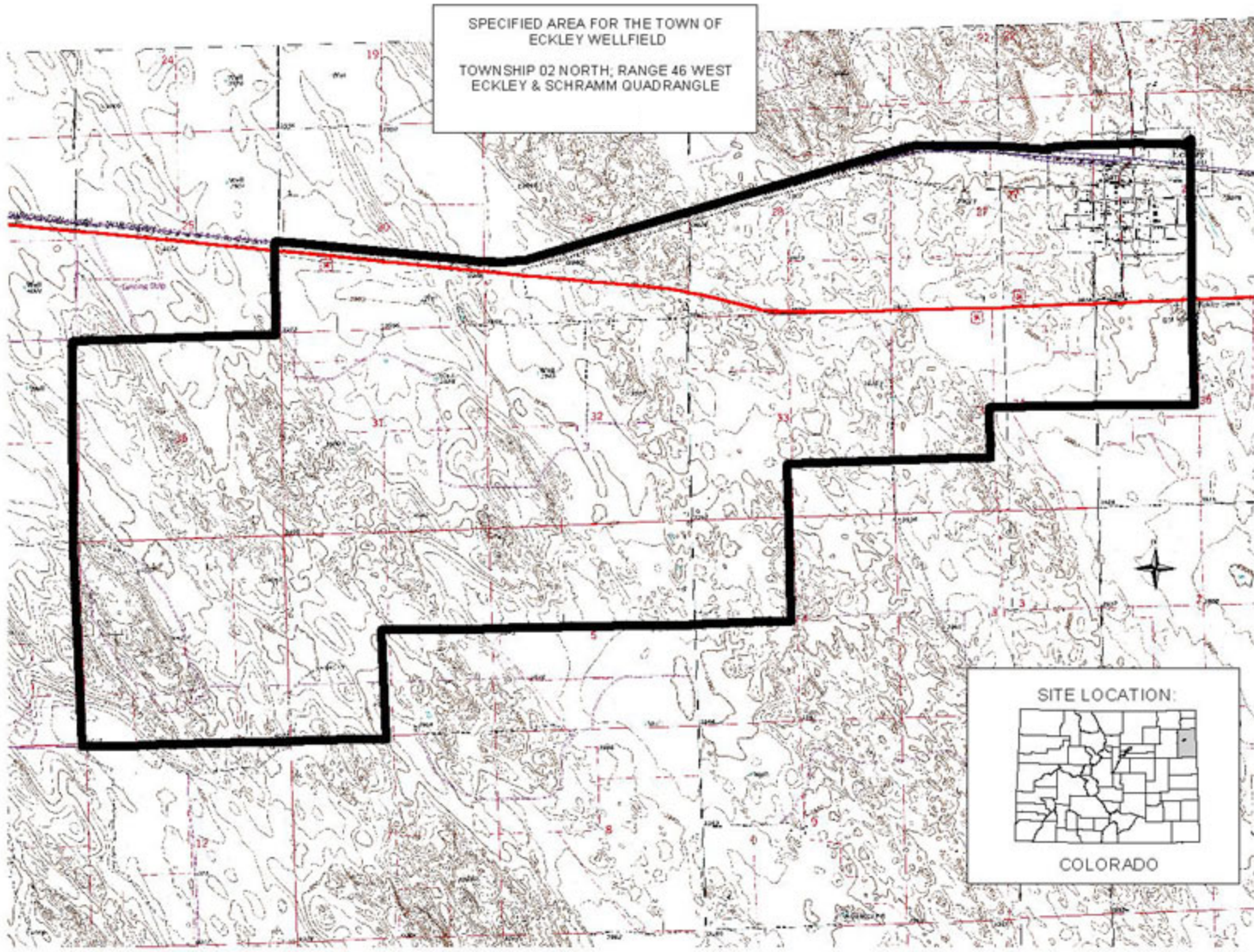
Exhibit 12-27. Republican River Basin; Southwest Protection Area, Kit Carson County



Source: WQCC 2006b.

