2012 NORTH PLATTE RIVER WATER QUALITY MANAGEMENT PLAN

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NORTH PLATTE RIVER WATER QUALITY MANAGEMENT PLAN

1.0 WATERSHED OVERVIEW

1.1 Geography and Hydrology

The North Platte River basin, which encompasses all of Jackson County and a part of Larimer County to the east, drains 2,030 square miles - the smallest drainage area of the State's nine river basins. Principal tributaries to the North Platte River included in this study are: the Canadian River, the Michigan River, the Illinois River, Willow Creek; Grizzly Creek, Hell Creek; and Pinkham Creek. A map of the watershed is provided as Figure 8. This watershed flows to the east of the continental divide, the only watershed east of the continental divide within Northwest Colorado Council of Government's regional boundary.

Elevations in the watershed range from approximately 12,180 feet along the continental divide (to the west) and 12,940 on the east (Medicine Bow Mountains) to approximately 8,000 feet where the North Platte River leaves Colorado. The average annual rainfall varies from approximately 35 inches at the higher elevations in the Routt National Forest to 10 inches at the lower elevations. Precipitation is highest in April and July, with April receiving the highest snowfall with 18.7 inches.

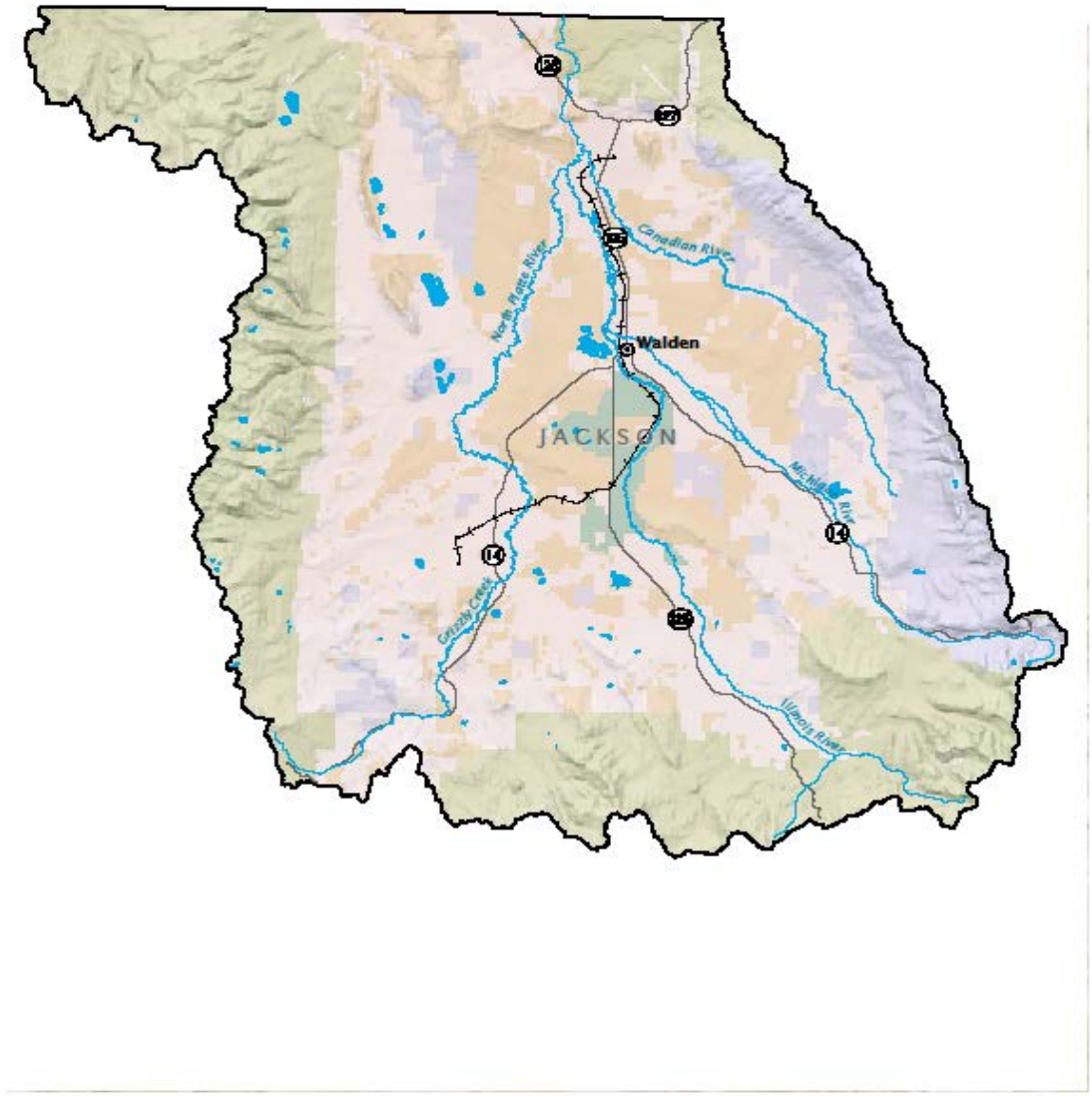
1.2 Land Uses and Population Characteristics

Jackson County, in the northernmost part of Colorado has an area of 1,628 square miles. The county is sparsely populated with only approximately 1,390 inhabitants [July 2010 State Demographer Office estimate]. Nearly one-half the population is centered around the town of Walden. Of the 63 counties in Colorado, Jackson County ranks 60th in population density [July 2010 State Demographer Office estimate].

