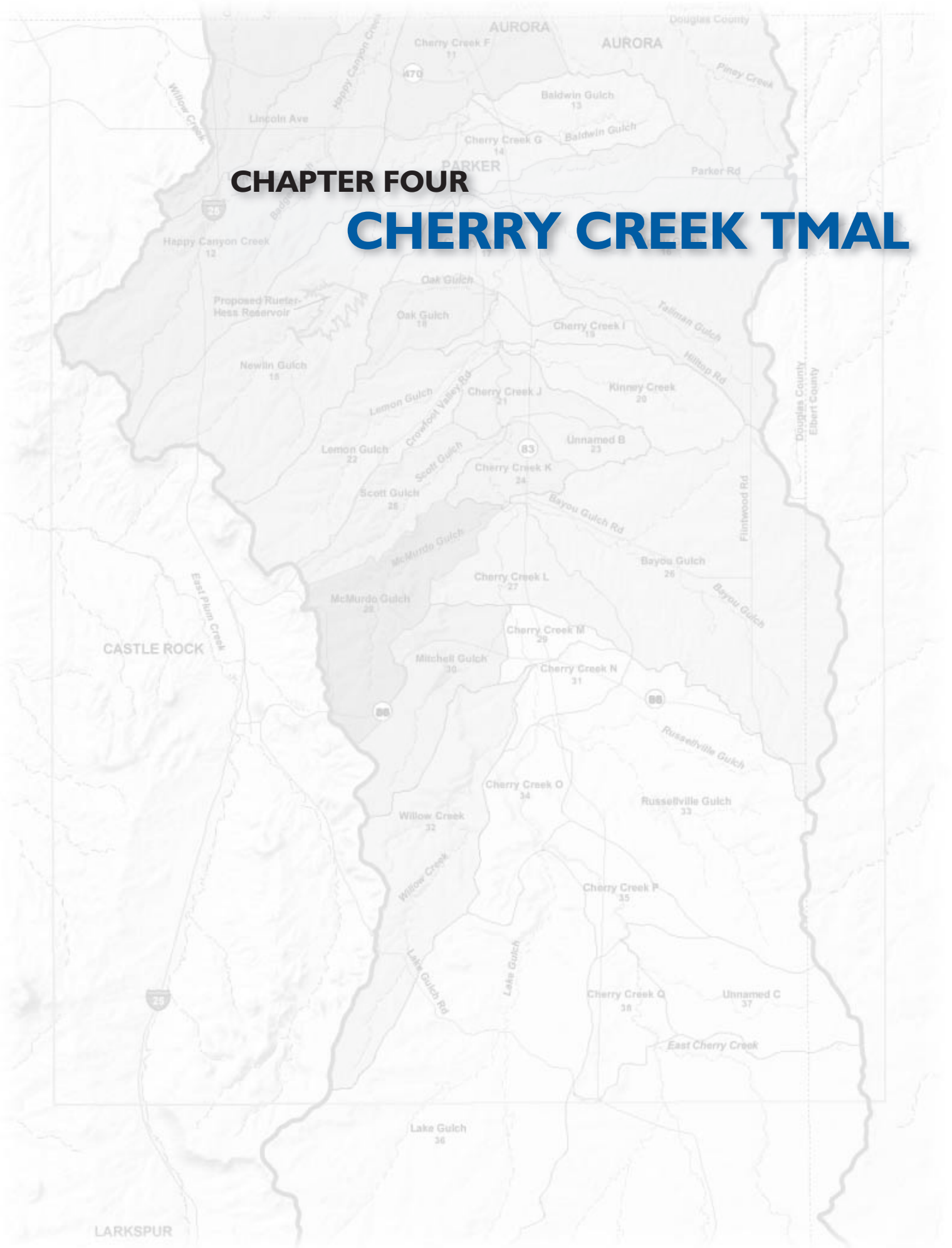


CHAPTER FOUR

CHERRY CREEK TMAP



In September of 2000, the WQCC adopted a phased TMAL for total phosphorus for Cherry Creek Reservoir.

