



Continuing Planning Process



2006 edition

**with contributions from the
Oklahoma Water Resources Board
Oklahoma Conservation Commission**

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CHAPTER 1

INTRODUCTION AND OVERVIEW

The Continuing Planning Process (CPP) is required by the Clean Water Act (CWA) § 303(e)(3)(A)-(H) and 40 CFR § 130.5. The document describes the water quality programs implemented within the State. The document also describes present and planned water quality management programs and the strategy to be used by the State in conducting these programs.

PRIMARY AGENCIES

Corp. Comm.	Oklahoma Corporation Commission
OCC	Oklahoma Conservation Commission
DEQ	Oklahoma Department of Environmental Quality
ODM	Oklahoma Department of Mines
ODWC	Oklahoma Department of Wildlife Conservation
OSDA	Oklahoma State Department of Agriculture
OSE	Office of the Secretary of Environment
OWRB	Oklahoma Water Resources Board

OTHER AGENCIES

ACOG	<i>Association of Central Oklahoma Governments</i> One of the regional planning agencies designated by the Governor to provide planning for the State under the CWA. AG <i>Attorney General</i> The Attorney General's Office provides legal counsel and representation for Oklahoma's state agencies.
ODOC	<i>Oklahoma Department of Commerce</i> This agency is responsible for conducting population projections used in the Water Quality Management Plan.
EPA	<i>Environmental Protection Agency</i> The primary federal agency responsible for administering various environmental programs. It is responsible for restoring and maintaining the physical, chemical, and biological integrity of the nation's environment.
INCOG	<i>Indian Nations Council of Governments</i> One of the designated regional planning agencies in Oklahoma. This agency is designated by the Governor to provide planning for the State under the CWA. OGS <i>Oklahoma Geological Survey</i> A state agency under the direction of the University of Oklahoma that does research on the geological, mineral, and water resources in the State and makes the information discovered available to the public.

USGS

United States Geological Survey The USGS is a federal agency that works closely with state agencies to gather water quality, geological, and geohydrological data.

PROGRAMMATIC TERMS

A-95

A Congressionally mandated review system that establishes a network of state, metropolitan and regional planning and development clearinghouse. The system provides rules and regulations governing the formulation, evaluation and review of Federal programs and projects having a significant impact on area and community development

104

Section 104 of the CWA This section of the CWA provides federal grants for water quality management activities and other special projects.

106

Section 106 of the CWA This section of the CWA provides annual grants to the states for use in controlling and abating water pollution control problems.

205

Section 205 of the CWA This section, 205(j), of the CWA provides federal grants for water quality management activities.

257

Section 257 of the CWA These rules were promulgated on September 19, 1979 and provided the first national guidance standards for sewage sludge use and disposal. These regulations set forth requirements for sludge treatment and sludge quality for the practices of land application and land filling. The State of Oklahoma rules for sludge management are modeled after the 257 requirements and are in some cases more stringent.

258

Section 258 of the CWA These rules were promulgated on October 9, 1991 and provide for non hazardous sludge disposal at landfills. These regulations set forth sludge quality requirements for landfills to accept and dispose of sewage sludge. Sewage sludge that is not land applied and is non-hazardous will be disposed of at landfills in Oklahoma.

301

Section 301 of the CWA This section of the CWA requires the achievement of EPA established effluent limitations for industrial and municipal point sources of pollution.

303

Section 303 of the CWA This section of the CWA requires states to review and, if necessary, revise their Water Quality Standards, at least once every three years, beginning in 1972.

303(d)

Section 303(d) of the CWA This section requires states to identify waters that do not or are not expected to meet applicable Water Quality Standards with technology-based controls alone. States are required to establish a priority ranking for the waters, taking into

account the pollution severity and designated uses of the waters. Once identification and priority ranking are completed, states are to develop Total Maximum Daily Loads at a level necessary to achieve the applicable state Water Quality Standards.

- 303(e)** *Section 303(e) of the CWA* This section requires each state to prepare a Continuing Planning Process document.
- 304(l)** *Section 304(l) of the CWA* This section was enacted as part of the Water Quality Act of 1987 and requires the identification of those waters that fail to meet Water Quality Standards due to toxic pollutants and other sources of toxicity. It also requires the preparation of individual control strategies that will reduce point source discharges of toxic pollutants.
- 305(b)** *Section 305(b) of the CWA* This section of the CWA established a process for preparing and submitting the Water Quality Assessment Report biennially. This process was established as a means for the U.S. Environmental Protection Agency and the U.S. Congress to determine the status of the Nation's waters.
- 314** *Section 314 of the CWA* This section of the CWA established the Clean Lakes Program for the states. Section 314 provides federal funds for the State to submit a classification of lakes according to eutrophic condition, develop processes and methods to control sources of pollution and to work with other agencies in restoring the quality of these lakes.
- 319** *Section 319 of the CWA* This section requires the development of a State Assessment Report and a Management Program for Nonpoint Source (NPS) pollution problems. The Assessment Report is to describe the nature, extent, and effects of NPS pollution, the causes and sources of such pollution, and programs and methods used for controlling this pollution. The Management Program explains what the State intends to accomplish in the next four fiscal years to address NPS problems.
- 401** *Section 401 of the CWA* This section of the CWA requires any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, to provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate.
- 402** *Section 402 of the CWA* This section of the CWA established the National Pollutant Discharge Elimination System (NPDES).
- 404** *Section 404 of the CWA* This section of the CWA is intended to control discharges of dredge or fill materials. Section 404 required permits to be issued for discharging dredged or fill materials into navigable water at specific disposal sites. This process is currently administered by the U.S. Army Corps of Engineers in conjunction with the DEQ.

503

Section 503 of the CWA These rules were promulgated on February 19, 1993 and provide for disposal and reuse of sewage sludge that does not exceed the ceiling concentration as expressed in table 1 of the rule. The rule also requires that sewage sludge, based upon its proposed use be treated for pathogen and vector attraction reduction. Land application, incineration, and surface disposal practices are the required disposal alternatives. Domestic septage requirements are addressed in the rule in addition to the sludge requirements. Oklahoma rules for both sewage sludge and septage that meet the 503 requirements have been presented for approval.

604

Section 604(b) of the CWA Water quality management planning program. This section contains a provision that 40% of the total available funds be designated to regional public comprehensive planning organizations. These comprehensive planning organizations are designated by the Governor to receive funds under the 604(b) program. INCOG and ACOG are designated as comprehensive planning organizations. The designation of a comprehensive planning organization is at the discretion of the Governor.

7Q2

Seven Day, two-year low flow The design flow for determining allowable discharge load to a stream. The flow is calculated as a moving average of seven consecutive days for each year in a given record. These seven-day low flow values are ranked in ascending order. An order number (m) is calculated based upon the number of years of record (n), with a recurrence interval (R) of two years, as $m=(n+1)/R$, where R=two years. A value of flow corresponding to the mth order is taken as the seven-day, two-year low flow for those historical data.

ACRONYMS AND DEFINITIONS

acute WET testing (LC50)	WET testing, which measures short-term lethality to a test species over a 48-hour period.
allotment	State Revolving Funds that are available for obligation. Allotments are made on a formula or other basis, which Congress specifies for each fiscal year.
alternative technology	Proven wastewater treatment processes and techniques which provide for the reclaiming and reuse of water, productively recycle wastewater constituents or otherwise eliminate the discharge of pollutants, or recover energy. Specifically, alternative technology includes land application of effluent and sludge; aquifer recharge; aquaculture; direct reuse (non-potable); horticulture; revegetation of disturbed land; containment ponds; sludge composting and drying prior to land application; self-sustaining incineration; methane recovery; individual and on-site systems; and small diameter pressure and vacuum sewers and small diameter gravity sewers carrying partially or fully treated wastewater.
APA	<i>Administrative Procedures Act</i>
applicant	Any municipality, as defined for the State Revolving Fund, that submits a preapplication/application for financial assistance in accordance with these rules and regulations.
appropriation	Statutory authority that allows federal agencies to incur obligations and to make payments out of the Treasury for specific purposes.
architectural or engineering services	Consultation, investigations, reports, or services for design-type projects within the scope of the practice of architecture or professional engineering.
assimilative capacity	The greatest amount of loading a waterbody can receive and still maintain the water quality standards designated for that waterbody.
AST	<i>Advanced Secondary Treatment</i> Essentially the same as AWT.
authorization	Legislation which authorizes the appropriation of funds to implement program activities. It does not provide any money, only the appropriation act itself permits the withdrawal of funds from the Treasury.
AWT or AT	<i>Advanced Wastewater Treatment</i> Treatment of wastewater effluent at a higher level than secondary. This process usually involves the addition or removal of chemical components during treatment.
BAT	<i>Best Available Technology Economically Achievable.</i> A term derived from Section 301 of the CWA in which effluent limitations for categories and classes of point source, other than publicly owned treatment works, shall require application of the best available technology economically achievable for such category or class. BAT effluent limitations guidelines, in general, represent the

best existing performance in the category or subcategory for control of non-conventional and toxic pollutants.

BCT

Best Conventional Pollutant Control Technology. A term derived from Section 301 of the CWA in which effluent limitations for categories and classes of point source, other than publicly owned treatment works, shall require application of the best conventional pollutant control technology for such category or class. BCT effluent limitations guidelines, in general, represent the best existing performance in the category or subcategory for control of conventional pollutants. BCT is not an additional limitation but replaces BAT for the control of conventional pollutants.

BPT

Best Pollutant Control Technology Currently Available. A term derived from Section 301 of the CWA in which effluent limitations for categories and classes of point source, other than publicly owned treatment works, shall require application of the best pollutant control technology currently available for such category or class. BPT effluent limitations guidelines are generally based on the average of the best existing performance by plants of various sizes, ages and unit processes within the category or subcategory for the control of familiar pollutants (i.e., conventional pollutants and some metals).

binding commitment

Legal obligations by the State to the local recipient that define the terms and the timing for assistance under the State Revolving Fund.

BMP

Best Management Practice A technique that is determined to be the most effective, practical means of preventing or reducing pollutants from Nonpoint sources in order to achieve water quality goals.

BOD5

Biochemical Oxygen Demand The BOD5 of a water is an amount of oxygen required by microorganisms while stabilizing decomposable organic matter under aerobic conditions. The test is important in the evaluation of purification capacity of a stream or other body of water. The test requires five days of laboratory time and results may vary when toxic substances are present which affect bacteria.

BPWTT

Best Practical Waste Treatment Technology A term derived from Section 201 of the CWA in which waste treatment management plans and practices shall provide for the application of the best practical waste treatment technology before any discharge into receiving waters.

building

The erection, acquisition, alteration, remodeling, improvement or extension of treatment works.

CAA

Clean Air Act Public Law 95-396, this includes 1970 amendments to the Clean Air Acts of 1963-67 which authorizes the setting of tough, uniform national ambient air quality standards to safeguard public health and welfare and upgrade the quality of American life.

capitalization grant	An agreement between EPA and the states whereby federal dollars are made available to partially fund a State Revolving Fund (SRF).
CBOD5	<i>Carbonaceous Biochemical Oxygen Demand</i> That portion of the BOD that is not due to oxidation of nitrogenous compounds.
CFR	<i>Code of Federal Regulations</i> A codification of the general and permanent rules published in the Federal Register by the Executive Departments and agencies of the Federal Government.
chronic WET testing	WET testing, which measures long term lethal and sublethal effects to specific aquatic animal test species over a 7 day period.
COD	<i>Chemical Oxygen Demand</i> The COD test is used extensively in the measurement of pollution strength of domestic and industrial wastes. The COD test measures the total amount of oxygen needed to completely oxidize the waste to carbon dioxide and water. The test employs a strong oxidizing agent to oxidize all organic compounds present in the waste. The test is more reliable than the BOD test and can be completed in about three hours.
collector sewer	The common lateral sewers, within a publicly owned treatment system which are primarily installed to receive wastewater directly from facilities which convey wastewater from individual systems, or from private property, and which include service "Y" connections designed for connection with those facilities including: Crossover sewers connecting more than one property on one side of a major street, road, or highway to a lateral sewer on the other side when more cost effective than parallel sewers; and Pumping units and pressurized lines serving individual structures or groups of structures when such units are cost effective and are owned and maintained by the recipient.
combined sewer	A sewer that is designed as a sanitary sewer and a storm sewer.
construction	Any one or more of the following: preliminary planning to determine the feasibility of treatment works, engineering, architectural, legal, fiscal, or economic investigations or studies, surveys, designs, plans, working drawings, specifications, procedures, or other necessary actions, erection, building, acquisition, alteration, remodeling, improvement, or extension of treatment works, or the inspection or supervision of any of the foregoing items.
contingency section	The planning portion of the priority list consisting of projects which may receive loans due to bypass provision or due to additional funds becoming available.
CPP	<i>Continuing Planning Process</i> A document which describes present and planned water quality management programs and the strategy to be used by the State in conducting these programs.
critical dilution	An effluent dilution, expressed as a percentage, representative of the dilution afforded a wastewater discharge according to the appropriate Q*-dependent chronic mixing zone equation for

	chronic WET testing. The critical dilution for acute WET testing is 100%.
critical effluent flow	The point source effluent waste flow used in water quality modeling of a pollutant.
cross-cutting laws and orders	Federal laws and authorities that apply to all activities supported with funds "directly made available by" capitalization grants.
cfs	cubic foot per second.
CWA or "the Act"	<i>Clean Water Act</i> Public Law 92-500 enacted in 1972 provides for a comprehensive program of water pollution control. Two goals are proclaimed in this Act: 1) to achieve swimmable, fishable waters wherever attainable by July 1, 1983, and 2) by 1985 eliminate the discharge of pollutants into navigable waters.
daily discharge	The discharge of a loading measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling.
dilution series	A set of proportional effluent dilutions for acute or chronic WET testing based on a specified critical dilution, which is typically the next-to-highest dilution in the series.
DO	<i>Dissolved Oxygen</i> DO concentrations range from a few parts per million up to about 10 ppm for most Oklahoma streams. A level of DO around 7 ppm is essential to sustain desired species of game fish. If DO drops below 5 ppm the danger of a fish kill is present and malodorous conditions will result. The major factors determining DO levels in water are temperature, atmospheric pressure, plant photosynthesis, rate of aeration and the presence of oxygen demanding substances such as organic wastes. In addition to its effect on aquatic life, DO also prevents the chemical reduction and subsequent movement of iron and manganese from the sediments and thereby reduces the cost of water treatment.
DO target	<i>Dissolved Oxygen Target</i> The dissolved oxygen concentration to be met using a particular water quality model so to meet a DO criterion corresponding to the maintenance of a beneficial use.
dynamic (unsteady-state) simulation	Conditions at one or more points in a system being modeled change with time. Dynamic simulations approximate the response of a system to time-variable changes in the loads entering the system.
EIS	<i>Environmental Impact Statement</i> A mandatory statement process required for federal agencies. An EIS is required before a federal agency reaches a decision on a proposed major action, which may significantly affect the environment. The statement must analyze in detail the likely environmental consequences of action and make the analysis available to the public.
enforceable requirements of the Act	Those conditions or limitations of NPDES permits which, if violated, could result in the issuance of a compliance order or

initiation of a civil or criminal action. If a permit has not been issued, the term shall include any requirement, which would be included in the permit when issued. Where no permit applies, the term shall include any requirement which is necessary to meet applicable criteria for best practicable wastewater treatment technology (BPWTT).

equivalency projects	Projects, cited by the Board as being funded up to an amount equivalent to the capitalization grant and which meet the sixteen specific Title II requirements.
excessive infiltration/inflow	The quantities of infiltration/inflow which can be economically eliminated from a sewer system as determined in a cost-effectiveness analysis that compares the costs for correcting the infiltration/inflow conditions to the total costs for transportation and treatment of the infiltration/inflow.
FIFRA	<i>Federal Insecticide, Fungicide and Rodenticide Act</i> Public Law 94-140 which provides for broad government pre-market clearance and control of pesticides to ensure that they do not pose unreasonable adverse effects on humans or the environment.
fundable portion	That portion of the Project Priority List which includes projects scheduled for financial assistance during the funding year.
funding year	The first year of the planning period represented by a project priority list.
FY	<i>Fiscal Year</i> A twelve month period for which budgetary appropriations are allocated. The fiscal year for the Federal Government begins October 1 and ends on September 30. The State of Oklahoma's fiscal year begins July 1 and ends June 30.
geometric mean	The antilog of the mean of a set of log-transformed data. For the purposes of performing a reasonable potential evaluation in those cases where only one data value is available that single effluent data value will be considered the geometric mean.
harmonic mean	The reciprocal of the mean of the reciprocals of a set of data.
HQW	<i>High Quality Waters</i> Waterbodies that are prohibited from having any point source discharge(s) or alteration of any existing point source discharge(s) which would result in an increase in the concentration or an increase of pollutant loading of any constituent in the receiving water. The water quality exceeds that necessary to support propagation of fishes, shellfishes, wildlife, and recreation as described in Rule 200.3, Anti-Degradation Policy Statement.
HSWA	<i>Hazardous and Solid Waste Amendments</i> The 1984 Act (Public Law 98-616) that significantly expanded both the scope and coverage of RCRA.
I/A	<i>Innovative and Alternative</i> Innovative technology deals with wastewater treatment processes and techniques that are being developed which have not been fully proven to reclaim and reuse

water. Alternative technology deals with proven wastewater treatment processes and techniques, which provide for the reclaiming and reuse of water.

infiltration

Water other than wastewater that enters a sewer system (including sewer service connections and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include and is distinguished from inflow.

inflow

Water other than wastewater that enters a sewer system (including sewer service connections) from sources such as, but not limited to, roof leaders, cellar drains, yard drains, area drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include and is distinguished from infiltration.

initiation of operation

The date specified by the recipient on which use of the project begins for the purposes that it was planned, designed, and built.

innovative technology

Developed wastewater treatment processes and techniques which have not been fully proven under the circumstances of their contemplated use and which represent a significant advancement over the state of the art in terms of significant reduction in life cycle cost or significant environmental benefits through the reclaiming and reuse of water, otherwise eliminating the discharge of pollutants, utilizing recycling techniques such as land treatment, more efficient use of energy and resources, improved or new methods of waste treatment management for combined municipal and industrial systems, or the confined disposal of pollutants so that they will not migrate to cause water or other environmental pollution.

Intended Use Plan

A document prepared each year by the State, which identifies the intended uses of the funds in the SRF and describes how those uses support the goals of the SRF.

interceptor sewer

A sewer which is designed for one or more of the following purposes:

To intercept wastewater from a final point in a collector sewer and convey such wastes directly to a treatment facility or another interceptor.

To replace an existing wastewater treatment facility and transport the wastes to an adjoining collector sewer or interceptor sewer for conveyance to a treatment plant.

To transport wastewater from one or more municipal collector sewers to another municipality or to a regional plant for treatment.

To intercept an existing major discharge of raw or inadequately treated wastewater for transport directly to another interceptor or to a treatment plant.

intermittent lethality

Two or more lethal effect test failures of a routine acute or chronic WET test within any 18-month period.

LA

Load Allocation The portion of a receiving water's loading capacity that is attributed either to one of its existing or future Nonpoint sources of pollution or to natural background sources.

LAB CERT

Laboratory Certification DEQ program which sets out the rules and regulations for the laboratory certification program. Its objective is to establish uniform methods of water and wastewater analysis.

LC

Lethal Concentration The concentration of certain chemicals or substances that can have lethal effects on living things.

LC₅₀

The concentration of a toxicant in an external medium that is lethal to fifty percent of the test animals for a specified period of exposure.

load or loading

The amount of matter or thermal energy that is introduced into a receiving water. A load may be caused by man (a pollutant) or by nature (natural background load). For oxygen demanding material, load may be expressed separately for separate components (e.g. CBOD, NBOD), or may be expressed as a total oxygen demand.

loan

An agreement between the State and the local recipient through which the SRF provides funds for eligible assistance and the recipient promises to repay the principal sum to the SRF over a period not to exceed 20 years at an interest rate established at or below market rates (may be interest free).

long-term average flow

An arithmetic average stream flow over a representative period of record.

maintenance

Preservation of functional integrity and efficiency of equipment and structures. This includes preventive or corrective maintenance and replacement of equipment.

maximum likelihood estimator

For the purposes of performing reasonable potential evaluations the maximum likelihood estimator for a particular upper percentile is calculated assuming the population of values fit a log-normal distribution with a coefficient of variation of 0.6. This can be described as:

where:

$$C_p = C_{mean} * \exp(Z_p * \sigma - 0.5 * \ln(CV^2 + 1)) \quad (1)$$

Z_p = normal distribution factor at pth percentile

C_{mean} = geometric mean

For the 95th percentile the maximum likelihood estimator is typically calculated as:

$$C_{95} = 2.13 \cdot C_{mean} \quad (2)$$

If a large data set of effluent concentrations is available, C_{95} may not need to be estimated, the 95th percentile value can be calculated from the data.

mean annual average flow

The annual mean flow found in "Statistical Summaries", USGS publication no. 87-4205, or most recent version thereof, or other annual mean flow as approved by the Oklahoma Water Resources Board or the permitting authority.

MBE/WBE participation

The federal requirement for negotiation of a "fair share" objective for minority and women owned businesses (MBE/WBE) applies to assistance in an amount equal to the capitalization grant.

MGD

Million Gallons per Day Measurement of average daily flow from municipal and industrial point sources.

MLQ

Minimum Quantification Level The lowest concentration at which a particular substance can be quantitatively measured with a defined precision level, using approved analytical methods.

mixing zone

When a liquid of a different quality than the receiving water is discharged into the receiving water, a mixing zone is formed. Concentration of the liquid within the mixing zone decreases until it is completely mixed with the receiving water. In Oklahoma, the regulatory mixing zone is described as follows:

In streams, the mixing zone extends downstream a distance equivalent to thirteen (13) times the width of the water within the receiving stream at the point of effluent discharge and encompasses 25% of the total stream flow of the 7Q2 or 1 cfs, whichever is larger, immediately downstream of the point of effluent discharge. Acute toxicity within the mixing zone is prohibited. The water quality in a portion of the mixing zone may be unsuitable for certain beneficial uses. Where overlapping mixing zones occur because of multiple outfalls, the total length of the mixing zone will extend thirteen (13) stream widths downstream from the downstream discharge point.

Mixing zones in lakes shall be designated on a case-by-case basis. However, for permitting purposes, the mixing zone is defined to extend a radius of 100 feet from the source.

NEPA

National Environmental Policy Act The cornerstone of the environmental impact statement process. The Act requires each federal agency to issue regulations detailing the policies and procedures it will follow for the impact statement process.

NIPDWR	<i>National Interim Primary Drinking Water Regulations</i> The EPA established the NIPDWR to provide minimum national drinking water standards for all public water.
NOEC_L	(No Observed Effect Concentration-Lethal) means the greatest tested effluent dilution in a WET test at and below which lethality to test organisms does not occur that is statistically different from the control (0% effluent) at the 95% confidence level.
NOEC_s	(No Observed Effect Concentration- Sublethal) means the greatest tested effluent dilution in a WET test at and below which a sublethal effect to test organisms does not occur that is statistically different from the control (0% effluent) at the 95% confidence level.
non-excessive infiltration	The quantity of flow which is less than 120 gallons per capita per day (domestic base flow and infiltration) or the quantity of infiltration, which cannot be economically and effectively eliminated from a sewer system as determined in a cost-effectiveness analysis.
non-excessive inflow	The rainfall induced peak inflow rate which does not result in chronic operational problems related to hydraulic overloading of the treatment works during storm events. These problems may include surcharging, backups, bypasses, and overflows.
NPDES	<i>National Pollutant Discharge Elimination System</i> A permit program established by Section 402 of the CWA. This program regulated discharges into the Nation's waters from point sources, including municipal, industrial, commercial and certain agricultural sources.
NPS	<i>Nonpoint source.</i> The contamination of the environment with a pollutant for which the specific point of origin may not be well defined and includes but is not limited to agricultural storm water runoff and return flows from irrigated agriculture.
NPS Mgmt.	<i>Nonpoint Source Management</i> Section 319 of the CWA.
NSPS	<i>New Source Performance Standards.</i> A term derived from Section 301 of the CWA in which effluent limitations for categories and classes of point source, other than publicly owned treatment works, shall require application of the new source performance standards for such category or class (applies to new industrial dischargers which are determined to be new sources). NSPS are based on the performance of the best available demonstrated control technology in the category or subcategory for all pollutants (conventional, non-conventional and toxic pollutants).
OAC	<i>Oklahoma Administrative Code</i>
OPDES	<i>Oklahoma Pollutant Discharge Elimination System</i> A permit program established by 27A O.S. 1993 Supp., § 2-6-201 et seq. (see also Section 402 of the CWA). This program regulated

discharges into Oklahoma's waters from point sources, including municipal, industrial, commercial and certain agricultural sources.

operable treatment works

A treatment works that, upon completion, will meet the enforceable requirements of the Act.

operation

Control of the unit processes and equipment which make up the treatment works. This includes financial and personnel management, records, laboratory control, process control, safety and emergency operation planning.

operation and maintenance

Activities required to assure the dependable and economical function of treatment works.

ORW

Outstanding Resources Waters These are waters which constitute outstanding resources or are of exceptional recreational and/or ecological significance as described in Rule 200.4, Anti-Degradation Policy Statement. They are prohibited from having any new point source discharge(s) or increased load from existing point source discharge(s).

O.S.

Oklahoma Statutes

PCBs

Polychlorinated Biphenyls Compounds that are produced by replacing hydrogen atoms in biphenyl with chlorine. They are poisonous environmental pollutants.

PCS

Permit and Compliance System A computerized management information system for tracking permit, compliance, and enforcement status for the NPDES program under the Clean Water Act. PCS is designed to support the individual NPDES administrative needs of the states and EPA Regional offices and provides a uniform means of communication between states, regions, and EPA Headquarters.

persistent lethality

Lethal test failures in two of three consecutive monthly WET tests for either or both test species. The monthly tests are the result of lethality during a regularly scheduled WET test..

persistent sublethality

Two consecutive chronic sublethal effect test failures.

P.L.

Public Law Law concerned with regulating relations of individuals with the government and the organization and conduct of the government itself.

planning

The process of evaluating alternative solutions to water pollution problems, and through a systematic screening procedure, selecting the most cost effective environmentally sound alternative.

planning portion

The part of the Project Priority List containing all projects outside the fundable portion of the list that may, under anticipated allotment levels, receive funding during the five-year planning period represented by the list.

POTW	<i>Publicly Owned Treatment Works</i> A treatment facility owned and operated by a municipality, governmental organization, or Indian Tribe.
Project	The scope of work for which SRF assistance is provided. The scope of work is for construction and design, or construction of an operable treatment works or segment thereof. The project must be part of an operable treatment works. The principal purpose of both the project and the operable treatment works must be for the treatment of domestic users' discharges of the jurisdiction, community, sewer service area, region, or the district concerned.
project completion	The date operations of the treatment works are initiated or are capable of being initiated, whichever is earlier.
project performance standards	The performance and operations requirements applicable to a project including the enforceable requirements of the Act and the specifications, including the quantity of excessive infiltration and inflow proposed to be eliminated, which the project is planned and designed to meet.
Project Priority List	A continuous list of projects in order of priority for which SRF assistance is expected during a five-year planning period.
project priority points	The total number of points assigned to a project by using the priority ranking formula.
PS	<i>Point Source</i> Any discernible, confined and discrete conveyance or outlet including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock or vessel or other floating craft from which pollutants are or may be discharged into waters of the state. The term "point source" shall not include agricultural storm water runoff and return flows from irrigated agriculture.
Q*	The ratio of the effluent regulatory flow (Q_e) to the receiving water regulatory flow (Q_w).
quasi-dynamic (or quasi-steady state) simulation	One or more boundary conditions is constant, but other conditions vary with time. For example, QUAL2E can be used to compute the average response of a stream to specified constant flows and loads, but the user can also specify time varying meteorological conditions to simulate the effect of variable sunlight, air temperature, and wind speed on water quality conditions.
RCRA	<i>Resource Conservation and Recovery Act of 1976</i> This Act, also known as Public Law 94-580, amended the Solid Waste Disposal Act of 1965. The Act has two main objectives: 1) to broaden the national waste management program to better protect the public health and the environment, and 2) to conserve natural resources through waste reduction, materials and energy recovery.
reallotment	Allotment of previously allotted unused funds.

recipient	A municipality or other entity which receives assistance under the SRF program.
repayment	Principal and interest payments on loans which must be credited directly to the SRF.
replacement	Expenditures for obtaining and installing equipment, accessories, or appurtenances during the useful life of the treatment works necessary to maintain the capacity and performance for which such works are designed and constructed.
responsible bidder	A prospective contractor that currently meets the minimum standards of financial and technical ability to perform the tasks identified in the project specifications.
revenue program	A formally documented determination of charges which is designed to provide revenues for operation and maintenance (including replacement), and local debt service for treatment works.
RRT	<i>Regional Response Team</i> A regional group composed of federal agencies and states within the region which are called upon in the event of an emergency.
SDWA	<i>Safe Drinking Water Act</i> Public Law 95-535 was passed in 1974 and amended in 1977. The Act mandates two major program initiatives- one aimed at ensuring the safety of the Nation's public water supplies and other designed to protect underground sources of drinking water from contamination through injection wells.
SEA	<i>State/Environmental Protection Agency Agreement</i> An agreement negotiated between EPA and the State which defines State and EPA responsibilities and funding levels. The Agreement encourages program coordination, simplified paperwork and improved program accountability.
SIC	<i>Standard Industrial Classification</i> The statistical classification standard developed by the Federal government for use in the classification of establishments by type of activity in which they are engaged. The Standard Industrial Classification covers the entire field of economic activities: agriculture, forestry, fishing, hunting and trapping; mining; construction; manufacturing; transportation, communications, electric, gas, and sanitary services; wholesale trade; retail trade; finance, insurance and real estate; personal, business, professional, repair, recreation and other services; and public administration. Under the SIC, establishments are assigned four-digit codes (SIC Codes) which identify the primary activity or activities in which they are engaged. SIC Codes can be found in the Standard Industrial Classification Manual 1987, published by the Executive Office of the President, Office of Management and Budget.
SIP	<i>State Implementation Plan</i> A plan required by Section 110 of the Clean Air Act. The plan provides for the implementation,

maintenance and enforcement of primary and secondary standards of air quality, which are consistent with national standards.

SRF	<i>State Revolving Fund</i> Funds for loans or providing other assistance for pollution control projects established through capitalization grants from EPA and State matching funds.
S.S.	<i>State Strategy</i> A document prepared and updated by the State. The document is a five year strategy for controlling water pollution problems.
SS	<i>Suspended Solids</i> The solid material that originates mostly from disintegrated rocks and is suspended in water. It includes biochemical and chemical precipitates and decomposed organic material.
SSES	<i>Sewer System Evaluation Survey</i> A study which shall identify the location, estimated flow rate, method of rehabilitation, and cost of rehabilitation versus the cost of transportation and treatment for each defined source of infiltration/inflow.
state match	Funds equaling at least 20% of the amount of the capitalization grant which the State must deposit into the SRF.
statutory requirements	The sixteen specific Title II requirements which are attached to Section 212 publicly-owned treatment works funded up to an amount equivalent to the capitalization grant.
steady-state simulation	Conditions at all points in a system being modeled are constant with time. Steady-state simulations use averaged loads and flows entering the system over specified periods of time to compute the average response in the system.
STORET	<i>Storage and Retrieval System</i> An EPA computerized management information system which allows the user to store and retrieve water quality information.
storm sewer	A sewer designed to carry only storm waters, surface runoff, street wash waters, and drainage.
STP	<i>Secondary Treatment Plant</i> A sewage treatment facility which utilizes oxidative activity of organisms to stabilize the organic components of sewage.
SWS	<i>Sensitive Public and Private Water Supplies</i> Waterbodies designated with this limitation are prohibited from having any new point source discharge(s) or increased load from existing point source discharge(s). These are waters, which constitute sensitive public and private water supplies.
TMDL	<i>Total Maximum Daily Load</i> The sum of individual wasteload allocations (WLA) for point sources, safety, reserves; and loads from Nonpoint source and natural backgrounds.