Ranching is by far the predominant land use, not only on privately owned land but also on lands managed by the US Bureau of Land Management and the US Forest Service lands. In 2012 there were approximately 7,000 yearlings and 18,000 cow-calf pairs grazed in the North Park Basin. The number of cattle held and grazed in Jackson County in any given year will be greatly influenced by annual precipitation and the corresponding available forage. There are approximately 117,148 irrigated acres in North Park Basin (Jackson County Extension Office, 2012). Secondary land uses include timbering, oil production, recreation and the production of liquid carbon dioxide and dry ice.

In the North Platte River watershed there are 12 community, transient non-community, and non-transient non-community drinking water systems, serving a combined total population of 2,626 persons [Colorado Department of Public Health and Environment, Water Quality Control Division, 2012]. Eleven of the systems are reliant upon ground water and one system is reliant upon surface water. This information does not include systems serving less than 25 people.

Figure NP-1. Upper North Platte Watershed Map.



1.3 Watershed Management

There are on-going efforts in the North Platte watershed, which since 1992 have developed many adaptive long-term landscape management programs, policies and practices. These efforts include the Owl Mountain Partnership and the North Park Habitat Partnership Program. Projects have included water well development, vegetative treatments for wildlife, fencing and educational events related to watershed health.

Recently, the BLM, Jackson County and the Owl Mountain Partnership have completed a draft Nonpoint Source Watershed Protection Plan intended to identify and recommend actions to improve nonpoint source water quality on impaired water bodies and maintain high quality waters in the basin. The plan may provide some guidance to the future development of water quality monitoring programs and pollutant mitigation strategies, as applicable. More information is available http://www.owlmountainpartnership.org .

2.0 WATERSHED WATER QUALITY ASSESSMENT

The 1988 208 Plan documented that historically, there are only two sites in the County where water-quality data have been routinely collected. The water in the North Platte River is of suitable quality for all uses, with no deterioration in water quality evident. However, data analyzed by the Colorado Department of Public Health and Environment for the 303(e) Basin Plan indicate that several of the dissolved-oxygen measurements during a five-year period exceeded dissolved-oxygen criteria recommended for aquatic life, and the stream was almost always under-saturated. These observations are unusual for mountainous streams in Colorado, which normally have supersaturated dissolved-oxygen concentrations, but many Jackson County streams are meandering streams with a low slope, unlike other streams in Colorado which flow over rock stream beds and, thus, naturally become more saturated. There are only 2 streams and one lake within the plan area on the Colorado 303(d) list, and 8 streams or lakes on the Colorado Monitoring and Evaluation list, and no point-source water quality issues documented.

The Jackson County Water Conservancy District has been directing a watershed –wide water quality monitoring effort in 2000 and 2001, with the assistance of federal Clean Water Act Nonpoint Source funding. Approximately 32 sites have been sampled for physical and chemical parameters. With the exception of iron and manganese, all metals concentrations were well below primary and secondary drinking water “maximum contaminant levels”. Iron and manganese appear to coming from natural sources. Dissolved oxygen levels met the State standard of 6.0 mg/L in all cases.

2.1 Michigan River (North Platte River Segment 5)

The 1988 208 Plan stated that the "Michigan River was assessed for possible water-quality changes in downstream reaches resulting from construction and agricultural activities. The Michigan River is unsaturated with respect to dissolved oxygen. The smallest dissolved-oxygen concentrations were measured during winter. This condition during the winter is probably due to a lack of re-aeration and photosynthesis because of ice cover. Much of the under-saturation of dissolved oxygen in the Michigan River, as well as in other streams in Jackson County, may be due to the small slope of the streams which have minimal natural re-aeration as compared to other mountainous streams in Colorado."

The 1988 208 Plan stated that a "review of the Colorado Health Department water quality monitoring data on the Michigan River at Walden indicates that ten year average concentrations (1977-1987) for copper, nickel, and silver exceed current state standards. Although the database for silver and nickel is very limited, silver concentrations appear

to be very high. The most recent three years of this period did not contain a sampling record for nickel and silver, however, three year average concentrations of copper were just equal to the state standard." According to the Water Quality Control Division (WQCD), the silver data collected by the WQCD was all below the limit of detection, and the copper standard was based on the old state total recoverable standard [Bill McKee, Dennis Anderson, WQCD, 1995].

Between 1988 and 1992, the WQCD collected 17 dissolved copper samples (the state standard is now based on dissolved concentrations) at the Michigan River at Walden station. Dissolved copper was not detected in any of the samples.

A review of Colorado Department of Public Health and Environment data collect on the Michigan River in Walden between 1988 and 1992 indicated good water quality. Individual fecal coliform counts have exceeded standards, but usually are acceptable. The source of the coliform bacteria has not been identified. Manganese has also occasionally exceeded stream standards, and iron concentrations are high (100 - 720 ug/l dissolved iron). Dissolved oxygen and pH at this station appears excellent, and total suspended solids, phosphorus, unionized ammonia, copper, cadmium, lead and zinc are all at low concentrations.