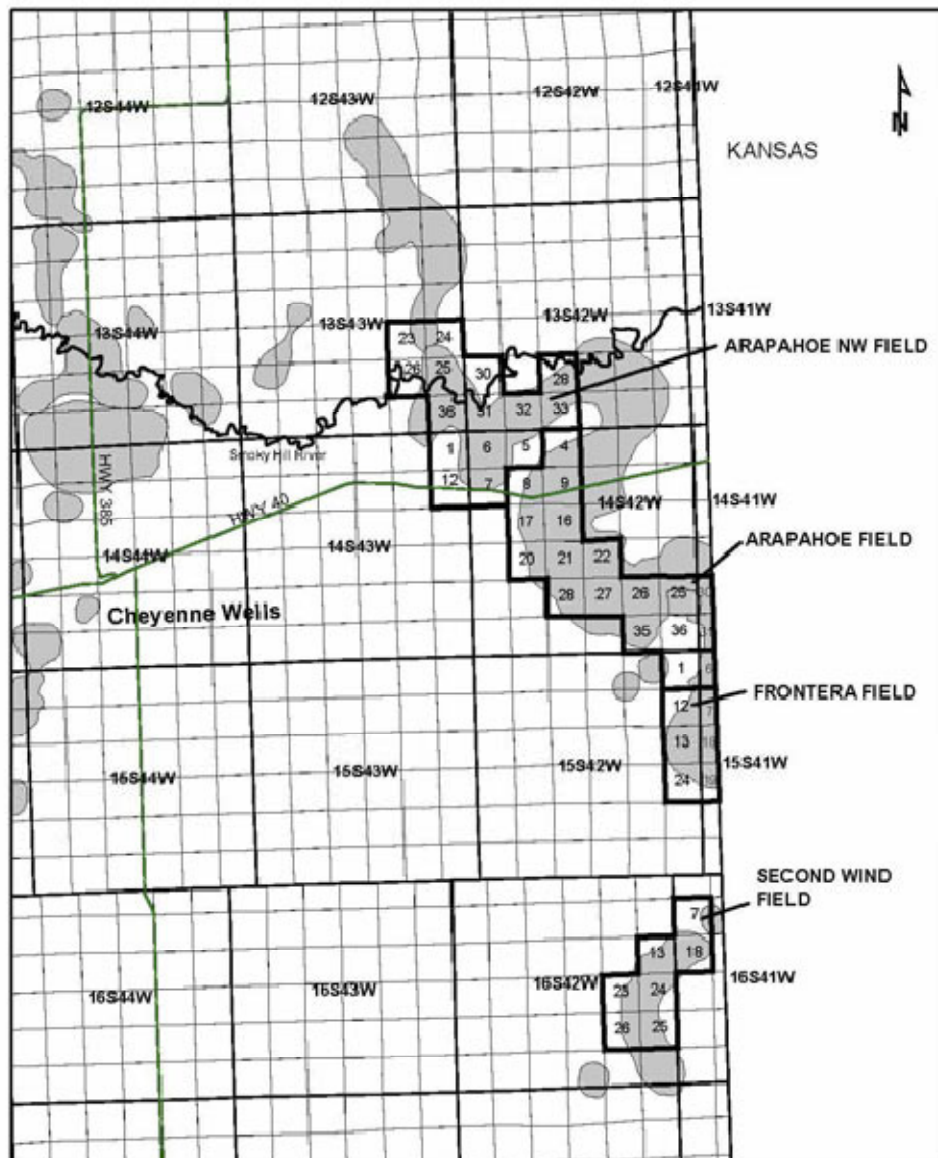


Exhibit 12-28. Republican River Basin; Town of Eckley Wellfield, Yuma County



Source: WQCC 2006b.