A phased TMAL recognizes that the TMAL has elements of uncertainty which need further monitoring and evaluation and, thereafter, the TMAL may be refined (See, *EPA, Guidance for Water Quality Based Decisions, 1991*). However, a phased TMAL requires implementation of the controls and management strategies designed to improve the water quality. EPA characterizes a phased TMAL as an appropriate mechanism for water quality control. Further, the WQCC recognized the importance of the phased TMAL process that allows for the adoption of both point source and nonpoint source requirements that will provide protection for the reservoir while studies of contributing problems to reservoir quality continue, and if necessary, additional control programs are formulated (WQCC, 2000).

Review of the TMAL by various entities, such as EPA and the WQCC, has revealed that the current allocations are not attaining water quality standards or protecting current designated uses. The WQCC recognizes that this situation requires the necessary controls be identified that will attain the applicable standards and protect the uses. The identification of the necessary controls will require considerably more investigation and evaluation before the Control Regulation can be revised to reflect these changes. The WQCC recognizes that until additional investigations are completed, a new TMAL cannot be calculated. The Phase I TMAL will implement further controls on point sources, stormwater, and nonpoint sources while sufficient information on the phosphorus loadings to the watershed and reservoir are developed to support revision of the TMAL (WQCC, 2000).

The TMAL for total phosphorus by sources is based on the following formula:

$$\text{Cherry Creek TMAL} =$$

$$\begin{aligned} & \text{Nonpoint and Regulated Stormwater Sources} + \text{Background Sources} + \text{Wastewater Facility} \\ & \text{Sources} + \text{Industrial Process Wastewater Sources} + \text{Individual Sewage Disposal Systems} \\ & + \text{Margin of Safety} \end{aligned}$$

The current TMAL phosphorus poundage allocations are distributed among the sources as shown in Table 4-1:

Table 4-1. Cherry Creek TMAL

ALLOCATION TYPE	TOTAL PHOSPHORUS (LBS/YR)
Nonpoint and Regulated Stormwater Sources	10,290
Background Sources	1,170
Wastewater Facility Sources (including Reserve Pool, Phosphorus Bank, and Semi-Urban Areas)	2,310
Industrial Process Wastewater Sources	50
Individual Sewage Disposal System Sources	450
TMAL	14,270

As shown, over 72-percent of the load is allocated to nonpoint and regulated stormwater sources. The annual point source wasteload allocation of phosphorus in the Cherry Creek Watershed is limited to 2,310 pounds per year, or 16-percent of the TMAL. The wasteload allocations for each WWTF were based on a maximum effluent concentration of 0.05 mg/L total phosphorus, near term (2007-2010) hydraulic capacity needs, and near term population and employment levels estimated in the Metro Vision Plan (DRCOG,

Table 4-2. Summary of Phosphorus Wasteload Allocations

CHERRY CREEK BASIN POINT SOURCE ALLOCATION	
Facility	(lbs/yr)
Arapahoe Water and Wastewater Authority/Cottonwood Water and Sanitation District	402
Pinery Water and Sanitation District	304
Inverness Water and Sanitation District	129
Parker Water and Sanitation District	533
Meridian Water and Sanitation District	113
Stonegate Village Water and Sanitation District	161
Subtotal	1,642
Semi-Urban Areas	236
Reserve Pool	216
Phosphorus Bank	216
Total Wasteload Allocation	2,310

2000). Table 4-2 summarizes the wasteload allocated to each of the WWTFs, semi-urban areas which as they develop may be provided centralized wastewater service, the Reserve Pool, and the Phosphorus Bank (WQCC, 2001). While treated wastewater flows have increased at each WWTF, treatment facilities have consistently instituted new processes or changed their chemical additives and dosages to reduce phosphorus concentrations (Authority, 2000).

Continued water quality monitoring, specific modeling, and special investigative studies are required as part of the process and continued development of the phased TMAL. The Control Regulation mandates that the Authority undertake certain activities and studies for 2003, 2004, and 2005 (Table 4-3). The WQCC requested that these water quality activities be implemented, as funding allows.