2.2 Canadian River (North Platte River Segment 4)

The 1988 208 Plan stated, "the Canadian River has been evaluated to determine the effects of agricultural and mining activities in downstream reaches. A control site was established on the Canadian River above Muddy Creek, and at this site, the water was of suitable quality for all uses, except for concentrations of dissolved iron which exceeded the water supply standard. The iron is probably derived from ground water draining from the lower Tertiary Coalmont Formation, which contains large amounts of iron."

Total coliform bacteria increased in the Canadian River downstream of this control site established to determine the impacts of agriculture and mining. According to the USGS study [Reconnaissance Evaluation of Surface-Water Quality in Eagle, Grand, Jackson, Pitkin, Routt, and Summit Counties, Colorado, 1979], the increases were not attributable to over-wintering cattle, based on the total coliform/streptococcus ratio and that complete ice cover precluded surface runoff to the river. Due to the age of this data, further monitoring would be warranted.

The Canadian River was placed on the 2012 Colorado Monitoring and Evaluation List for Iron and E. Coli, and further monitoring on the sources of these contaminants is being considered.

2.3 Illinois River (North Platte River Segment 4)

The 1988 208 Plan stated "the Illinois River drainage basin has been assessed for possible water quality effects resulting from agricultural activities that include cattle grazing, irrigation, and timber production in the upper reaches of the drainage basin near Rand. In Willow Creek, bacteria concentrations were larger than in the Illinois River. A part of the fecal coliform concentration may originate from seepage from septic systems in the vicinity of Rand". Due to the age of this data, further monitoring would be

warranted.

The smallest dissolved oxygen concentrations for the Illinois River sites and for Willow Creek occurred in the winter. During the winter, because of the lack of re-aeration and photosynthesis, the oxygen resources of the streams are reduced [1988 208 Plan].

Total-iron and mercury concentrations exceeded the standards for aquatic life and dissolved iron and manganese concentrations exceeded the water supply standards. The iron and manganese are probably derived from geologic formations that contain significant amounts of these constituents. Documentation of manganese concentrations in groundwater samples from the geologic formations along the Illinois River has not been made. However, in other counties, manganese often has been associated with iron in surface and ground waters [1988 208 Plan]. Changes in the Basic Standards regulation in 2000 changed the secondary drinking water standards associated with iron, manganese and sulfate to ambient conditions.

A Fishery and Habitat Analysis of the Illinois River and its tributaries for the Arapaho National Wildlife refuge was conducted by the US fish and Wildlife Service and Colorado Division of Wildlife in 1998. The survey found that overall, "the aquatic habitat on the Arapaho National Wildlife Refuge is in good, stable condition." Three sites on the Illinois River yielded 17 macroinvertebrate taxa. In general, both numbers and taxa decreased from upstream to downstream.

An additional finding of this study regarded ponds and reservoirs. The study states that "water depth and winter survival is the limiting factor in most of these systems. With the large amounts of aquatic vegetation growing in the standing bodies of water, wintertime BOD does not allow the survival of fish, due to low oxygen. Winter kill is a common problem with many of the lakes in the lower elevations of North Park. Without some major habitat renovations, little can be done to improve the fishery potential of the standing water resource."

The Illinois River was placed on the 2012 Colorado Monitoring and Evaluation List for determination of Iron sources.

2.4 Grizzly Creek (North Platte River Segment 4)

Grizzly Creek and Little Grizzly Creek were assessed to determine effects on water quality from previous coal mining activities and to establish water quality conditions. High concentrations of dissolved iron in the Grizzly Creek drainage have been attributed to natural drainage. The dissolved oxygen concentration has been documented to be under-saturated in the winter as with other streams evaluated in the area [1988 208 Plan].

Water sampling in 1979 on Grizzly Creek indicated excessive trace element concentrations. Total cadmium and iron concentrations exceed standards for aquatic life at three sites. In general, the largest concentrations occurred during the periods of higher flows. Dissolved oxygen concentrations also did not meet the minimum criteria for support of aquatic life in the winter [1988 208 Plan]. As this sampling data is dated, further monitoring should be undertaken to further evaluate these water quality parameters.

Little Grizzly Creek from Coalmont to the confluence with Grizzly Creek exceeds agricultural standards for total manganese and the recommended water supply standard for iron, according to the 1988 Colorado Nonpoint Assessment Report. Source of the metals is most likely the North Park coal mining district [1988 208 Plan]. This information is likely to be dated and may not be accurate.

Fisheries data collected by the Division of Wildlife in September 1993 on Grizzly Creek (Levis Ranch) and Little Grizzly Creek (old Peterson lease) found numerous species of fish, with the most prevalent being white suckers, cutthroat-rainbow trout hybrids, and rainbow trout. Greater numbers of fish per hectare were found on Grizzly Creek, however, the biomass per hectare was significantly greater in Little Grizzly Creek than in Grizzly Creek (202 versus 17 kg/ha). These numbers are relatively low.