TOC	<i>Total Organic Carbon</i> Measure of the organic matter contained in a sample based upon the amount of carbon it contains as measured by the complete oxidation of the matter to carbon dioxide.
transfer of reserves	The optional transfer of specific set-asides from a State's Title II allotment into an established SRF.
treatment works	Any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or sewage from other non-incorporated areas and contract facilities, including intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment, and their appurtenances. In addition "treatment works" means any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water runoff, including waste in combined storm water and sanitary sewer systems.
TSCA	<i>Toxic Substance Control Act</i> Public Law 94-469 which authorizes EPA to obtain data from industry on selected chemical substances and mixtures and to regulate the substances when needed.
TSS	<i>Total Suspended Solids</i> The complete amount of solid matter suspended in water or wastewater.
TXC LST	<i>Toxics List</i> Section 304(l) of the CWA.
UIC	<i>Underground Injection Control</i> A program under the Safe Drinking Water Act intended to regulate injection activities to prevent contamination of underground sources of drinking water.
USDA	<i>United States Department of Agriculture</i> The federal agency that provides assistance to agricultural and silviculture industries. The USDA ensures that fertilizers necessary for agricultural production are available and makes certain the fertilizers do not harm the environment.
user charge	A charge levied on users of a treatment works for the proportionate share of the cost of operation and maintenance (including replacement) of such works.
Value Engineering	A cost analysis technique which uses a systematic and creative approach to identify and to focus on areas of high costs in project planning in order to maximize the cost/benefit ratio while meeting the project objectives without sacrificing the reliability or efficiency of the project.
WLA	<i>Wasteload Allocation</i> "A wasteload allocation for a river segment is the assignment of target loads to point sources so as to achieve Water Quality Standards in the most efficient manner" (303 guidelines). The wasteload allocation is designed to allocate or allow certain quantities, rates or concentration of pollutants discharged from contributing point sources, which empty their effluent into the same river segment. The purpose of the wasteload

allocation is to eliminate an undue "wasteload burden" on a given stream segment.

WLE *Wasteload Evaluation* A more detailed assessment and estimation of pollutant loading to waterbodies than the WLA generally with a larger scope of modeling and more narrative of the analysis and application of the results; the prediction of resultant pollutant concentrations, and subsequent determination and allocation of the TMDL among the different pollutant sources in such a manner that water quality standards are maintained.

WQM *Water Quality Management* A term associated with the various state programs found under the CWA. The various program elements under the CWA form the State and Area Water Quality Management Plans.

WQS *Water Quality Standards* Standards established to serve as goals for the water quality management plans (Section 208) and as benchmark criteria for the NPDES (Section 402) permit process. State Water Quality Standards at a minimum consist of beneficial use classification for navigable water, water quality criteria to support those uses and a statement of policy which prevents the degradation of waters.

WQD *Water Quality Division* The section of the DEQ which regulates the discharge of non-industrial waste from any sewer system and waste from any industrial system into any water of the State and handles permitting of changes made to public water supplies and industrial and municipal permitted discharges.

zone of impact The portion of a stream between the most upstream pollutant source and a downstream limit located by the point at which water quality has recovered to the background quality at a point immediately upstream of the most upstream pollutant source.

zone of passage A three-dimensional zone expressed as a volume in the receiving stream through which mobile aquatic organisms may traverse the stream past a discharge without being affected by it. In Oklahoma, the regulatory zone of passage is described as follows:

A zone of passage shall be maintained within the stream at the outfall and adjacent to the mixing zone that shall be no less than seventy-five percent (75%) of the volume of flow. Water quality standards shall be maintained throughout the zone of passage.

Zones of passage in lakes shall be designated on a case-by-case basis.

CHAPTER 2

PART I WATER QUALITY STANDARDS

INTRODUCTION AND PURPOSE

40 CFR (Code of Federal Regulations) § 131.2 states " A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (the Act). ``Serve the purposes of the Act" (as defined in sections 101(a)(2) and 303(c) of the Act) means that water quality standards should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water and take into consideration their use and value of public water supplies, propagation of fish, shellfish, and wildlife, recreation in and on the water, and agricultural, industrial, and other purposes including navigation. Such standards serve the dual purposes of establishing the water quality goals for a specific water body and serve as the regulatory basis for the establishment of water-quality-based treatment controls and strategies beyond the technology-based levels of treatment required by sections 301(b) and 306 of the Act."

Water Quality Standards (WQS) are applicable to all waters of the State and are designed to enhance the quality of waters, to protect their beneficial uses, and to aid in the prevention, control and abatement of water pollution in the State of Oklahoma. For standards to be enforceable, adoption by the Oklahoma Water Resources Board pursuant to the State's Administrative Procedures Act (APA) is required. For the standards to be utilized in water pollution control programs, the standards must be implemented into discharge permits.

The most recent EPA approved Oklahoma Water Quality Standards may be found at:
<http://www.epa.gov/waterscience/standards/wqslibrary/ok/index.html>.

Section 303 of the Clean Water Act requires each state to develop and prepare WQS. In addition, at least once every three years, each state is required to review and evaluate existing standards and determine if the current standards are appropriate or if modifications are needed.

WATER QUALITY STANDARDS AUTHORITY

STATE AUTHORITY

40 CFR § 131.4 states, " States . . . are responsible for reviewing, establishing, and revising water quality standards. As recognized by section 510 of the Clean Water Act, States may develop water quality standards more stringent than required by this regulation. "

Oklahoma law at Title 82 O.S. §1085.2 empowers the Oklahoma Water Resources Board (OWRB) to "adopt, modify or repeal and promulgate standards of quality of the waters of the State, and to classify such waters according to their best uses in the interest of the public under such conditions as the OWRB may prescribe for the prevention, control and abatement of pollution. The standard of quality of water of the State adopted by the Board pursuant to the provisions of Title 82 O.S. §1085.30 of the act shall be utilized by all appropriate state environmental agencies in implementing their respective duties to abate and prevent pollution to the waters of the state."

Section 321 (C) further states "The standards of quality of the waters of the state, implementation documents and classification of such waters or any modification or change thereof shall be adopted and otherwise comply with the APA and shall be enforced by all state agencies within the scope of their jurisdiction."

FEDERAL AUTHORITY

40 CFR § 131.5 states " (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of: (1) Whether the State has adopted water uses which are consistent with the requirements of the Clean Water Act; (2) Whether the State has adopted criteria that protect the designated water uses; (3) Whether the State has followed its legal procedures for revising or adopting standards; (4) Whether the State standards which do not include the uses specified in section 101(a)(2) of the Act are based upon appropriate technical and scientific data and analyses, and (5) Whether the State submission meets the requirements included in Sec. 131.6 of this part . . . (b) If EPA determines that the State's or Tribe's water quality standards are consistent with the factors listed in paragraphs (a)(1) through (a)(5) of this section, EPA approves the standards. EPA must disapprove the State's or Tribe's water quality standards and promulgate Federal standards under section 303(c)(4), . . . if State or Tribal adopted standards are not consistent with the factors listed in paragraphs (a)(1) through (a)(5) of this section. EPA may also promulgate a new or revised standard when necessary to meet the requirements of the Act."

WATER QUALITY STANDARDS COMPONENTS

Oklahoma's WQS are composed of three basic elements:

- **Beneficial uses:** a classification of the waters of the State according to their best uses in the interest of the public.
- **Criteria to protect those uses:** numerical or narrative guides on the physical, chemical, or biological aspects, which will assure achievement of the designated use.
- **Antidegradation Policy:** a statement of the State's position on the use of waters, which are protected at levels considered above that required for beneficial use maintenance.

Additionally, a fourth and fifth component involve special requirements set forth within the Standards document.

These include:

- **Compliance Schedules:** establish a reasonable time for new criteria to be implemented into permits
- **Variations:** allow for deviations from certain criteria for various reasons

All five of these components will be discussed more thoroughly in subsequent chapters.

BENEFICIAL USES

Oklahoma law in Title 82 O.S. §1085.2 mandates that the OWRB is "To adopt, modify or repeal and promulgate standards of quality of the waters of the State and to classify such waters according to their best uses in the interest of the public under such conditions as the Board may prescribe for the prevention, control, and abatement of pollution."

Thus, state statutory language specifies that the OWRB is to designate beneficial uses and the Federal law (as manifest through the Code of Federal Regulations) establishes national guidelines for use designation.

Beneficial uses have been applied to Oklahoma streams and lakes since the initial (1968) WQS were adopted. These uses are revised periodically as more data are obtained. Oklahoma's WQS specifically list beneficial uses in Appendix A and 785:45-5 for Oklahoma waters. Uses defined in the WQS

include: Public and Private Water Supply, Emergency Water Supply, Fish and Wildlife Propagation, Agriculture, Hydroelectric Power, Municipal and Industrial Process and Cooling Water, Primary Body Contact Recreation, Secondary Body Contact Recreation, Navigation, and Aesthetics. Specific limitations may also apply to selected waters in order to provide them with additional protection.

Beneficial uses are assigned to Oklahoma Waters by three different methods. They are 1) Existing uses, 2) Assumed uses and 3) Designated uses.

EXISTING USES

40 CFR § 131.3 (e) states that " Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." Generally, in Oklahoma, existing uses are evaluated through literature surveys of each water body. Ultimately, existing uses become designated uses when they are included in Appendix A of the WQS Document.

ASSUMED USES

Because it is not practical to determine the specific beneficial uses of all waterbodies through field surveys and list them in Appendix A, all waters of the State are assumed to be capable of certain beneficial uses. These uses vary according to their hydrological type such as stream or lake.

DESIGNATED USES

The process of designating beneficial uses generally involves a three step process which at any point may include sufficient information to designate uses. These three elements include, a literature review, a "one-day" survey, and an intensive survey. A guidance document is available (TRWQ2001-1) through OWRB explaining the decisions and requirements for assignment of certain beneficial uses.

LITERATURE REVIEW

The literature review involves the review of historical chemical, physical and biological data. Although information of this type may be available, it is seldom comprehensive enough to allow the designation of a beneficial use. Consequently, most Use Attainability Analysis (UAAs) in Oklahoma, including the unlisted streams surveys, utilize a minimum of "one-day" surveys.

ONE-DAY SURVEYS

One-day UAAs utilize abbreviated field and laboratory analysis to designate uses. Generally, one-day surveys are sufficient to designate beneficial uses. In those rare instances when a one-day survey is inadequate to assign uses, a more intensive study may be required.

INTENSIVE SURVEY USE ATTAINABILITY ANALYSIS

In rare instances, it is not possible to designate uses to a waterbody based upon a one-day survey. In these instances, a more intensive survey is required.

These intensive studies generally involve more exhaustive chemical, physical and biological analysis. Continuous recording of physico-chemical parameters, and the deployment of periphytometers and benthic macroinvertebrate substrates are commonplace. Because of the time and manpower commitment required to perform intensive studies, they are undertaken only when one-day studies do not provide use designations or when a more detailed analyses is required to re-evaluate a stream, which had previously received a UAA.

CRITERIA TO PROTECT BENEFICIAL USES

Narrative and numerical criteria found within Oklahoma's WQS are scientifically derived to protect designated beneficial uses including human health, aquatic and terrestrial life, aesthetics, etc. These criteria also incorporate public policy through the public participation process. EPA also publishes guidance documents designed to facilitate the best available science into useful criteria.

In general, EPA guidance is helpful, but theoretical and broad based. Because it is developed from a national perspective, it is often of limited value in Oklahoma. Numerous items unique to Oklahoma water quality management (7Q2, the 1 cfs minimum low flow, beneficial uses, etc.) require that criteria (and methods to implement these criteria into permits) be developed uniquely.

GENERAL NARRATIVE CRITERIA

Oklahoma's WQS contain general narrative criteria that apply to all beneficial uses for the following parameters:

Minerals – Increased mineralization shall not impair any beneficial use.

Solids (suspended and/or settleable) – Surface waters of the state shall be maintained so as to be essentially free of floating debris, bottom deposits, scum, foam and other materials, including suspended substances of a persistent nature, from other than natural sources.

Taste and odor – Taste and odor producing substances from other than natural origin shall not impair any beneficial use.

Nutrients – Nutrients from point source discharges or other sources shall not cause excessive growth of periphyton, phytoplankton, or aquatic macrophyte communities which impairs any existing or designated beneficial use.

PUBLIC AND PRIVATE WATER SUPPLY

The various criteria to protect the Public and Private Water Supply beneficial use include:

- raw water numerical criteria, most based upon drinking water MCLs
- radioactive materials numerical criteria
- maximum and geometric mean total coliform limits
- oil and grease limits
- general criteria
- water column numerical criteria to protect human health for the consumption of fish flesh and water

Please refer to OAC 785:45-5-10 for statutory language regarding the Public and Private Water supply beneficial use. Raw water numerical criteria are located in 785:45 Appendix G Table 2. Water column numerical criteria to protect human health for the consumption of fish flesh and water are also located in 785:45 Appendix G Table 2.

EMERGENCY PUBLIC AND PRIVATE WATER SUPPLIES

The following statutory language regarding Emergency Public and Private Water Supplies is found in OAC 785:45-5-11.

- “(a) During emergencies, those waters designated Emergency Public and Private Water Supplies may be put to use.
- (b) Each emergency will be handled on a case-by-case basis, and be thoroughly evaluated by the appropriate state agencies and/or local health authorities.”

FISH AND WILDLIFE PROPAGATION

Four sub-categories of the Fish and Wildlife Propagation beneficial use have been designated: Warm Water Aquatic Community, Habitat Limited Aquatic Community, Cool Water Aquatic Community, and Trout Fishery. Certain criteria apply to all waters designated with any sub-category of Fish and Wildlife Propagation, while others are sub-category specific.

Criteria to protect the Fish and Wildlife Propagation beneficial use include:

- dissolved oxygen for each sub-category with an associated 1.0 mg/L diurnal excursion.
- temperature
- pH
- oil and grease
- biological criteria (an in-situ measure of biological community health)
- numerical criteria for toxic substances
- criteria which are alert and concern levels in fish tissue
- water column numerical criteria to protect human health for the consumption of fish flesh
- turbidity

Please refer to OAC 785:45-5-12 for statutory language regarding Fish and Wildlife Propagation beneficial use. Dissolved oxygen criteria are located at 785:45 Appendix G Table 1. Numerical criteria for toxic substances are in 785:45 Appendix G Table 2. Conversion factors for total to dissolved fractions are in 785:45 Appendix G Table 3. Language regarding fish consumption, water column criteria to protect for the consumption of fish flesh, and fish tissue levels are in 785:45-5-20.

AGRICULTURE: LIVESTOCK AND IRRIGATION

The Water Quality Standards for the agriculture beneficial use are intended to maintain the surface waters of the State so that toxicity does not inhibit continued ingestion by livestock or irrigation of crops.

Criteria to protect the Agriculture beneficial use include:

- Water quality management segment number yearly mean standard and sample standard chloride, sulfate and TDS values.

Please refer to OAC 785:45-5-13 for statutory language regarding Agriculture: Livestock and Irrigation beneficial use. Statistical values of the historical data for mineral constituents of water quality are found in 785:45 Appendix F.

HYDROELECTRIC POWER GENERATION

The following statutory language regarding Hydroelectric Power Generation is found in OAC 785:45-5-14.

"This beneficial use is not generally dependent upon water quality."

INDUSTRIAL AND MUNICIPAL PROCESS AND COOLING WATER

The following statutory language regarding Industrial and Municipal Process and Cooling Water is found in OAC 785:45-5-15.

"(a) Quality criteria for water used for process or cooling purposes varies with the type of industrial or municipal processes involved.

(b) This use will be protected by application of the criteria for other beneficial uses."

PRIMARY BODY CONTACT RECREATION

Primary Body Contact Recreation involves direct body contact with the water where a possibility of ingestion exists. The Water Quality Standards for Primary Body Contact Recreation are intended to protect the water from containing chemical, physical, or biological substances in concentrations that are irritating to skin or sense organs or are toxic or cause illness upon ingestion by human beings.

Criteria to protect the Primary Body Contact Recreation beneficial use include bacteriological criteria that apply only during the recreation period of May 1 to September 30. During the remainder of the year, the criteria for Secondary Body Contact Recreation apply.

Please refer to OAC 785:45-5-16 for statutory language regarding Primary Body Contact Recreation beneficial use.

SECONDARY BODY CONTACT RECREATION

The Secondary Body Contact Recreation beneficial use is designated where ingestion of water is not anticipated, but activities such as boating, fishing, or wading may occur.

The Water Quality Standards for Secondary Body Contact Recreation have no numerical criteria, but have narrative language stating that these waters shall be "free from human pathogens in numbers which may produce adverse health effects in humans."

Please refer to OAC 785:45-5-17 for statutory language regarding Secondary Body Contact Recreation beneficial use.

NAVIGATION

The following statutory language regarding Navigation is found in OAC 785:45-5-18.

"This beneficial use is generally more dependent upon quantity than quality of water."

AESTHETICS

The Aesthetics beneficial use has narrative "free from" criteria for substances such as floating materials, noxious odors and tastes, color, nutrients, solids, and others.

In addition to these narrative criteria, there is a numerical criterion for phosphorus on waters designated Scenic Rivers. The criterion states that the 30-day geometric mean total phosphorus concentration shall not exceed .037 mg/L in these waters, and that this level will be fully implemented within 10 years.

Please refer to OAC 785:45-5-19 for statutory language regarding Aesthetics beneficial use.

ANTIDegradation Policy

40 CFR §131.12 states:

"The State shall develop and adopt a statewide antidegradation policy and identify the methods for implementing such policy pursuant to this subpart. The antidegradation policy and implementation methods shall, at a minimum, be consistent with the following: (1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. (2) Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control. (3) Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected. (4) In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act."

Oklahoma's Water Quality Standards address these Antidegradation requirements in OAC 785:45-3.

SPECIAL REQUIREMENTS

Oklahoma's WQS contain supplementary information concerning numerous issues related to water quality. Foremost among them are compliance schedules, variances, endangered species protection and development of site-specific metals criteria.

COMPLIANCE SCHEDULES

Oklahoma law at Title 82 O.S. §1085.30 states: "In classifying waters and setting standards of water quality or making any modification or change thereof, the Board shall announce a reasonable time for persons discharging waste into the waters of the State to comply with such new or modified classifications or standards unless such discharges create an actual or potential hazard to public health."

Oklahoma's WQS build upon this statutory language in 785:45-5-4 (f) which states:

"Schedules for compliance with the Oklahoma Water Quality Standards may be granted to persons or facilities discharging wastes into waters of the State unless such discharge creates an actual or potential hazard to the public health in accordance with 82 O.S. §1085.30(D)."

This language allows facilities a reasonable time to make treatment modifications and/or retool in order that new WQS criteria may be met in their effluent.

VARIANCES

Oklahoma's WQS further allow that, within some stringent guidelines, a variance may be granted for selected criteria to individual discharges. "Variance" is defined in the Oklahoma WQS as "a temporary (not to exceed three years) exclusion of a specific numerical criterion for a specific discharge to a specific waterbody."

Further guidance is provided at 785:45-5-4(e).

ENDANGERED SPECIES PROTECTION

Endangered species protection is provided in OAC 785:45-5-25(c)(2) (A) and (D). OAC 785:45, Appendix B, Table 1 and Table 2 list National and State Parks, National Forests, Wildlife Areas, Wildlife Management Areas and Wildlife Refuges, and areas inhabited by federally listed threatened or endangered species pursuant to the Federal Endangered Species Act. These areas may be restricted through agreements between appropriate regulatory agencies and the United States Fish and Wildlife Services.

REQUIREMENTS FOR DEVELOPMENT OF SITE SPECIFIC CRITERIA FOR METALS

Please refer to OAC 785:45 Appendix E for statutory language regarding requirements for development of site-specific criteria for metals. A guidance document (OWRB Technical Report TRWQ2002-1) is also available at the OWRB offices and is highly recommended for those interested in pursuing development of site-specific criteria.

BIOCRITERIA

The development of biological thresholds (biocriteria) for use-support decisions has been an evolving part of the Water Quality Standards Implementation. Specific thresholds for specific ecoregions, as defined by Omernick, have been identified in OAC 785:46-15 for the purpose of making Fish and Wildlife Propagation use-support determinations. The language for the various ecoregions is as follows:

(h) Special provisions for Ouachita Mountains wadable streams. The determination of whether the use of Fish and Wildlife Propagation is supported for wadable streams located in the Ouachita Mountains ecoregion shall be made according to the application of Appendix C of this Chapter, together with this subsection, as follows:

(1) Where designated, the subcategory of Warm Water Aquatic Community shall be deemed fully supported if the application of Appendix C produces a score of 35 or more. Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 24 or less. If a score is 25 to 34 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.

(2) Where designated, the subcategory of Habitat Limited Aquatic Community shall be deemed fully supported if the application of Appendix C produces a score of 27 or more. Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 18 or less. If a score is 19 to 26 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.

(i) Special provisions for Arkansas Valley wadable streams. The determination of whether the use of Fish and Wildlife Propagation is supported for wadable streams located in the Arkansas Valley ecoregion shall be made according to the application of Appendix C of this Chapter, together with this subsection, as follows:

(1) Where designated, the subcategory of Warm Water Aquatic Community shall be deemed fully supported if the application of Appendix C produces a score of 35 or more. Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 24 or less. If a score is 25 to 34 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.

(2) Where designated, the subcategory of Habitat Limited Aquatic Community shall be deemed fully supported if the application of Appendix C produces a score of 27 or more. Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 18 or less. If a score is 19 to 26 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.

(j) Special provisions for Boston Mountains and Ozark Highlands wadable streams. The determination of whether the use of Fish and Wildlife Propagation is supported for wadable streams located in the Boston Mountains and Ozark Highlands ecoregions shall be made according to the application of Appendix C of this Chapter, together with this subsection, as follows:

- (1) Where designated, the subcategory of Cool Water Aquatic Community shall be deemed fully supported if the application of Appendix C produces a score of 37 or more. Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 29 or less. If a score is 30 to 36 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.
 - (2) Where designated, the subcategory of Warm Water Aquatic Community shall be deemed fully supported if the application of Appendix C produces a score of 31 or more. Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 22 or less. If a score is 23 to 30 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.
- (k) **Special provisions for Central Irregular Plains wadable streams.** The determination of whether the use of Fish and Wildlife Propagation is supported for wadable streams located in the Central Irregular Plains ecoregion shall be made according to the application of Appendix C of this Chapter, together with this subsection, as follows:
- (1) Where designated, the subcategory of Cool Water Aquatic Community shall be deemed fully supported if the application of Appendix C produces a score of 35 or more. Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 28 or less. If a score is 29 to 34 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.
 - (2) Where designated, the subcategory of Warm Water Aquatic Community shall be deemed fully supported if the application of Appendix C produces a score of 30 or more. Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 22 or less. If a score is 23 to 29 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.
 - (3) Where designated, the subcategory of Habitat Limited Aquatic Community shall be deemed fully supported if the application of Appendix C produces a score of 25 or more. Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 16 or less. If a score is 17 to 24 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.
- (l) **Special provisions for Central Oklahoma - Texas Plains wadable streams.** The determination of whether the Warm Water Aquatic Community subcategory of the Fish and Wildlife Propagation beneficial use is supported for wadable streams located in the Central Oklahoma - Texas Plains ecoregion shall be made according to the application of Appendix C of this Chapter, together with this subsection, as follows:
- (1) Such subcategory shall be deemed fully supported if the application of Appendix C produces a score of 26 or more.
 - (2) Such subcategory shall be deemed not supported if the application of Appendix C produces a score of 19 or less.
 - (3) If the application of Appendix C produces a score of 20 to 25 inclusive, the issue of whether this subcategory is supported shall be deemed undetermined.

The actual Index of Biotic Integrity, as it is shown in OAC 785:46 Appendix C (Table 1), is as follows:

TABLE 1: APPENDIX C. OUACHITA MOUNTAIN INDEX OF BIOLOGICAL INTEGRITY

		5	1	3	SCORE
Sample Composition	Total no. of species	See Figure 1			
	Shannon's diversity* based upon numbers	>2.50	2.49-1.50	<1.50	
	No. of sunfish species	>3	2-3	<2	
	No. of species comprising 75% of sample	>5	4-3	<3	
	No. of intolerant species <100mi ² area	>5	3-5	<3	
		>100mi ² area	See Figure 2		
	Percentage of tolerant species	See Figure 3			
Fish Condition	Percentage of lithophils	>36	18-36	<18	
	Percentage of DELT anomalies**	<0.1	0.1-1.3	>1.3	
	Fish numbers (total individuals)	>200	200-75	<75	

$$* d = - \sum \frac{n_i}{N} \ln \frac{n_i}{N}$$

** DELT = deformities, eroded fins, lesions, tumors

FIGURE 1: TOTAL NO. OF SPECIES

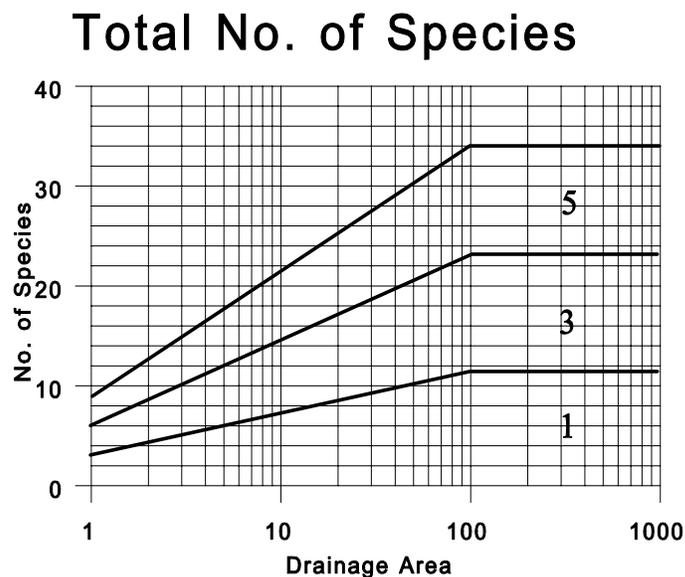


FIGURE 2: NO. OF INTOLERANT SPECIES

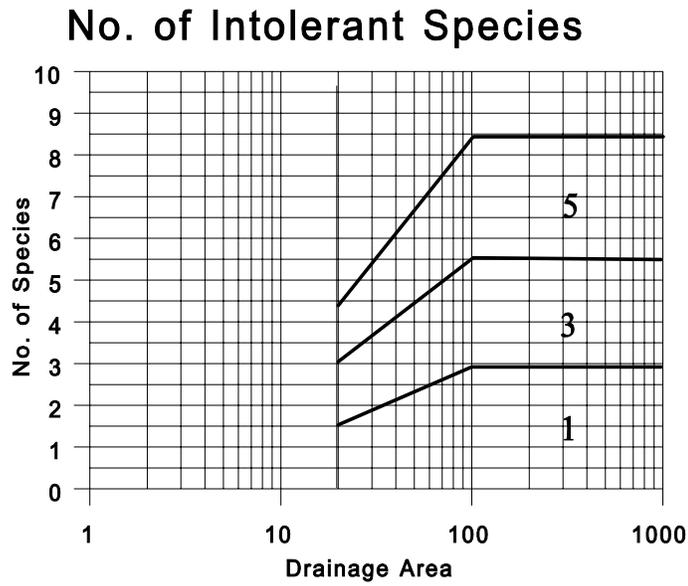
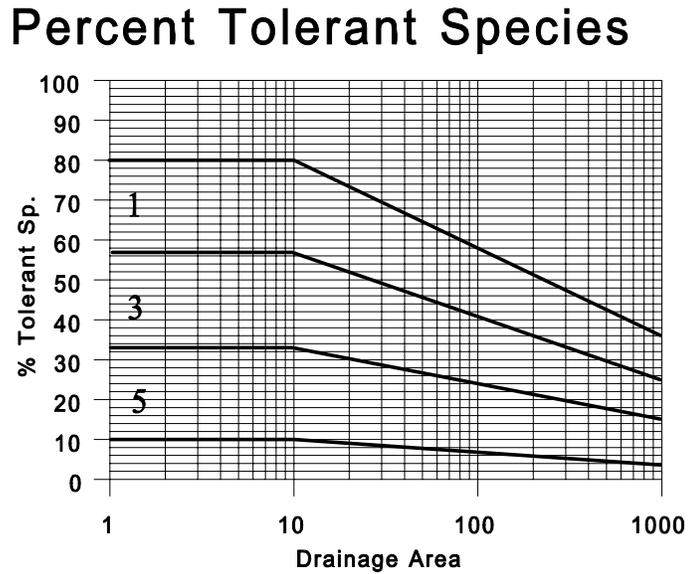


FIGURE 3: PERCENT TOLERANT SPECIES



Special provisions have also been developed for the Arkansas Valley, Ozark Highlands, Boston Mountains, and Central Irregular Plains. These thresholds are similar but should be consulted for specific use-support decisions.

PROCEDURES FOR REVIEW AND REVISION OF WATER QUALITY STANDARDS

MINIMUM REQUIREMENTS FOR WATER QUALITY STANDARDS SUBMISSION

40 CFR §131.6 establishes minimum requirements for submission to EPA for review. These include:

- "(a) Use designations consistent with the provisions of sections 101(a)(2) and 303(c)(2) of the Act.
- (b) Methods used and analyses conducted to support water quality standards revisions.
- (c) Water quality criteria sufficient to protect the designated uses.
- (d) An antidegradation policy consistent with Sec. 131.12.
- (e) Certification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to State law.
- (f) General information which will aid the Agency in determining the adequacy of the scientific basis of the standards which do not include the uses specified in section 101(a)(2) of the Act as well as information on general policies applicable to State standards which may affect their application and implementation."

In general, these items are submitted to the EPA in what is termed a "WQS Submittal Packet". This packet at a minimum includes:

- a copy of the revised standards which include strike-outs and underlines,
- a copy of all documentation regarding the public participation process (i.e., public notices, copies of mailing lists, comment responsiveness summaries, etc.),
- a copy of all scientific justification documents, and,
- Attorney General certification as to the satisfactory completion of the public participation process.

A more exhaustive review of the public participation requirements, including required notices, rule impact statements, comment periods, etc. is included in the following chapter.

TRIENNIAL REVISIONS

FEDERAL REQUIREMENTS

Generally, revisions occur once every three years, however, interim revisions may occur. 40 CFR §131.20 gives procedures to follow when reviewing or revising Oklahoma's WQS. It states:

"(a) State review. The State shall from time to time, but at least once every three years, hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards. Any water body segment with water quality standards that do not include the uses specified in section 101(a)(2) of the Act shall be re-examined every three years to determine if any new information has become available. If such new information indicates that the uses specified in section 101(a)(2) of the Act are attainable, the State shall revise its standards accordingly. Procedures States establish for identifying and reviewing water bodies for review should be incorporated into their Continuing Planning Process.

(b) Public participation. The State shall hold a public hearing for the purpose of reviewing water quality standards, in accordance with provisions of State law, EPA's water quality management regulation (40 CFR 130.3(b)(6)) and public participation regulation (40 CFR part 25). The proposed water quality standards revision and supporting analyses shall be made available to the public prior to the hearing.

(c) Submittal to EPA. The State shall submit the results of the review, any supporting analysis for the use attainability analysis, the methodologies used for site-specific criteria development, any general policies applicable to water quality standards and any revisions of the standards to the Regional Administrator for review and approval, within 30 days of the final State action to adopt and certify the

revised standard, or if no revisions are made as a result of the review, within 30 days of the completion of the review."

40 CFR § 131.21 goes on to outline EPA review and approval requirements after submittal of water quality standards. It states:

"(a) After the State submits its officially adopted revisions, the Regional Administrator shall either:

- (1) Notify the State within 60 days that the revisions are approved, or
- (2) Notify the State within 90 days that the revisions are disapproved.

Such notification of disapproval shall specify the changes needed to assure compliance with the requirements of the Act and this regulation, and shall explain why the State standard is not in compliance with such requirements. Any new or revised State standard must be accompanied by some type of supporting analysis.

(b) The Regional Administrator's approval or disapproval of a State water quality standard shall be based on the requirements of the Act as described in Secs. 131.5 and 131.6, and, with respect to Great Lakes States or Tribes (as defined in 40 CFR 132.2), 40 CFR part 132.

Based upon the preceding regulations and the public participation regulations set forth in Part 25, public notice must be given and a public meeting held 45 days after Notice. Then, the document and all required justifications, are forwarded to EPA for either approval within 60 days or disapproved within 90 days.

STATE REQUIREMENTS

State law governing the procedure for amending the Oklahoma WQS is codified at title 82 O.S. Supp. 1993, §1085.30, which requires 20 days advance notice of public hearings by publication as required by the APA (codified at 75 O.S. 1991, § 250.1 and following as amended) and by mailing to the chief executive of each municipality and county in the areas affected, to affected permit holders, and to persons who have requested such notice. Because the Oklahoma WQS are "rules" under the APA, they must be amended in accordance with the procedure for "rulemaking" provided in the APA. This rulemaking procedure must comply with the requirements of the Small Business Regulatory Flexibility Act. It is summarized in the following discussion.

PUBLIC NOTICE OF RULEMAKING INTENT

Prior to the revision of the Standards, the OWRB is required to publish notice of the intended action in The Oklahoma Register, a semi-monthly publication of the Secretary of State Office of Administrative Rules. The notice must include several elements prescribed by §303(B), including a brief summary of the rule; the proposed action being taken; the specific legal authority authorizing the proposed rule; the time, place and manner in which interested persons may make oral or written comments; the time, place and manner in which interested persons may demand a hearing, if a hearing is not specifically provided; and where copies of the proposed rule(s) may be obtained for review by the public. Prior to or within three (3) days of the publication of the notice in The Oklahoma Register, the agency must mail a copy of the notice to all persons who have made a timely request to the agency for advance notice of its rulemaking proceedings. For the Oklahoma WQS, this will generally include the WQS Mailing List and the standing Water Resources Board Mailing List.