Exhibit 12-29. Republican River Basin; Oil and Gas Field of Cheyenne County and Kit Carson Counties, Colorado (Cheyenne County)



COGCC, May 1, 2003  
 Land Grid: Tobin International  
 O&G Fields: CGS

**Legend**  
  
 SPECIFIED AREAS  
 OIL/GAS FIELDS

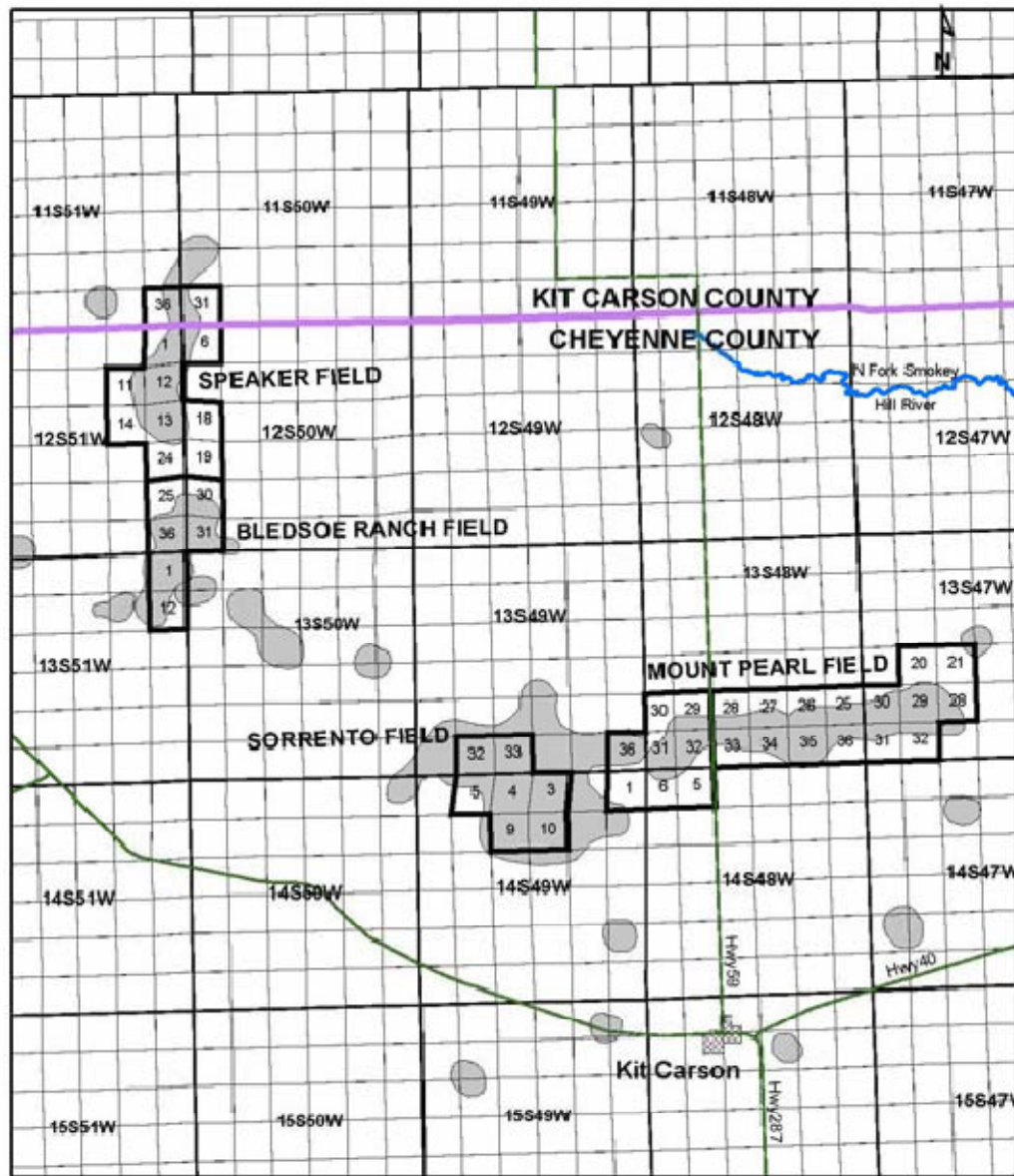
**SPECIFIED AREAS FOR THE ARAPAHOE NW,  
 ARAPAHOE, FRONTERA, & SECOND WIND FIELDS  
 CHEYENNE COUNTY, COLORADO**

(Sections 23-26, & 36 of 13S43W; Sections 1 & 12 of 14S43W; Sections 4-9,16,17,20-22, 25-28,35 & 36 of 14S42W;  
 Sections 30 & 31 of 14S41W; Sections 1,12,13,& 24 of 15S42W; 6,7,18, & 19 of 15S41W;  
 Sections 13, 23-26 of 16S42W; Sections 7 & 18 of 16S41W)

Source: WQCC 2006b.