According to the Natural Resources Conservation Service [Al White, District Conservationist, per. comm., 1995], Grizzly Creek serves as a significant source of sediment to the North Platte River. Currently, any elevated metals (manganese, iron) in this area are probably due to natural weathering of volcanic materials.

Grizzly Creek and Little Grizzly Creek were placed on the State's 2012 Monitoring and Evaluation list for determination of aquatic life impairment on both creeks based on Division of Wildlife fishery surveys, and E. coli and Iron standards on Little Grizzly Creek. The cause of potential impairments is not known.

2.5 North Platte River (North Platte River Segment 3)

The North Platte River and its tributaries have been assessed for possible water quality changes from agricultural activities and from influences of oil and gas production and fluorspar mining activities. The North Platte River near Hebron (below the confluence of the Grizzly and Little Grizzly Creeks) had water suitable for all uses, with the exception of unsaturated dissolved oxygen concentration during the winter. The dissolved solids concentration was small and only total iron concentration exceeded water quality standards. A total organic carbon concentration indicated that hydrocarbons from oil and gas fields in the basin may be in the water and increasing total organic carbon concentrations in the North Platte River and its tributaries [USGS, 1979, 1988 208 Plan].

During USGS sampling on Hell Creek [USGS, 1979], cattle were observed grazing on and near the streambed, however, bacterial concentrations during both sampling periods indicated no deleterious effects from cattle grazing at that time.

Previously, Pinkham Creek exhibited fluoride concentrations which were significantly higher compared to other streams in the county, indicating some water quality effects from fluorspar mining operations. The source of fluoride is probably from ground water seepage from this mineralized area into the stream [1988 208 Plan].

The Pinkham Creek Mine has been closed since 1974 and it is expected that fluoride concentrations in Pinkham Creek (North Platte River Segment 6) have decreased as a consequence of the closure.

The Jackson County Water Conservancy sampling effort in 2001 documented slightly

elevated above background fluoride concentrations (0.6 mg/L), but well below the primary drinking water standard of 4.0 mg/L and the Water Quality Control Commission Table Value Standard of 2.0 m/L for domestic water supplies.

In 1988, sediment impacts to North Delany Butte Reservoir were identified [1988 Colorado Nonpoint Assessment Report]. A drop structure was installed at the inlet to North Delany Butte Reservoir in 1993 by the Division of Wildlife in cooperation with the National Resources Conservation Service. This structure has corrected the impacts on the trout egg production facility and fishery.

In 1993, the Division of Wildlife conducted a fishery sampling on the North Platte River at the Hudspeth site. Six species were collected, with white suckers, cutthroat-rainbow hybrids, and brown trout predominant. Total fish biomass at the site was estimated to be 95 kg/ha, with white suckers making up the majority of the biomass.

2.6 Watershed Instream Flows

A description of the Colorado Water Conservation Board's (CWCB) instream flow filings including those found in the North Platte watershed can be found at: http://cwcb.state.co.us/technical-resources/instream-flow-water-rights-database/Pages/main.aspx. Colorado statute (CRS 37-92-102(3) recognizes that preserving the natural environment to a reasonable degree, through the protection of instream flows and maintenance of natural lake levels in natural lakes is a beneficial use of water. Under the same statute, the Colorado Water Conservation Board is declared the exclusive agent authorized to appropriate water rights for the purpose of preserving the natural environment, although water rights can be donated to the CWCB for instream flow protection. It is also stated that the acquisition of the water rights to protect minimum instream flows has to be made within the context of existing water rights appropriation regulations. Minimum instream flows are therefore subject to appropriation dates, and the CWCB can only call out water rights junior to their own for maintenance of those flows. Most of the appropriation dates in the North Platte River watershed are between 1978 and 1981.

The CWCB appropriation flows, determined in consultation with the Division of Wildlife and the Division of Parks and Outdoor Recreation, are the flows necessary "to preserve the natural environment to a reasonable degree" (CRS 37-92-102(3)). The fact that the CWCB has filings for these instream flows does not ensure that stream flows will always exceed the minimum necessary to protect the natural environment, as the water rights associated with these flows have relatively junior appropriation dates. Exercise of water rights that are senior in date to the CWCB instream flow appropriation dates can result in stream flows lower than the CWCB appropriation amount.

Instream flow filings and appropriations in the North Platte River in Colorado are above existing and decreed water diversion structures. The 1945 Nebraska versus Wyoming Supreme Court Decree and 1953 Decree modification enjoins the State of Colorado from diverting or permitting the diversion of water from the North Platte River and its tributaries for the irrigation of more than a total of 145,000 acres of land in Jackson County, Colorado, during any one irrigation season and from storing or permitting the storage of more than a total amount of 17,000 acre feet of water for irrigation purposes from the North Platte River and its tributaries in Jackson County, Colorado, between

October 1 of any year and September 30 of the following year. Under the basic tenets of Colorado water law at C.R.S. 37-92-102(3) it is stated "Nothing in this article shall . . . deprive the people of the State of Colorado of the beneficial use of those waters available by law and interstate compact." With that portion of the statute and the decree in Nebraska v. Wyoming in mind, the Jackson County Water Conservancy District required that the Water Conservation Board insure that there is no interference from instream flow appropriations to prevent the irrigation of the maximum acreage allowed pursuant to Nebraska v. Wyoming. The Colorado Water Conservation Board agreed to adjust its instream flow filings to be above decreed water diversion structures so that instream flow appropriations would not impair the irrigation of the total acres of land allowed in the Supreme Court Decree.