CONSIDERATION OF COMMENTS AND POSSIBLE EFFECTS ON SPECIFIED GROUPS

The OWRB must allow a comment period for at least 20 days after publication of the notice for all interested persons to submit data, views or arguments, orally or in writing. The agency must "consider fully" all written and oral submissions regarding the proposal.

The OWRB must also consider the effect its intended action may have on "the various types of business entities" and "the various types of consumer groups." If the OWRB finds that its proposed rule may adversely affect any business entity or consumer group, then it may modify its proposed rule to exclude that type of business entity or activity. In the case of business entities, upon a finding of possible adverse effect, the agency may also "tier" its action to provide rules, penalties, fines or reporting procedures and forms which vary according to the size of a business or its ability to comply or both.

RULEMAKING HEARING

82 O.S. Supp. 1993, §1085.30, requires a public hearing on proposed WQS amendments. Accordingly, the notice of rulemaking intent must specify the time and place of the hearing.

The hearing may not be held earlier than 20 days after the notice is published in The Oklahoma Register. At the hearing, persons may present oral argument, data, and views on the proposed rule.

In addition, Title 27A O.S. Supp. 1993, § 1-1-102 requires each state environmental agency to participate in these hearings.

This process must comply with the requirements of the Small Business Regulatory Flexibility Act.

PREPARATION OF RULE IMPACT STATEMENT

The OWRB is required to issue a "rule impact statement" for a proposed rule prior to or within 15 days after the publication of the notice of rulemaking intent.

The rule impact statement shall include the elements specified in §303(D)(2), which include a brief description of the purpose of the rule; a description of the classes of persons who most likely will be affected by the proposed rule, including classes who will bear the cost of the rule and who will benefit from the rule; the probable costs to the agency and any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues; a determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the rule; and the date the rule impact statement was prepared. Note, however, that an insufficiency or inaccuracy in the contents of the rule impact statement is not a ground for invalidating the rule. Moreover, the rule impact statement may be modified after any hearing or comment period afforded per §303.

Before the OWRB publishes its notice of rulemaking intent, to the extent an agency for good cause finds the preparation of a rule impact statement or the specified contents thereof are unnecessary, impracticable or contrary to the public interest in the process of adopting a particular rule, the agency may request the Governor to waive the requirement. (Section 303(D)(3))

If not waived by the Governor before the notice is published, then the agency must complete the rule impact statement.

ADOPTION OF THE PROPOSED RULE BY THE OKLAHOMA WATER RESOURCES BOARD

At the time the OWRB staff's recommendations for adoption are submitted to the OWRB members for review and consideration, each state environmental agency shall have the opportunity to present written comments to the OWRB members.

Section 303(E) provides that "upon completing the requirements of this section, an agency may adopt a proposed rule." Section 250.3(2) states that "'adopted' means that a proposed rule has been approved by the agency but has not been reviewed by the Legislature and the Governor...."

Note that in order to avoid complications later, the rule should be adopted in the style of the language and format required by the Secretary of State, since the rule must be submitted to the Governor in the same format. Note also that §303(E) provides that no rule is valid unless it is adopted in substantial compliance with the provisions of §303. When the permanent rule becomes "adopted" it is still weeks, if not months, away from becoming effective.

FILING WITH GOVERNOR, SECRETARY STATE, AND LEGISLATURE

Once the OWRB adopts a revised or new WQS provision, it has ten (10) days to file one copy of the rule with the Governor and two copies each with the Speaker of the House of Representatives and the President Pro Tempore of the Senate. The Governor and Legislature are entitled to review and either approve or disapprove the rule. Copies of the rule must also be filed with the Secretary of State. Each of these steps are discussed more fully below.

GUBERNATORIAL REVIEW

Section 303.1(A) requires the OWRB to file a copy of the rule and a copy of an agency rule report with the Governor for approval. The agency rule report condenses information about the rule and must include the elements prescribed by §303.1(E), including the name and address of the agency, the title and number of the rule, the date the notice of rule making intent was published, a brief summary of the content of the rule, the date and location of the meeting at which the rule was adopted, the members of the OWRB and their recorded votes on the adoption, and a statutory citation of authority for the rule. The agency must also submit to the Secretary of State for publication in The Oklahoma Register a statement that the adopted rule has been submitted to the Governor.

The Governor has 45 calendar days after receipt of the rule to approve or disapprove it. If the Governor approves the rule, the Governor shall immediately notify the OWRB in writing and give notice of the approval to the Speaker, President Pro Tempore, and Secretary of State for publication in The Oklahoma Register. If the Governor disapproves the rule, the Governor shall return the entire document to the OWRB with written reasons for the disapproval, and notice of the disapproval shall likewise be given to the Speaker, President Pro Tempore, and Secretary for publication. If the Governor does not expressly approve the rule within the 45-day period, the rule is disapproved by operation of §303.2(A)(2). However, §303.2(B) provides that a gubernatorial-disapproved rule may still become effective if the rule is approved by a joint resolution of the Legislature pursuant to §308(B).

LEGISLATIVE REVIEW

Section 308(A) requires the agency to submit two copies of the rule and two copies of the agency rule report to both the Speaker of the House and the President Pro Tempore of the Senate. The agency must also submit to the Secretary of State's Office of Administrative Rules for publication in The Oklahoma Register a statement that the rules have been submitted to the Legislature. The elements required to be set forth in the agency rule report to the Legislature are the same as those required for the agency rule report filed with the Governor; see §303.1.

Except as otherwise provided in §308, the Legislature shall have 30 legislative days to review the rules. Rules may be disapproved in whole or in part by the Legislature. Section 308(E).

Upon receipt of the adopted rules, the Speaker and President Pro Tempore shall assign the rules to appropriate legislative committees for legislative review. The Speaker and President Pro Tempore may each establish a rule review committee or designate standing committees of each house to review administrative rules. § 307.1. Such committees shall review the rules in an advisory capacity and may make recommendations concerning the rule to their respective houses, or to the agency, or both. §307.1(C).

By the adoption of a joint resolution, the Legislature may (1) disapprove any rule, (2) waive the 30 legislative day review period and approve the rule, or (3) otherwise approve the rule. The waiver of the 30 legislative day review period may also be done with a concurrent resolution.

The Legislature may by concurrent resolution disapprove a proposed rule or proposed rule amendment. Such a concurrent resolution must be approved by both houses prior to the end of the 30 legislative day review period. Section 308(B)(2) provides that any such concurrent resolution shall not require the approval of the Governor, and any rule so disapproved shall be invalid and of no effect regardless of the approval by the Governor of the rule.

Any resolution disapproving a rule shall be filed with the Secretary of State for publication in The Oklahoma Register.

Whenever a rule is disapproved by joint resolution or concurrent resolution as provided in §308(B), the agency does not have authority to submit an identical rule except during the first 60 calendar days of the next regular legislative session.

Timing in submitting the rule to the Legislature is critical. If the rule is submitted to the Legislature before April 1 of any year, it shall be deemed approved by the Legislature if (a) the Legislature is in regular session and has failed to disapprove the rule within 30 legislative days after the submission of the rule, or (b) the Legislature has adjourned before the expiration of the 30 legislative day period and has failed to disapprove the rule. However, if the rule is submitted to the Legislature after April 1 of the year, the rule is deemed approved by the Legislature only if the Legislature is in regular session and fails to disapprove the rule within 30 legislative days after the rule has been submitted. In the event the Legislature adjourns after April 1 and before 30 legislative days expire, the rule shall be carried over for consideration by the Legislature during the next regular session and the required 30 legislative day review period begins on the first day of such succeeding regular session. The OWRB has two alternatives to try to avoid these consequences of filing after April 1: it may (1) request direct legislative approval by adoption of a joint resolution waiving the 30 legislative day review period and approving the rule, or adoption of a joint resolution otherwise approving the rule, or (2) it may adopt emergency rules.

FINAL ADOPTION

Upon legislative and gubernatorial approval, a rule attains the status of "final adoption." Section 308.1 provides that upon approval by the Legislature and the Governor, or upon approval by a joint resolution of the Legislature pursuant to §308(B) (i.e., a joint resolution waiving the 30 legislative day review period and approving the rule, or a joint resolution otherwise approving the rule), a rule shall be considered "finally adopted." However, there are still several more steps that must be completed before the rule becomes effective.

FILING FINALLY ADOPTED RULE WITH SECRETARY OF STATE

After a Water Quality Standard Revision becomes finally adopted, the OWRB has 30 calendar days to file the rule and the number of copies specified by the Secretary of State with the Secretary

of State Office of Administrative Rules. The text of the rule submitted for publication shall be the same as the text considered by the Legislature and Governor.

Section 251(B)(2) prescribes several requirements that the agency must follow in conjunction with filing the rule with the Secretary of State. The first two of these requirements must be adhered to from the earliest stages of rule drafting. First, the rules must be prepared in plain language that can be easily understood. Second, the agency shall not unnecessarily repeat statutory language, and where it is necessary to refer to statutory language to effectively convey the meaning of the rule interpreting that language, the reference shall clearly indicate that portion which is statutory and that which is the agency's amplification or interpretation of that language

Additional requirements prescribed by §251(B)(2) include:

1. an indication whether the rule is new, amends an existing permanent rule, or repeals an existing permanent rule. If amendatory, any deleted language shall be shown by strikeout and any new language shall be shown by underscoring;
2. if the rule supersedes an existing emergency rule, a statement to that effect;
3. a reference to any rule requiring a new or revised form used by the agency, in a note to the rule. The Secretary of State shall insert that reference in The Oklahoma Register as a notation to the affected rule;
4. an analysis, prepared in plain language, of new or amended rules. The analysis shall include a reference to any statute that the rule interprets, any related statute or any related rule; and
5. other information required by the Secretary of State.

Section 251(B)(2)(i) also provides that the agency may change the format of existing rules without any rule making action in order to comply with the Secretary's standard provisions for publication in The Oklahoma Register and Oklahoma Administrative Code (OAC), so long as there is no substantive change to the rule.

PUBLICATION; PROMULGATION

The Secretary of State is to publish the WQS revisions in the first issue of The Oklahoma Register published per §§251, 253, 256, 303, 303.1 and 308, after the date of acceptance of the rule by the Secretary. Publication of rules and other items in The Oklahoma Register and the OAC is a major subject in itself, and is discussed more thoroughly below. In the context of this discussion of rulemaking procedure, it is sufficient at this point to state that once the rule has been filed and published in The Oklahoma Register, and otherwise complies with the APA, it shall be considered "promulgated."

EFFECTIVE DATE

Section 304(B) provides that each rule "finally adopted" is effective 10 calendar days after publication in The Oklahoma Register pursuant to §255 unless a later date is required by statute or specified in the rule, in which case the later date is the effective date.

PUBLICATION OF RULES IN THE OKLAHOMA REGISTER AND THE OKLAHOMA ADMINISTRATIVE CODE

The Oklahoma Register (the "Register") is the State counterpart to the Federal Register for publication of state agency rulemaking developments such as notices of rulemaking intent,

adoption of rules, submission of adopted rules for gubernatorial and legislative review, and approval and promulgation of rules. Additionally, the Register has served for years as the official publication for promulgated rules or summaries of lengthy promulgated rules.

1. The Oklahoma Register

Section 255 provides that the Secretary of State is authorized and directed to publish the Register not less than monthly for publication of new permanent rules, amendments or revocations of rules, emergency rules, and any notices of such rulemaking process. (The Register is now being published twice per month and is also used for publication of Executive Orders.) The Secretary may provide for the publication of rules in summary form when the rules are so lengthy that publication would be "too costly"; the summary is to be prepared by the submitting agency and must state where the text of the rule may be obtained. The Secretary of State is required to keep a copy of all rules, new rules, amendments and revocations of existing rules on file and available for public inspection in the Secretary of State's Office of Administrative Rules during normal office hours.

The Secretary also must send a copy of each publication of the Register to every county clerk, to members of the Legislature upon request, and to such agencies, libraries and officials as the Secretary may select.

2. The OAC

The OAC is a comprehensive compilation of law (i.e., agency rules of practice, procedure, and substantive law) for state agencies in a uniform format much like the Code of Federal Regulations for federal agencies. It is intended to be an annual, cumulative collection of the permanent rules published semi-monthly in the Register. The OAC will not contain emergency rules. These are left to be published only in the Register.

Rules which are submitted and accepted for codification by June 30 of each year must be published in the next succeeding OAC or supplement. The OAC and its supplements must be published annually, and should be published as soon as possible after August 30 of each year.

Section 257.1 lists several public offices which are entitled to receive, as soon as available from the Secretary of State, without cost, one copy of the printed volumes of the OAC and its supplements. These offices include:

- a. the county clerk of each county;
- b. several specified state offices including the Attorney General, Governor, and Speaker and President Pro Tempore; and
- c. the Department of Libraries for the Law Library.

To complement this free availability via public offices, the Secretary of State is authorized to sell or otherwise distribute the OAC and its supplements. The OAC shall be made generally available by the Secretary of State at a cost sufficient to defray the cost of publication and mailing.

3. Effect of Failure to Publish in *The Oklahoma Register* or OAC

Reading §§250.7 and 256 together, it may be concluded that the official permanent rules of the State shall be those which are published in the Register prior to the compilation of rules due to be completed by January 1, 1992; upon that date, any permanent rule not included in the official compilation by the Secretary of State in the OAC becomes void and has no effect.

The official permanent rules of the State shall be (1) those published in the OAC or its annual supplement, and (2) those published in the Register after the closing date for publication of the last preceding OAC or OAC supplement. Permanent rules published in the Register but not published in the next succeeding publication of the OAC or OAC supplement become void.

NON-STATUTORY ACTIVITIES FOR WATER QUALITY STANDARDS REVISIONS

Board staff may hold a series of public meetings prior to the formal public hearing. These informal meetings have proven beneficial in that the informal setting promotes an active dialogue between Board staff and affected or concerned parties.

It is during these informal meetings that scientific justification documents and policy questions are discussed.

EMERGENCY WATER QUALITY STANDARDS RULEMAKING

The procedure for promulgating emergency rule provisions in the Oklahoma WQS is governed primarily by §253. They may be distinguished from permanent rules in several ways. Generally, emergency rules can be adopted by the OWRB at any time with or without an abbreviated notice and hearing process in order to respond to a compelling, extraordinary circumstance. They are not necessarily subject to immediate Legislative review, although they are subject to immediate gubernatorial approval before they can become effective. The Legislature can review and disapprove the rule or otherwise affect its effective term. Emergency rules are not permanent but are effective for only a limited period of time.

FINDING OF COMPELLING, EXTRAORDINARY CIRCUMSTANCE

Section 253(A) states that "[i]f an agency finds that an imminent peril to the preservation of the public health, safety, welfare, or other compelling extraordinary circumstance requires an emergency rule, amendment, revision, or revocation of an existing rule, then an agency may initiate emergency rulemaking procedures in an effort to promulgate a rule to meet the emergency. In practice, much emergency rulemaking is done as a stopgap measure to track changes in federal statutory or administrative agency law, or state statutory law, which must be implemented before permanent rules can be promulgated. In such cases, the emergency rules are put into effect until they are superseded by permanent rules.

ABBREVIATED NOTICE AND HEARING, RULE IMPACT STATEMENT

Section 253(J) provides that the notice and hearing, rule impact statement, agency rule report, and statement of submission requirements in permanent rulemaking are not applicable in emergency rulemaking. However, if an agency determines that an abbreviated notice and hearing procedure or an abbreviated rule impact statement are necessary, then this section does not prohibit such abbreviated procedures. Moreover, an agency has discretion to prepare an agency rule report although it is not required for emergency rulemaking.

ADOPTION AND FILING WITH GOVERNOR

Before the OWRB adopts an emergency rule, it must prepare the rule in the proper format required by the Secretary of State. Upon adoption, §253(B) requires the agency to transmit the rule to the Governor, and §253(C) requires the Governor to submit the emergency rule to the Secretary of State for review of proper formatting.

GUBERNATORIAL APPROVAL OR DISAPPROVAL; PROMULGATION; FILING WITH SECRETARY OF STATE; AGENCY FILING WITH LEGISLATURE; PUBLICATION

Section 253(C)(1) provides that the Governor shall review the emergency rule and decide whether or not it should be approved. Section 253(D)(2) provides that the Governor has 45 calendar days to review and approve or disapprove the emergency rule.

If the Governor fails to approve the emergency rule within the 45 calendar day period, the rule is deemed disapproved according to §253(D)(2). In any event, if the Governor disapproves the emergency rule, the Governor shall return the entire rule document to the agency with reasons for the disapproval. The agency then may elect to modify the emergency rule and resubmit it to the Governor for approval.

If the Governor approves the emergency rule, the emergency rule shall be considered promulgated and shall be effective immediately, unless a later effective date is specified in the rule. The Governor's approval of the emergency rule shall be published in the next publication of The Oklahoma Register following approval by the Governor. Section 253(E)(3). A copy of the Governor's approval and the emergency rule shall be submitted by the agency to the Speaker and President Pro Tempore.

As a result of the "fast track" emergency rulemaking process, agencies are required by §304(B)(2)(b) to take appropriate measures to make emergency rules known to the persons who may be affected by them.

EFFECTIVE TERM; LEGISLATIVE REVIEW

An emergency rule may specify an expiration date that will control the rule's effective term unless other provisions of the APA dictate a different result.

In cases where the emergency rule does not state an expiration date (i.e., it is intended to have a continuing effect), §253(H)(1) requires the agency to initiate rulemaking proceedings to promulgate a permanent rule to supersede the emergency rule. If an emergency rule is superseded by another emergency rule prior to the enactment of a permanent rule, the latter emergency rule will retain the same expiration date as the superseded emergency rule, unless otherwise authorized by the Legislature.

According to §253(F), emergency rules “shall be effective from the date of approval by the Governor or a later date as specified in the approved emergency rule, unless otherwise specifically provided by the Legislature, through the first day of the next succeeding Regular Session of the Oklahoma Legislature, after the promulgation of such emergency rule, and shall be in full force and effect through July 14 following such session unless it is made ineffective pursuant to” §253(H).

Section 253(G) provides that “No agency shall adopt any emergency rule which establishes or increases fees, except during such times as the Legislature is in session, unless specifically mandated by the Legislature or federal legislation, or when the failure to establish or increase fees would conflict with an order issued by a court of law”.

Section 253(H) provides in paragraph 2 thereof that any promulgated emergency rule shall be made ineffective by (a) legislative disapproval of the emergency rule, (b) supersession by the promulgation of a permanent rule, (c) legislative disapproval of an adopted permanent rule based upon the emergency rule, or (d) an earlier expiration date if specified in the emergency rule. Paragraph 3 of subsection H provides that emergency rules in effect on the first day of a legislative session shall be null and void on July 15 immediately following sine die adjournment of the Legislature unless otherwise specifically provided by the Legislature. In the event of such nullity, the agency is expressly prohibited from evading this result by adopting the emergency rule again or adopting new emergency rules of similar scope or intent.

COORDINATION OF NEW STANDARDS, CRITERIA AND IMPLEMENTATION POLICIES

Oklahoma's WQS and Implementation documents are evolutionary documents. Consequently, as required by the CWA, at least once every three years, the WQS undergo a revision. During these revisions, modification suggestions to the current WQS are accepted from the U.S. EPA, other federal and state agencies, special interest groups and private citizens. Although all comments and suggestions are

considered, time and staffing constraints may prohibit an in depth evaluation of all suggestions. Those comments with the greatest potential merit will receive the greatest scrutiny.

WATER QUALITY STANDARDS CRITERIA MODIFICATION

Scientific advances and changes in public policy will periodically require the addition of new narrative and numerical water quality criteria. These criteria modifications may occur at any time, but will generally occur during the triennial revision process. During the triennial revision public participation process, justification for changes/modifications will be presented. The final adoption process is specified in a previous section.

WATER QUALITY STANDARDS IMPLEMENTATION MODIFICATION

To effectively implement Oklahoma's WQS into permits, enforcement, or other regulatory activities, WQS Implementation Documents are required. These documents are housed in a different chapter. Development of Implementation documents will be driven by Oklahoma's WQS. Consequently, Implementation documents must reflect the principals outlined in Oklahoma's WQS. This requires that Implementation documents will be developed either simultaneously or subsequent to the Standards. The development of Implementation documents will also require prioritization. This prioritization will consider existing needs and require input from other state and federal agencies.

Title 82 O.S. §1085.30 Subsection C states: "The standards of quality of the waters of the State, implementation documents and classification of such waters or any modification or change thereof shall be adopted and otherwise comply with the APA and shall be enforced by all state agencies within the scope of their jurisdiction." Consequently, all WQS Implementation documents will be subjected to the public participation process as outlined in the APA. Both new, and modifications to existing documents are subject to APA requirements. These documents will principally reside in OAC 785:46. They may also be found in this document. Although it is anticipated that Implementation documents will be dynamic, only those concepts supported by the WQS may be considered. Conversely, not all concepts found in the WQS are currently implemented. It is anticipated that additional implementation documents will be developed over time.

PART II PROCEDURES FOR ASSIGNMENT OF BENEFICIAL USES

40 CFR §131.10 states:

"(a) Each State must specify appropriate water uses to be achieved and protected. The classification of the waters of the State must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States.

(b) In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

(c) States may adopt sub-categories of a use and set the appropriate criteria to reflect varying needs of such sub-categories of uses, for instance, to differentiate between cold water and warm water fisheries.

(d) At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under sections 301(b) and 306 of the Act and cost-effective and reasonable best management practices for nonpoint source control.

(e) Prior to adding or removing any use, or establishing sub-categories of a use, the State shall provide notice and an opportunity for a public hearing under Sec. 131.20(b) of this regulation.

(f) States may adopt seasonal uses as an alternative to reclassifying a water body or segment thereof to uses requiring less stringent water quality criteria. If seasonal uses are adopted, water quality criteria should be adjusted to reflect the seasonal uses, however, such criteria shall not preclude the attainment and maintenance of a more protective use in another season.

(g) States may remove a designated use which is not an existing use, as defined in Sec. 131.3, or establish sub-categories of a use if the State can demonstrate that attaining the designated use is not feasible because:

Naturally occurring pollutant concentrations prevent the attainment of the use; or

(1) Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or

(2) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

(3) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or

(4) Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or

(5) Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.

(h) States may not remove designated uses if:

(1) They are existing uses, as defined in Sec. 131.3, unless a use requiring more stringent criteria is added; or

(2) Such uses will be attained by implementing effluent limits required under sections 301(b) and 306 of the Act and by implementing cost-effective and reasonable best management practices for nonpoint source control.

(i) Where existing water quality standards specify designated uses less than those, which are presently being attained, the State shall revise its standards to reflect the uses actually being attained.

(j) A State must conduct a use attainability analysis as described in Sec. 131.3(g) whenever: (1) The State designates or has designated uses that do not include the uses specified in section 101(a)(2) of the Act, or (2) The State wishes to remove a designated use that is specified in section 101(a)(2) of the Act or to adopt subcategories of uses specified in section 101(a)(2) of the Act which require less stringent criteria.

(k) A State is not required to conduct a use attainability analysis under this regulation whenever designating uses which include those specified in section 101(a)(2) of the Act."

Oklahoma law in Section 319(15) mandates that the OWRB is "To adopt, modify or repeal and promulgate standards of quality of the waters of the State and *to classify such waters according to their best uses* in the

interest of the public under such conditions as the OWRB may prescribe for the prevention, control, and abatement of pollution."

State statutory language specifies that the OWRB is to designate beneficial uses, by classification of waters according to their best uses, and the CFR establishes national guidelines for use designation.

Beneficial uses have been applied to Oklahoma streams and lakes since the initial WQS were adopted. These uses are revised periodically as more data is obtained. Oklahoma's WQS specifically list beneficial uses in Appendix A and 785:45-5-3(a) for Oklahoma waters. Uses defined in the WQS include: Public and Private Water Supply, Emergency Water Supply, Fish and Wildlife Propagation, Agriculture, Hydroelectric Power, Municipal & Industrial Process and Cooling Water, Primary Recreation, Secondary Recreation, Navigation, Aesthetics and Fish Consumption.

Specific limitations may also apply to selected waters in order to provide them with additional protection.

Beneficial uses are assigned to Oklahoma Waters by three different methods. They are 1) Existing uses, 2) Assumed uses and 3) Designated uses.

EXISTING USES

40 CFR § 131.3(e) states that "Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." Generally, in Oklahoma, existing uses are evaluated through literature surveys of each water body. Ultimately, existing uses become designated uses when they are included in Appendix A of the WQS Document.

ASSUMED USES

Oklahoma's WQS in Section 785:45-5-2(a) state that: "Beneficial uses are designated for all waters of the State. Such uses are protected through the restrictions imposed by the antidegradation policy statement, narrative criteria and numerical standards. Some uses require higher quality water than others. When multiple uses are assigned to the same waters, all such uses shall be protected. Beneficial uses are also protected by permits or other authorizations issued to meet these Standards for point sources and through practical management or regulatory programs for nonpoint sources. The criteria to protect the beneficial uses designated in 785:45-5-3 or in Appendix A of [the Oklahoma WQS] this Chapter for certain surface waters of the State are described in the following sections:

- (1) 785:45-5-10. Public and Private Water Supplies
- (2) 785:45-5-11. Emergency Public and Private Water Supplies
- (3) 785:45-5-12. Fish and Wildlife Propagation
 - (A) Habitat Limited Aquatic Community
 - (B) Warm Water Aquatic Community
 - (C) Cool Water Aquatic Community (Excluding Lake Waters)
 - (D) Trout Fisheries (Put and Take)
- (4) 785:45-5-13. Agriculture: livestock and irrigation
- (5) 785:45-5-14. Hydroelectric Power Generation
- (6) 785:45-5-15. Industrial and Municipal Process and Cooling Water
- (7) 785:45-5-16. Primary Body Contact Recreation
- (8) 785:45-5-17. Secondary Body Contact Recreation
- (9) 785:45-5-18. Navigation
- (10) 785:45-5-19. Aesthetics
- (11) 785:45-5-20 Fish Consumption."

785:45-5-3. UNLISTED SURFACE WATERS

(A) SURFACE WATERS EXCLUDING LAKES.

- (1) For those surface waters of the State not listed in Appendix A of [the Oklahoma WQS] this Chapter, excluding lakes, the following beneficial uses are designated:
 - (A) Agriculture: livestock and irrigation (785:45-5-13),
 - (B) Industrial and Municipal Process and Cooling Water (785:45-5-15),
 - (C) Aesthetics (785:45-5-19),
 - (D) Fish and Wildlife Propagation, (Warm Water Aquatic Community) (785:45-5-12),
 - (E) Primary Body Contact Recreation (785:45-5-16).
- (2) Specifically, the Beneficial uses described under 785:45-5-10 (Public and Private Water Supplies), 785:45-5-11 (Emergency Public and Private Water Supplies), 785:45-5-12 (Fish and Wildlife Propagation, Habitat Limited Aquatic Community), 785:45-5-17 (Secondary Body Contact Recreation) shall only be designated following use attainability analyses.
- (3) Beneficial use determinations, following Use Attainability Analyses, are subject to administrative proceedings including the public hearing process.

(B) LAKES.

- (1) For lakes, including those listed in Appendix A of [the Oklahoma WQS] this Chapter, the following beneficial uses are designated:
 - (A) Fish and Wildlife Propagation (Warm Water Aquatic Community) (785:45-5-12).
 - (B) Agriculture (785:45-5-13).
 - (C) Industrial and Municipal Process and Cooling Water (785:45-5-15).
 - (D) Primary Body Contact Recreation (785:45-5-16).
 - (E) Aesthetics (785:45-5-19).
- (2) The beneficial use of Public and Private Water Supplies (785:45-5-10) is specifically designated for certain lakes in Appendix A of [the Oklahoma WQS] this Chapter, otherwise the beneficial uses designated in this paragraph take control over the uses designated for segments which include descriptions of lakes in Appendix A of [the Oklahoma WQS] this Chapter."

In Oklahoma, both Secondary Body Contact Recreation (SBCR) and Habitat Limited Aquatic Community (HLAC) are subcategories of uses requiring less stringent criteria. Therefore, prior to their designation to a waterbody, a Use Attainability Analysis (UAA) which provides the scientific justification for the SBCR or the HLAC designation must be completed. During the 1988 Oklahoma WQS revision, the Environmental Protection Agency (EPA) communicated that the State must meet the requirement of the federal regulation for EPA approval of that section of the standards. Because of the EPA comments which were a restatement of the applicable regulatory requirements, the Standards were amended to insure that a UAA is conducted prior to regulatory activity that affects the water quality of an unlisted water (OAC 785:45-5-3(a)(2),(3)).

To satisfy Federal (EPA) requirements and comply with the Oklahoma WQS, the OWRB has designed and implemented a program to perform UAAs on the concerned unlisted streams. Through these UAAs, assumed beneficial uses may be confirmed or refuted.

DESIGNATED USES

The process of designating beneficial uses generally involves a three-step process which at any point may include sufficient information to designate uses. These three elements include a literature review, a "one-day" survey, and an intensive survey.

LITERATURE REVIEW

The literature review involves the review of historical chemical, physical and biological data. Although information of this type may be available, it is seldom comprehensive enough to allow the

designation of a beneficial use. Consequently, most UAAs in Oklahoma, including the "unlisted streams" surveys, utilize a minimum of "one-day" surveys.

ONE-DAY SURVEYS

One-day UAA have evolved much over the 20-year history of UAAs in Oklahoma. Recently, the unlisted streams program has incorporated one-day survey concepts into the designation of uses.

It is the OWRB's task to approve UAAs to assess the current physical, chemical and biological components of streams and to determine the highest beneficial uses each is capable of attaining. These UAAs are performed using a "one-day survey" method which has the benefit of allowing a large amount of information to be gathered in a short period of time with a minimum amount of cost compared to more intensive stream studies.

There currently exists in the Oklahoma WQS, four subcategories of beneficial uses under the category of Fish and Wildlife Propagation, of which the highest attainable use should be designated through a UAA. All Oklahoma streams have been classified as capable of attaining one of these beneficial uses, which are listed as follows:

Warm Water Aquatic Community (WWAC): - A subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality and habitat are adequate to support climax fish communities.

Habitat Limited Aquatic Community (HLAC): - A subcategory of the beneficial use "Fish and Wildlife Propagation" where the water chemistry and habitat are not adequate to support a WWAC because: (1) Naturally occurring water chemistry prevents the attainment of the use; or (2) Naturally occurring ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of a sufficient volume of effluent to enable uses to be met; or (3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or (4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way that would result in the attainment of the use; or (5) Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of the WWAC beneficial use.

Cool Water Aquatic Community - A subcategory of the beneficial use category "Fish and Wildlife Propagation" where the water quality, water chemistry and habitat are adequate to support warm water intolerant climax fish communities and includes an environment suitable for the full range of cool water benthos. Typical species may include smallmouth bass, certain darters and stoneflies.

Trout Fishery - A water body, which contains trout at least part of the year.

The highest beneficial use classification a stream is capable of attaining is a function of five physical, chemical and biological factors described by Karr et al. (1986). Since the abiotic components are the limiting factors to the biological potential in any system, it is assumed that the existing biological integrity of a stream is a reflection of its long-term average physical and chemical well-being. The mechanism for determining the highest biological potential attainable in a stream must look at all abiotic components that currently exist in the system, then determine if the biological community is a true reflection of that potential. Through this mechanism it may be determined if the existing uses are the potentially attainable uses. Due to infinite combinations of environmental factors that may possibly exist in a stream (no two streams are chemically and physically identical), no precise formula has been devised to accurately predict and describe the biological community that should exist there. Only through the evaluation of several watershed, stream habitat, water quality, and biological factors

of numerous Oklahoma streams may predictions be made on aquatic life uses attainable for a given set of conditions.

The optimal time of year for conducting a UAA is when a stream's biological community is most limited by its abiotic components. Karr's et al. (1986) five major classes of environmental factors that determine a biological community's performance are susceptible to seasonal perturbations and for most Oklahoma streams these environmental factors are generally most limiting to biological community performance between July and September or later if summer-like conditions persist. This is during the period of lowest stream flow, which may decrease habitat availability and allow for higher concentrations of point source pollutants. It is also during the period of highest water temperatures, which may be exceeding the maximum threshold of tolerance for some of the community organisms and decrease dissolved oxygen to near lethal levels.

Other uses considered in these surveys included body contact recreation and Public and Private Water Supply (PPWS) uses. Body contact recreation uses include Primary Body Contact Recreation (PBCR) and SBCR, which are exclusive of each other within a stream. PBCR involves direct body contact with the water where a possibility of ingestion exists. Typically this involves a water body with sufficient depths for full body immersion to occur such as in swimming (typically considered to be >1/2 m deep for more than 20% of the stream reach). However, PBCR may be assigned to a waterbody if there is evidence to indicate that immersion may be taking place. In these cases, the water shall not contain chemical, physical or biological substances in concentrations that are irritating to skin or sense organs or are toxic or cause illness upon ingestion by human beings (specific chemical criteria are found in OAC 785:45-5-16). SBCR is designated where ingestion of water is not likely to occur such as in boating or wading. Body contact recreation uses are therefore dependent on attainment of physical, chemical and biological characteristics within a stream.