Exhibit 12-30. Republican River Basin; Oil and Gas Field of Cheyenne County and Kit Carson Counties, Colorado (Kit Carson and Cheyenne Counties)



COGCC, May 1, 2003  
 Land Grid: Tobin International  
 O&G Fields: CGS

**Legend**  

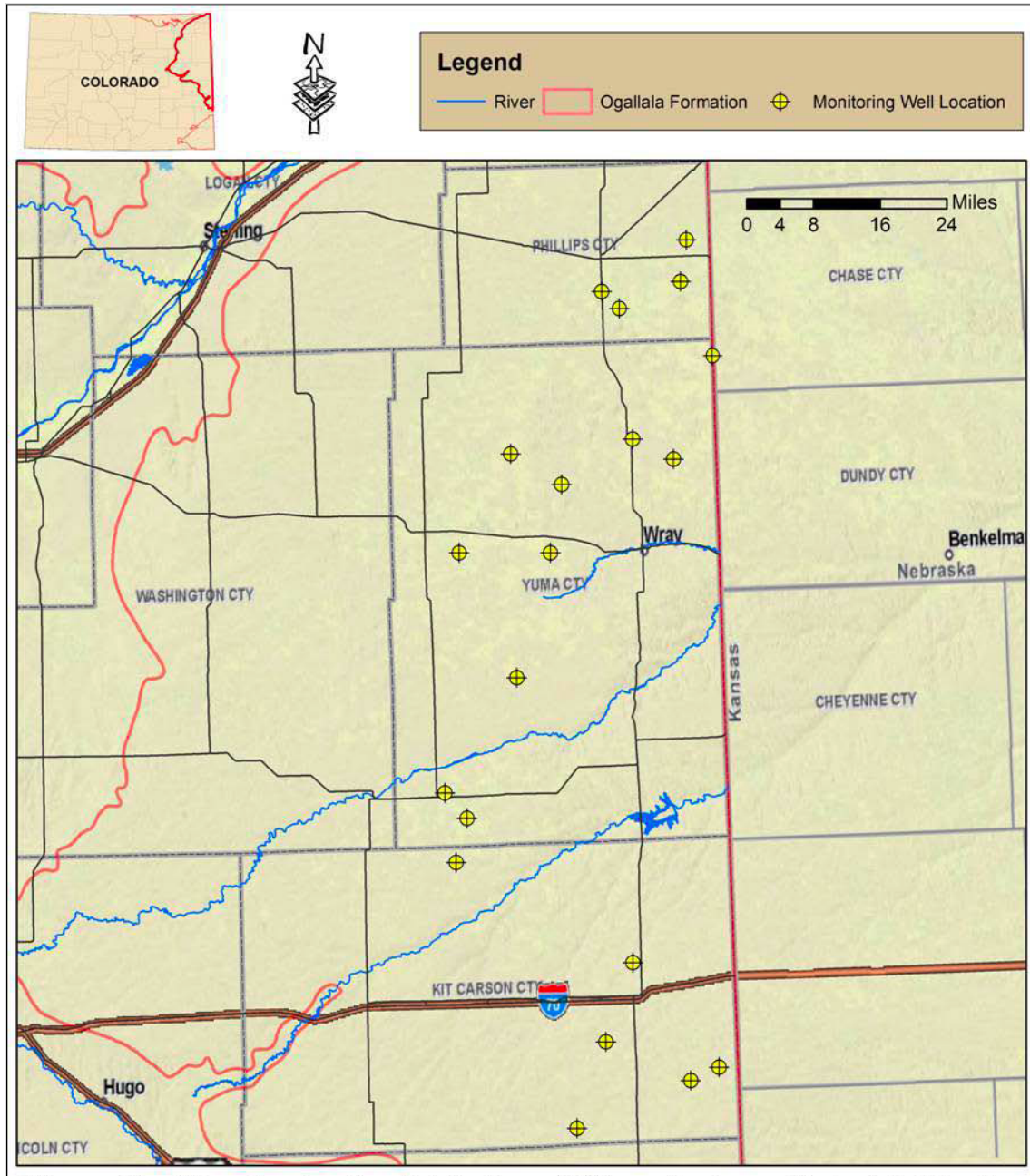
 SPECIFIED AREAS  
 OIL/GAS FIELDS

**SPECIFIED AREAS FOR THE SPEAKER, BLEDSOE RANCH, SORRENTO, AND MOUNT PEARL FIELDS  
 KIT CARSON AND CHEYENNE COUNTIES, COLORADO**

(Section 36 of 11S51W, Section 31 of 11S50W, Sections 1, 11-14, 24, 25, & 36 of 12S51W, Sections 6, 18, 19, 30, & 31 of 12S50W, Sections 1 & 12 of 13S51W, Sections 32, 33, & 36 of 13S49W, Sections 1, 3-5, 9 & 10 of 14S49W, Sections 25-36 of 13S48W, Sections 5 & 6 of 14S48W, Sections 20, 21, & 28-32 of 13S47W)

Source: WQCC 2006b.

Exhibit 12-31. High Plains Monitoring Well Network Development Final Well Locations



Source: WQCC 2010a.



Exhibit 12-32. Republican River Basin Impairments by Stream Segment<sup>1</sup>

Stream Segment (COSPRE)	Stream Miles	Were All Uses Attained in 2010?	Segment Portion	Portion Miles	Use(s) Not Attained <sup>2</sup>								Desig	Parameter(s) Causing Impairments <sup>3</sup>	Source(s) <sup>4</sup>	TMDL Development Status <sup>5</sup>		
					C1	C2	W1	W2	RE	RNS	WS	AG		<i>E. coli</i>		L	M	H
4	87.60	N	Del Norte to county line	87.60						•					N/A			•
<b>Total Segments Impaired</b>				1														
<b>Total Stream Miles Impaired</b>				87.60														

<sup>1</sup> The table includes all segments that are not attaining one or more of their classified uses as presented in appendix A of the 2010 Integrated Report. This can include segments for which a TMDL has been developed (which means the segment is not listed on the 2010 CWA section 303(d) list (Regulation No. 93) (WQCC 2010c; WQCD 2010a). For these segments it likely means that the full effects of TMDL implementation are yet to be realized and the segment has yet to attain its classified uses. The cells for “parameters causing impairments,” “source(s),” and “TMDL development status” are left blank in these cases.

<sup>2</sup> Key to Classified Uses: C1 = Aquatic Life (AL) Cold Water 1, C2 = AL Cold Water 2, W1 = AL Warm Water 1, W2 = AL Warm Water 2, RE = Recreation Existing, RNS = Recreation Not Suitable, WS = Water Supply, and AG = Agriculture.