3.0 WATER QUALITY ISSUES

3.1 Point Source Issues

Point source problems were extensively evaluated by the Colorado Department of Health in 1975 as part of the North Platte River Basin 303(e) Plan. Point source treatment needs and other water quality considerations related to increasing levels of coal production were addressed in the basin plan [1988 208 Plan].

3.1.1 Municipal and Domestic Wastewater Treatment

There is one municipal wastewater treatment plant in the North Platte River watershed, which serves the Town of Walden.

Walden Wastewater Treatment Plant
The Town of Walden's wastewater treatment facility is a 0.215 MGD extended aeration package plant that discharges to the Michigan River (segment 5 of the North Platte River). The organic capacity of the facility is rated at 362 pounds of BOD per day. The facility consists of an aeration basin with a jet aerator and a secondary clarifier. In addition to the package plant, the facility has a 6.2 MG storage lagoon (unlined). Disinfection is provided by chlorination and dechlorination. Infiltration and inflow (I/I) increase influent flows by as much as 100% during the irrigation season, however the facility can easily handle the increased flows, and treatment appears more cost effective than removal of the I/I. In 2001, upgrades to aeration, sludge pumping and building replacement were installed. Average flows in June 2011 were 0.221MGD. Due to the 1997 closure of the local solid waste landfill facility, the Town developed alternative plans for disposal of biosolids. In 2011, the Town submitted a grant application to pursue biosolids dewatering equipment to replace the sludge drying beds which have proven inadequate for Walden's climate. The plan is to dewater solids in a portable dewatering box, then store the dewatered material in refurbished drying beds until a hauling schedule is established with Parker Ag, the contractor currently used to haul the Town's dewatered solids. An I/I study has also been identified by the operator as a current need of the plant. The discharge permit for the facility expires November 30, 2015.

Table NP-1 Jackson County Population Estimates and Projections.

Jackson County Population Estimates and Projections[1]

ENTITY	1980	1990	2000	2000 projected[2]	2010[3]	2020[4]
Jackson County	1,863	1,597	1,577	2,090	1,390	1,598
Walden	947	890	734	982	606	n/a

[1]: Data from US Census as reported by Denver Post, 2000 Census Special Report, March 20, 2001.
[2]: 1996 NWCCOG 208 Plan, projected population based on State Department of Local Affairs, State Demographers Office, 1994.
[3,4]: Population projections and 2020 County forecast, State Department of Local Affairs, State Demographer's Office, July 2010 projections.

3.1.2 Industrial Discharges

The industrial wastewater discharge permits in the North Platte watershed are mainly for mining and oil and gas related activities, issued to the Kerr Coal Company. Most of the current activities related to mining involve reclamation efforts, and as a result it is anticipated that water quality is improving downstream of these sites.

3.1.3 Point Source Issues – Summary

In summary, there are no point source water quality problems documented in streams in Jackson County.

3.2 Point Source Recommendations

There are no recommendations for point source issues, as no point source water quality problems have been documented.

3.3 Nonpoint Source Issues

The potential nonpoint source water quality issues of streams and lakes in the North Platte River Basin in Jackson County include:

Under-saturated dissolved oxygen concentrations probably resulting from small streambed slopes that cause decreased re-aeration and photosynthesis [1988 208 Plan]. This is a natural condition, but could potentially be addressed through stream improvement projects.

3.3.1 Mining Impacts

The previous 208 Plan [1988] indicated excessive total organic carbon concentrations in

streams draining coal, oil, and gas fields. Since most of the current mining activities are related to site reclamation, it is expected that this water quality concern is being addressed.

The previous 208 Plan [1988] indicated excessive fluoride concentrations from past fluorspar mining operations. The fluoride concentrations in Pinkham Creek are expected to have decreased due to the mine closure and site reclamation at the fluorspar mine.

More recent sampling by the Jackson County Water Conservancy District (May 2001), indicates that fluoride concentrations in Pinkham Creek have decreased and are currently meeting the Water Quality Control Commission's domestic water supply standard of 2.0 mg/L.

3.3.2 Urban and Construction Activities

Due to lack of urban and construction activities in the watershed, these activities are generally not a concern in the watershed at this time.

3.3.3 Hydrologic Modifications

There is one trans-basin diversion in this watershed. 60,000 acre-feet in any 10 year running period are diverted by the City of Fort Collins through the Michigan River ditch. This equates to an average annual diversion of 6,000 acre-feet per year. Stream flow in the Michigan River are adequate to meet Walden's wastewater treatment plant discharge concerns

The North Platte River basin is somewhat unique in Region XII, in that trans-basin diversions have been limited to no more than 60,000 acre feet of water in any period of ten consecutive years reckoned in continuing progressive series beginning with October 1, 1945 as a result of the Supreme Court decree in the Nebraska versus Wyoming case (325 US 589 (1945). In addition, irrigators in Jackson County are limited under the same case and a modification (345 US 981 (1953)) to irrigating no more than 145,000 acres and no more than 17,000 acre feet of total annual storage for irrigation purposes.