Table 4-3. Summary of Future Activities to Revise the TMAL - Years 1-3

YEAR ONE
Construction of nonpoint source control projects
Reservoir nutrient enhancement studies
Further development of event mean concentration for stormwater flows
Identification of industrial process wastewater sources and associated phosphorus loading
YEAR TWO
Construction of nonpoint source control projects
Evaluation of phosphorus removal effectiveness of nonpoint source control structures
Monitoring of shallow alluvial ground water loading in tributaries
Quantification of individual sewage disposal system phosphorus loading
YEAR THREE
Construction of nonpoint source control projects to reduce phosphorus loading to the maximum extent practicable
Implementation of lower phosphorus effluent limits
Characterization of watershed hydrology to establish reference condition for evaluation of phosphorus loading
Depth profiling of nutrient content in ground water
Revised calculations of background sources, industrial process wastewater sources, and septic system sources of phosphorus contributions
Revision of control regulation TMAL for next triennial review

From: 5 CCR 1002-72.3 (4) (a)-(c)

Table 4-4 summarizes the status of Authority activities identified in the Control Regulation. (following pages)

Table 4-4 Control Regulation Review and Status

Control Regulation Requirement	Description	Status	Comments	Action Item(s)
72.3 Phase I TMAL Phosphorus Load Allocations		Continuous process	See below	See below.
72.3 (4) Future activities to attain TMAL¹				
(a)(1): Construct non-point source control projects	1.Cottonwood Creek at Peoria Pond	Completed 2002	Items 2 and 3 are currently in design phases; Item 2 scheduled to begin construction Fall 2003	<ul style="list-style-type: none"> Continue with 2004 CIP
	2.Cottonwood Creek Stabilization	Design and construction		
	3.Cherry Creek SP Wetlands	Design		
(a)(2): Conduct reservoir nutrient studies		In progress	Study funded with EPA 319 grant and Authority match dollars	<ul style="list-style-type: none"> Work with WQCD
(a)(3): Develop event mean concentrations for storm flows		No action taken	How to fund studies?	<ul style="list-style-type: none"> Work with WQCD to address requirements and funding
(a)(4): Quantify soil and GW background phosphorus levels		WQCD developed scope	Partial study funded with EPA 319 grant dollars and Authority match	<ul style="list-style-type: none"> Work with WQCD to address requirements
(a)(5): Identify industrial process WW sources and associated phosphorus loading; Identify and quantify septic system phosphorus loading		No action taken	Septic systems identified in Franktown and Valley Country Club area	<ul style="list-style-type: none"> Identify scope and direct investigation
72.4 WWTF Load Allocations/ Limitations				
72.4(2): Wasteload allocation	Annual WW load among WWTFs limited to 2,310 lbs/yr (excluding industrial waste)	Loads reported by dischargers in their DMR submitted to WQCD; Loads below allocation		<ul style="list-style-type: none"> Provide results in Annual Report (See 72.9)
72.4(4) Effluent concentration	Attain phosphorus effluent concentration of 0.05 mg/l by August 2004			<ul style="list-style-type: none"> Identify dischargers unable to meet objective by Aug. 2004 Support loans for WWTFs to improve phosphorus removals Continue studies of fate and transport to better characterize the wastewater loadings and effects on Reservoir
72.4(5): Discharger request for a compliance schedule	Discharger must notify Authority and request comments	Site applications and wastewater utility plans evaluated to meet water quality requirements; Recommendations to TAC	TAC recommends to Board for action	<ul style="list-style-type: none"> Continue current process No compliance schedules requested, if so, would include in Annual Report. (see 72.9)

¹ Year One activities discussed in summary table. Additional requirements for Years Two and Three will be addressed during subsequent report updates.