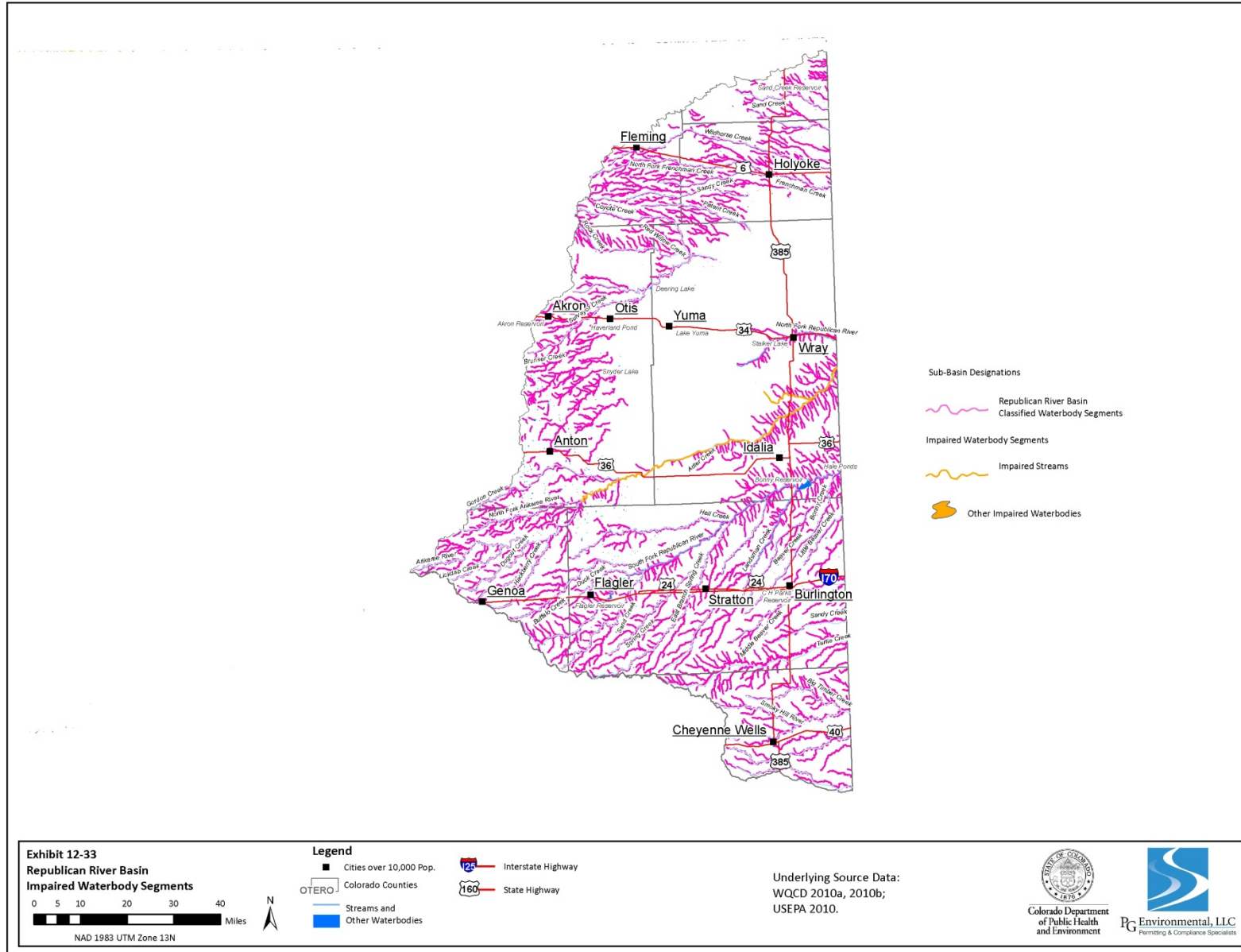
<sup>3</sup> Key to Parameter: *E. coli* = *Escherichia coli*.

<sup>4</sup> Key to Sources: N/A = Not Assessed.

<sup>5</sup> Key to TMDL Development Status: L = low priority, M = medium priority, and H = high priority.

Sources: WQCC 2010b; WQCD 2010a, appendices A to D.

Exhibit 12-33. Republican River Basin Impaired Waterbody Segments



**Exhibit 12-34. Republican River Basin Waterbody Segments Listed for Further Monitoring and Evaluation**

Segment (COSPRE)	Segment Portion(s)	Parameters of Concern and Source(s) if Known	
		Selenium	<i>E. coli</i>
5	all	•	•
Total Segments with One or More Portions on M&E List	1	1	1
<i>Total as Percent of All Segments in Sub-basin, n=8</i>	13%	13%	13%

Sources: WQCC 2010b; WQCD 2010a, appendix D.