The Colorado Water Conservation Board has limited its instream flow filings to those stream reaches above irrigable lands. Thus, hydrologic modifications are not anticipated to be a problem in the North Platte watershed, unless very site specific and limited in extent.

3.3.4 Agricultural Activities

Agricultural activities in the watershed have not been documented to cause water quality concerns.

Due to the amount of grazing in the watershed (see section 1.2), this area is appropriate for the examination of Best Management Practices developed in cooperation with the ranchers, state, and federal management agencies in the basin, such as the State Land Board, Bureau of Land Management, the Natural Resources Conservation Service, and

the Forest Service. Livestock grazing management can be used as a tool to improve range conditions as well as maintaining a healthy riparian ecosystem.

The Owl Mountain Partnership was established in 1993 as a prototype for “ecosystem management” in Jackson County, as an offshoot of the Colorado Division of Wildlife’s Habitat Partnership Program. Grant funding from Section 319 of the Clean Water Act was obtained in 1996 ($76,000). A second grant was awarded in 1997 for $152,000, and a third phase of the resource management project was funded in 2000 at $150,000. Through a collaborative approach, working with resource agencies and North Park ranchers, 20 ranch management plans have been developed to improve range conditions and protect water quality of streams in the Illinois, Canadian, and Michigan River basins. Wells and pipelines have been installed for a number of grazing allotments to provide alternative stock watering. Fencing best management practices have been used to better manage livestock. Spring developments have been installed in several locations. Vegetative treatments have been used extensively to improve forage for livestock and wildlife. Grant funds allow cost share for these practices, which are matched with both cash and in-kind efforts of participating producers, for both private and public lands.

3.3.5 Recreational Activities

A concern has been raised that significant increases in wildlife populations due to DOW big game management could be having an impact on water quality. The Owl Mountain Partnership may be the appropriate forum to evaluate and resolve this concern.

Elk and deer 2001 post hunt projections by the Division of Wildlife in March of 2001 were 4,387 and 4,467, respectively. Antelope and moose 2001 projections were 1,836 and 509, respectively.

3.4 Nonpoint Source Recommendations

Voluntary appropriate agricultural Best Management Practices (BMPs) that have been demonstrated to improve or protect water quality, identified through the 208 Plan and other efforts should be encouraged.

4.0 WATERSHED IMPROVEMENT PROJECTS

4.1 Existing Projects

4.1.1 Owl Mountain Watershed Project

This project is being lead by the Colorado Wildlife Heritage Foundation and is being funded in part by EPA 319 funds. The major goals of the project are to "Promote ecosystem health over large landscapes with varying ownership throughout the project area; improve soil and vegetative conditions; improve water quality to benefit aquatic and terrestrial wildlife species; promote sustainable agricultural and timber industries; and build trust between government and the local North Park community." The project area includes three major drainages - the Michigan, Illinois, and Canadian Rivers, which

all flow into the North Platte River. For more information on this project see section 3.3.4

The Owl Mountain Partnership will continue to undertake projects that will not diminish the rights of all present and future water users to divert, fully develop and use, up to Colorado's full equitable apportionment and entitlements, the waters of the North Platte River and its tributaries under the Nebraska v. Wyoming decrees as allowed under such decrees and in accordance with Colorado water law. Furthermore, the Owl Mountain Partnership agreed that they would not support or fund efforts by any entity to claim or file on or obtain any in-stream flow decree on the North Platte River or its tributaries downstream from any existing and decreed water diversion structures.

4.1.2 Jackson County Nonpoint Source Watershed Protection Plan

In 2011, the Owl Mountain Partnership in cooperation with the BLM and Jackson County began drafting a watershed plan intended to both identify and recommend actions to improve nonpoint source water quality issues on impaired water bodies and maintain the high quality water in Jackson County. The Owl Mountain Partnership received a grant from the Colorado Nonpoint Source Committee to prepare this plan, which is scheduled for completion no later than December 13, 2013. The plan will identify projects and practices that benefit water quality throughout the County, specifically focused on non-point source issues and best management practices for existing or potential future water quality issues cause by both natural and man-made sources.

4.1.3 North Delany Butte Reservoir Drop Structure

See Section 2.5 for information on this project.

4.1.4 Colorado State Forest Ecosystem Project

The Colorado State Forest Ecosystem Planning Project was initiated in 1993, and culminated with the development of a comprehensive, integrated management plan. The project's goals were to " establish a planning and monitoring process on the State Forest for the State Land Board, provide the Board with a mechanism to define long term goals, develop management strategies for the Forest, monitor ecosystem health, and foster an environment of cooperation among the Forest stakeholders." The “Strategic Plan” developed by the Colorado State Forest Ecosystem Project was approved by the State Land Board in February 1996.

4.2 Future Project Needs

Projects may be identified through the various efforts previously mentioned.

5.0 LAND USE REGULATIONS APPLICABLE TO WATER QUALITY PROTECTION AND IMPROVEMENT

Jackson County has 1041 land use and zoning regulations. It does not appear that land

use regulations beyond those currently in place, are needed to protect existing water quality.