Control Regulation Requirement	Description	Status	Comments	Action Item(s)
72.4(6): Wasteload Allocation for Semi-urban areas		None pending	Requirements would be identified in WUP or site applications	<ul style="list-style-type: none"> Identify activities in Annual Report (see 72.9)
72.4(7): Determine monthly and annual quantity of phosphorus discharged		Included with discharger's DMR submitted to WQCD	WQCD reviews DMR from discharger	
72.4(8): Additional prohibitions and precautionary measures	Control of other point sources	No action taken		<ul style="list-style-type: none"> Evaluate and prioritize activities for future consideration. Work with WQCD to identify additional prohibitions and precautionary measures
72.5 Point Source Wasteload Allocation Modifications				
72.5 (1): Temporary Transfer of Phosphorus Allocation		None Pending	Include activities with Annual Report (see 72.9)	<ul style="list-style-type: none"> Include any potential activities with Annual Report (see 72.9)
72.5(2) Reserve Pool	For expanded or new wasteload allocations	Three possible applications for credits pending	Board considering reserving portion for lease only for emergency conditions and retiring remainder. New guidelines adopted by Board, July 2003	<ul style="list-style-type: none"> Authority and WQCD review trading applications Identify activities in Annual Report Request the WQCC to remove the 216 - pound cap on trading
72.5(3) Trading Program	Trading allowed for certain nonpoint source projects	Trading Guidelines have been drafted and received Authority approval Application submitted by: Parker Water & Sanitation District and Arapahoe Water and WW Authority		<ul style="list-style-type: none"> Implement Trading Guidelines via trading applications
72.5(3)(I): Maintain Phosphorus Bank	Approved phosphorus trade credits are tracked. Credits are available for expanded or new wasteload allocations	Trading Guidelines have been drafted and received Authority approval; No credits have been banked; Four projects in progress	Trading Guidelines approved by WQCD	<ul style="list-style-type: none"> Establish accounting system for tracking banked credits
Section 72.6				
Nonpoint Source Nutrient Controls				
72.6(1)(a): Nonpoint Source BMP	Recommends that Authority Members adopt and implement nutrient control measures	The Authority reviews development submittals for compliance with the criteria Authority budgeted, scoped, and advertised for Phosphorus Facilitator in 2003	Authority requirements for control measures is completed, but has not been adopted by all land use agencies Phosphorus facilitator to investigate and report on low impact development techniques	<ul style="list-style-type: none"> Request all Authority members to adopt and implement appropriate control measures

Control Regulation Requirement	Description	Status	Comments	Action Item(s)
72.6(1)(c): List of Prioritized CIP Projects	Identify, prioritize, and update list of effective and cost-efficient projects	3-year CIP implemented in 2003	Original project list was submitted 9/2001 as required by the control regulation	<ul style="list-style-type: none"> Review updated project list for 2004 planning and budget
72.6(1)(d): O&M provided for nonpoint source projects and oversight		<p>O&M costs included in prioritized CIP list.</p> <p>O&M activities for Cottonwood Pond included in 2003 CIP</p>	<p>Updated list in progress.</p> <p>Consultant designing Cottonwood O&M improvements</p>	<ul style="list-style-type: none"> Refine O&M requirements. Define O&M procedures for each project. Budget for oversight in the future and determine how Authority will provide oversight
72.6(2): Public Information and Education	Develop program with focus on known nonpoint water quality impairments; Consult with WQCD; To be implemented by 6-1-2002	<p>319 Grant education program in progress</p> <p>Authority participates in Cherry Creek Stewardship Partners and has contributed to CCSP interpretative signage</p>	<p>Possible partnership with COE upgrade of visitor center</p> <p>WQCD can provide personnel and funding assistance</p> <p>319 Information and Education program meets schedule requirements</p>	<ul style="list-style-type: none"> Implement 319 Grant Program Identify other Education and Public Information requirements Form TAC subcommittee
72.6(5): Floodplain Preservation	Recognizes protection of floodplains, etc. through acquisition and conservation as nonpoint control measures	Purchase of Bowtie property adjacent to CCSP completed	Cherry Creek Corridor master plan update (in progress), may identify other priority properties	<ul style="list-style-type: none"> Pursue other acquisitions and conservation measures
Section 72.7 Stormwater Permit Requirements (Addressed by Local Jurisdictions)				
Section 72.8				
Nutrient Monitoring				
72.8(1): Nutrient monitoring by Wastewater Dischargers				<ul style="list-style-type: none"> No action required
72.8(2): Authority develop and implement Monitoring Program	Watershed and Reservoir water quality monitoring required	<p>Monitoring plan completed and monitoring is completed</p> <p>Prepared and submitted Annual Aquatic Biological and Nutrient Monitoring Report</p>		<ul style="list-style-type: none"> Report on annual monitoring program
72.8(3): Authority consults with WQCD on Monitoring Program	<p>Evaluate nutrient sources/transport</p> <p>Characterize nutrient load reductions</p> <p>Document attainment standards</p>	Completed	WQCD approved monitoring program	<ul style="list-style-type: none"> Continue coordinating with WQCD on future programs