PPWS beneficial use is based principally upon water quantity. Methods used to evaluate the PPWS use are not as elaborate or exhaustive as for fish and wildlife uses. Typically, a base flow in excess of two cubic feet per second is considered the minimum required for maintenance of the PPWS use. In addition, a permits review to determine if water withdrawal records indicate an existing PPWS use is conducted. If an existing public withdrawal use is discovered, the PPWS use is assigned.

ONE-DAY SURVEY MATERIALS AND METHODS TO DETERMINE BENEFICIAL USES

The methods used to perform one-day UAAs involve evaluating the physical, chemical and biological components of each stream surveyed. Designating a beneficial use to a stream called for an integrated assessment of these biotic and abiotic components. UAAs should be performed between June 1 and October 31 and must follow the OWRB technical guidance document TRWQ2001-1 (*Unified Protocols for Beneficial Use Assignments for Oklahoma Wadable Streams*).

Depending on length of stream and availability of access, one or more sample sites should be selected per stream surveyed. Prior to selection of sample sites, U.S. Geological Survey topographical maps of the entire watershed should be reviewed for watershed characteristics and all potential access points. One to three of these access points are selected as sites for physical, chemical and biological measurements. If the stream is at least one mile long and has sufficient access, a site is selected in the lower reaches below any effluent but at least one-half mile upstream of its confluence with the receiving stream. A sample site is also selected near the headwaters and above any effluent discharge if the stream was not 100% effluent dominated at the point of discharge. If there is no water upstream of the point source discharge then a sample site should be selected immediately downstream of the outfall. If the stream is several miles long and has numerous access points, a third or more sample sites should be selected for collecting additional physical, chemical or biological data. On longer streams, sites are selected after reconnaissance to allow selection of the least impacted and most representative sites. The length of each sample site where physical and biological data are collected, generally ranges in length

from 200 to 400 meters. Care should be taken to ensure that each site selected is representative of the particular reach of stream being evaluated.

PHYSICAL

Physical characteristics of each stream should be measured and inventoried using the technical report TRWQ2001-1, which is partly based on work by Platts et al. (1983), U.S. Environmental Protection Agency (EPA)(1983), Karr et al. (1986) and EPA (1989).

A data sheet should be completed for each stream listing specific characteristics under the general headings of watershed description, hydrology, channel morphology and structure, streambed composition, and banks and riparian. These data sheets have evolved through several OWRB stream surveys with numerous authors. The function of these sheets is to facilitate describing the true condition of a given stream. These data sheets are available in the guidance document.

Watershed description characteristics include stream length, watershed area, recent precipitation and rural and urban land use descriptions. Some of this data is entered on site and some completed with the aid of U.S. Geological Survey topographical maps. Stream Order is determined with 7.5 minute (1:24,000) USGS maps including intermittent and ephemeral channels (Strahler 1957) as is stream link magnitude (Osborne 1992).

Methods for documenting stream habitat quality are as described in the technical guidance document TRWQ2001-1 and are based in part on the Rapid Bioassessment Protocol (EPA 1989). Raw data for each site are recorded in the aforementioned data sheets for later assessment.

Hydrology includes total discharge measured with a Marsh-McBurney Model 201 portable water flow meter and utilizing methods described in the guidance document. A sheet for recording these data is included in the field sheet package. Water source is noted if possible. Total discharge is calculated with this formula:

$$Q = \sum_{i=1}^n (W_{i+1} - W_i) \frac{d_i + d_{i+1}}{2} \frac{v_i + v_{i+1}}{2} \quad (1)$$

where:

- n = the total number of individual sections
- w_i = horizontal distance from initial point
- d_i = water depth at location i
- v_i = measured velocity at location i

Calculation of total discharge is then accomplished with aid of a spreadsheet in a similar format to the field sheet. Care should be taken to ensure that the formulas in the spreadsheet reflect the actual mathematical operations of the formula.

Channel morphology and structure characteristics describe the macrohabitats and large features of the stream by estimating what percentage of each stream was comprised of pools, riffles and runs, descriptions of undercuts, and presence of large instream structures and channel alterations. Streambed composition characteristics describe microhabitats by estimating percent composition of streambed material, percent embeddedness, and presence of small and particulate organic material.

Banks and riparian zone characteristics require evaluating streamside cover by estimating percent composition of grasses, shrubs, trees, or other cover, shading by overhead canopy cover, bank material composition, bank slope, and presence of bank erosion. Estimated average riparian width is also recorded at every transect station. Any unusual or human-induced physical impacts are noted in this section as well.

Distance traveled for these methods are measured with a Chainman II trailing string distance measurer calibrated in 0.1 meter increments. With this device, stations are established beginning at a recorded starting point and every ten or twenty meters (depending on stream size and homogeneity) for a total of twenty to thirty stations. Total distance assessed should be approximately 30 times the average stream width. Generally, this is done wading along the center of the stream.

At each station, thalweg depth should be measured to the nearest 0.1 meter; stream width is estimated to the nearest meter using a 1.5 meter staff as reference, habitat type (pool, run, riffle, or dry) was noted and percent composition of each substrate type is estimated. Instream cover such as logs, undercutting, roots and trash are also noted.

Raw data are then entered in a spreadsheet to calculate mean habitat depths, maximum depth, depth distribution, percent habitat types and substrate composition. This information is used to supplement the previously described field sheets.

All physical characteristic information is recorded by photographic documentation and onto the data sheets while at the site or immediately thereafter.

Upon returning from the field, the recorded information is used to make an assessment of combined physical characteristics of a stream by means of the habitat assessment metric sheet modified from EPA (1989). The habitat assessment metric sheet is used to obtain an empirically derived habitat score for each stream.

For evaluating the physical characteristics of a stream for Body Contact Recreation classifications, a minimum criteria in which "... direct body contact with the water where a possibility of ingestion exists..." (OAC 785:45-5-16, OWRB) is used for classifying a stream as either PBCR or SBCR. This involves utilizing methodologies previously used by the OWRB. The criteria used for determining PBCR is water depth equal to or exceeding 0.5 meters in at least 20% of the stream. This criteria was established in order to permit an objective decision to be made for body contact recreation classifications. Occasionally, a stream may be encountered that does not meet the established criteria for PBCR throughout most of its length but has a short section suitable for that classification. This exception is taken into consideration where appropriate.

For evaluating a stream for a PPWS beneficial use, the total instream flow is measured. The criteria for assigning this beneficial use to a stream is a minimum stream discharge of at least 2.0 cfs from a reliable source (i.e. not effluent dominated) and good attainable water quality.

CHEMICAL

Chemical components of the stream are measured to obtain existing water quality information for several purposes. Usually, water quality is measured to detect natural and man-induced constraints to attaining Fish and Wildlife Propagation, body contact recreation and PPWS beneficial uses. In most cases, water quality is measured at sites upstream and downstream of a discharge effluent mixing zone to measure impacts resulting from the discharge.

Chemical characteristics measured at most sites include: dissolved oxygen, pH, specific conductance, alkalinity, total hardness, and nutrients including nitrate, phosphate and

ammonia. These parameters are measured at one to four sites on each stream, depending on presence and proximity of effluent discharges to sampling sites and proximity to other sampling sites. All measurements are made between late morning and late afternoon hours.

Many chemical characteristics can be measured with one of the latest generation of multiple parameter data loggers such as the Hydrolab or YSI. Care should be taken to maintain and calibrate these instruments per the manufacturer's instructions prior to beginning of any sampling event. All equipment is rinsed with deionized water between measurements.

BIOLOGICAL

In order to determine existing beneficial uses and biological integrity of a stream, aquatic macroinvertebrates and fish are sampled at most sites. Aquatic macrophytes and algae are also sampled if appropriate. Current beneficial uses are indicated by the presence or absence of an intolerant climax fish community and a full range of aquatic macroinvertebrates, both of which help define a WWAC. A stream capable of supporting an intolerant climax fish community is one with habitat and water quality adequate to support game fishes or other sensitive species introduced or native to the biotic province or ecological region, which require specific or narrow ranges of high quality environmental conditions. Therefore, as part of the procedure to determine the existence of a WWAC, fish samples are analyzed to determine fish community composition. If the sample consists of game fishes or other sensitive species which require specific or narrow ranges of high quality environmental conditions, then the community is considered an existing WWAC and is recommended as a beneficial use. Fishes tolerances to habitat and water quality degradation as listed by Jester et al. (1992) are used to make this determination. Abundances within each species are not considered since the method of sampling (seining), which is used for most streams, is biased towards smaller pelagic species. Abundances are considered with age class structures, however, for situations requiring more information for a sound decision.

Fish sampling is done according to the protocols found in OWRB technical report 99-3. Riffle dwelling species are sampled by holding the lead-line of the seine on the substrate across the lower end of the riffle while one or two crew members agitated the substrate with their hands and feet for several square meters upstream of the seine. Electrofishing gear consisting of a Smith-Root backpack shocking unit is used in instances where representative sample sites are readily accessible but difficult to seine. All sampled species and abundances are noted for each sample site with samples of unidentifiable species preserved in 10% formalin solution for later identification. Identification is done utilizing keys by Miller and Robison (1980) and Robison and Buchanan (1989) by personnel with a high degree of taxonomic expertise.

The presence of a full range of warm water benthos in a stream is also supporting and indicative of an existing WWAC. If the aquatic macroinvertebrate community consists of several species, which collectively require a variety of microhabitats, then it was assumed that the habitat was suitable for the full range of warm water benthos. This sampling must also be performed per the requirements of the OWRB technical guidance document. These methods require sampling from all available habitat types to detect presence and estimate relative abundance of various macroinvertebrate taxa.

Sampling of aquatic macroinvertebrates is done with a 34 cm wide D-shaped, 500 μ m mesh dip net and a 500 μ m mesh, 1 meter square seine. For riffle habitats, the seine is held perpendicular to the substrate at the downstream end of the riffle while 1 meter square of upstream riffle substrate is agitated to release many of the clinging organisms to drift into the net. This is repeated 2 more times in the middle and upstream regions of the riffle. The dip net is pulled through submerged aquatic vegetation or roots along with sampling fine particulate organic matter such as decaying leaves from most sites for sampling aquatic macroinvertebrates. All aquatic macroinvertebrates are identified to the family level and to

genus level where practical. Other methods for sampling aquatic macroinvertebrates include visual observations such as mussels, picking up rocks and other suitable substrates for aquatic macroinvertebrate colonization, and incidental catch of larger species such as crayfish in the seine while sampling fish.

The final steps in the process of assigning a beneficial use designation to a stream involves an analysis of the biotic and abiotic factors comprising the stream and watershed. After analyses of data, a flow chart for assigning beneficial uses to unlisted streams is followed to derive a final recommendation. A stream is assigned a WWAC beneficial use unless the water chemistry and habitat were not adequate to support it as described in Oklahoma's WQS definitions for HLAC. Streams with a low habitat assessment score are assumed not capable of supporting a WWAC regardless of water quality and streams with a high habitat assessment score are capable of sustaining a WWAC unless precluded by naturally occurring water quality. In complying with 40 CFR §131.12(a)(1), if a WWAC type of community is found to currently exist in a stream, then that stream is designated a WWAC in order to protect that existing beneficial use even if it received an intermediate habitat assessment score. If, however, a stream receives a low habitat assessment score but is found to contain an existing WWAC, the stream is reassessed to determine if an error was made in assessing the habitat or if the fish sampled are actually an anomaly to the system, such as relics from farm pond washouts. If evidence indicates that a low habitat assessment score is a result of an impact to the habitat then a stream is more closely evaluated to determine if removal of the impact will allow the existence of a WWAC. In the event of lower than expected biological integrity for a given habitat assessment score, a water quality problem may be present which may be limiting the attainment of a WWAC. In this case a determination is made as to whether or not available habitat could support a WWAC if the cause of the poor water quality is removed. This is done by utilizing biological and water quality data collected upstream from possible sources of pollution or from a nearby reference stream to make the final beneficial use recommendation.

PUBLIC PARTICIPATION PROCESS/DESIGNATING DETERMINED USES

Upon completion of the UAA field work and report development phases, uses are designated in the Oklahoma's WQS Appendix A through the WQS revision process. In general, proposed uses are presented to affected industries and municipalities at an informal meeting. During this meeting, the UAA process is presented along with recommended beneficial uses. During the subsequent WQS revision process, public meetings and hearings are conducted during which comments are received, and answered, from all concerned parties. The WQS revision process is reviewed more thoroughly in a subsequent chapter.

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INTENSIVE SURVEYS

INTENSIVE SURVEY MATERIALS AND METHODS TO DETERMINE BENEFICIAL USES

In rare instances, it is not possible to designate uses to a waterbody based upon a one-day survey. In these instances, an more intensive survey is required.

These intensive studies generally involve more exhaustive chemical, physical and biological analysis. Continuous recording of physio-chemical parameters, and the deployment of periphytometers and benthic macroinvertebrate substrates are commonplace. Because of the time and manpower commitment required to perform intensive studies, they are undertaken only when one-day studies do not render uses.

Methods to perform an intensive UAA are given in EPA's "WQS Handbook" published in December, 1983. Oklahoma has refined these methods over the last decade, especially as illustrated by the OWRB's one-day survey (Unlisted Streams) program. Additional documentation is available through the OWRB. Because of the effectiveness of these one-day surveys, it is seldom necessary to undertake an intensive survey. Occasionally, after a single sampling season, a streams uses may be inconclusive. A reevaluation the next summer will usually allow the designation of uses.

Intensive UAAs are never-the-less invaluable tools in the designation of uses. Through the use of more exhaustive field and laboratory methods, uses can be more specifically assigned. The following are general intensive UAA methods.

PHYSICOCHEMICAL

Physical and chemical variables are measured throughout the study to characterize water quality and detect potential limiting conditions for aquatic life. Water quality data may be obtained using two types of sampling: on-site, *in-situ* measurements (hereafter referred to as field measurements) and more exhaustive laboratory analysis. Most water quality data originate from field measurements. Several replicates of field measurements (to document temporal variability) are taken to allow statistical analysis among sites. Methods for field and laboratory measurements are given below.

FIELD MEASUREMENTS

The following parameters should be measured on-site, water temperature, pH, conductivity, total hardness, total alkalinity, and nutrients (ammonia, nitrate and phosphate). The Hydrolab instrument must be calibrated prior to use using manufacturer's standards and methods. The titration supplies and equipment must be cleaned after each use and pre-rinsed with site water prior to each use. In addition, accuracy of Hydrolab dissolved oxygen measurements should be verified by comparison with Winkler titration results using split samples. Between 7-9 replicate field measurements should be taken at all sites during July through September, 1989.

Continuous monitoring of dissolved oxygen, pH, temperature, and conductivity (hourly readings) during 3-4 days should be conducted using a Hydrolab DataSonde Model continuous recorder. The purpose of this sampling is to determine diel variability of critical water quality parameters. Continuous monitoring should be conducted from July - September, or during critical conditions.

Pre-dawn measurements of dissolved oxygen, pH, conductivity, and temperature should be obtained at all sites. Pre-dawn measurements are taken to determine if limiting dissolved oxygen conditions are present at any site.

LABORATORY MEASUREMENTS

Water samples at all sites should be collected and preserved for laboratory analysis. At a minimum, the following parameters should be analyzed from these samples: Chloride, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Nitrite N as N, Nitrate N as N, Ammonia N as N, Kjeldahl N as N, Total phosphorus, Ortho-phosphorus as P, Turbidity, Total Suspended Solids (TSS), fecal coliform, fecal streptococcus, Sulfate, Copper, Iron, Zinc, and Manganese. Procedures for analysis should follow those in *Methods for Chemical Analysis of Water and Wastes* (EPA, 1982) and *Standard Methods for the Examination of Water and Wastewater* (APHA et al., 1988). Quality assurance procedures should follow those in *Quality Management Plan* (OWRB, 2000).

HYDROLOGICAL

Flow measurements are taken using a top-setting flow rod and portable Water Flow Meter. Instantaneous cross sectional flows are taken at six inch or one foot intervals depending upon overall stream width. Utilizing instantaneous flow velocity (feet/second) and depth, a volume may be calculated in cubic feet per second (cfs).

This method is further described in the QA/QC plan or the *Marsh-McBirney, Inc. Model 201/201D Portable Water Flow Meter Instruction Manual* (Marsh-McBirney, Inc., 1985). Replicate measurements should be taken at least every fifth flow. Instantaneous flows are calculated using the formula previously cited and explained.

HABITAT

Both habitat quality and availability play major roles in the type and quantity of organisms in an aquatic community. However quantification of this parameter is difficult because habitat requirements for aquatic life uses vary among regions of the State.

In the past, the OWRB has utilized a pair wise statistical comparison to evaluate the quantity and quality of available habitat as it was assessed by field personnel. Although this method has proven effective, it still relied upon each member of the field team to make observations afield and transcribe them into non-standardized rankings or evaluation scores.

EPA's Rapid Bioassessment Protocol requires that similar habitat quantity and quality observations be made by field personnel, but transcribes those observations through the use of a standardized metric system. The result is an assignment of numerical values to a series of habitat questions. These numerical scores are then summed to achieve an overall habitat ranking score.

These habitat ranking forms have been modified to more accurately reflect Oklahoma conditions. The use of these forms is evaluated in the one-day survey method. Copies of this form are available through the UAA protocol document. These forms should be filled out by each senior member of the UAA crew. For a more detailed description of this Habitat Assessment method, see the OWRB technical guidance document TRWQ2001-1.

To retain some consistency within the State in habitat evaluations, OWRB habitat evaluation data sheets may also be utilized. These data sheets enable a knowledgeable investigator to evaluate in stream habitat, bank habitat, erosion potential, etc. Although pair wise habitat comparisons need not be completed for these studies, the combination of previously referenced habitat evaluation forms and techniques provide a definitive evaluation of extant aquatic habitat.

BIOLOGICAL

PERIPHYTON

Periphyton (attached algae) are useful indicators when assessing the environmental characteristics of a site. Periphyton analysis can be important when determining the overall health of a stream, assessing enrichment, or as an aid in evaluating other measurements such as dissolved oxygen or pH. Relative pollution levels may be estimated through taxonomic identification. For collection of periphyton, these studies should utilize periphytometers deployed at each site for a two week colonization period.

Four replicate periphytometers are placed at each site following EPA methods (EPA, 1973). Sample locations are selected to maintain comparable shading and velocity among sites. These are standardized by placement in pool habitats and areas of similar canopy. Metal posts are driven into the substrate and periphytometers are attached using wire. Care should be taken to avoid heavily traveled roads (to prevent vandalism) and areas prone to rapid water level fluctuations during rainfall events.

Each periphytometer contains six standard microscope slides, giving a total of 24 separate slides per site. Three sets of five are then randomly sorted into three separate plastic containers. One replicate per site should be preserved with Lugols iodine for taxonomic identification and enumeration in the laboratory (EPA, 1973). Data from these samples are reported as total individuals, total species, density (individuals / unit area), and species diversity (d) (Wilhm and Dorris, 1968; and Patten, 1962).

BENTHIC MACROINVERTEBRATES

Benthic macroinvertebrates are often reliable indicators of environmental quality. Because of their limited mobility and diverse habitat requirements, the quality and quantity of benthic organisms may be used as indicators of water quality when assessing the best present and potential beneficial uses of a stream.

UAAs may utilize two methods of invertebrate collection, Hester-Dendy artificial substrates and Rapid-Bioassessment techniques.

Hester-Dendy artificial substrate samplers are constructed according to Hester and Dendy (1962). These samplers are standardized by placement in areas of comparable shading and stream velocity. At these sites, metal posts are driven into the substrate with sampler attachment approximately 10 cm from the substrate. Each site utilizes four separate Hester-Dendy samplers and allowed a six-week colonization period. Surface area of each sampler should equal 779 cm².

After this six-week colonization period, the samplers are collected, resident organisms removed and field preserved for laboratory analysis.

The Rapid-Bioassessment method involves the use of a hand-held benthic collection net and a seine to collect invertebrates from different habitats and substrates. It is important that the protocols in the technical guidance documents be followed as closely as possible to allow for comparison of results and defensibility of conclusions.

FISHES

Fishes are sampled by both seining and electrofishing to collect as many different fish species as possible at each site because the singular use of one method may bias the sample (seining biases toward smaller fish and electrofishing toward larger fish). A

depletion sample is not necessary and, in most cases, is actually counter-productive. As long as the sampling effort is thorough and follows the protocols, the sample should be representative of the community in that area.

Seining is generally accomplished using a ten foot, 1/8 inch square mesh minnow seine following methods described by EPA (EPA, 1973). Approximately 200-400 meters are seined at each site. A variety of habitats must be included such as pools, riffles, runs, log jams and undercut banks. Because the goal of fish collection in UAA sampling is to obtain an estimate of fish species at a site, more time is expended in those areas which prove to be the most productive in terms of species richness.

Electrofishing consists of positive and negative electrodes which discharge a DC pulse which can be manipulated. Electrical pulse width, frequency, and voltage are manipulated with the dials on the backpack shocker. In general, a four man team requires at least one hour of actual sampling time to adequately sample each site.

Every effort should be made to use the standardized protocols for both seining and shocking procedures among sites. Collection notes of importance include: seining and electrofishing both include approximately a one hour of sampling period and cover a minimum 200 meter stretch and more productive areas of all sites receive a greater collection effort.

All fishes collected in the field are preserved in a 10% formalin solution and transported to the lab for identification and enumeration. Those individuals too large for proper preservation and/or easily identifiable in the field are identified, weighed, measured (total length), checked for diseases, parasites or abnormalities, and released.

Fishes are subsequently identified from the keys of Miller and Robison (1973), Pfliger (1968), and Robison and Buchanan (1984).

EVALUATION

Several indices, formulas and coefficients may be utilized in an effort to gain an understanding of the biological data. This understanding is important in establishing each sites relative quality, and both existing and potential aquatic life uses. They include:

Sorensens coefficient (Index of Similarity) (1948)

$$S_s = \frac{2c}{a + b} \quad (2)$$

where:

a = number of taxa in community a
b = number of taxa in community b
c = number of taxa common to both

Coefficient of Community (Johnson and Brinkhurst, 1971 and Jaccard, 1912)

$$S_{cc} = \frac{a}{a + b + c} \quad (3)$$

where:

a = number of taxa in community a
 b = number of taxa in community b
 c = number of taxa common to both

Margalefs Index (1958)

$$D_m = \frac{s-1}{\ln N} \quad (4)$$

where:

s = number of species in population sampled
 N = number of individuals in population

Menhinicks Index (1964)

$$d = \frac{s}{\sqrt{n}} \quad (5)$$

Shannon-Weaver Index (H)(1949)

$$H = -\sum \left(\frac{n_i}{n} \log \frac{n_i}{n} \right) \quad (6)$$

where:

n_i = number of individuals in a species i of a sample population
 n = number of individuals in a sample population

Hurlberts PIE (1971)

$$PIE = \left(\frac{N}{N-1} \right) \left(1 - \sum P_i^2 \right) \quad (7)$$

where:

N = number of individuals in a population
 P_i = the fraction of a sample of individuals belonging to species i (n_i / n)

Other indices may provide additional insights, and many are given in numerous OWRB and EPA publications.

PUBLIC PARTICIPATION PROCESS/DESIGNATING DETERMINED USES

Upon completion of the UAA field work and report development phases, uses are designated in the Oklahoma's WQS Appendix A through the WQS revision process. In general, proposed uses are presented to affected industries and municipalities at an informal meeting. During this meeting, the Use Attainability Process is presented along with recommended beneficial uses. During the subsequent WQS revision process, public meetings and hearings are conducted during which comments are received, and answered, from all concerned parties. The WQS revision process was reviewed more thoroughly in Part I of this Chapter.

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PART III WATER QUALITY STANDARDS IMPLEMENTATION

The explanation of how both narrative and numerical criteria found within Oklahoma's WQS are to be translated into permits (commonly called water quality standards implementation) is statutorily assigned to the OWRB. These implementation procedures are to be followed in the development of both industrial and municipal permits under the National Pollutant Discharge Elimination System (NPDES).

WATER QUALITY STANDARDS IMPLEMENTATION DOCUMENTS

Statutory authority to develop and promulgate water quality standards implementation documents to be utilized by all Oklahoma environmental agencies in the discharge of their duties has historically resided with the OWRB. OWRB staff, through cooperation with other appropriate state agencies and the U.S. EPA, have promulgated water quality standards implementation procedures at OAC 785:46. Because these implementation procedures must adapt to new and ever dynamic water quality standards requirements, as they may be promulgated from time to time in OAC 785:45, OAC 785:46 must also be periodically updated.

Each state environmental agency has been mandated by 27A O.S. §1-1-202(B), as enacted by Senate Bill 549, to promulgate a Water Quality Standards Implementation Plan (WQSIP) for its jurisdictional areas of environmental responsibility. The DEQ's WQSIP is contained in Appendix A to OAC 252:690. Certain water quality standards implementation procedures are being transferred by the OWRB to the DEQ for its jurisdictional areas as part of the cited WQSIP mandate. Implementation procedures in OAC 785:46 apply to all state environmental agencies. Implementation procedures in OAC 252:690 apply only to the DEQ's jurisdictional areas.

Procedures and content from these two implementation documents (OAC 785:46 and OAC 252:690) are reiterated in part in this and the following chapter. Because the CPP is not promulgated by the DEQ as a rule, implementation procedures found in OAC 785:46 and OAC 252:690 take precedence over those outlined in the CPP, should there be any inconsistencies.

These two implementation documents represent the minimum requirements necessary to ensure discharger compliance with specific criteria of the WQS. Nothing contained within these implementation documents shall be construed to limit additional or more restrictive requirements placed on the permittee by the DEQ as permitting authority.

Because of the potential impact of WQS Implementation Documents to permittees and the environment, the OWRB and DEQ are required to subject these implementation documents to the rulemaking process as described in the APA. This includes public notices and comment periods, public hearings, Board approvals, and legislative and gubernatorial approvals. These requirements are outlined in the previous chapter concerning state requirements for water quality standards approval.

PURPOSE, SCOPE, AND APPLICABILITY OF IMPLEMENTATION DOCUMENTS

See OAC 785:46 and OAC 252:690. Definitions and terms relevant to water quality standards implementation are found at OAC 785:45-1-2, OAC 785:46-1-2, and OAC 252:690-1-2.

IMPLEMENTATION OF NARRATIVE TOXICS CRITERIA IMPLEMENTATION TO PROTECT AQUATIC LIFE USING WHOLE EFFLUENT TOXICITY (WET) TESTING

INTRODUCTION

The CWA and EPA regulations require the use of an "integrated strategy" to achieve and maintain the fish and wildlife propagation beneficial use (EPA, 1990). This integrated strategy involves the use of both the whole effluent toxicity control approach and the chemical specific approach.

The integrated strategy is necessary to protect the fish and wildlife propagation beneficial use. The whole effluent toxicity approach can deal with the combined (synergistic) effect of a complex mix of toxic substances in an effluent, but the chemical specific approach cannot. On the other hand, the chemical specific approach can deal with background toxicity, but the whole effluent approach cannot.

The narrative toxicity criterion to protect the fish and wildlife propagation beneficial use is found at OAC 785:45-5-12(e)(6)(A) and states "Surface waters of the State shall not exhibit acute toxicity and shall not exhibit chronic toxicity outside the chronic regulatory mixing zone. Acute test failure and chronic test failure shall be used to determine discharger compliance with these narrative aquatic life toxics criteria." Section 785:45-5-26(a)(3) states "Acute toxicity within the mixing zone is prohibited."

EPA Region 6 has provided guidance for the implementation of these narrative criteria. EPA's "Post Third Round NPDES Permit Implementation Strategy" addresses narrative criteria. The intent of the strategy is to prevent discharge of wastewater from any source which results in acute aquatic toxicity, or in chronic toxicity after dilution of the effluent with receiving water. This strategy is implemented by applying appropriate whole effluent toxicity (WET) limitations to the discharge. Specific state required effluent limits or monitoring for whole effluent toxicity will be imposed as required by the State water quality standards and implementation rules (see OAC 785:46-3). EPA Region 6's "Post Third Round Implementation Strategy" for narrative toxicity is incorporated into this document by reference.

This document sets forth an implementation procedure by which the State of Oklahoma regulates point source discharges so that they do not violate the narrative toxicity prohibitions in the Oklahoma WQS which protect aquatic life. The procedure follows EPA Region 6 guidance for whole effluent toxicity and insures that the criteria are met by effluent discharged to receiving waters. OAC 785:45-5-12(f)(6)(B) requires that the CPP document contain the procedures for implementation of the narrative toxicity criterion. These procedures are found in Chapter 3, Sections B.4.a (WET testing) and B.3.d (WET testing limits).

APPLICABILITY AND SCOPE OF NARRATIVE CRITERIA IMPLEMENTATION

Section 785:45-5-4 of the Oklahoma WQS addresses applicability of narrative criteria. The narrative criterion which prohibits acute toxicity shall be maintained at all times and apply to all surface waters of the State. The narrative criterion that prohibits chronic toxicity applies at all times outside the mixing zone except when the receiving stream flow is less than the larger of 1 cfs or the larger of 1 cfs or the 7Q2.

Although toxicity testing can be used to evaluate non-point source activities, the regulatory focus in Oklahoma is on point source discharges. At this time narrative implementation using the whole effluent approach addresses only point sources.

APPLICABILITY TO HALOGENS

The requirement of OAC 785:46-3-1(c) for dehalogenation is typically implemented as "no measurable amount in the effluent". For chlorine "no measurable amount" is considered to be less than 0.1 mg/L.

APPLICABILITY TO AMMONIA

OAC 785:45-5-12(f)(6)(F) requires permit limits to control for ammonia toxicity to be developed pursuant to the narrative toxicity criterion. In addition, OAC 785:46-5-3(b)(3) states, "For regulatory purposes, there is a reasonable potential for chronic toxicity if concentrations of ammonia outside the chronic regulatory mixing zone exceed 6 mg/L." Implementation of this requirement is described in Chapter 3, sections B.3.c(1) and B.3.d(1).

REGULATORY STREAM FLOW DETERMINATION

The 7Q2 is used as the regulatory receiving stream flow for determining the type of WET test required and, where chronic WET testing is required, the chronic critical dilution.

PERMITTING STRATEGY TO IMPLEMENT WHOLE EFFLUENT TOXICITY TESTING

Whole effluent toxicity (WET) testing is the most direct measure of potential aquatic toxicity, since it incorporates the effects of synergism of effluent components and receiving stream water quality characteristics. OAC 785:45-5-12(f)(6)(A) states, "Surface waters of the state shall not exhibit acute toxicity and shall not exhibit chronic toxicity outside the [chronic] mixing zone. Acute test failure and chronic test failure shall be used to determine discharger compliance with these narrative aquatic life toxics criteria." This narrative toxicity criterion is implemented according to procedures described at OAC 785:46, Subchapter 3, OAC. 252:690-3-17 through 3-43, and Chapter 3 of the CPP.

Two types of WET tests are used to implement the narrative toxicity criterion. The 48-hour acute test is used to protect against acute toxicity, and the 7-day chronic test is used to protect against chronic toxicity outside the chronic regulatory mixing zone. Two test species are used: a vertebrate species, *Pimephales promelas* (or Fathead minnow), and an invertebrate species, *Daphia pulex* (for acute testing) or *Ceriodaphia dubia* (for chronic testing).

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NUMERICAL CRITERIA IMPLEMENTATION TO PROTECT FISH AND WILDLIFE PROPAGATION FROM TOXICITY DUE TO CONSERVATIVE SUBSTANCES

DEFINITIONS

For relevant definitions, please see OAC 785:45-45-1-2 and OAC 785:45-5-12.

INTRODUCTION

CWA and EPA regulations require the use of an "integrated strategy" to achieve and maintain the fish and wildlife propagation beneficial use (EPA, 1990). This integrated strategy involves the use of both the whole effluent toxicity control approach and the chemical specific approach.

The integrated strategy is necessary to protect the fish and wildlife propagation beneficial use. The whole effluent approach can deal with a complex mix of toxic substances in an effluent, which the chemical specific approach cannot. The chemical specific approach is better suited to addressing bioconcentration, background toxicity and the TMDL process.

Oklahoma's WQS protect the fish and wildlife propagation beneficial use through the numeric criteria listed in the table in Appendix G of the Oklahoma WQS. The table lists numerical criteria to protect aquatic life from certain toxic substances. The acute criteria are expressed as Final Acute Values (FAV), while chronic criteria are the product of the FAVs and acute to chronic ratios (ACRs).