**Exhibit 12-35. in text**

**Exhibit 12-36. in text**

**Exhibit 12-37 in text**

Exhibit 12-38. Republican River Basin Identified Point Source Projects and Scheduled Improvements<sup>1</sup>

County	Permit No.	Permit Type, Expiration Date & Status <sup>2</sup>	Facility or Authority Project Name Address (if available)	Source Info <sup>3</sup>	IUP <sup>4</sup> No.	Applicable IUP Appendices <sup>5</sup>	Project Type <sup>6</sup>	Project Description	Estimated Cost	Population to Benefit from Project
Cheyenne	G589039	NPDES Gen. 10/31/2010 Effective	Cheyenne Wells WWTP <sup>7</sup>	CWNS and IUP	030049W	B and C	WWT	Improvement/Expansion of Wastewater Treatment Plant	\$775,000	945
					090048W	B	WWT	Eliminate ISDS <sup>8</sup>	\$115,000	945
					100003W	B and C	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation; Reuse Facility; Green Infrastructure, Water Efficiency, Energy Efficiency	\$4,340,000	945
					100030W	B	SWP	Source Water Protection	\$20,000	945
					100101W	B	StW	Stormwater Project	\$2,500,000	945
<b>Total for Cheyenne County</b>									<b>\$7,750,000</b>	
Kit Carson	-		Bethune, Town of	CWNS and IUP	080032W	B and C	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation; Green Infrastructure, Water Efficiency, Energy Efficiency	\$555,000	244
					100027W	B	SWP	Source Water Protection	\$10,000	244
	0020613	NPDES 9/30/1996 Admin. Continued	Burlington WWTP	CWNS and IUP	030039W	B and C	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation	\$1,900,000	3,700
					090004W	B	NPS	Nonpoint Source Project	\$500,000	3,700
	G589028 (G582022)	NPDES Gen. 10/31/2010 Effective	Seibert WWTP	CWNS and IUP	030246W	B and C	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation; Green Infrastructure, Water Efficiency, Energy Efficiency	\$860,000	197
100046W					B	SWP	Source Water Protection	\$10,000	197	
<b>Total for Kit Carson County</b>									<b>\$3,835,000</b>	
Lincoln	G589055	NPDES Gen. 10/31/2010 Effective	Arriba, Town Of	CWNS and IUP	100026W	B	SWP	Source Water Protection	\$10,000	217
	0582047			IUP	100053W	B	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation; Green Infrastructure, Water Efficiency, Energy Efficiency	\$220,000	217

County	Permit No.	Permit Type, Expiration Date & Status <sup>2</sup>	Facility or Authority Project Name Address (if available)	Source Info <sup>3</sup>	IUP <sup>4</sup> No.	Applicable IUP Appendices <sup>5</sup>	Project Type <sup>6</sup>	Project Description	Estimated Cost	Population to Benefit from Project
Lincoln	-		Genoa , Town of	CWNS and IUP	080022W	B	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation; Green Infrastructure, Water Efficiency, Energy Efficiency	\$105,000	203
					100034W	B	SWP	Source Water Protection	\$10,000	203
<b>Total for Lincoln County</b>									<b>\$345,000</b>	
Logan	-		Fleming, Town of	CWNS and IUP	080045W	B	WWT	Improvement/Expansion of Wastewater Treatment Plant	\$250,000	438
<b>Total for Logan County</b>									<b>\$250,000</b>	
Phillips	G589062	NPDES Gen. 10/31/2010 Effective	Haxtun Sewage Treatment Plant	CWNS and IUP	090053W	B	StW	Stormwater Project	\$740,041	982
	G589059 (0044385)	NPDES Gen. 10/31/2010 Effective	Holyoke, City of	CWNS and IUP	040025W	B	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation	\$1,000,000	2,261
	-		Phillips County/Amherst	CWNS and IUP	070026W (Amherst Unincorp Area)	B and C	WWT	New Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation; Eliminate ISDS	\$2,000,000	200
<b>Total for Phillips County</b>									<b>\$3,740,041</b>	
Washington	G650162	NPDES Gen. 10/19/2012 Effective	Akron, Town of 1/2 Mile East and 1/2 Mile South of Akron Washington County, CO	Envirofacts	NA	NA	NA		NA	NA
	G589061	NPDES Gen. 10/31/2010 Effective	Akron WWTP	CWNS and IUP	090050W	B	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation; Eliminate ISDS	\$250,000	1,785
	X044865	2/28/2011 Effective	Otis Sanitation District	CWNS and IUP	080019W	B and C	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation	\$1,465,000	544
	-		Otis WWTP	CWNS and IUP	030206W	B	WWT	Improvement/Expansion of Wastewater Treatment Plant	\$250,000	520
<b>Total for Washington County</b>									<b>\$1,965,000</b>	
Yuma	0023833	NPDES 11/30/2012 Effective	Wray, City of 245 West Fourth Street Wray, CO 80758	CWNS, Envirofacts, and IUP	030295W	B	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation; Eliminate ISDS	\$5,000,000	2,287