Control Regulation Requirement	Description	Status	Comments	Action Item(s)
72.8(4): Authority consult with WQCD on Special Studies	72.8(4)(a): Feasibility study of nutrient removal: point sources	Discussions with WQCD in progress under leadership of TAC Chairman	Requires that data be collected under 72.8(4) WQCD or others may fund some special studies	<ul style="list-style-type: none"> Continue coordinating with WQCD on requirements and report to TAC
	72.8(4)(a): Qualification of effectiveness of removal strategies: non point sources			
	72.8(4)(b): Quantification of control structure effectiveness			
	72.8(4)(c): Other studies to support phased TMAL			
72.8(5): Uses of monitoring data	Determine nutrient fate and transport	Some monitoring data collection in progress	Requires that data be collected under 72.8(4)	<ul style="list-style-type: none"> No action required at this time
	Calculate annual nutrient loads			
	Document compliance with standards			
	Analyze long-term trends in Reservoir and the Watershed			
Calibrate WQ models for next phase				
Section 72.9	Reporting			
72.9(1): Annual Report Submittal		Submitted 2002 Annual Report in March 2003		<ul style="list-style-type: none"> Compile information for 2003 Annual Report due in March 2004
72.9(1)(a): Wastewater Facility Controls	Monthly and annual loads	Submitted 2002 Annual Report in March 2003 and included information	Monthly loads not previously included and annual loads not reported in 2001	<ul style="list-style-type: none"> Compile information for 2003 Annual Report due in March 2004
	Permit violations			
	Approved Site Applications			
Reduction in nutrient load effectiveness				
72.9(1)(b): Nonpoint Source Controls	Sediment and erosion control permit, inspection, and enforcement actions	Authority reviews land use applications for compliance	Requires additional input from local jurisdictions	<ul style="list-style-type: none"> Work with local jurisdictions to compile information for Annual Report.
	Construction BMPs inspection and enforcement actions			
	Permanent BMP construction, inspection, and maintenance actions	Design of two PRF's began in 2003	Cherry Creek Corridor master plan update (in progress) may identify other priority properties	
	Flood control facilities retrofitting, inspection and maintenance actions	Completion of Cottonwood/Peoria St. in 2002		
	Effectiveness in reducing nutrient loads			
	Funding/monitoring of nonpoint projects			
	Public information and education actions			

Control Regulation Requirement	Description	Status	Comments	Action Item(s)
72.9(1)(c): Riparian and Wetlands Protection	Protection, enhancement, and restoration actions	Authority approved participation in Piney Creek stream stabilization, Bowtie property acquisition, and Cherry Creek Corridor Major Drainageway Study Compiled information for 2002 Annual Report and was delivered in March 2003	Cherry Creek Corridor master plan update (in progress) may identify other priority properties	<ul style="list-style-type: none"> Continue participation in multi-party watershed protection plans Compile information for 2003 Annual Report due in March 2004
72.9(1)(d): Wasteload Allocation	Temporary transfer and Reserve Pool actions	See 72.5(3)	See 72.5(3)	See 72.5(3)
72.9(1)(e): Trading Program	Point and nonpoint source actions	See 72.5(3)	See 72.5(3)	See 72.5(3)
Annual Report Content	Monitoring data	2002 report delivered in March 2003	Some information not previously reported	<ul style="list-style-type: none"> Include information in Annual Report due in March 2004 Work with local jurisdictions to compile information for Annual Report
	Point and nonpoint source loadings	Included information in Annual Report		
	Status of compliance with discharge permits	Worked with local jurisdictions to compile information for Annual Report		
	Recommendations on new or proposed expansion of treatment facilities Recommendations for improving water quality			
Evidence or agreements	Financing of nonpoint source projects	2002 report provided in March 2003	Some information not previously reported	<ul style="list-style-type: none"> Include information in Annual Report due in March 2004
	Implementation of permit			
	Adoption/Implementation of BMPs	Included information in Annual Report		
	Demonstrate reasonable progress towards control of point and non-point sources of phosphorus			