This document sets forth the implementation procedure by which the State of Oklahoma regulates point source discharges so that such discharges are conducted in accordance with the numerical toxics criteria as specified in the Oklahoma WQS for fish and wildlife protection. WLA are developed to protect fish and wildlife for both chronic and acute criteria. Long-term averages are derived from the WLA. Permit limits are developed from the most stringent long-term average. The process for developing monthly average and daily maximum permit limits is described elsewhere in this document.

This implementation procedure conforms with EPA Region 6 guidance for numerical criteria. EPA Region 6's "Post Third Round Implementation Strategy" is incorporated into this document by reference.

APPLICABILITY AND SCOPE OF NUMERICAL CRITERIA AND IMPLEMENTATION

Numerical criteria applicability is dictated by constraints established in the Oklahoma WQS. Section 785:45-5-4 of the Oklahoma WQS addresses applicability of numerical criteria. It states, "For purposes of permitting discharges for attainment of numerical criteria or establishing site specific criteria, streamflows of the greater of 1.0 cfs or 7Q2 shall be used to determine appropriate permit conditions unless otherwise provided in OAC 785:45 or 785:46."

Please consult OAC 785:46 for statutory language.

REGULATORY FLOW DETERMINATION

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-5-2. Regulatory flow determination

(a) **Regulatory receiving stream flow.** Section 785:45-5-12(f)(6)(G) of the OAC defines the regulatory receiving stream flow upstream of the discharge, Q_u , to be used in implementing fish and wildlife propagation criteria. The Q_u is the greater of the 7Q2 or 1 cfs. 7Q2 shall be determined according to 785:46-1-6. Q_u is assumed to be 1 cfs if the 7Q2 is unknown or the permittee chooses not to develop an actual 7Q2.

(b) **Regulatory flow for lakes.** No regulatory flow determination is required for lakes.

(c) **Regulatory effluent flows.** The regulatory effluent flow, Q_e , is the highest monthly averaged flow over the previous two years for industrial discharges if the permitting authority determines that sufficient data are available. For other dischargers (e.g. municipalities), Q_e is the design flow. If a significant daily or seasonal variability in effluent flow is present, a regulatory effluent flow should take this variability into account.”

PERMITTING STRATEGY TO IMPLEMENT NUMERICAL AQUATIC CRITERIA

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-5-3. Reasonable potential

(a) **General.** The need for a permit limit will be determined, on a pollutant by pollutant basis, after determination of reasonable potential, which considers assimilation capacity of the receiving water and effluent variability.

(b) **Use of reasonable potential factor; relationship with wasteload allocation process.**

(1) The technical report produced by the Oklahoma Water Resources Board entitled "The Incorporation Of Ambient Concentration With That Due To Effluent For Wasteload Allocation" shall be used to determine if there is a reasonable potential for a criterion exceedance outside the mixing zone. $C_{95} = 2.13C_{\text{mean}}$ is used for effluent concentration in the reasonable potential calculation. C_{mean} is the geometric mean of all effluent concentrations analyzed for the toxicant. If the geometric mean cannot be determined, an arithmetic mean may be substituted. If a large dataset of effluent concentrations is available, the permitting authority may not need to estimate C_{95} ; the 95th percentile value can be calculated from the data.

(2) The wasteload allocation process is used to determine reasonable potential. C is the reasonable potential concentration on the chronic regulatory mixing zone boundary. C is calculated for chronic criteria in streams as: $C = C_b + (1.94Q^*(C_{95} - C_b)) / (1 + Q^*)$ when Q^* is less than or equal to 0.1823, or $C = C_b + (C_{95} - C_b) / (6.17 - 15.51Q^*)$ when Q^* is greater than 0.1823 and less than 0.3333, or $C = C_{95}$ when Q^* is greater than or equal to 0.3333. $Q^* = Q_e/Q_u$. Q^* is the dilution capacity. C is calculated for lakes as: *pipe*: $C = C_b + (D(C_{95} - C_b)) / 20.15$ when D is greater than or equal to 3 feet, or *canal*: $C = C_b + (W^{1/2}(C_{95} - C_b)) / 4.2$ when W is greater than or equal to 3 feet. D is the diameter of the discharge pipe in feet and W is the width of the canal in feet. D and W shall not be less than three feet for implementation purposes. When C is the concentration on the acute regulatory mixing zone boundary it is calculated as $C = C_b + (Q_e(C_{95} - C_b) / 100)$. If Q_e is greater than 100 cfs, then 100 cfs shall be substituted for Q_e .

(3) For regulatory purposes, there is a reasonable potential for chronic toxicity if concentrations of ammonia outside the chronic regulatory mixing zone exceed 6 mg/L.”

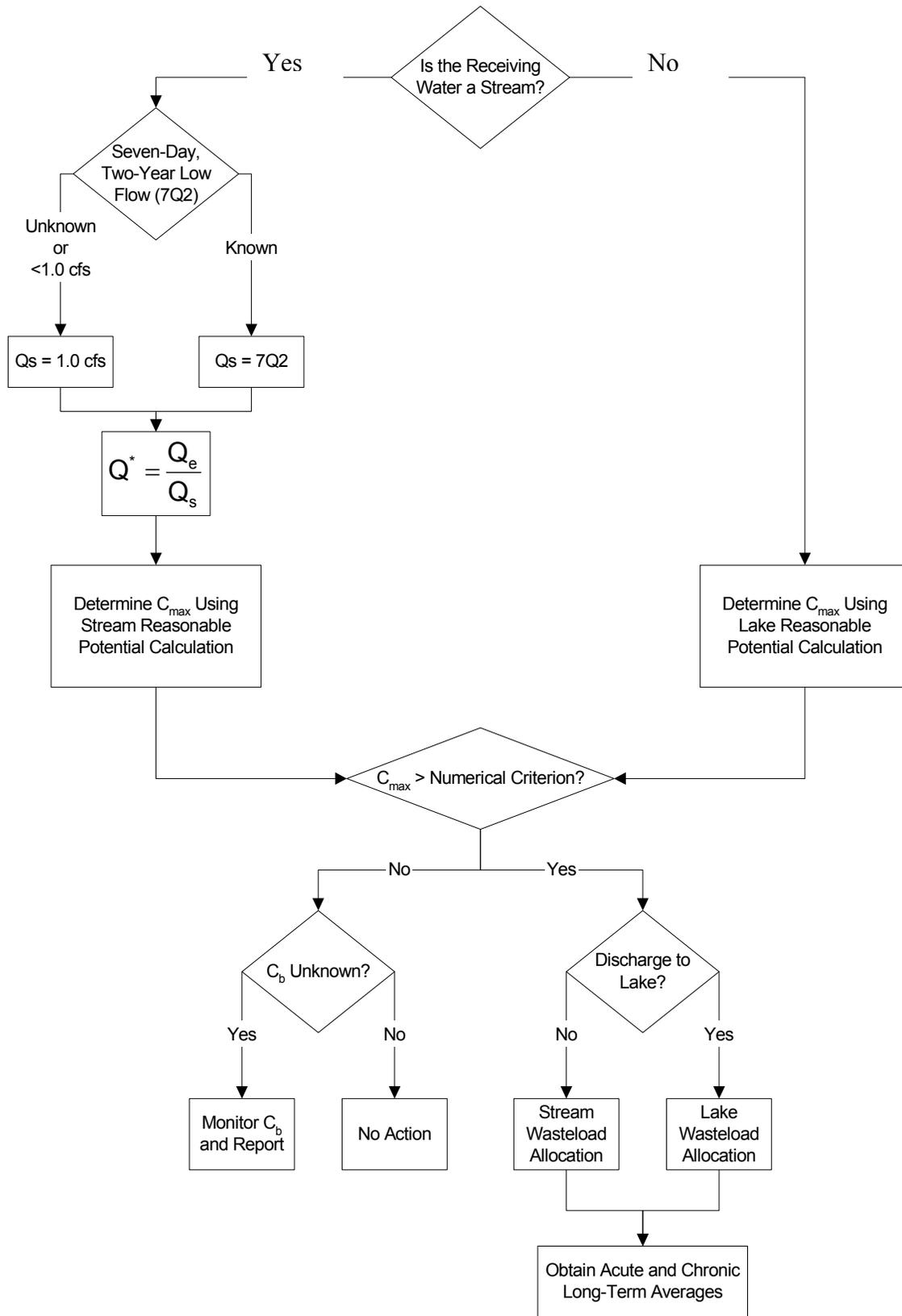
PH AND HARDNESS DEPENDENT TOXICITY

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-5-8. pH and hardness dependent toxicity

The criteria for some of the substances listed in 785:45-5-12(f)(6) are hardness or pH dependent. The segment-averaged pH in Appendix B of this Chapter shall be used to determine the criterion if there is insufficient site specific data to determine receiving stream pH. The mean hardness of the receiving stream, collected near the outfall but not affected by the discharge (as CaCO₃) may be used if at least 10 monthly samples were collected over a ten month period. The segment-averaged hardness in Appendix B of this Chapter shall be used in the determination of the criterion if there is insufficient site specific data to determine receiving stream hardness. If the required pH or hardness is not specified for a particular waterbody segment, appropriate data from surrounding waterbody segments may be used.”

FIGURE 4: NUMERICAL AQUATIC LIFE IMPLEMENTATION DECISION TREE



REFERENCES

- Discussion Of Methods Of Metals Analysis For Use In Oklahoma's Water Quality Management Programs FY 87 106 "Toxics" Output 621
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- Strategy For Addressing Background Concentrations 09/16/93. EPA, Region 6, Dallas Texas.
- Technical Support Document For Water Quality-based Toxics Control. EPA/505/2-90-001
- Water Quality Criteria Documents (e.g. Ambient Water Quality Criteria for Arsenic-1984 EPA 440/5-85-033)

IMPLEMENTATION OF NUMERICAL CRITERIA IN THE OKLAHOMA WATER QUALITY STANDARDS TO PROTECT HUMAN HEALTH

DEFINITIONS

Drainage area (A_D): A_D is the area drained above a discharge. It may be determined from USGS contour maps.

Drainage basins: Oklahoma is drained by the Arkansas and Red Rivers. For implementation purposes, drainage basins are the areas drained by the main stems and by their major tributaries.

Long term average flow (Q_u): Q_u is the mean annual flow for implementation purposes.

Wasteload Allocation (WLA): WLA is the maximum effluent concentration of a conservative substance which will not exceed the human health criterion after complete mixing.

INTRODUCTION

Certain of the numerical criteria in Oklahoma's WQS are designed to protect human health. Raw Water Numerical Criteria and Water Column Numerical Criteria to Protect Human Health for the Consumption of Fish Flesh and Water (Section 785:45-5-10) apply to surface waters of the state designated Public and Private Water Supplies. Numerical Criteria to Protect Human Health for the Consumption of Fish Flesh (Section 785:45-5-20) apply to all surface waters. Sometimes more than one human health criterion is applicable to a waterbody. In this case, the most stringent shall be used in the WLA. The WLA is the mechanism by which permit limits are developed to prevent exceedances of the criteria in the Oklahoma WQS.

The Oklahoma WQS provides two important regulations, which aid in human health criteria implementation. Section 785:45-5-20 of the Oklahoma WQS specifies that to protect human health for the consumption of fish flesh and/or fish flesh and water, long-term average receiving stream flows and complete mixing of effluent and receiving water shall be used to determine appropriate permit limits. Long term average flows and complete mixing form the basis for Oklahoma's WLA for human health criteria.

APPLICABILITY AND SCOPE OF NUMERICAL CRITERIA AND IMPLEMENTATION

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-7-1. Applicability and scope

(a) **General.** Rules in this Subchapter prescribe the method for determining regulatory flow and to determine whether there is a reasonable potential to exceed the criteria, all in order to implement numerical criteria to protect human health for consumption of fish flesh and/or water.

(b) **Applicable public and private water supply criteria.** Applicable criteria for waters designated Public and Private Water Supplies are found in OAC 785:45-5-10(1) and OAC 785:45-5-10(6) and OAC 785:45 Appendix G .

(c) **Applicable fish consumption criteria.** Applicable criteria for waters designated Warm Water Aquatic Community and/or Cool Water Aquatic Community and/or Trout Fisheries are found in 785:45-5-20 and OAC 785:45 Appendix G.

(d) **Appropriate criterion.** If several criteria apply to human health implementation, the most stringent is used for implementation purposes.

(e) **Applicable receiving waters.** The human health criteria apply in receiving waters designated as Public and Private Water Supplies and certain designated sub-categories of Fish and Wildlife

Propagation. Some streams in Appendix A of OAC 785:45 are designated Habitat Limited Aquatic Communities, and are not designated for the Public and Private Water Supply beneficial use. Therefore, human health criteria do not apply to these streams. For implementation purposes these streams are considered conduits to the downstream water body. Human health criteria must be implemented on the first downstream water body to which they apply.”

DETERMINATION AND USE OF REGULATORY FLOW, Q_u

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-7-2. Determination and use of regulatory flow

- (a) **General.** OAC 785:45-5-10(1), 785:45-5-10(6)(B) and 785:45-5-20(b) require that long term average receiving stream flows shall be used to implement water column numerical criteria to protect human health.
- (b) **Long term average flow on gaged receiving streams.** Mean annual average flow as determined in the technical report produced by the Oklahoma Water Resources Board entitled "Estimation Of Mean Annual Average Flows" shall be used for long term average flow in receiving streams which are or have been measured by USGS gages.
- (c) **Mean annual average flows on ungaged receiving streams.** Mean annual average flow may be estimated on streams where flow is not routinely measured. This method for estimation is demonstrated in the technical report produced by the Oklahoma Water Resources Board entitled "Estimation Of Mean Annual Average Flows". Other scientifically defensible methods of long term average flow estimation are permissible if approved by the permitting authority.
- (d) **Long term average flow in lakes.** Q_u cannot be estimated in a lake as easily as it can be for a stream. Therefore, mean annual average discharge from the lake shall be used for Q_u .
- (e) **Long term effluent flow.** The regulatory effluent flow, Q_e , is long term average effluent flow over the previous two years for industrial discharges if the permitting authority determines that sufficient data are available. For other discharges, Q_e is the design flow.”

LONG-TERM AVERAGE FLOWS ON STREAMS

Long term average flow must be precisely defined for use in a human health criteria WLA. Mean annual average flow shall be used for human health implementation. Mean annual average flow may be estimated on streams where flow is not routinely measured. This is demonstrated below, as excerpted from the technical report produced by the Oklahoma Water Resources Board entitled "Estimation of Mean Annual Average Flows". Other scientifically defensible methods of long term average flow estimation are allowable at the discretion of the permitting authority.

MEAN ANNUAL AVERAGE FLOWS ON GAGED RECEIVING STREAMS

If the discharge is near a gage on the receiving stream, the mean annual average flow at the gage may be used as Q_u at the discharge. If the flow is between gages, a weighted average may be used.

MEAN ANNUAL AVERAGE FLOWS ON UNGAGED RECEIVING STREAMS

Mean annual average flow directly above the discharge on a receiving stream without a USGS gage is difficult to estimate. Sophisticated techniques can yield accurate mean annual average flows on ungaged streams but are usually too resource intensive for routine regulatory use. A map of mean annual average flows per unit drainage area, Q_u/A_D , is produced in Figure 5 to aid in

rapidly estimating mean average annual flow. Q_u/A_D is in cfs/mi². Drainage area above a discharge may be obtained from USGS topographic maps. Multiplication of the drainage area by Q_u/A_D yields an estimate of mean annual average flow in the receiving stream at the discharge.

Three resources were used to produce isopleths of Q_u/A_D . The runoff pattern in "Appraisal of the Water and Related Land Resources of Oklahoma" was used because the runoff pattern and isopleths of Q_u/A_D should be similar. These patterns are not identical because more factors affect mean flow than runoff (e.g. springs, effluent discharges and water diversions).

The primary resource used to produce isopleths of Q_u/A_D was the hydrologic investigations commissioned by the OWRB. These investigations have been accomplished for all the basins in Oklahoma except the Neosho (Grand) and Poteau Rivers. Figure 6 shows the basins and sub-basins into which Oklahoma has been divided. Mean annual average flows leaving many of these sub-basins have been determined from the hydrologic investigations. Subtraction of the mean annual average flow entering a sub-basin from that leaving it yields the mean annual average flow generated in the sub-basin. Division of the flow generated in a sub-basin by the sub-basin area yields an estimate of Q_u/A_D . This estimate is not valid throughout a sub-basin because Q_u/A_D increases from west to east along with runoff. Therefore the estimate is assumed to be valid at the center of the sub-basin.

Estimates of the mean annual average flow generated in the Arkansas and Red River sub-basins are not useful in determining Q_u/A_D , because these rivers are not representative of small, ungaged receiving streams. The hydrology of the Arkansas River is too complicated, while the Red forms the southern boundary of Oklahoma, and is therefore not representative of Oklahoma basins. Sub-basins which are dominated by large lakes (like Eufaula) could not be used either.

The Bureau of Reclamation published a map of Q_u/A_D for southeast Oklahoma in its hydrologic investigations of that region. This map has been modified and combined with the rest of the data to produce the isopleths in Figure 5. Due to the diverse nature of the very limited data the isopleths are hand drawn, rather than produced by a computer driven contouring routine.

The map in Figure 5 does not include the panhandle, because Q_u/A_D is always less than 0.1 there. For implementation purposes, use $Q_u/A_D = 0.05$ for the entire panhandle.

VERACITY OF ESTIMATED MEAN ANNUAL AVERAGE FLOWS ON STREAMS

The isopleths in Figure 5 are only useful if they help obtain adequate estimates of mean annual average flows. Although there is no completely independent data set with which to test Figure 5, data in the USGS Statistical Summaries were used to test the utility of the map. Since there are USGS gages on most of the larger streams in Oklahoma, only gages with a mean annual average flow of less than 500 cfs or a drainage area less than 5000 square miles were used in the comparison. The locations of the gages used are shown in Figure 7 at the end of this section. Values for Q_u/A_D are estimated at the gage by interpolating between isopleths. These values of Q_u/A_D are multiplied by the drainage areas at the gages to obtain estimates of the mean annual average flow.

The estimates are compared with the observed mean annual average flows in Figure 8 at the end of this section. The line represents the estimate equal to the observed flow. For example, if the estimated and observed flows are both 200 cfs, the resulting point will fall on the line. The estimated flow is greater than the observed flow if the point is above the line, and the estimated flow is less than that observed if the point is below the line. Figure 8 shows that the isopleth method yields relatively unbiased estimates of the observed flow.

The isopleth method may not yield an exact, appropriate regulatory flow at a specific site. Even though isopleth estimated flows are close to those observed, there are too many factors

unaccounted for to be assured that a flow appropriate for WLA will always be obtained. The isopleth estimate should not be used downstream from impoundments in western Oklahoma. Much of the water in these reservoirs is lost to evaporation or used for agricultural or municipal purposes. Therefore, estimated flow is much greater than the dam discharge observed. Assumption of such a large mean annual average flow on a stream with a small dilution capacity allows for very high instream concentrations at low flows. For implementation purposes, the mean annual average flow from the dam shall be used for Q_u below dams in western Oklahoma.

PERMITTING STRATEGY TO IMPLEMENT NUMERICAL HUMAN HEALTH CRITERIA

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-7-3. Reasonable potential

(a) **General.** Complete mixing of effluent and receiving water shall be used to determine appropriate permit limits. A mass balance model shall be used for implementation purposes.

(b) Determination of reasonable potential factor

- (1) The mass balance equation will be used in the determination of human health reasonable potential: $C = (C_e Q^* + C_b) / (Q^* + I)$. $Q^* = Q_e / Q_u$, where Q_e is the regulatory effluent flow. C must be considered a long term average concentration after complete mixing. C_b is the background concentration. To determine if there is a reasonable potential to exceed the criterion after complete mixing, choose $C_e = 2.13C_{\text{mean}}$, where C_{mean} is a geometric mean of all effluent concentrations analyzed for the toxicant. If the geometric mean cannot be determined, an arithmetic mean may be used instead.
- (2) Representative background concentrations will be used if available. Such representative data should reflect long term average pollutant concentrations for implementation purposes. Otherwise, C_b is assumed zero.
- (3) C must be compared with the applicable water quality criterion to determine if there is a reasonable potential for the pollutant discharge to cause a criterion exceedance. If concentration after complete mixing is greater than the human health criterion, a permit limit will be required.”

FIGURE 6: WATER PLANNING BASINS AND SEGMENTS IN OKLAHOMA

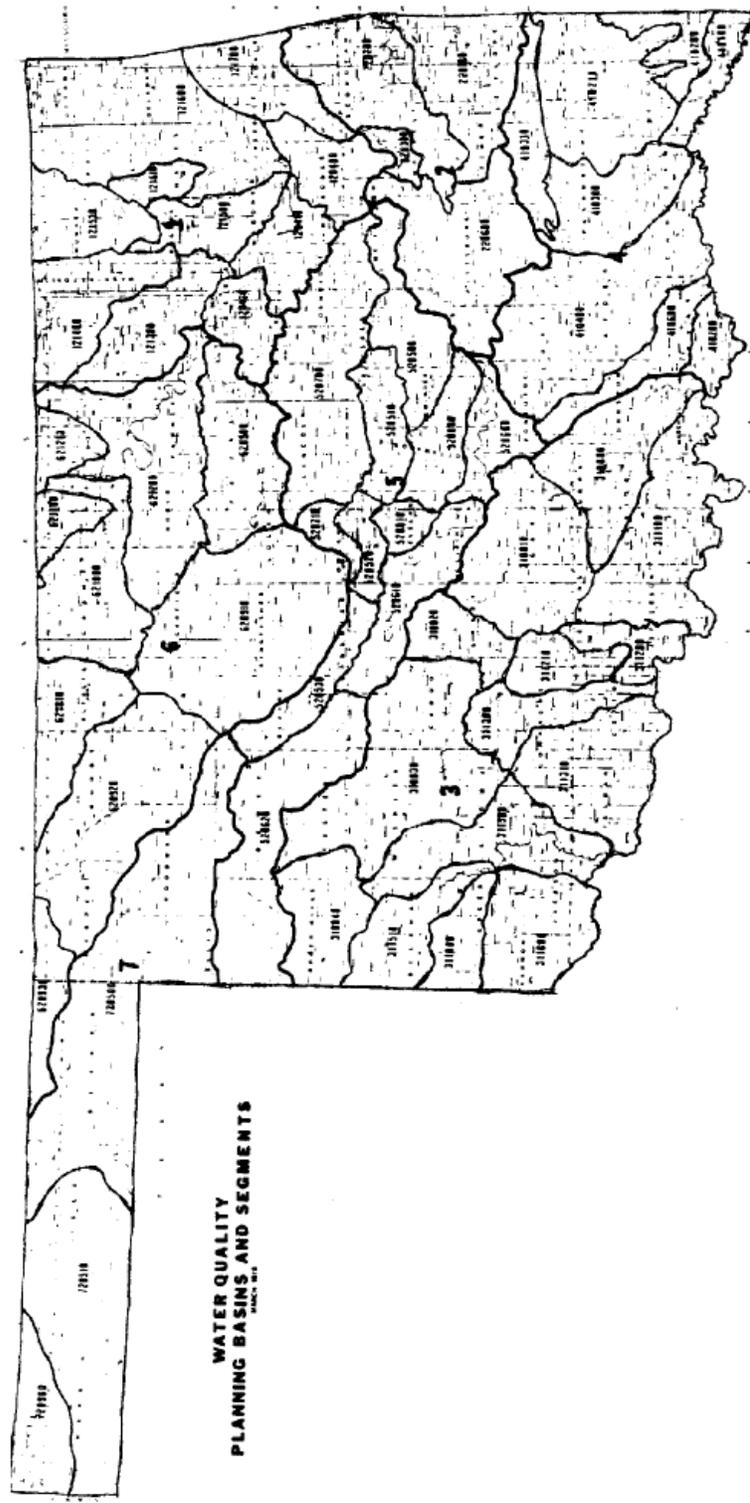
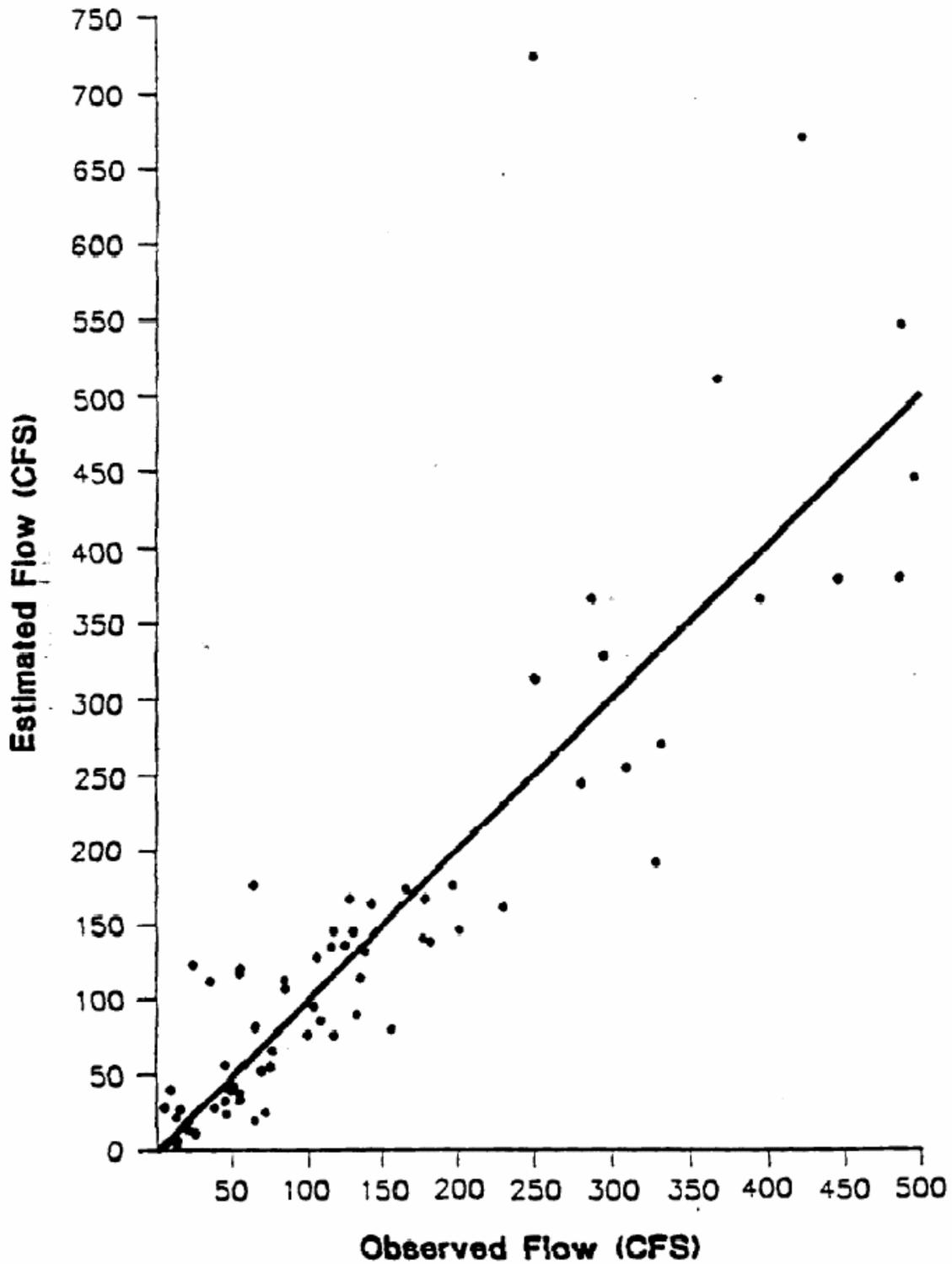


FIGURE 8: COMPANION OF OBSERVED AND ESTIMATED MEAN ANNUAL FLOWS



IMPLEMENTATION OF CRITERIA TO PROTECT THE AGRICULTURE BENEFICIAL USE

DEFINITIONS

“SS” means the sample standard.

“YMS” means yearly mean standard.

“WLA” means short-term wasteload allocation.

“WLA_L” means long-term wasteload allocation.

APPLICABILITY AND SCOPE

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-9-1. Applicability and scope

Rules in this Subchapter prescribe the method for determining whether there is a reasonable potential to exceed the criteria identified in OAC 785:45-5-13(h) and OAC 785:45 Appendix F for protection of the beneficial use of Agriculture. Included are criteria for chlorides, sulfates and total dissolved solids.”

APPLICABLE MINERAL CRITERIA

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-9-2. Applicable mineral criteria

- (a) **General.** OAC 785:45 Appendix F contains yearly mean standards and sample standards for protection of the Agriculture beneficial use. Historical values for chlorides, sulfates and TDS for water quality segments identified in OAC 785:45 Appendix F will not be updated. Data from surrounding segments shall be used by the permitting authority to develop yearly mean standards and sample standards for those segments with inadequate historical data.
- (b) **Segment averages.** Segment averages of yearly mean standards and sample standards shall be the criteria for chlorides, sulfates and TDS to protect the Agriculture beneficial use.”

REGULATORY FLOWS

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-9-3. Regulatory flows

- (a) **General.** Six regulatory flows are required for implementation of yearly mean standards and sample standards. They include stream flows, regulatory flows for lakes and regulatory effluent flows.
- (b) **Long term average flows for streams.** Mean annual average flow, A, will be used by the permitting authority for long term average flows to implement yearly mean standards. Mean annual average flows may be obtained from the USGS publication entitled “Statistical Summaries of Streamflow Records in Oklahoma and Parts of Arkansas, Kansas, Missouri and Texas through 1984” on streams with USGS gages. They may also be estimated on streams

without gages using the Oklahoma Water Resources Board publication entitled “Estimation of Mean Annual Average Flows” (OWRB Technical Report 96-2).

- (c) **Long term average flow for lakes.** Mean annual average discharge from the lake, A, shall be used to implement the Agriculture beneficial use.
- (d) **Regulatory long term effluent flows.** If the permitting authority determines that sufficient data is available to calculate the mean annual effluent discharge, then such discharge shall be the long term effluent flow, Q_{el} . If the permitting authority determines insufficient data is available to calculate the mean annual effluent discharge, then the design flow shall be the long term effluent flow, Q_{el} .
- (e) **Short term average flow for streams.** OAC 785:45-5-4(d) requires that short term average flow, Q_s , be used to implement sample standards. The short term average flow is determined so that short term and long term wasteload allocations are equally likely to be more stringent, depending on the historical concentration distribution for a particular segment.

$$Q_s = 0.68A$$

A is mean annual average stream flow.

- (f) **Short term average flows for lakes.** Short term average flows for lakes are also determined by the formula in OAC 785:46-9-3(e). In this case A is the mean annual average lake discharge.
- (g) **Short term average effluent flows.** If the permitting authority determines that sufficient data is available to calculate the highest monthly average discharge for industrial discharges, then such discharge shall be the short term average effluent flow, Q_{es} . If the permitting authority determines insufficient data is available to calculate the highest monthly average discharge for industrial discharges, then the design flow shall be the short term average effluent flow, Q_{es} .”

PERMITTING STRATEGY TO IMPLEMENT MINERAL CRITERIA

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-9-5. Reasonable potential

- (a) **General.** The need for a permit limit will be determined on a mineral constituent basis, after application of the reasonable potential equation specified in (b) of this Section, which considers assimilation capacity of the receiving water and effluent variability.
- (b) **Reasonable potential equation.** OAC 785:45-5-13(d) requires that complete mixing of effluent and receiving water be taken into account in the reasonable potential equation. The use of mass balance to obtain wasteload allocations for complete mixing is codified at OAC 785:46-7-3(a). Therefore, the reasonable potential equation for mineral constituents is $C = (Q_u BC + Q_e C_{95}) / (Q_u + Q_e)$, where $C_{95} = 2.13 C_{mean}$, where C_{mean} is the geometric mean of all effluent concentrations analyzed for the mineral. If the geometric mean cannot be determined, an arithmetic mean may be used. If sufficient effluent concentration observations exist as determined by the permitting authority, then the permitting authority may compute the 95th percentile concentration and use it as C_{95} , in accordance with OAC 785:46-5-3(b)(1).
- (c) **Reasonable potential to exceed yearly mean standard.** $Q_u = A$ and $Q_e = Q_{el}$ in OAC 785:46-9-5(b) to obtain a long term average concentration after complete mixing. If C is greater than YMS there is a reasonable potential to exceed an Agriculture beneficial use criterion, so a permit limit is required.
- (d) **Reasonable potential to exceed sample standard.** $Q_u = 0.68A$ and $Q_e = Q_{es}$ in OAC 785:46-9-5(b) to obtain a short term average concentration after complete mixing. If C is greater than SS there is a reasonable potential to exceed an Agriculture beneficial use criterion, so a permit limit is required.”

IMPLEMENTATION OF TEMPERATURE CRITERIA TO PROTECT FISH AND WILDLIFE PROPAGATION

DEFINITIONS

Please see OAC 785:46-1-2 for relevant definitions..