6.0 WASTELOAD ALLOCATIONS

A total monthly ammonia wasteload allocation has been placed on the Walden Wastewater treatment facility to protect the fishery in the Michigan River.

The total ammonia monthly chronic effluent limits are as follows:

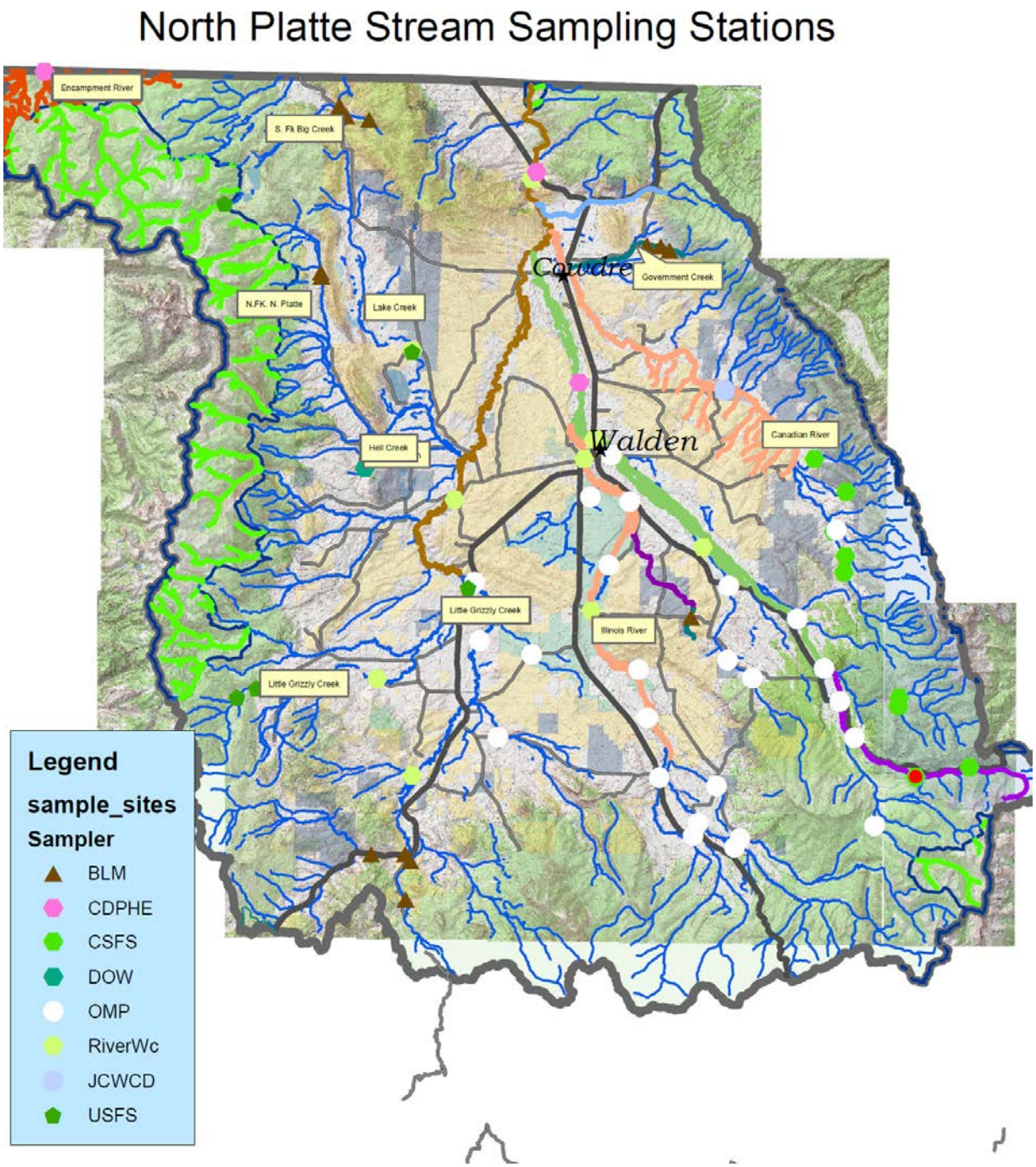
January:	6.2 mg/L
February:	6.3 mg/L
March:	6.1 mg/L
April:	6.1 mg/L
May:	5.9 mg/L
June:	4.5 mg/L
July:	4.1 mg/L
August:	4.8 mg/L
September:	5.4 mg/L
October:	6.0 mg/L
November:	5.9 mg/L
December:	5.9 mg/L

7.0 WATER QUALITY MONITORING

7.1 Existing Monitoring Efforts. The Water Quality Control Division maintained a monitoring station on the Michigan River in Walden until 1992. That station is no longer active. The Division of Wildlife's River Watch Program does not maintain any stations in the North Platte Watershed. The USGS maintains two gauging stations on the North Platte, but water quality data is not collected at these stations.

The Jackson County Water Conservancy District, as previously mentioned, has undertaken a watershed-wide water quality monitoring program which was initiated in 2000, and will continue in 2002. This monitoring project is being coordinated with the Owl Mountain Partnership, and the Colorado State Forest, which although separate projects, are utilizing the same sampling techniques and analytical procedures, and have been monitoring since 1995.