County	Permit No.	Permit Type, Expiration Date & Status <sup>2</sup>	Facility or Authority Project Name Address (if available)	Source Info <sup>3</sup>	IUP <sup>4</sup> No.	Applicable IUP Appendices <sup>5</sup>	Project Type <sup>6</sup>	Project Description	Estimated Cost	Population to Benefit from Project	
Yuma	G650178	NPDES Gen. 10/19/2012 Effective	Wray, City of Railway And Grove Wray, CO 80758	Envirofacts	NA	NA	NA		NA	NA	
	0044709	NPDES	Eckley, Town of	CWNS and IUP	050016W	B and C	WWT	Improvement/Expansion of Wastewater Treatment Plant; Collection System and/or Interceptor Construction or Rehabilitation	\$750,000	278	
					090111W	B	WWT	Collection System and/or Interceptor Construction or Rehabilitation	\$1,161,100	278	
	-			Idalia Lagoon	CWNS and IUP	040055W	B and C	WWT	Improvement/Expansion of Wastewater Treatment Plant	\$360,000	80
	X047210	12/31/2010 Effective	Yuma Conservation District	CWNS and IUP	060016W	B	NPS	Nonpoint Source Project	\$250,000	187	
	X047210	12/31/2010 Effective	Yuma, City of	CWNS and IUP	090060W	B	WWT	New or Improvements to Biosolids Handling Facility	\$500,000	3,500	
	-				090131W	B	StW	Stormwater Project	\$875,000	3,500	
					060013W	B	WWT	New or Improvements to Biosolids Handling Facility	\$500,000	3,500	
	0644595			IUP	030296W	B	WWT	Collection System and/or Interceptor Construction or Rehabilitation; Improvement/Expansion of Wastewater Treatment Plant	\$2,000,000	3,500	
	R108426		Satellite Niabrara Project Approximately 10 Miles North Of Wray, CO Yuma County, CO	Envirofacts	NA	NA	NA		NA	NA	
<b>Total for Yuma County</b>									<b>\$11,396,100</b>		

<b>Total Estimated Cost All Projects</b>	<b>\$29,281,141</b>
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<sup>1</sup> Note that this table identifies only NPDES facilities as contained in the publicly available data sources evaluated. Therefore, it should not be considered an all-inclusive list.

<sup>2</sup> Admin. Continued = Administratively Continued (permit status). For a review of the various NPDES permit types issued by Colorado, consult chapter 3 of the SWQMP.

<sup>3</sup> Sources: USEPA 2010a, 2010d; WQCD 2010b.

<sup>4</sup> IUP = Intended Use Plan (WQCD 2010b).

<sup>5</sup> The 2010 IUP contains several appendices containing listings of projects. Appendix B is a list of the current construction needs for all identified eligible water quality projects (i.e., project eligibility list), including point source treatment, nonpoint source, stormwater, and source water assessment projects. Appendix C lists projects that are likely to be funded with Water Pollution Control Revolving Funds (WPCRF) loans in 2010. For those projects included in appendix A, the loan value is sometimes lower than the estimated cost. Only the estimated cost as shown in appendix B is shown in this table.

<sup>6</sup> Project type categories include the following: WWT = advanced or secondary wastewater treatment, including infiltration and inflow correction, NPS = nonpoint source control project, StW = stormwater project, and SWP = source water protection project.

<sup>7</sup> WWTP = wastewater treatment plant.

<sup>8</sup> ISDS = individual sewage disposal systems.