INTRODUCTION

Oklahoma's WQS protect the fish and wildlife propagation beneficial use from temperature through the numeric criteria listed in section 785:45-5-12(f)(2) of the Oklahoma WQS. The WQS list numerical criteria to protect aquatic life from temperature, with the specific criterion varying depending on the applicable subcategory of the fish and wildlife propagation beneficial use.

This document sets forth the implementation procedure by which the State of Oklahoma regulates point source discharges so that such discharges are conducted in accordance with the numerical temperature criteria as specified in the Oklahoma WQS for fish and wildlife protection. A temperature WLA is developed to protect fish and wildlife. A long term average is derived from the WLA. Permit limits are developed from the long term average. The process for developing 30-day average and 7-day average permit limits is described elsewhere in this document (see Chapter 3).

APPLICABILITY AND SCOPE

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-11-1. Applicability and scope

(a) OAC 785:45-5-12(f)(2) provides that at no time shall heat be added in excess of the amount that will raise receiving water temperature more than 2.8 °C outside the mixing zone. Therefore, the temperature criterion will be implemented with respect to regulatory flow and reasonable potential at the maximum temperature on the edge of the mixing zone.

(b) OAC 785:45-5-26 provides generally to the effect that in streams the mixing zone encompasses 25% of the total flow. The mixing zone in lakes may be designated by the permitting authority on a case by case basis. To be consistent, the mixing zone used for numerical criteria implementation to protect fish and wildlife propagation from toxicity will be employed for temperature implementation in lakes. This mixing zone is defined to extend 100 feet into the lake from the source.

(c) Temperature implementation does not apply to privately owned cooling water reservoirs. Such reservoirs are specifically exempted in OAC 785:45-5-12(f)(2)(F) from implementation of temperature criteria to protect aquatic life. However, implementation of the antidegradation policy includes a maximum temperature (52°C) which applies to all waters of the state including privately owned cooling water reservoirs. Privately owned cooling water reservoirs, however, that demonstrate no reasonable potential to exceed the antidegradation temperature shall not be limited in permits by such temperature.

(d) All calculations to implement temperature criteria shall be done in °C at critical temperature conditions.”

APPLICABLE TEMPERATURES

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-11-2. Applicable temperatures

(a) **General.** OAC 785:45-5-12(f)(2) governs what the applicable temperature criteria are.

(b) Habitat limited and warm water aquatic community.

(1) In waters which are designated in OAC 785:45 to be Habitat Limited Aquatic Community and/or Warm Water Aquatic Community, no heat of artificial origin shall be added that causes the receiving water to exceed the critical temperature plus 2.8°C outside the mixing zone.

(2) The temperature criterion for Habitat Limited Aquatic Community and/or Warm Water Aquatic Community, T_c , is the critical temperature plus 2.8°C. In the absence of data, T_c is 32.24°C. Where data exist, the critical temperature is the higher of 29.44°C or the seven-day maximum temperature likely to occur with a 50% probability each year, 7T2. The 7T2 is calculated using a moving average of seven consecutive days for each year in a given record. These seven day receiving stream temperature values are ranked in descending order. An order number, m , is calculated based on the number of years of record, n , with a recurrence interval of 2 years, as $m = (n+1)/2$. The m^{th} highest average temperature is the 7T2. Provided, in the segment of the Arkansas River from Red Rock Creek to the headwaters of Keystone Reservoir, the maximum temperature outside the mixing zone shall not exceed 34.4°C.

(3) To implement the temperature criterion for Habitat Limited Aquatic Community and/or Warm Water Aquatic Community protection, the critical temperature also is the regulatory ambient temperature, T_a .

(c) Cool water aquatic communities. In waters designated in OAC 785:45 to be Cool Water Aquatic Community, T_c is 28.9°C. To be consistent with implementation for warm water and habitat limited aquatic communities, the regulatory ambient temperature must be 2.8°C less than T_c . Therefore, $T_a = 26.1^\circ\text{C}$ for cool water aquatic communities.

(d) Trout fisheries. In waters designated in OAC 785:45 to be Trout Fishery, no artificial heat shall be added such that the temperature in the receiving water exceeds 20°C outside the mixing zone. However, water temperatures regularly reach in excess of 20°C in Oklahoma's summers. When background levels exceed this criterion, the effluent level should equal the criterion. Therefore, the wasteload allocation for trout fisheries is 20°C."

REGULATORY FLOWS

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-11-3. Regulatory flows

- (a) Regulatory receiving stream flow to protect the Fish and Wildlife Propagation beneficial use, Q_{is} , is the greater of the 7Q2 or 1 cfs. Q_{is} is assumed to be 1 cfs if the 7Q2 is unknown.
- (b) The regulatory effluent flow, Q_e , is defined as the highest monthly averaged flow over the past two years for industrial discharges with adequate data. Q_e is the design flow for other dischargers."

REASONABLE POTENTIAL

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-11-5. Reasonable potential

A permit limit for temperature is required if there is a reasonable potential that the temperature increase at the edge of the mixing zone is greater than 2.8°C. EPA Region 6 uses a reasonable potential factor to determine if there is a reasonable potential that concentration of a given substance will exceed the criterion. An analogous reasonable potential factor, T_f , will be used to determine if there is a reasonable potential that temperature will exceed the criterion by 2.8°C at the edge of the mixing zone. T_f is determined such that only approximately 5% of the observed temperatures are higher. Therefore, T_f is the upper 95th percentile of the effluent temperature distribution."

REASONABLE POTENTIAL EQUATIONS

The following excerpt of the 2001 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

“785:46-11-6. Reasonable potential equations

(a) The maximum temperature difference on the mixing zone boundary must be computed using the following equation to determine if there is a reasonable potential to exceed 2.8°C outside the mixing zone:

$$\therefore T' = (T_f - T_a) / df.$$

The dilution factor, df, must be that which yields the maximum temperature difference on the mixing zone boundary.

(b) Substituting for df, the following equations shall be used for discharges to streams:

$$T' = (1.94Q^* (T_f - T_a)) / (1 + Q^*)$$

when Q^* is less than or equal to 0.1823, or

$$T' = (T_f - T_a) / (6.17 - 15.51Q^*)$$

when Q^* is greater than 0.1823 and less than 0.3333, or

$$T' = T_f - T_a$$

when Q^* is greater than or equal to 0.3333. $Q^* = Q_e/Q_u$ (the dilution capacity).

(c) The following equations shall be used for discharges to lakes:

$$T' = (D(T_f - T_a)) / 20.15$$

when D is greater than or equal to 3 feet. D is pipe diameter, and

$$T' = (W^{1/2}(T_f - T_a)) / 4.2$$

when W is greater than or equal to 3 feet. W is canal width.

(d) There is a reasonable potential that the effluent may cause a criterion exceedance at the maximum concentration on the mixing zone boundary if $T' > 2.8^\circ\text{C}$.

IMPLEMENTATION OF DISSOLVED OXYGEN CRITERIA TO PROTECT FISH AND WILDLIFE PROPAGATION

INTRODUCTION

This document sets forth the implementation procedure by which the State of Oklahoma regulates point source discharges so that such discharges are conducted in accordance with the dissolved oxygen criteria as specified in the Oklahoma WQS for fish and wildlife protection. The process for developing monthly average and daily maximum permit limits is described elsewhere in this document.

APPLICABILITY AND SCOPE

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-19-1. Applicability and scope

Rules in this Subchapter are designed to implement the criteria for dissolved oxygen prescribed in OAC 785:45 Appendix G Table 1 for protection of the beneficial use of Fish and Wildlife Propagation."

REGULATORY FLOWS

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-19-2. Regulatory flows

- (a) The flow in the receiving stream, Q_u , shall be deemed to be the greater of the 7Q2 or 1 cfs. If the 7Q2 is unknown, then Q_u shall be deemed to be 1 cfs.
- (b) For industrial dischargers with adequate data as determined by the permitting authority, the effluent flow, Q_e , shall be deemed to be the highest monthly averaged flow over the previous two years. For all other discharges, the effluent flow shall be deemed to be the design flow."

REASONABLE POTENTIAL DETERMINATION

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

-"785:46-19-3. Reasonable potential determination

- (a) A permit limit for oxygen demanding substances is required if there is a reasonable potential that the dissolved oxygen criteria will not be satisfied. Such a reasonable potential is demonstrated whenever an existing discharger proposes to increase the concentration of oxygen demanding substances, a new discharge of oxygen demanding substances is created, or a receiving waterbody is reclassified to a subcategory of the Fish and Wildlife Propagation beneficial use with a more stringent dissolved oxygen criterion.
- (b) The permitting authority may base its determination of the reasonable potential upon meeting the dissolved oxygen standard at the applicable seasonal 7Q2 and at the applicable seasonal temperatures."

ANTIDEGRADATION IMPLEMENTATION PROCEDURES FOR THE OKLAHOMA WATER QUALITY STANDARDS

WHAT IS ANTIDEGRADATION?

Antidegradation is a policy and implementation procedure whose goal is to prevent clean water from becoming degraded. It is deeply entrenched in both Federal Regulation and state law. Antidegradation concepts first appeared in Oklahoma's WQS in the late 1960s.

Antidegradation is one of the minimum elements required of a state's WQS. From the Federal perspective, antidegradation forms a three level, pyramidal, protection scheme, which states at its basic level, (termed Tier I) that all existing uses of the Nation's waters shall be maintained and protected. Examples of this level in Oklahoma include the North Canadian River, the Red River, the Washita River, and most of our streams and rivers.

At the second level (Tier II) there is a recognition that some of the Nation's waters are better in quality than that needed to merely support beneficial uses. Those waters, termed "high quality waters" under federal law, are to be maintained and protected (unless a lowering of water quality is needed to accommodate important social or economic development). Examples of this level in Oklahoma include the Blue River in Johnston County, Sallisaw Creek, Honey Creek and thirty-nine other waterbodies.

The third level (Tier III), referred to as "Outstanding National Resource Waters", are essentially the same as high quality waters except that there is no allowance for the lowering of water quality for any reason. This level in Oklahoma is called "Outstanding Resource Waters (ORW)" and includes the legislatively set "Scenic Rivers" and their watersheds. Examples would be the Illinois River, Lee Creek, and the Upper Mountain Fork River.

In Oklahoma, this scheme has been altered because of interpretation of the Oklahoma Pollution Remedies Act by the Oklahoma Attorney General. These alterations will be discussed in more depth later in this report.

BACKGROUND

Oklahoma's WQS are reviewed and amended every three years in fulfillment of Clean Water Act requirements set forth in 40 CFR 131.1. During the 1991 triennial revision, the Antidegradation Implementation portion of the Standards was modified to allow differential levels of protection which parallel the three levels discussed below. These modifications were carried forward in the 1994 triennial revision and remain in Oklahoma's WQS (OAC 785:45-3-2).

In general, these modifications follow the U.S. EPA tiered protection scheme. This establishes:

- Tier I All waters must maintain existing or designated beneficial uses. In Oklahoma, these beneficial uses include Fish and Wildlife Propagation, Public and Private Water Supply, Emergency Water Supply, Agriculture, Hydroelectric Power, Municipal and Industrial Process Cooling Water, Primary Body Contact Recreation, Secondary Body Contact Recreation, Navigation, and Aesthetics. Specific language reads: "No water quality degradation which will interfere with the attainment or maintenance of an existing or designated beneficial use shall be allowed" (Code Section 785:45-3-2(c)).
- Tier II Certain Oklahoma waters possess existing water quality which exceeds that necessary to maintain beneficial uses. Water Quality must be maintained at these higher levels. These waters are designated with the High Quality Water (HQW) limitation in Appendix A. Specific language reads: "It is recognized that certain waters of the state possess existing

water quality which exceeds those levels necessary to support propagation of fishes, shellfishes, wildlife, and recreation in and on the water. These high quality waters shall be maintained and protected" (785:45-3-2(b)).[Note: Federal guidelines allow that water quality of High Quality Waters may be lowered to that required to maintain beneficial uses if necessary for social or economic development. However, based upon a 1985 Oklahoma Attorney General opinions (No. 85-87 and 84-124), water quality in Oklahoma cannot be lowered for social or economic reasons.]

Tier III Select Oklahoma waters represent exceptional resources which are protected with the most stringent level of protection afforded any water, that of "no degradation". These waters are designated with the Outstanding Resource Water (ORW) limitation.

Specific language reads: "Certain waters of the state constitute an outstanding resource or have exceptional recreational and/or ecological significance. These exceptional waters include streams designated "Scenic River" or "ORW" in Appendix A, and waters of the State located within watersheds of Scenic Rivers. Additionally, these may include waters located within National and State parks, forests, wilderness areas, wildlife management areas, and wildlife refuges, and waters which contain species listed pursuant to the federal Endangered Species Act as described in 785:45-5-25(c)2(A). No degradation of water quality shall be allowed in these waters" (Code Section 785:45-3-2(a)).

Thus, this pyramidal protection system establishes baseline protection to all waters of the state (beneficial use maintenance), more protection to a subset of the state's waters called high quality waters, and the highest level of protection to those waters with exceptional ecological and/or recreational significance.

To be truly useful for water quality management, however, these concepts must be implemented into the state's water management scheme. These "Implementation Policies for the antidegradation policy statement" are located in Part 5 of the Oklahoma WQS. In addition, implementation documents promulgated under OAC 785:46 contain further procedures for implementation of the Antidegradation policy.

Implementation of Oklahoma's Antidegradation Policy has been found in Oklahoma's WQS since 1973. Initially, certain waters were given additional protection by restricting point source discharges. This concept was initiated with a footnote of "a" in Appendix A of the WQS. This "little a" restriction applied to approximately 150 waters. Additionally, 96 areas were listed in Appendix B which received this level of protection. From 1973 to 1988 there was no differential classification of "a" waters or differential protection applied to them. In 1988, water classes were developed which specify the reason for additional protection. Then, in 1991, specific protection strategies were assigned to the existing classes. These protective strategies were continued in the 1994 Oklahoma WQS. Implementation documents for the Antidegradation policy were also promulgated in 1994 under OAC 785:46-13.

Although specific protection methods are now applied to different classes of Oklahoma waters, and a comprehensive policy has been developed, Antidegradation implementation will never be totally completed. Because of advances in science, changing public policy, and legal modifications, Antidegradation Implementation procedures will require constant updating. It is certainly possible that during each triennial revision, the Oklahoma WQS will see a refinement of Antidegradation and its companion implementation policy. It is also possible that implementation documents for the Antidegradation policy promulgated under OAC 785:46 will undergo periodic revision.

Antidegradation has a long history in Oklahoma's WQS. For clarity, these past revisions will not be described. Only the current Oklahoma WQS Antidegradation Policy and Implementation procedures will be discussed.

IMPLEMENTATION OF OKLAHOMA'S ANTIDegradATION POLICY

GENERALIZED PROTECTION NARRATIVES

TIER I WATERS (BENEFICIAL USE PROTECTION)

WQS utilize both narrative and numerical criteria to protect designated beneficial uses. These statements and values are rooted in both policy and science, and provide maximum concentrations (levels) which do not impair recreation, aquatic life or affect human health in or on the water. These may be found in Part 3, Rule 785:45-5-10 through 785:45-5-20 of the Oklahoma WQS.

For example, numerical criteria to protect aquatic life were developed using concentrations, which are lethal to 50% of the test organisms (LC50s). Then using statistical methods, a value was calculated which is protective of Oklahoma's aquatic life. A narrative statement is also incorporated into the Standards, which prohibits acute toxicity to all waters of the state and chronic toxicity to all waters outside the mixing zone.

Body Contact Recreation is protected through maximum concentrations of bacteria (E. coli, fecal coliform or Enterococci) and a narrative statement, which prohibits pathogenic organisms. The aesthetics beneficial use utilizes a series of "free froms", including scum, foam, objectionable bottom deposits, etc.

These narrative expressions and numerical criteria are effective when applied in water quality based permits or other regulatory activities to protect the beneficial uses assigned to Oklahoma waters in Appendix A of the WQS. Subchapter 5, Part 3 and Appendix G of the Oklahoma WQS establish narrative and numerical criteria to protect existing and designated beneficial uses of all waters of the state.

TIER II AND III WATERS

Rule 785:45-3-2 "Applications of Antidegradation Policy" highlights which of Oklahoma's Tier II and Tier III waters may receive protection beyond that established for the protection of beneficial uses.

In general, the method that Tier II (High Quality) and Tier III (Outstanding) waters receive specific protection is given in Rule 785:45-5-25 of the Oklahoma WQS. This Rule outlines special protection provisions applicable to High Quality Waters (HQW), Appendix B areas, Sensitive Public and Private Water Supplies (SWS) and Outstanding Resource Waters (ORW).

It is the goal of Part 5 of the WQS to allow Oklahoma to maintain high and outstanding water quality in select waters.

The following policy gives specific standards language and clarifying language found in Subchapters 3 and 5. It will outline:

- (1) where and when point source discharges will and will not be allowed
- (2) which Oklahoma waters will receive additional protection
- (3) when these protection measures will be applied, and
- (4) outline non-point source pollution control strategies applicable to each water.

SUBCHAPTER 3, APPLICATIONS OF ANTIDegradATION POLICY

OKLAHOMA WATER QUALITY STANDARDS LANGUAGE

Please consult the Oklahoma WQS for actual statutory language.

GUIDANCE AND CLARIFYING LANGUAGE

Paragraph (a), Application to Outstanding Resource Waters, contains language which identifies special protection waters. Specifically, it specifies that "ORW" waters are only those designated with an "ORW" designation in Appendix A of the Oklahoma WQS. These include all legislatively designated "Scenic Rivers", and their watersheds. Language in the third sentence of this paragraph reconveys ORW status only to selected waters as described which are specifically listed as "ORW" in Appendix A of the Oklahoma WQS.

Paragraph (b), Application to High Quality Waters, contains language which identifies that water quality in waters which possess existing water quality that exceeds that necessary to support beneficial uses, must be maintained and protected.

Paragraph (c), Application to beneficial uses, establishes baseline beneficial use protection. Specific protection levels to assure beneficial use protection may be found throughout the WQS in the form of narrative and numerical criteria. If a beneficial use is designated for a specific waterbody in Appendix A of the WQS, criteria necessary to maintain that beneficial use shall be implemented.

Paragraph (d), Application to improved waters, requires that as the water quality of the state's waters improve, that level of improved water quality must be maintained and protected.

SUBCHAPTER 5, PART 5, IMPLEMENTATION POLICIES FOR THE ANTIDegradation Policy STATEMENT

OKLAHOMA WQS LANGUAGE

Please consult the Oklahoma WQS for actual statutory language.

GUIDANCE AND CLARIFYING LANGUAGE

Paragraph (a) contains language addressing discharges of stormwater in the various categories of protected waters. Note that permanent discharges from new sources of stormwater will not be allowed into ORW waters. Exceptions for discharges to ORW waters are given for existing sources of stormwater and from temporary construction activities. Both "existing point source discharge" and "stormwater" are defined in the definition section of the Standards (785:45-1-2).

Stormwater discharges (new, existing, permanent, and temporary) are not excluded in HQW, SWS, and Appendix B waters. Stormwater will be allowed in beneficial use waters as well, provided such stormwater discharges meet applicable permit restrictions.

Paragraph (b) introduces the concept of "specified pollutants" and defines this concept. Use of the term specified pollutants becomes more clear under the "High Quality Waters" (HQW) section and the "Sensitive Public and Private Water Supply" (SWS) section. The concept of specified pollutants does not apply to ORW or Appendix B waters.

OUTSTANDING RESOURCE WATERS (ORW) PROTECTION

Paragraph (c)(1) contains language which identifies additional protection methods for Outstanding Resource Waters. Paragraph (c)1(A) re-establishes which waters receive ORW protection.

Paragraph (c)(1)(B) contains language which emphasizes that Outstanding Resource Waters are "prohibited from having any new point source discharge of any pollutant, or increased load of any pollutant from existing point source discharge(s)." The definition section of the Oklahoma WQS defines the terms "pollutant" and "existing point source discharge". "Existing Point Source Discharge" has been previously defined. "Pollutant" is defined as:

"Pollutant" means any material, substance or property which may cause pollution.

Language contained in (c)(1)(B) (i), (ii), and (iii) specifies which waters receive ORW protection.

In effect, this ties all "ORW" protection to a requirement that it be designated as "ORW" in Appendix A [of the Oklahoma WQS].

APPENDIX B WATERS PROTECTION

Appendix B waters receive ORW status only when they are specifically listed as ORW in Appendix A. This may occur for several reasons, but the ORW designation must occur in Appendix A to receive ORW protection.

Paragraph (c)(2) outlines provisions for those Appendix B waters not designated ORW. The Oklahoma WQS include language which provides variable protection to Appendix B waters. This was necessary because all waters listed in Appendix B are not alike with respect to their "ecological and recreational" significance (such as endangered species protection, canoeing recreation, scenic beauty, waterfowl refuge, or wildlife refuge). Therefore, there was a need to broaden the scope of permit review to allow consideration of each Appendix B area's specific ecological attributes. Within this context, areas such as the Glover River should receive a high level of protection in order to protect the threatened leopard darter (*Percina pantherina*). It also has very high water quality with canoeing recreation occurring throughout much of its length. Conversely, other areas, such as a wildlife management area, may contain marshes and swamps managed for waterfowl, where pristine nutrient levels would not be desirable. The intent is to allow the review of discharge applications against each Appendix B area's specific ecological or recreational attributes to ensure an area's "ecological or recreational integrity" is maintained.

Therefore, (c)(2)(C) allows new discharges or increased loading from existing discharges to Appendix B waters under such conditions that ensure that the recreational and ecological significance of these waters will be maintained.

Discharge limitation requirements for Appendix B waters apply only to those discharges located within the boundaries of the Appendix B areas. Discharges located outside of Appendix B area boundaries must maintain beneficial uses. They may be considered for Appendix B limitation application only if the discharge would compromise the recreational and ecological integrity of the Appendix B water. For example, a discharge to the Arkansas River 200 miles upstream of the Lake Eufaula Wildlife Management Area would be unlikely to affect wildlife resources of that area. However, if the discharge is located within the boundaries of the area, wildlife impacts would be much more likely. This is not to say that such a discharge would not be allowed, but that it would require a higher level of scrutiny than a similar discharge outside the area.

HIGH QUALITY WATERS (HQW) PROTECTION

Paragraph (c)(3)(A) contains language defining High Quality Waters. This language is expanded in (c)(3)(B), which provides that new point source discharges or increased loads of specified pollutants from existing point source discharges may be allowed (subject to

approval by the OWRB) if the level of water quality (which exceeds that level needed for beneficial use attainment) is maintained and improved. This change was made to HQWs to conform with the Antidegradation Policy. Only an increased load of specified pollutants, as defined in 785:45-5-25(b), may be allowed into HQWs. However, no discharge of any pollutant to a water designated HQW may lower existing water quality.

It should be remembered that "Water Quality" is defined in the Oklahoma WQS as "physical, chemical, and biological characteristics of water which determine diversity, stability, and productivity of the climax biotic community or affect human health".

SENSITIVE PUBLIC AND PRIVATE WATER SUPPLIES (SWS) PROTECTION

Paragraph (c)(4) describes limitations for additional protection to SWS waters. SWS waters are specifically designated in Appendix A of the Oklahoma WQS. Sensitive Public and Private Water Supplies do not follow the strict Antidegradation restrictions of the other waters with limitations for additional protection. Rather, they may be assigned to small municipal water supply impoundments where there is a high potential for contamination. To protect these waters, discharge controls similar to antidegradation limitations are applied.

Specifically, these waterbodies (or watersheds as stipulated in Appendix A) "are prohibited from having any new point source discharge(s) of any pollutant or increased load of specified pollutants from existing point source discharge(s), provided however that new point source discharge(s) or increased load of specified pollutants ... may be approved by the Board in those circumstances where the discharger can demonstrate to the satisfaction of the Board that a new point source discharge or increased load from an existing point source discharge will not lower water quality of either the direct receiving water or downstream waterbodies designated SWS" (Rule 785:45-5-25(c)(4)(B)). This language and rationale follows that previously discussed for HQWs.

It must be stressed that the "SWS" limitation is not a true component of the pyramidal protection scheme manifest through Antidegradation Implementation. This is because it incorporates water quality restrictions to protect an existing sensitive drinking water supply, not necessarily water quality. Therefore, although SWS waters utilize the HQW method of restricting degradation, the reason for this restriction is not to maintain "water quality", but to protect a sensitive surface water supply. It also maintains the HQW policy of prohibiting (or severely restricting) point source discharges into SWS waters and/or watersheds.

PRIORITIZATION OF LIMITATIONS

Rule 785:45-5-25(c)(5) establishes that where more than one beneficial use limitation (i.e.: ORW, Appendix B, HQW or SWS) exists for a waterbody, the more stringent limitation applies. This follows logic similar to all water quality criteria.

NONPOINT SOURCE POLLUTION

Non-point source pollution represents the dominant portion of the Nation's existing surface water pollution problem. Figure 9 and Figure 10 illustrate nonpoint source pollution impacts upon the nation's lakes and rivers.

Although it is recognized that nonpoint source pollution is a major contributor of pollution, control measures have been difficult to implement. In an effort to begin to deal with this nonpoint source dilemma, Rule 785:45-5-25(c)(6) establishes that, in addition to the best management practices requested for all waters of the state, conservation plans are required in sub-watersheds where discharges from non-point sources are identified as causing, or

significantly contributing to, degradation in a waterbody designated "ORW" in Appendix A [of the Oklahoma WQS].

This conservation plan requirement in existing or suspected degraded sub-watersheds, was inserted into the 1991 Oklahoma WQS, and continued in the 1994 Oklahoma WQS. It was done in an effort to formally address areas where non-point sources of pollutants are adversely affecting water quality.

CULTURALLY SIGNIFICANT WATERS

Paragraph c(7) contains language describing Culturally Significant Waters. CSWs are identified by recognized Tribal authorities as critical to maintaining the waters' utility for cultural, historic, recreational or ceremonial uses. These waters may require more stringent protection measures to protect human health or aquatic life or both. All activities associated with a CSW may require consultation with the duly authorized Tribal authority to assure that the proposed activity is consistent with applicable Tribal environmental laws.

PHOSPHORUS CRITERION FOR SCENIC RIVERS

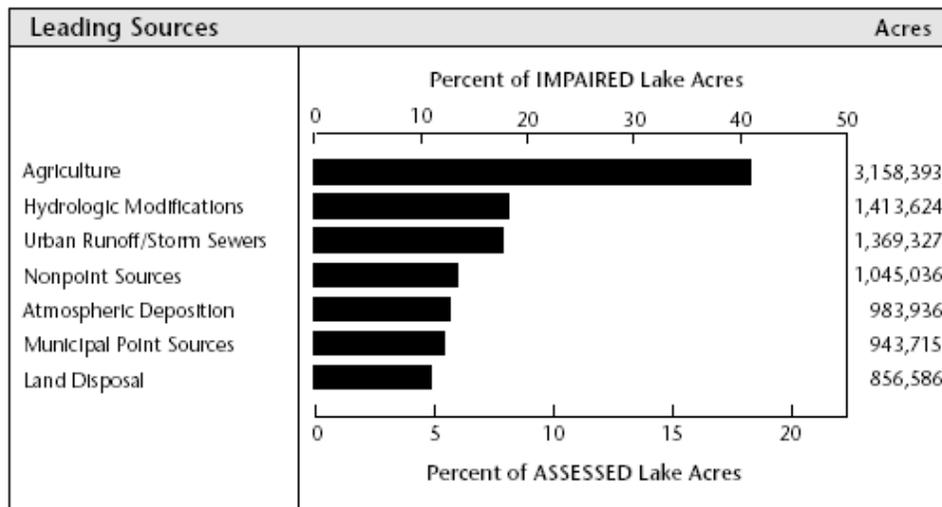
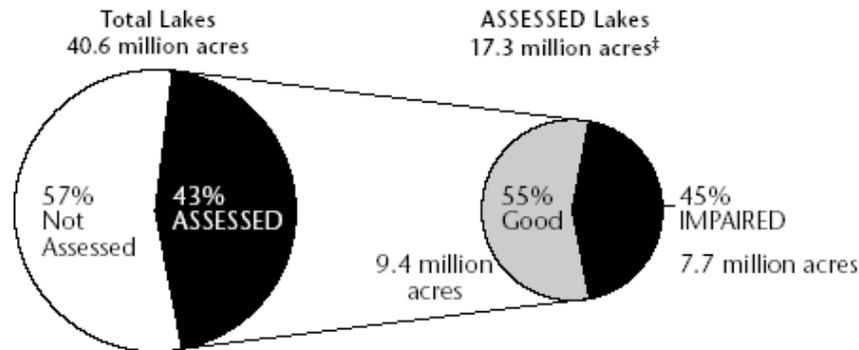
Paragraph (d) provides for a numerical criterion for phosphorus on waters designated Scenic Rivers. The criterion states that the 30-day geometric mean total phosphorus concentration shall not exceed .037 mg/L in these waters, and that this level will be fully implemented within 10 years.

INDUSTRIAL WASTELOAD EVALUATION IMPLEMENTATION PROCEDURE FOR STREAMS AND RIVERS

Implementation procedures for oxygen demanding discharges associated with industrial discharges is addressed in another section of this document.

FIGURE 9: IMPAIRMENT SOURCES OF SURVEYED LAKE ACRES IN THE NATION

Leading SOURCES of Lake Impairment* †



States assessed 43% of the total acres of lakes, reservoirs, and ponds for the 2000 report. The larger pie chart on the left illustrates this proportion. The smaller pie chart on the right shows that, for the subset of assessed waters, 55% are rated as good and 45% as impaired. When states identify waters that are impaired, they also describe the sources of pollutants associated with the impairment. The bar chart presents the leading sources and the number of lake, reservoir, and pond acres impacted. The percent scales on the upper and lower x-axes of the bar chart provide different perspectives on the magnitude of the impact of these sources. The lower axis compares the acres impacted by the source to the total ASSESSED acres. The upper axis compares the acres impacted by the source to the total IMPAIRED acres.

Based on data contained in Appendix B, Table B-5.

* Eleven states did not include the effects of statewide fish consumption advisories when reporting the pollutants and sources responsible for impairment. Therefore, certain pollutants and sources, such as metals and atmospheric deposition, may be underrepresented.

† Excluding unknown, natural, and "other" sources.

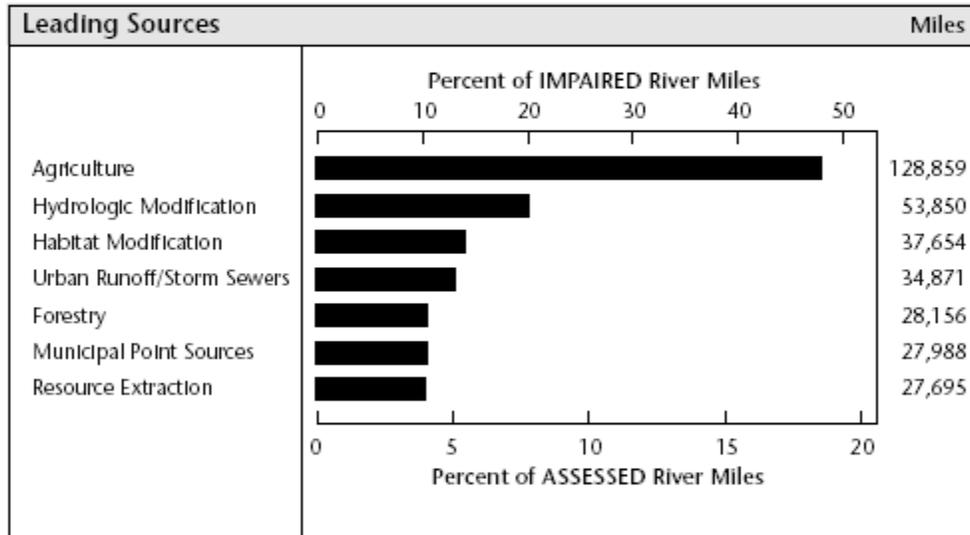
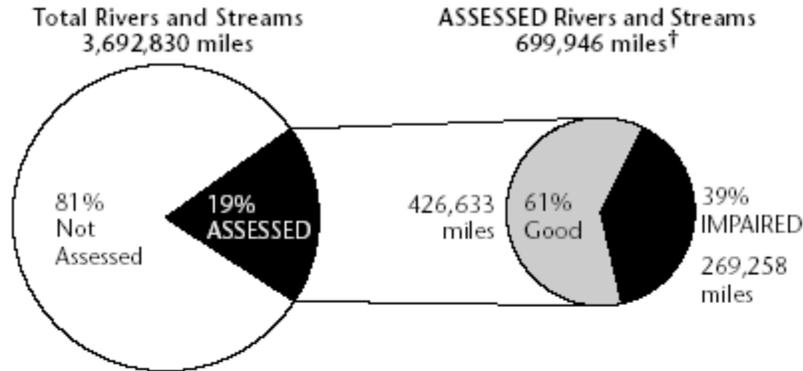
‡ Includes acres assessed as not attainable.

Note: Percentages do not add up to 100% because more than one pollutant or source may impair a lake.