A draft sampling plan for 2012 is under review by the Conservancy District, and proposes to include selected sites for Total Recoverable Iron (TRI) analysis in addition to TSS at all locations as a result of the Illinois River being included on the 303(d) list in order to ascertain whether or not the TRI values in the North Park Basin are naturally occurring.



Water quality sampling locations by Federal, State and Local agencies and organizations (Source: 2012 Draft Nonpoint Source Watershed Protection Plan)

The Water Quality Control Division has existing water quality monitoring sites in the North Platte watershed and has macroinvertebrate and flow data from a special study conducted in October 2000.

7.2 Water Quality Monitoring Needs

A thorough investigation of dissolved oxygen concentrations is needed to determine why streams are under-saturated. Dissolved oxygen could be monitored during several 24 hour periods seasonally, especially in streams draining areas that are heavily grazed. Photosynthesis and respiration rates need to be measured, especially during the winter when streams are frozen.

Concentrations of dissolved oxygen in stream bottom sediments need to be determined by intra-gravel techniques. An investigation of the possible contribution of ground water to the streams should be measured during the winter to study the problem of low dissolved oxygen concentrations.

A study is needed to supplement monitoring of dissolved oxygen with the collection of periphyton or benthic invertebrates for measurement of biomass by artificial substrate method. This could be a useful tool for determining seasonal and aerial changes of dissolved oxygen.

The draft 2012 Nonpoint Source Watershed Protection Plan for Jackson County identified a number of water quality sampling and monitoring recommendations for all 303(d) listed water bodies however is still subject to review and approval.

Additionally, a baseline water quality network to ensure that present and future oil and gas development in Jackson County minimizes impairment to water quality has been identified in the draft 2012 Nonpoint Source Watershed Protection Plan as an important action to support high quality water sources.

8.0 WATER QUALITY STANDARDS

8.1 Existing Standards and Classifications

Streams in the North Platte River watershed are classified for protection of cold water aquatic life (Class I), primary contact recreation, water supply and agricultural uses.

Three stream segments in the basin are listed as "Use Protected". Use protection ensures that the existing uses on these segments are protected from future antidegradation reviews. Those segments are: tributaries to the North Platte including lakes and reservoirs, except those in the Mount Zirkel Wilderness area (Stream Segment 5); mainstem of the Michigan River (Stream Segment 5); and the mainstem of Government Creek from the State Forest to the North Platte (Stream Segment 7).

8.1.1 Designated Use Impairment Stream Segments

There are no designated use impairment stream segments in the North Platte River watershed.

8.1.2 303(d) list

Section 303(d) of the Clean Water Act requires each state to identify those waters for which effluent limits are not enough to allow the waters to meet water quality standards. There are no listed stream segments in the North Platte River watershed.

Seven segments have been placed on the State's monitoring and Evaluation List. All seven segments have been identified by the US Forest Service as potentially impacted by sediment sources.

Table NP-2. 303(d) Listed Segments in the Upper Colorado River Basin

Segment	Description	Portion	Impairment	Priority
COUCNP01	Tribs to the N Platte & Encampment Rivers w/in Wilderness Areas	South Fork Big Creek	Cu, *E. coli*	M & E list
COUCNP04a	Tributaries to the North Platte River except those tributaries in Segment 1, 4b, 6, 7a and 7b	Canadian River	Fe (Dis), *E. coli*	M & E list
COUCNP04a	All tributaries to N. Platt River excepts segments 4b, 6, 7a and 7b	Grizzly Creek, Little Grizzly Creek	Aquatic Life Use	M & E list
COUCNP04a	All tributaries to N. Platte River except segments 4b, 6, 7a and 7b	Little Grizzly Creek	*E.coli*, Fe (Trec)	M & E list
COUCNP04a	All tributaries to N. Platte River except segments 4b, 6, 7a and 7b	Lake Creek	pH, Fe (Trec)	M & E list
COUCNP04a	All tributaries to N. Platte River except segments 4b, 6, 7a and 7b	Big Creek Reservoir	Aquatic Life Use (Hg Fish Tissue)	M & E list
COUCNP04b	Mainstem of the Illinois and Canadian Rivers, including all tributaries of the Illinois from Indian Creek to Michigan River except for specific listings in Segments 7a and 7b, and all tribs of Canadian entering the mainstem from the Southwest	Illinois River	Fe (Trec)	M
COUCNP07b	Government Creek, Spring Creek	Spring Creek	D.O.	M
COUCNP09	All lakes and reservoirs tributary to the North Platte and Encampment Rivers	Lake John, North Delaney Lake	pH	M & E list
COUCNP09	All lakes and reservoirs tributary to the North Platte and Encampment Rivers	Lake John	D.O.	H

The Jackson County Water Conservancy District has monitored Newcomb, Ninegar, Pinkham, and Snyder Creeks, for sediment impacts and recommends deletion of these segments from the monitoring and evaluation list.

8.2 Recommendations on Standards

Existing water quality standards (including use designations and criteria) for the North Platte River Basin are adequate to protect the existing uses under current conditions. NWCCOG is supportive of the State's antidegradation provision and protection of high quality waters.

There is a permitted discharge to Segment 5 (Town of Walden Wastewater facility).