SOURCE: 2000 U.S. EPA National Water Quality Inventory

FIGURE 10: IMPAIRMENT SOURCES OF SURVEYED RIVER MILES IN THE NATION

Leading SOURCES of River and Stream Impairment*



States assessed 19% of the total miles of rivers and streams for the 2000 report. The larger pie chart on the left illustrates this proportion. The smaller pie chart on the right shows that, for the subset of assessed waters, 61% are rated as good and 39% as impaired. When states identify waters that are impaired, they also describe the sources of pollutants associated with the impairment. The bar chart presents the leading sources and the number of river and stream miles they impact. The percent scales on the upper and lower x-axes of the bar chart provide different perspectives on the magnitude of the impact of these sources. The lower axis compares the miles impacted by the source to the total ASSESSED miles. The upper axis compares the miles impacted by the source to the total IMPAIRED miles.

Based on data contained in Appendix A, Table A-5.

*Excluding unknown and natural sources.

†Includes miles assessed as not attainable.

Note: Percentages do not add up to 100% because more than one pollutant or source may impair a river segment.

SOURCE: 2000 U.S. EPA National Water Quality Inventory

CHAPTER 46, SUBCHAPTER 13, IMPLEMENTATION OF ANTIDegradation POLICY

Implementation of Oklahoma's antidegradation policy is further developed in OAC Title 785, Chapter 46, "Implementation of Oklahoma's Water Quality Standards," Subchapter 13, "Implementation of Antidegradation Policy."

APPLICABILITY AND SCOPE

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-13-1. Applicability and scope

- (a) The rules in this Subchapter provide a framework for implementing the antidegradation policy stated in OAC 785:45-3-2 for all waters of the state. This policy and framework includes three tiers, or levels, of protection.
- (b) The three tiers of protection are as follows:
 - (1) Tier 1. Attainment or maintenance of an existing or designated beneficial use.
 - (2) Tier 2. Maintenance or protection of High Quality Waters and Sensitive Public and Private Water Supply waters.
 - (3) Tier 3. No degradation of water quality allowed in Outstanding Resource Waters.
- (c) In addition to the three tiers of protection, this Subchapter provides rules to implement the protection of waters in areas listed in Appendix B of OAC 785:45. Although Appendix B areas are not mentioned in OAC 785:45-3-2, the framework for protection of Appendix B areas is similar to the implementation framework for the antidegradation policy.
- (d) In circumstances where more than one beneficial use limitation exists for a waterbody, the most protective limitation shall apply. For example, all antidegradation policy implementation rules applicable to Tier 1 waterbodies shall be applicable also to Tier 2 and Tier 3 waterbodies or areas, and implementation rules applicable to Tier 2 waterbodies shall be applicable also to Tier 3 waterbodies.
- (e) Publicly owned treatment works may use design flow, mass loadings or concentration, as appropriate, to calculate compliance with the increased loading requirements of this section if those flows, loadings or concentrations were approved by the Oklahoma Department of Environmental Quality as a portion of Oklahoma's Water Quality Management Plan prior to the application of the ORW, HQW or SWS limitation."

DEFINITIONS

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-13-2. Definitions

The following words and terms, when used in this Subchapter, shall have the following meaning, unless the context clearly indicates otherwise:

"Specified pollutants" means

- (A) Oxygen demanding substances, measured as Carbonaceous Biochemical Oxygen Demand (CBOD) and/or Biochemical Oxygen Demand (BOD);
- (B) Ammonia Nitrogen and/or Total Organic Nitrogen;
- (C) Phosphorus;
- (D) Total Suspended Solids (TSS); and
- (E) Such other substances as may be determined by the Oklahoma Water Resources Board or the permitting authority."

TIER 1 PROTECTION; ATTAINMENT OR MAINTENANCE OF AN EXISTING OR DESIGNATED BENEFICIAL USE

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-13-3. Tier 1 protection; attainment or maintenance of an existing or designated beneficial use

(a) **General.**

- (1) Beneficial uses which are existing or designated shall be maintained and protected.
- (2) The process of issuing permits for discharges to waters of the state is one of several means employed by governmental agencies and affected persons which are designed to attain or maintain beneficial uses which have been designated for those waters. For example, Subchapters 3, 5, 7, 9 and 11 of this Chapter are rules for the permitting process. As such, the latter Subchapters not only implement numerical and narrative criteria, but also implement Tier 1 of the antidegradation policy.

(b) **Thermal pollution.** Thermal pollution shall be prohibited in all waters of the state.

Temperatures greater than 52 degrees Centigrade shall constitute thermal pollution and shall be prohibited in all waters of the state.

(c) **Prohibition against degradation of improved waters.** As the quality of any waters of the state improves, no degradation of such improved waters shall be allowed."

TIER 2 PROTECTION; MAINTENANCE AND PROTECTION OF HIGH QUALITY WATERS AND SENSITIVE WATER SUPPLIES

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-13-4. Tier 2 protection; maintenance and protection of High Quality Waters and Sensitive Water Supplies

(a) **General rules for High Quality Waters.** New point source discharges of any pollutant after June 11, 1989, and increased load or concentration of any specified pollutant from any point source discharge existing as of June 11, 1989, shall be prohibited in any waterbody or watershed designated in Appendix A of OAC 785:45 with the limitation "HQW". Any discharge of any pollutant to a waterbody designated "HQW" which would, if it occurred, lower existing water quality shall be prohibited. Provided however, new point source discharges or increased load or concentration of any specified pollutant from a discharge existing as of June 11, 1989, may be approved by the permitting authority in circumstances where the discharger demonstrates to the satisfaction of the permitting authority that such new discharge or increased load or concentration would result in maintaining or improving the level of water quality which exceeds that necessary to support recreation and propagation of fishes, shellfishes, and wildlife in the receiving water.

(b) **General rules for Sensitive Public and Private Water Supplies.** New point source discharges of any pollutant after June 11, 1989, and increased load of any specified pollutant from any point source discharge existing as of June 11, 1989, shall be prohibited in any waterbody or watershed designated in Appendix A of OAC 785:45 with the limitation "SWS". Any discharge of any pollutant to a waterbody designated "SWS" which would, if it occurred, lower existing water quality shall be prohibited. Provided however, new point source discharges or increased load of any specified pollutant from a discharge existing as of June 11, 1989, may be approved by the permitting authority in circumstances where the discharger demonstrates to the satisfaction of the permitting authority that such new discharge or increased load will result in maintaining or improving the water quality in both the direct receiving water, if designated SWS, and any downstream waterbodies designated SWS.

(c) **Stormwater discharges.** Regardless of subsections (a) and (b) of this Section, point source discharges of stormwater to waterbodies and watersheds designated "HQW" and "SWS" may be approved by the permitting authority.

(d) **Nonpoint source discharges or runoff.** Best management practices for control of nonpoint source discharges or runoff should be implemented in watersheds of waterbodies designated "HQW" or "SWS" in Appendix A of OAC 785:45."

TIER 3 PROTECTION; PROHIBITION AGAINST DEGRADATION OF WATER QUALITY IN OUTSTANDING RESOURCE WATERS

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-13-5. Tier 3 protection; prohibition against degradation of water quality in outstanding resource waters

(a) **General.** New point source discharges of any pollutant after June 11, 1989, and increased load of any pollutant from any point source discharge existing as of June 11, 1989, shall be prohibited in any waterbody or watershed designated in Appendix A of OAC 785:45 with the limitation "ORW" and/or "Scenic River", and in any waterbody located within the watershed of any waterbody designated with the limitation "Scenic River". Any discharge of any pollutant to a waterbody designated "ORW" or "Scenic River" which would, if it occurred, lower existing water quality shall be prohibited.

(b) **Stormwater discharges.** Regardless of 785:46-13-5(a), point source discharges of stormwater from temporary construction activities to waterbodies and watersheds designated "ORW" and/or "Scenic River" may be permitted by the permitting authority. Regardless of 785:46-13-5(a), discharges of stormwater to waterbodies and watersheds designated "ORW" and/or "Scenic River" from point sources existing as of June 25, 1992, whether or not such stormwater discharges were permitted as point sources prior to June 25, 1992, may be permitted by the permitting authority; provided, however, increased load of any pollutant from such stormwater discharge shall be prohibited.

(c) **Nonpoint source discharges or runoff.** Best management practices for control of nonpoint source discharges or runoff should be implemented in watersheds of waterbodies designated "ORW" in Appendix A of OAC 785:45, provided, however, that development of conservation plans shall be required in sub-watersheds where discharges or runoff from nonpoint sources are identified as causing or significantly contributing to degradation in a waterbody designated "ORW".

(d) **LMFO's.** *No licensed managed feeding operation (LMFO) established after June 10, 1998 which applies for a new or expanding license from the State Department of Agriculture after March 9, 1998 shall be located...[w]ithin three (3) miles of any designated scenic river area as specified by the Scenic Rivers Act in 82 O.S. Section 1451 and following, or [w]ithin one (1) mile of a waterbody [2:9-210.3(D)] designated in Appendix A of OAC 785:45 as "ORW".*

PROTECTION OF APPENDIX B AREAS

The following excerpt of the 2004 version of OAC 785:46 is provided here for reference. Please consult the most recent version of OAC 785:46 for actual statutory language.

"785:46-13-6. Protection for Appendix B areas

(a) **General.** Appendix B of OAC 785:45 identifies areas in Oklahoma with waters of recreational and/or ecological significance. These areas are divided into Table 1, which includes national and state parks, national forests, wildlife area, wildlife management areas and wildlife refuges; and Table 2, which includes areas which contain threatened or endangered species listed as such by the federal government pursuant to the federal Endangered Species Act as amended.

(b) **Protection for Table 1 areas.** New discharges of pollutants after June 11, 1989, or increased loading of pollutants from discharges existing as of June 11, 1989, to waters within the boundaries of areas listed in Table 1 of Appendix B of OAC 785:45 may be approved by the permitting authority under such conditions as ensure that the recreational and ecological significance of these waters will be maintained.

(c) **Protection for Table 2 areas.** Discharges or other activities associated with those waters within the boundaries listed in Table 2 of Appendix B of OAC 785:45 may be restricted through agreements between appropriate regulatory agencies and the United States Fish and Wildlife Service. Discharges or other activities in such areas shall not substantially disrupt the threatened or endangered species inhabiting the receiving water.

(d) **Nonpoint source discharges or runoff.** Best management practices for control of nonpoint source discharges or runoff should be implemented in watersheds located within areas listed in Appendix B of OAC 785:45.”

CHAPTER 3

PERMITTING PROCEDURES

INTRODUCTION

The water quality provisions of the Oklahoma Environmental Quality Act (OEQA) provide that pollution of the waters of the state constitutes a menace to public health and welfare, creates public nuisances, is harmful to wildlife, fish and aquatic life, and impairs beneficial uses of water. It is therefore the public policy of this state to conserve the waters of the state and protect, maintain and improve the quality of such water for its legitimate beneficial uses. No waste or pollutant shall be discharged into any waters of the state or otherwise placed in a location likely to affect such waters without first being given the degree of treatment or taking such other measures as necessary to further the prevention, abatement and control of new or existing water pollution.

The primary mechanism used to control pollution from point source discharges to waters of the state is through the issuance of pollutant discharge permits. These permits may include schedules of compliance and other such conditions to prevent, control or abate pollution. They include such water-quality related and technology-based effluent limitations as are necessary to protect the water quality and existing and designated beneficial uses of the waters of the state. A sound basis for development of these effluent limitations is important to assure the permit is both reasonable and protective of waters of the state.

DEVELOPING EFFLUENT LIMITATIONS

Developing an effluent limitation in a permit is a multi-step process. The first step involves assuring that a certain minimum level of treatment is provided for a particular pollutant or category of pollutant. This is usually established through effluent limitation guidelines (ELGs) promulgated at 40 CFR Parts 400-499 for industrial dischargers, or through the definition of secondary treatment promulgated at 40 CFR Part 133 for municipal dischargers; unless more stringent state requirements apply. ODEQ has promulgated a more stringent definition of secondary treatment at OAC 252:605-5-4. In those cases where there are no ELGs available for a particular pollutant or industrial category the permit writer may use Best Professional Judgment (BPJ) in establishing a site-specific technology-based limitation.

The second step involves comparing the monthly average technology-based limit developed in the first step to applicable water quality standards requirements. A more stringent, site-specific water quality-based limit for a particular pollutant may be required to protect the water quality of the receiving water. The more stringent of the monthly average technology-based or monthly average water quality-based limit, along with its associated weekly average or daily maximum limit, as appropriate, is used in the permit. For the purpose of comparing technology-based concentration limits with water quality-based concentration limits for industries where the technology-based loading limits are production-based, the permit writer should calculate loading limit-equivalent concentrations using long-term average effluent flow as the flow basis.

TECHNOLOGY-BASED REQUIREMENTS

The OEQA provides that the Environmental Quality Board shall have the power and duty to promulgate rules implementing or effectuating the Oklahoma Pollutant Discharge Elimination System (OPDES) Act. Such rules may incorporate by reference any applicable rules, regulations and policies of the EPA adopted under the CWA. Such rules shall be in reasonable accord with the EPA regulations and policies, including rules which allow the inclusion of technology-based effluent limitations in discharge permits to the extent necessary to protect the designated and existing beneficial uses of the waters of the state and to comply with the requirements of the CWA. In addition, they include rules, which establish pretreatment standards and apply, in permits, applicable national standards of performance pursuant to Section 306 of the CWA.

Regulations promulgated by the DEQ at OAC 252:605-1-5 adopt by reference the majority of 40 CFR Part 125 (Criteria and Standards for the National Pollutant Discharge Elimination System). The regulations adopted by reference include Criteria and Standards for Imposing Technology-Based Treatment

Requirements under Sections 301(b) and 402 of the Act, Criteria for Extending Compliance Dates for Facilities Installing Innovative Technology under Section 301(k) of the Act, Criteria and Standards for Determining Fundamentally Different Factors under Sections 301(b)(1)(A), 301(b)(2)(A) and (E) of the Act, Criteria for Determining Alternative Effluent Limitations under Section 316(a) of the Act, Criteria Applicable to Cooling Water Intake Structures under Section 316(b) of the Act, Criteria for Extending Compliance Dates under Section 301(I) of the Act, and Criteria and Standards for Best Management Practices Authorized under Section 304(e) of the Act.

In general, these regulations require that technology-based treatment requirements under section 301(b) of the Act represent the minimum level of control that must be imposed in a permit issued under section 402 of the Act. Permits must contain the following technology-based treatment requirements:

- For POTWs, effluent limitations based upon secondary treatment, and the best practicable waste treatment technology.
- For dischargers other than POTWs:
 1. Effluent limitations based on the best practicable control technology currently available (BPT);
 2. For conventional pollutants, effluent limitations based on the best conventional pollutant control technology (BCT); and
 3. For all toxic pollutants, and all pollutants which are neither toxic nor conventional, effluent limitations based on the best available technology economically achievable (BAT).

Technology-based treatment requirements may be imposed in permits by either application of EPA promulgated ELGs to dischargers by category or subcategory, or on a case-by-case basis to the extent that EPA promulgated ELGs are not applicable, or by a combination of these methods. Technology-based treatment requirements are applied prior to or at the point of discharge. They cannot be satisfied through the use of "non-treatment" techniques such as flow augmentation and in-stream mechanical aerators. However, these techniques may be considered as a method of achieving water quality standards on a case-by-case basis when the technology-based treatment requirements are not sufficient to meet the standards, the discharger agrees to waive any opportunity to request a variance under section 301(c), (g), or (h) of the Act, and the discharger demonstrates that such a technique is the preferred environmental and economic method to achieve the standards after consideration of alternatives such as advanced waste treatment, recycle and reuse, land disposal, changes in operating methods, and other available methods. Technology-based effluent limitations may also be established for solids, sludge, filter backwash, and other pollutants removed in the course of treatment or control of wastewater in the same manner as for other pollutants.

EFFLUENT LIMITATION GUIDELINES (ELGs)

Regulations promulgated by the ODEQ at OAC 252:605-1-5 also adopt by reference all of 40 CFR Parts 401-471 (Effluent Guidelines and Standards). This regulation prescribes effluent limitations guidelines for existing sources, standards of performance for new sources and pretreatment standards for new and existing sources pursuant to the Clean Water Act. The ELGs include the following categories:

- Asbestos manufacturing point source category (Part 427)
- Aluminum forming point source category (Part 467)
- Battery manufacturing point source category (Part 461)
- Canned and preserved fruits and vegetables processing point source category (Part 407)
- Canned and preserved seafood processing point source category (Part 408)
- Carbon black manufacturing point source category (Part 458)

Cement manufacturing point source category (Part 411)
Centralized waste treatment point source category (Part 437)
Coal mining point sources category (Part 434)
Coil coating point source category (Part 465)
Copper forming point source category (Part 468)
Dairy products processing point source category (Part 405)
Electroplating point source category (Part 413)
Electrical and electronic components point source category (Part 469)
Explosives manufacturing point source category (Part 457)
Feedlots point source category (Part 412)
Ferroalloy manufacturing point source category (Part 424)
Fertilizer manufacturing point source category (Part 418)
Glass manufacturing point source category (Part 426)
Grain mills point source category (Part 406)
Gum and wood chemicals manufacturing point source category (Part 454)
Hospital point source category (Part 460)
Ink formulating point source category (Part 447)
Inorganic chemical manufacturing point source category (Part 415)
Iron and steel manufacturing point source category (Part 420)
Landfills point source category (Part 445)
Leather tanning and finishing point source category (Part 425)
Meat products point source category (Part 432)
Metal finishing point source category (Part 433)
Metal molding and casting point source category (Part 464)
Mineral mining and processing point source category (Part 436)
Nonferrous metals forming/metal powders point source category (Part 471)
Nonferrous metals manufacturing point source category (Part 421)
Oil and gas extraction point source category (Part 435)
Ore mining and dressing point source category (Part 440)
Organic chemicals, plastics, and synthetic fibers category (Part 414)
Paint formulating point source category (Part 446)
Paving and roofing materials (tars and asphalt) point source category (Part 443)
Pesticide chemicals point source category (Part 455)
Petroleum refining point source category (Part 419)
Pharmaceutical manufacturing point source category (Part 439)
Phosphate manufacturing point source category (Part 422)
Photographic point source category (Part 459)
Plastics molding and forming point source category (Part 463)
Porcelain enameling point source category (Part 466)
Pulp, paper, and paperboard point source category (Part 430)
Rubber manufacturing point source category (Part 428)
Soap and detergent manufacturing point source category (Part 417)
Steam electric power generating point source category (Part 423)
Sugar processing point source category (Part 409)
Textile mills point source category (Part 410)
Timber products processing point source category (Part 429)
Transportation equipment cleaning point source category (Part 442)
Waste combustors point source category (Part 444)

TREATMENT LEVELS

The ELGs include limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT), the best conventional pollutant control technology (BCT), the best available technology economically achievable (BAT), new source performance standards (NSPS), pretreatment standards for new sources (PSNS) and pretreatment standards for existing sources (PSES). These technology-based

limits consider the category of industry that produces the pollutant. Thus, the regulations take into account the specific factors unique to a particular type of industry (manufacturing process, type and quantity of pollutants generated, types of treatment facilities available to treat the pollutants, etc.). In using this approach, the regulations remove any economic advantage based upon pollution control for similar categories of industry. In theory, for example, a pulp and paper mill on the west coast of the U.S. would be required to meet the same BCT pollution controls for sulfate as an identical plant located on the east coast (unless there were special site-specific water quality concerns which had to be addressed).

These treatment levels were originally required under the CWA in a phased approach for existing industries. BPT was originally required by July 1, 1977 and applies to conventional, non-conventional, and toxic pollutants from all industries discharging wastes to waters of the U.S. BCT was originally required by July 1, 1984 and applies only to the discharge of conventional pollutants. BAT was also originally required by July 1, 1984 and applies to non-conventional and toxic pollutants. It is important to note that BPT represents the average of the best existing waste treatment performance within each industry category or subcategory. Thus, in most cases for conventional and non-conventional pollutants, BCT and BAT levels of treatment were found to be no more stringent than the old BPT levels and therefore, in many cases, BPT may equal BCT or BAT. In other words, the best practicable treatment may also be the best available treatment. However, BAT levels for many toxic pollutants have been added to the guidelines, where no such requirements previously existed under the BPT requirements.

Conventional pollutants include Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Fecal Coliform, pH, and Oil & Grease. Toxic pollutants are those defined in Section 307(a)(1) of the CWA and include:

- Acenaphthene
- Acrolein
- Acrylonitrile
- Aldrin/Dieldrin
- Antimony and compounds
- Arsenic and compounds
- Asbestos
- Benzene
- Benzidine
- Beryllium and compounds
- Cadmium and compounds
- Carbon tetrachloride
- Chlordane (technical mixture and metabolites)
- Chlorinated benzenes (other than di-chlorobenzenes)
- Chlorinated ethanes (including 1,2-di-chloroethane, 1,1,1-trichloroethane, and hexachloroethane)
- Chloroalkyl ethers (chloroethyl and mixed ethers)
- Chlorinated naphthalene
- Chlorinated phenols (other than those listed elsewhere; includes trichlorophenols and chlorinated cresols)
- Chloroform
- 2-Chlorophenol
- Chromium and compounds
- Copper and compounds
- Cyanides
- DDT and metabolites
- Dichlorobenzenes (1,2-, 1,3-, and 1,4-di-chlorobenzenes)
- Dichlorobenzidine
- Dichloroethylenes (1,1-, and 1,2-dichloroethylene)
- 2,4-Dichlorophenol

Dichloropropane and dichloropropene
 2,4-Dimethylphenol
 Dinitrotoluene
 Diphenylhydrazine
 Endosulfan and metabolites
 Endrin and metabolites
 Ethylbenzene
 Fluoranthene
 Haloethers (other than those listed elsewhere; includes chlorophenylphenyl ethers, bromophenylphenyl ether, bis(dichloroisopropyl) ether, bis-(chloroethoxy) methane and polychlorinated diphenyl ethers)
 Halomethanes (other than those listed elsewhere; includes methylene chloride, methylchloride, methylbromide, bromoform, dichlorobromomethane)
 Heptachlor and metabolites
 Hexachlorobutadiene
 Hexachlorocyclohexane
 Hexachlorocyclopentadiene
 Isophorone
 Lead and compounds
 Mercury and compounds
 Naphthalene
 Nickel and compounds
 Nitrobenzene
 Nitrophenols (including 2,4-dinitrophenol, dinitrocresol)
 Nitrosamines
 Pentachlorophenol
 Phenol
 Phthalate esters
 Polychlorinated biphenyls (PCBs)
 Polynuclear aromatic hydrocarbons (including benzanthracenes, benzopyrenes, benzofluoranthene, chrysenes, dibenz-anthracenes, and indenopyrenes)
 Selenium and compounds
 Silver and compounds
 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)
 Tetrachloroethylene
 Thallium and compounds
 Toluene
 Toxaphene
 Trichloroethylene
 Vinyl chloride
 Zinc and compounds

Non-conventional pollutants are those which do not fall under either of the above categories and include parameters such as Chemical Oxygen Demand, Total Organic Carbon, Color, etc.

CATEGORIZATION/SUBCATEGORIZATION

In order to properly use and apply effluent guidelines information, a determination must first be made as to what industrial category is applicable to the facility under consideration. The subcategory must then be determined. This is primarily done using the Standard Industrial Classification (SIC) Code. Usually the SIC Code will determine the appropriate category. However, in some cases the plants do not fall into a single category and then a single subcategory. In this regard it is helpful not to place the plant into a category or subcategory, but rather find all those categories under which the plant falls. By using a process of elimination by either classifying the categories as "not applicable" or "possibly applicable" the proper categorization

can be made. In those cases where multiple categories and subcategories are applicable, the final effluent limitation may be calculated by the summation of individual production and loading rates.

PRODUCTION

Most effluent limitation guidelines are expressed in terms of allowable pollutant discharge rate per unit of production rate. To determine permit limits, these standards are multiplied by the facility's production rate. In most cases, where production is constant from day to day and month to month, the average production rate is used to calculate limitations. In practice, production rates vary because of market factors, maintenance, product changes, down times, breakdowns, and facility modifications. In those cases where the production rate of a facility varies with time, the value used to calculate limits should be based on a reasonable measure of the actual production rate that is expected to exist during the term of the permit.

The use of a limited amount of production data in estimating the production for a specific facility should be avoided. For example, the data from a particular month may be unusually high and thus lead to the derivation of an effluent limitation, which is not actually reflective of the normal plant operations. Effluent limitation guidelines already account for variations, which occur within long-term production rates. The use of too short a time frame in the calculation of production based limitations for a specific industrial facility may lead to "double accounting" of the variability factors. The objective in determining a production estimate for a facility is to develop a single estimate of the long-term average production rate (in terms of mass of product per day), which can reasonably be expected to prevail during the term of the permit.

ALTERNATE LIMITS

If production rates are expected to change significantly during the life of the permit, the permit can include alternate limits. These alternate limits would become effective when production exceeds a threshold value, such as during seasonal production variations. Typically, alternate limits are developed when changes in production exceed 50%. Alternate limits should be used only after careful consideration and only when a substantial increase or decrease in production is likely to occur.

MASS AND CONCENTRATION LIMITS

Most of the technology-based effluent limitations for industrial facilities are expressed in terms of allowable mass (in units of pounds or kilograms) of pollutant per day. In order to encourage the proper operation of the treatment facility at all times, equivalent concentration limits should usually be included in the permit. This is also helpful in tracking plant performance to compare treatment efficiencies with those indicated in treatability manuals for a particular type of waste. In determining applicable effluent concentration limitations, the monthly average and daily maximum mass loading limits divided by the long term average effluent flow will generally provide concentrations, which are appropriate.

In certain instances, the use of concentration limits may be counterproductive since they may discourage the use of innovative techniques such as water conservation. Likewise, in some instances it is inappropriate to express limitations in terms of mass. This includes limitations for pH, temperature, radiation, or where the mass of the pollutant cannot be related to a measure of operation and permit conditions insure that dilution will not be used as a substitute for treatment. For example, in those cases where storm water discharges are commingled with process water discharges, use of mass loading limitations for those pollutants present only in the storm water is most likely inappropriate. Special requirements and conditions may be required to insure adequate treatment is provided those pollutants present in the process stream as well as in the storm water stream. The applicability of concentration limits should therefore be a case-by-case determination based upon the best professional judgment of the permit writer.

OTHER ELG CONSIDERATIONS

Development documents should be utilized to confirm that proper categorization and sub-categorization has been determined for a particular facility. In addition, information provided in the development document can sometimes be used to determine if an appropriate treatment technology or other control measures are being used at a facility. For example, the development document may indicate that a particular treatment is the recognized BPT treatment technology for a particular subcategory, and that BAT treatment consists of the existing BPT technology plus in-plant control measures or additional end-of-pipe treatment. The choice of whether to institute in-plant control measures (e.g., water reuse, water reduction through conservation, chemical substitution, segregation of waste streams, etc.) or provide additional treatment is ultimately up to the facility to decide. However, the regulatory requirements associated with a particular course of action should be considered during permit development and may affect selection of the most appropriate course of action.

In some cases toxic pollutants are specifically regulated through effluent guidelines for a particular category and subcategory of facility. Other toxic pollutants may be present in the discharge at low levels or at levels difficult to quantify because of the difficulty of performing lengthy and expensive analytical procedures. Information in the development documents can be used to determine when this may be a concern. In some cases an indicator pollutant, such as TSS, is sometimes used to effectively control toxic pollutant levels even though the toxic substances are not expressly regulated by numerical limitations. Where conventional pollutants are used as indicator pollutants for toxic pollutants, BAT limitations for these pollutants have been established to assure installation and performance of waste treatment technology that is adequate for the removal of toxic pollutants.

Sludge management is another topic usually addressed in the development document for a particular point source category. In some cases, existing sludge management practices may be of particular concern for a particular industrial subcategory. Special conditions addressing sludge management may be warranted in the permit in this case. However, because of the wide range in production, types of handling systems, and processing these special conditions are specific to a particular facility and should be developed on a case-by-case basis by selecting from among the variety of alternatives that are available.

BEST PROFESSIONAL JUDGEMENT (BPJ)

For non-categorical industries, or where there are no ELGs for a particular pollutant or industrial subcategory the permit drafter may use Best Professional Judgment (BPJ) in establishing a site-specific technology-based limitation. BPJ is defined as the highest quality technical opinion developed by a permit writer after consideration of all reasonably available and pertinent data or information, which forms the basis for the terms and conditions of an NPDES permit. BPJ allows the permit writer considerable flexibility in establishing permit terms and conditions. However, inherent in this flexibility is the burden on the permit writer to show that his/her BPJ is based on sound engineering analysis. The determination of a permit condition is subject to challenge by the permittee and/or the public, and, if unresolved through negotiation between the parties, may be the subject of an evidentiary hearing or other legal challenge. Therefore, the need for the permit condition and the basis for its establishment should be clearly defined and documented.

BEST POLLUTANT CONTROL TECHNOLOGY CURRENTLY AVAILABLE (BPT) REQUIREMENTS

In setting BPT limitations on a case-by-case basis, the permit drafter must consider certain factors, including:

- 1) the age of equipment and facilities involved,
- 2) the process employed,
- 3) the engineering aspects of the application of various types of control techniques,
- 4) process changes,
- 5) non-water quality environmental impact (including energy requirements), and
- 6) the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application.

BEST CONVENTIONAL POLLUTANT CONTROL TECHNOLOGY (BCT) REQUIREMENTS

In setting BCT limitations on a case-by-case basis, the permit drafter must consider certain factors, including:

- 1) the age of equipment and facilities involved,
- 2) the process employed,
- 3) the engineering aspects of the application of various types of control techniques,
- 4) process changes,
- 5) non-water quality environmental impact (including energy requirements),
- 6) the reasonableness of the relationship between the costs of attaining a reduction in effluent and the effluent reduction benefits derived, and
- 7) the comparison of the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class or category of industrial sources.

BEST AVAILABLE TECHNOLOGY ECONOMICALLY ACHIEVABLE (BAT) REQUIREMENTS

In setting BAT limitations on a case-by-case basis, the permit drafter must consider certain factors, including:

- 1) the age of equipment and facilities involved,
- 2) the process employed,
- 3) the engineering aspects of the application of various types of control techniques,
- 4) process changes,
- 5) non-water quality environmental impact (including energy requirements), and
- 6) the cost of achieving such effluent reduction.

OTHER BPJ CONSIDERATIONS

Case-by-case limitations may be expressed, where appropriate, in terms of toxicity (e.g., “the fathead minnow acute LC₅₀ of the effluent from outfall 001 shall be > 100%”). However, it must be shown that the limits reflect the appropriate requirements (for example, technology-based or water-quality based standards) of the Act.

A technically sound and reasonable permit is not likely to be successfully challenged by the permittee or a third party. In this context, "technically sound" permit conditions means that the conditions are achievable with existing technology and "reasonable" means they are achievable at a cost which is affordable by the facility. Historically, some of the other factors such as age, process employed, and non-water quality impacts have assumed lesser importance than the technical and economic feasibility (technically sound and reasonable) tests.

SECONDARY TREATMENT REQUIREMENTS

MECHANICAL PLANTS

- (1) For facilities discharging to perennial streams, a monthly average of 30 mg/L BOD₅ and 30 mg/L TSS shall be considered secondary treatment. A CBOD₅ of 25 mg/L is considered to be equivalent to a BOD₅ of 30 mg/L.
- (2) For discharges to intermittent streams (those with 7-day, 2-year, low flow of zero), a monthly average of 20 mg/L BOD₅ and 30 mg/L TSS shall be considered secondary treatment. A CBOD₅ of 18 mg/L is considered to be equivalent to a BOD₅ of 20 mg/L.

LAGOON SYSTEMS

For discharges where treatment is solely provided by lagoons, a monthly average of 30 mg/L BOD₅ (25 mg/L CBOD₅) and 90 mg/L TSS shall be considered secondary treatment whether the discharge is to a perennial or an intermittent stream. This is not applicable to a discharge to a lake.

DISCHARGES TO LAKES

A discharge to a lake is defined as any discharge from a point source, which is either a direct discharge into a lake, or within five river miles upstream of the conservation pool of any lake. A lake is considered to be an impoundment of the waters of the state, which exceeds fifty acre-feet in volume, which either:

- is owned or operated by a unit of government,
- appears in Oklahoma's Clean Lakes Inventory, or
- is a privately-owned lake which has beneficial uses similar to those of publicly-owned or operated lakes.

For all discharges to lakes, a monthly average of 20 mg/L BOD₅ and 30 mg/L TSS shall be considered secondary treatment. A CBOD₅ of 18 mg/L is considered to be equivalent to a BOD₅ of 20 mg/L.

WATER QUALITY BASED REQUIREMENTS

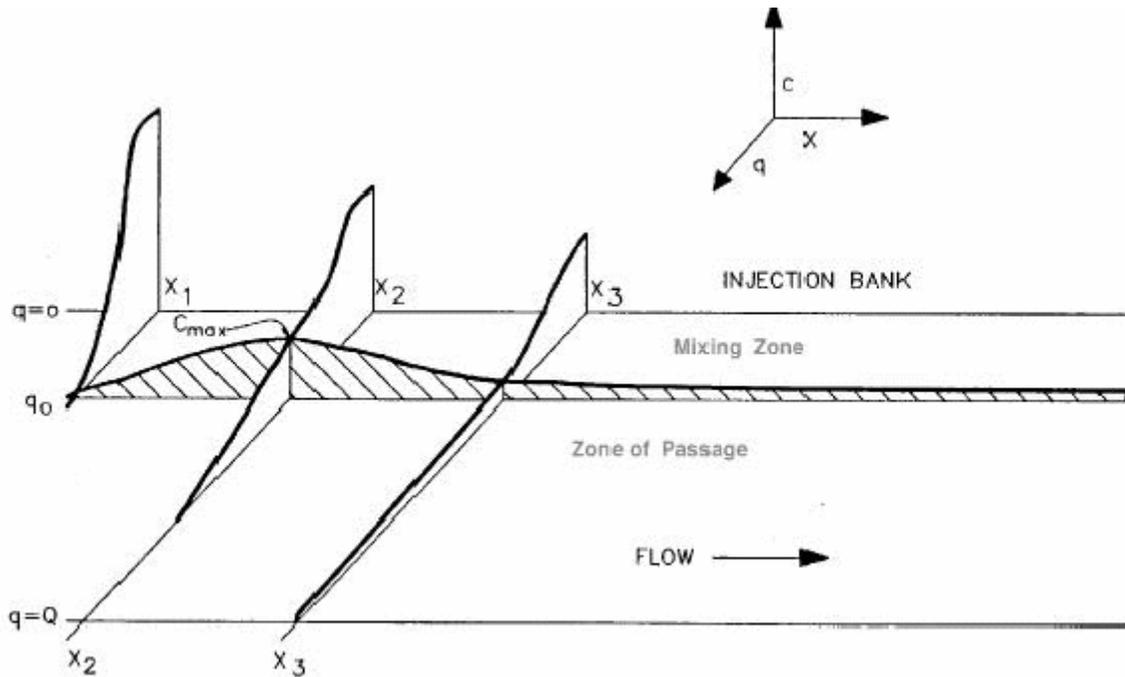
Any discharge to waters of the state must meet the requirements of Oklahoma's Water Quality Standards (OWQS), as amended. Water quality standards have three components: designated uses, narrative and numerical criteria to protect those uses, and an antidegradation policy. The following sections describe the strategy used to assure that a discharge meets the requirements of these standards.

MIXING ZONE REQUIREMENTS

The OWQS define mixing zone and zone of passage requirements for discharges to streams. These mixing zone requirements vary depending on the designated beneficial use. Mixing zone equations to implement these requirements are defined at OAC 785:46. Temperature and chronic toxicity criteria for toxic substances for the Fish and Wildlife Propagation use are applied at the edge of a mixing zone which ensures a zone of passage of 75% of the stream flow. Acute toxicity criteria for the Fish and Wildlife Propagation use are applied at the edge of an acute toxicity mixing zone, the extent of which is a function of the discharge's concentration divided by its waste load. All other criteria are applied after complete mixing. Figure 11 below illustrates the temperature and chronic toxicity mixing zone and zone of passage for a river bank outfall point source discharge into a stream. If a discharger uses a diffuser at their outfall such that complete mixing is achieved instream, permit limits could be calculated using a complete-mix mass balance model. Documentation showing size, geometry, etc., and/or an instream study may be required to confirm complete mixing.

Mixing zones in lakes are designated on a case-by-case basis. However, for permitting purposes for numerical chronic toxicity criteria, a mixing zone is defined to extend a radius of 100 feet from the source. The Fischer model for pipe discharges and the Fischer variation for canals is used to perform the wasteload evaluation for these pollutants.

FIGURE 11: MIXING ZONE AND ZONE OF PASSAGE FOR A RIVER BANK OUTFALL POINT SOURCE DISCHARGE



REASONABLE POTENTIAL EVALUATION

An effluent limit shall be developed and placed in a permit when a discharge has reasonable potential to exceed an applicable water quality criterion. This evaluation will be based upon meeting a particular numerical or narrative water quality criterion under regulatory effluent and receiving stream flow and concentration conditions. If the receiving stream is a tributary to a waterbody with different beneficial uses and water quality criteria, those uses and criteria will also be maintained. In cases where multiple criteria apply to a pollutant, the criterion resulting in the most stringent monthly average limit shall be used as the basis for the pollutant's permit limits.

Factors to be considered when evaluating the potential for a discharge to exceed water quality criteria include the following:

- expected upstream pollutant concentrations and/or loading
- expected effluent pollutant concentration and/or loading
- mixing zone requirements
- overlapping impacts from multiple discharges and/or dischargers

Reasonable potential evaluations are specific to the type of designated use to be protected: fish and wildlife propagation, fish consumption, public and private water supplies, agriculture (livestock and irrigation), body contact recreation, and waterbody aesthetics at a minimum unless otherwise designated in the OWQS. In addition, they must also consider OWQS antidegradation requirements

for waterbodies designated as outstanding resource waters (ORW), high quality waters (HQW), sensitive water supplies (SWS), or waters of particular ecological or recreational significance.

REASONABLE EXPECTATION EVALUATION

The first step in performing a reasonable potential evaluation involves determining if a pollutant can reasonably be expected to be present in the effluent as a result of processes or operations at the facility. This generally requires an in-depth review of processes and operations performed at a facility. An inventory of raw materials, products, treatment chemicals, and additives should be performed to establish the quantity and presence of regulated pollutants and their tendency to be discharged in a stream.

A pollutant can reasonably be expected to be present in the effluent from a facility if ELGs for that pollutant are applicable to discharges from that facility, the pollutant is used as a raw material in a process, created as a final product or by-product, or added during treatment of wastewater. Reasonable expectation can also be met if the facility concentrates naturally occurring pollutants in process operations (such as recirculated cooling water) or wastewater treatment operations (leaching from process vessels).

For those facilities, which do not concentrate naturally occurring pollutants in process operations (such as in once-through cooling water) reasonable expectation is not met if the effluent pollutant level does not exceed one standard deviation from the mean of the influent pollutant level. The influent and effluent level should be calculated consistent with the type of reasonable potential evaluation.

EFFLUENT SAMPLING PROCEDURES

COMPOSITE SAMPLING

Composite sampling must be utilized where effluent characteristics may reasonably be expected to vary over a 24-hour period. Such composite samples shall consist of at least 12 effluent portions collected at equal time intervals and combined proportional to flow. At the discretion of the permitting authority, samples from discharges with overlapping mixing zones may be combined in proportion to the flow from each outfall. Combining of discharges with overlapping mixing zones will be allowed only if it is reasonable to expect that each discharge contains the pollutant(s) of concern in some measure. Where it is apparent that one discharge will merely serve to dilute the other, combining of such discharges will be disallowed. If the discharge is from a lagoon with a retention time greater than 24 hours and it is reasonable to assume that the contents of the lagoon are well mixed (i.e., not subject to plug flow), composite samples may not be necessary. The permitting authority may determine that a grab sample of the discharge is sufficient.

GRAB SAMPLING

Where grab sampling is required, or where it is permitted as described in (a) above, it must be collected within a 15-minute window.

SAMPLE COLLECTION, HANDLING, AND ANALYSIS

Collection, preservation, shipment, storage and analysis of samples shall be accomplished in accordance with EPA-approved methods at 40 CFR Part 136.

EFFLUENT AND RECEIVING WATER DATA SET ANALYSIS

An important step in performing a reasonable potential evaluation is to assure that data used to characterize effluent and receiving water quality is defensible and is representative of the critical conditions associated with a particular water quality criterion. DEQ implementation criteria for effluent characterization are described at OAC 252:690-3-1 through 3-9. DEQ implementation criteria for receiving water (background) characterization are described at OAC 252:690-3-1, 3-2 and 3-10 through 3-16.

Nonrepresentative data or data determined to be inappropriate should not be used in the evaluation process. Examples of such situations include: data points representing statistical outliers, data collected prior to significant changes in inputs or processes, inappropriate laboratory or method QA/QC, use of a non-certified laboratory, use of unapproved sampling and/or analytical methods, and insufficient analytical sensitivity (detection levels higher than prescribed minimum quantification levels, or MQLs). In general, data will not be discarded without first requiring the submission of new data which is more appropriate, more representative and/or of higher quality.

MINIMUM QUANTIFICATION LEVELS (MQLs)

Table 2 lists MQLs developed by EPA Region 6 for use in assessing acceptable analytical sensitivity. The MQL is defined as the lowest concentration at which a particular substance can be quantitatively measurable. Although the listed MQLs are the lowest concentrations required to be used in the calibration of a measurement system they are not necessarily the minimum acceptable sensitivity. They were chosen to be appropriate for a scan of all pollutants present in a discharge and do not represent the most sensitive analysis that may be achieved for a particular pollutant (volatile and semivolatile organics). If specific pollutants are known to be present and pose water quality concerns, the discharger should be required to analyze those pollutants by the most sensitive approved method available and determine a site-specific quantification level, which will be used in the reasonable potential evaluation.

For effluent and receiving water characterization purposes, where the data set reflects both measurable and unmeasurable quantities, an assumed value of one-half the reported level of sensitivity will be used for the unmeasurable quantities. In accordance with OAC 252:690-3-2, if a pollutant is reported as "nondetectable" with a level of sensitivity above the MQL, the permit writer will, if the facility does not provide additional analytical data at an appropriate level of sensitivity in a timely fashion, assume that the pollutant is present at the reported level of sensitivity.

TABLE 2: MINIMUM QUANTIFICATION LEVELS (MQLs)

Substance		µg/L	EPA Method
<i>Metals and Cyanide</i>			
Antimony	(Total) ¹	60	200.7
Arsenic	(Total) ¹	10	206.2
Beryllium	(Total) ¹	5	200.7
Cadmium	(Total) ²	1	213.2
Chromium	(Total) ¹	10	200.7
Chromium	(3+) ¹	10	200.7
Chromium	(6+) ¹	10	200.7
Copper	(Total) ²	10	220.2
Lead	(Total) ²	5	239.2
Mercury	(Total) ¹	0.2	245.1
Molybdenum	(Total) ⁹	30	200.7
Nickel	(Total) ¹ (Freshwater)	40	200.7

Substance		µg/L	EPA Method
Nickel	(Total) ² (Marine)	5	249.2
Selenium	(Total) ¹	5	270.2
Silver	(Total) ²	2	272.2
Thallium	(Total) ¹	10	279.2
Zinc	(Total) ¹	20	200.7
Cyanide	(Total) ¹	10	335.2
<i>Dioxin³</i>			
2,3,7,8-Tetrachloro-dibenzo-p-dioxin (TCDD)	0.00001		1613.0
<i>Volatile Compounds</i>			
Acrolein ⁴		50	624
Acrylonitrile ⁴		50	624
Benzene ⁴		10	624
Bromoform ⁵		10	624
Carbon Tetrachloride ⁵		10	624
Chlorobenzene ⁵		10	624
Chlorodibromomethane ⁵		10	624
Chloroethane ⁶		50	624
2-Chloroethyl vinyl ether ⁴		10	624
Chloroform ⁵		10	624
Dichlorobromomethane ⁵		10	624
1,1-Dichloroethane ⁵		10	624
1,2-Dichloroethane ⁵		10	624
1,1-Dichloroethylene ⁵		10	624
1,2-Dichloropropane ⁵		10	624
1,3-Dichloropropylene ⁵		10	624
Ethylbenzene ⁵		10	624
Methyl Bromide [Bromomethane] ⁶		50	624
Methyl Chloride [Chloromethane] ⁶		50	624
Methylene Chloride ⁵		20	624
1,1,2,2-Tetrachloroethane ⁵		10	624
Tetrachloroethylene ⁵		10	624
Toluene ⁵		10	624
1,2-trans-Dichloroethylene ⁵		10	624
1,1,1-Trichloroethane ⁵		10	624
1,1,2-Trichloroethane ⁵		10	624
Trichloroethylene ⁵		10	624
Vinyl Chloride ⁵		10	624
<i>Acid Compounds</i>			
2-Chlorophenol ⁵		10	625
2,4-Dichlorophenol ⁵		10	625
2,4-Dimethylphenol ⁷		10	625
4,6-Dinitro-o-Cresol [2 methyl 4,6-dinitrophenol] ⁸		50	625
2,4-Dinitrophenol ⁵		50	625
2-Nitrophenol ⁶		20	625
4-Nitrophenol ⁵		50	625
p-Chloro-m-Cresol [4 chloro-3-methylphenol] ⁵		10	625
Pentachlorophenol ⁵		50	625
Phenol ⁵		10	625
2,4,6-Trichlorophenol ⁵		10	625

Substance	µg/L	EPA Method
<i>Base/Neutral Compounds</i>		
Acenaphthene ⁵	10	625
Acenaphthylene ⁵	10	625
Anthracene ⁵	10	625
Benzidine ⁴	50	625
Benzo(a)anthracene ⁵	10	625
Benzo(a)pyrene ⁵	10	625
3,4-Benzofluoranthene ⁵	10	625
Benzo(ghi)perylene ⁶	20	625
Benzo(k)fluoranthene ⁵	10	625
Bis(2-chloroethoxy) methane ⁵	10	625
Bis(2-chloroethyl) ether ⁵	10	625
Bis(2-chloroisopropyl) ether ⁵	10	625
Bis(2-ethylhexyl) phthalate ⁵	10	625
4-Bromophenyl phenyl ether ⁵	10	625
Butyl benzyl phthalate ⁵	10	625
2-Chloronaphthalene ⁵	10	625
4-Chlorophenyl phenyl ether ⁵	10	625
Chrysene ⁵	10	625
Dibenzo (a,h) anthracene ⁶	20	625
1,2-Dichlorobenzene ⁵	10	625
1,3-Dichlorobenzene ⁵	10	625
1,4-Dichlorobenzene ⁵	10	625
3,3'-Dichlorobenzidine ⁶	50	625
Diethyl Phthalate ⁵	10	625
Dimethyl Phthalate ⁵	10	625
Di-n-Butyl Phthalate ⁵	10	625
2,4-Dinitrotoluene ⁵	10	625
2,6-Dinitrotoluene ⁵	10	625
Di-n-octyl Phthalate ⁵	10	625
1,2-Diphenylhydrazine ⁴	20	625
Fluoranthene ⁵	10	625
Fluorene ⁵	10	625
Hexachlorobenzene ⁵	10	625
Hexachlorobutadiene ⁵	10	625
Hexachlorocyclopentadiene ⁵	10	625
Hexachloroethane ⁶	20	625
Indeno (1,2,3-cd) pyrene ⁶ (2,3-o-phenylene pyrene)	20	625
Isophorone ⁵	10	625
Naphthalene ⁵	10	625
Nitrobenzene ⁵	10	625
N-nitrosodimethylamine ⁶	50	625
N-nitrosodi-n-propylamine ⁶	20	625
N-nitrosodiphenylamine ⁶	20	625
Phenanthrene ⁵	10	625
Pyrene ⁵	10	625
1,2,4-Trichlorobenzene ⁵	10	625
<i>Pesticides</i>		
Aldrin ⁷	0.05	608

Substance	µg/L	EPA Method
Alpha-BHC ⁷	0.05	608
Beta-BHC ⁷	0.05	608
Gamma-BHC (Lindane) ⁷	0.05	608
Delta-BHC ⁷	0.05	608
Chlordane ⁷	0.2	608
4,4'-DDT ⁷	0.1	608
4,4'-DDE (p,p-DDX) ⁷	0.1	608
4,4'-DDD (p,p-TDE) ⁷	0.1	608
Dieldrin ⁷	0.1	608
Alpha-endosulfan ⁷	0.1	608
Beta-endosulfan ⁷	0.1	608
Endosulfan sulfate ⁷	0.1	608
Endrin ⁷	0.1	608
Endrin aldehyde ⁷	0.1	608
Heptachlor ⁷	0.05	608
Heptachlor epoxide ⁷ (BHC-hexachlorocyclohexane)	0.05	608
PCB-1242 ⁷	1.0	608
PCB-1254	1.0	608
PCB-1221	1.0	608
PCB-1232	1.0	608
PCB-1248	1.0	608
PCB-1260	1.0	608
PCB-1016	1.0	608
Toxaphene ⁷	5.0	608

¹ CRDL

² Method 213.2, 239.2, 220.2, 272.2

³ Dioxin National Strategy

⁴ No CRQL established

⁵ CRQL basis, equivalent to ML

⁶ ML basis, higher than CRQL

⁷ CRQL basis, no ML established

⁸ CRQL basis, higher than ML

⁹ Based on 3.3 times IDL published in 40 CFR Part 136, Appendix C

DATA SET REQUIREMENTS FOR CALCULATING SUMMARY STATISTICS

EFFLUENT DATA

Arithmetic averages may be determined from whatever defensible effluent data is available. A log-normal distribution is assumed for the purpose of calculating summary statistics unless there is evidence to the contrary. Geometric means and other summary statistics (standard deviation and coefficient of variation) should only be determined where there is a sufficient number of measurable data points to do so. At least 10 data points, of which at least five are measurable, should be available for calculating geometric means and standard deviations. Where determinable, a geometric mean should always be used. Where individual data points are unavailable and/or where the detection level of unmeasurable data points is unknown and assumed to be one-half the MQL, an arithmetic mean may be substituted.

C₉₅, known as the 95th percentile maximum likelihood effluent concentration, is the effluent concentration used to determine whether a discharge demonstrates reasonable potential to exceed an applicable water quality criterion.

Where sufficient effluent data is available to calculate C_{95} directly from effluent data set

Where sufficient effluent data is available (at least 10 data points total), C_{95} is determined directly from the effluent data set as the inverse of the cumulative log-normal distribution function at a 95% probability according to the following equation.

$$C_{95} = \text{EXP} \left(\ln(x)_{\text{avg}} + 1.645 \times s_{\ln(x)} \right), \quad (21)$$

where $\ln(x)_{\text{avg}}$ is the arithmetic mean of the log-transformed effluent data set and $s_{\ln(x)}$ is the standard deviation of the log-transformed effluent data set.

The standard deviation of a log-transformed effluent data set is calculated according to Equation C-4.

$$s_{\ln(x)} = \sqrt{\frac{N \sum_{i=1}^N (\ln(x_i))^2 - \left(\sum_{i=1}^N \ln(x_i) \right)^2}{N(N-1)}}, \quad (22)$$

where N is the number of data points in the effluent data set.

The standard deviation of a log-transformed data set applies only to the transformed data set and cannot be translated back into an equivalent untransformed data set standard deviation, i.e.,

$$\text{EXP}(s_{\ln(x)}) \neq s_x. \quad (23)$$

Although not required for reasonable potential determination, the coefficient of variation (CV) must be calculated for use in determining water quality-based permit limitations should reasonable potential be demonstrated for a pollutant. The CV is calculated according to the following equation:

$$\text{CV} = \frac{s_x}{C_{e(\text{avg})}}, \quad (24)$$

where s_x is the standard deviation of the (untransformed) effluent data set.

The standard deviation of an untransformed effluent data set is calculated as follows:

$$s_x = \sqrt{\frac{N \sum_{i=1}^N (x_i^2) - \left(\sum_{i=1}^N x_i \right)^2}{N(N-1)}}, \quad (24)$$

where N is the number of data points in the effluent data set.

Where C_{95} must be estimated from the mean effluent concentration

Where less than 10 data points are available, C_{95} is estimated from the mean effluent concentration, $C_{e(\text{mean})}$, assuming a coefficient of variation (CV) of 0.6, according to the following equation for a log-normal distribution:

$$C_{95} = C_{e(\text{mean})} \times \text{EXP}\left(1.645 \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2)\right), \quad (26)$$

With the assumed CV value of 0.6, this equation reduces to

$$C_{95} = C_{e(\text{mean})} \times 2.135. \quad (27)$$

Degree of uncertainty inherent in small effluent data sets

The greater the size of an effluent data set, the greater the degree of certainty in characterizing its distribution. Conversely, as the size of a data set decreases, the degree of uncertainty inherent in characterizing its distribution increases. Below 10 data points the degree of uncertainty is sufficiently high as to warrant further examination. Consequently, additional effluent monitoring may be justified in some cases where the use of C_{95} , as estimated above using the mean effluent concentration, does not result in reasonable potential. As described in Section 3.3.2 of the Technical Support Document for Water Quality-Based Toxics Control, Publication No. EPA/505/2-90-001 (referred to hereafter as TSD), C_{95} may be estimated using the maximum observed effluent concentration, C_{max} , and the number of data points in the effluent data set. The TSD approach is used to determine whether there is sufficient cause to require further effluent monitoring and reassessment of reasonable potential. In order to distinguish between C_{95} values used for determining whether there is reasonable potential for the purpose of establishing water quality-based effluent limits from C_{95} values used for the purpose determining whether further effluent monitoring is justified, the term $C_{95(M)}$ is used for the latter.

For calculating $C_{95(M)}$, a log-normal distribution is assumed. Use of a 95% confidence level and a 95% probability basis results in the following equation for calculating $C_{95(M)}$:

$$C_{95(M)} = C_{e(\text{max})} \times \frac{\text{EXP}\left(1.645 \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2)\right)}{\text{EXP}\left(z_N \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2)\right)}, \quad (28)$$

where N is the number of data points, z_N is the upper 95th percentile of the normal distribution, and $CV=0.6$.

$$\text{Letting } \text{RPF}_{95(M)} = \frac{\text{EXP}\left(1.645 \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2)\right)}{\text{EXP}\left(z_N \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2)\right)}, \quad (29)$$

$$C_{95(M)} = C_{e(\text{max})} \times \text{RPF}_{95(M)}. \quad (30)$$

The following table lists the values of RPF_{95(M)} for values of N from 1 to 9:

N	RPF _{95(M)}
1	6.199
2	3.795
3	3.000
4	2.585
5	2.324
6	2.141
7	2.006
8	1.898
9	1.811

C_{95(M)} is used in the same manner as C₉₅ in the various reasonable potential equations. Section B.4.b in this chapter describes permitting requirements should the use of C_{95(M)} result in reasonable potential to exceed an applicable criterion.

RECEIVING WATER (BACKGROUND) DATA

With the exception of mineral constituents of agricultural significance (chlorides, sulfates and total dissolved solids), where no background data is available, the background concentration is assumed to be zero. Where determinable, a geometric mean should always be used. At least 10 data points, of which at least five are measurable, should be available for calculating geometric means. Where individual data points are unavailable and/or where the detection level of unmeasurable data points is unknown and assumed to be one-half the MQL, an arithmetic mean may be substituted.

In accordance with OAC 252:690-3-16, where background levels of chloride, sulfate and total dissolved solids are calculated from the yearly mean standards and sample standards published in Appendix F of the OWQS, the background level, C_b, is calculated as follows:

$$C_b = 2 \times C_{b(YMS)} - C_{b(SS)}, \quad (31)$$

where C_{b(YMS)} and C_{b(SS)} are the published YMS and SS criteria, respectively. Background levels of these mineral constituents are always expressed as arithmetic averages. Segment-averaged YMS and SS criteria, because they aggregate data over broad areas which potentially may have widely-varying characteristics, should be used only if data for the receiving water of concern or site-specific data are not available. Site-specific data, where available, are always preferred. Where permit limits for one of these mineral constituents are required in a permit, background monitoring is recommended to establish site-specific background characteristics prior to such limit going into effect.

EFFLUENT CHARACTERIZATION

Effluent quality and quantity characterization must be consistent with the type of reasonable potential evaluation. The number and type of effluent samples taken to characterize a particular pollutant should be consistent with the regulatory mixing zone and stream flow conditions associated with each applicable criterion. Specific factors to be considered include the frequency, duration, and magnitude of pollutant levels in the discharge.

NUMERICAL CRITERIA FOR THE PUBLIC AND PRIVATE WATER SUPPLY USE

RAW WATER COLUMN CRITERIA

Raw water column criteria are average values not to be exceeded instream. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

For municipal facilities, the regulatory effluent flow for raw water column criteria is the design flow of the facility.

For industrial facilities, the regulatory effluent flow for raw water column criteria is the highest 30-day average flow occurring in the most recent two year period of record. If a significant seasonal variability in flow is present, a seasonal regulatory effluent flow may be calculated for a particular season of the year. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

CRITERIA FOR THE PROTECTION OF HUMAN HEALTH FOR THE CONSUMPTION OF FISH FLESH AND WATER

Criteria to protect human health for the consumption of fish flesh and water are long term average values. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

For municipal facilities, the regulatory effluent flow for human health/fish flesh and water criteria is the design flow of the facility.

For industrial facilities, the regulatory effluent flow for human health/fish flesh and water criteria is the arithmetic mean of all measured effluent daily discharges using a period of record of not less than two years. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

NUMERICAL CRITERIA FOR FISH THE FISH AND WILDLIFE PROPAGATION USE

Aquatic toxicity and temperature criteria requirements are described in this section. Dissolved oxygen-based requirements are described in Section C of this Chapter.

ACUTE AND CHRONIC TOXICITY CRITERIA

Acute and chronic toxicity criteria for toxic substances are maximum values never to be exceeded instream. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

For municipal facilities, the regulatory effluent flow for acute toxicity criteria is the design flow of the facility.

For industrial facilities, the regulatory effluent flow for toxic substances is the highest 30-day average flow occurring in the most recent two year period of record. If a significant

seasonal variability in effluent flow is present, a seasonal regulatory effluent flow may be calculated for a particular season of the year. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

TEMPERATURE CRITERIA

Numerical criteria for temperature are mean values. For purposes of performing reasonable potential evaluations for temperature when there is a reasonable expectation that the effluent contains a significant thermal component, the expected effluent value is calculated, using a non-parametric method, as the maximum likelihood estimator of the upper 95th percentile, in degrees Celsius, of the effluent daily maximum temperature data set.

For municipal facilities, the regulatory effluent flow for the temperature criterion is the design flow of the facility.

For industrial facilities, the regulatory effluent flow for the temperature criterion is the highest 30-day average flow occurring in the most recent two year period of record. If a significant seasonal variability in effluent flow is present, a seasonal regulatory effluent flow may be calculated for a particular season of the year. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

NUMERICAL CRITERIA FOR THE AGRICULTURE USE

Numerical criteria listed at Appendix F of OAC 785:45 for mineral constituents (chlorides, sulfates and total dissolved solids) are statistical measures of ambient levels present in specified waterbody segments around the state during the period from October 1976 through September 1983. Some of the data is characteristic of a specific USGS monitoring station, and others are segment averages of measured values at individual stations. Where data was obtained at a specific monitoring station, the yearly mean standard (YMS) is defined as the arithmetic mean of that station's historical data plus one standard deviation above the mean. The sample standard (SS) is defined as the arithmetic mean of the station's historical data plus two standard deviations above the mean. Segment averaged data is used to evaluate reasonable potential unless data specific to the site in question or to an upstream or downstream segment of the waterbody in question is available. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

For municipal facilities, the regulatory effluent flow is the design flow of the facility.

For industrial facilities, the regulatory effluent flow used to implement the YMS criterion is the arithmetic mean of all measured effluent daily discharges using a period of record of not less than two years, while the regulatory effluent flow used to implement the SS criterion is the highest 30-day average flow occurring in the most recent two year period of record. If a significant seasonal variability in flow is present, a seasonal regulatory effluent flow may be calculated for use with the SS criterion for a particular season of the year. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

NUMERICAL CRITERIA FOR THE PRIMARY BODY CONTACT RECREATION USE

Numerical criteria for enteric bacteria (coliform bacteria, *Escherichia coli*, or *Enterococci*) are the geometric mean values never to be exceeded instream, and are applied during the “recreational” season of May 1 through September 30. Since the OWQS does not specify a mixing zone for enteric bacteria criteria, they are applied end-of-pipe. Therefore, reasonable potential is presumed to exist when there is a reasonable expectation that enteric bacteria are present in the effluent.

NUMERICAL CRITERIA FOR THE AESTHETICS USE

Numerical criteria for color are values never to be exceeded instream due to other than natural sources. For purposes of performing reasonable potential evaluations for color when there is a reasonable expectation that it is present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set, measured as "true" color.

For municipal facilities, the regulatory effluent flow is the design flow of the facility.

For industrial facilities, the regulatory effluent flow is the highest 30-day average flow occurring in the most recent two-year period of record. If a significant seasonal variability in flow is present, a seasonal regulatory effluent flow may be calculated for a particular season of the year. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

NUMERICAL CRITERIA FOR THE FISH CONSUMPTION USE

Criteria to protect human health for the consumption of fish flesh are long term average values. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected effluent value is calculated as the maximum likelihood estimator of the upper 95th percentile of the effluent data set.

For municipal facilities, the regulatory effluent flow for human health/fish flesh criteria is the design flow of the facility.

For industrial facilities, the regulatory effluent flow for human health/fish flesh criteria is the arithmetic mean of all measured effluent daily discharges using a period of record of not less than two years. Allowances should be made to account for expected fluctuations in production and resulting discharge levels over the life of the permit.

RECEIVING WATER CHARACTERIZATION

Receiving water characterization should be consistent with the type of reasonable potential evaluation. Data for determining background concentrations may be available from STORET or other water quality databases with adequate and documentable quality assurance procedures, such as Beneficial Use Monitoring Program (BUMP) reports or Use Support Assessment Protocol (USAP) monitoring results. The number and type of upstream samples taken to characterize a particular pollutant should be consistent with the regulatory conditions associated with a particular criterion. Specific factors to be considered include the frequency, duration and magnitude of pollutant levels in the upstream receiving water.

NUMERICAL CRITERIA FOR THE PUBLIC AND PRIVATE WATER SUPPLIES USE

Raw water column criteria are average values not to be exceeded instream. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected upstream (background) concentration is the long term average of the upstream data set, and is expressed as a geometric mean where sufficient data is available to do so.

Criteria to protect human health for the consumption of fish flesh and water are long term average values. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected upstream concentration is the long term average of the upstream data set. It is expressed as a geometric mean where sufficient data is available to do so.

The regulatory upstream flow for both raw water column and human health/fish flesh and water criteria is a long term average flow. This long term average flow is the mean annual average flow of the receiving water upstream of the point of effluent discharge. Determination of mean annual flows for gaged and ungaged streams is described in section E.5 of Chapter 2, Part III. Where mean annual flows from USGS stations are available, they may be adjusted for known perennial contributions to or withdrawals from the receiving water between the point of discharge and the gaging station.

Numerical criteria for total coliform bacteria are geometric mean values never to be exceeded instream. These bacterial criteria apply only where a discharge is located within five miles upstream of a public water supply intake. Pursuant to OAC 785:45-5-10(3)(D), total coliform bacteria criteria are applied year round if the primary body contact recreation (PBCR) use is not designated for the receiving water and during the "non-recreational" season only (October 1 through April 30) where the PBCR use is designated for the receiving water. Since the OWQS do not specify a mixing zone for total coliform bacteria numerical criteria, they are applied end-of-pipe. Therefore, reasonable potential is presumed to exist when there is a reasonable expectation that total coliform bacteria are present in the effluent and the discharge is located within five miles upstream of a public water supply intake. In certain cases for modeling purposes where the Public and Private Water Supplies (PPWS) use applies instantaneously at some point downstream of a point of discharge, distance and time of travel parameters must be determined to estimate bacterial die-off at the point where the PPWS use applies. In such cases, the critical upstream flow is the long term average.

NUMERICAL CRITERIA FOR THE FISH AND WILDLIFE PROPAGATION USE

ACUTE AND CHRONIC TOXICITY CRITERIA

Acute and chronic toxicity criteria for toxic substances are maximum values never to be exceeded instream. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected upstream (background) concentration is the long term average of the upstream data set, and is expressed as a geometric mean where sufficient data is available to do so.

For chronic toxicity criteria, the regulatory upstream flow is the greater of 1.0 cfs or 7Q2. Seasonal 7Q2s may be utilized where toxicity-based ammonia limits must be compared with DO-based ammonia limits. For acute toxicity criteria, the upstream flow is not applicable. Where 7Q2 flows are available from USGS gaging stations, they may be adjusted for known perennial contributions to or withdrawals from the receiving water between the point of discharge and the gaging station.

TEMPERATURE CRITERIA

Numerical criteria for temperature are mean values. For purposes of performing reasonable potential evaluations for temperature when there is a reasonable expectation that the effluent contains a significant thermal component, the regulatory ambient (critical) temperature, T_a , in degrees Celsius, is defined as follows for each type of aquatic community, with the exception of trout fisheries.

<u>Aquatic Community</u>	<u>Critical Temperature (7T2)</u>
Habitat-Limited Aquatic Community (HLAC)	Higher of 7T2 or 29.44°C
Warm Water Aquatic Community (WWAC)	Higher of 7T2 or 29.44°C
Exception: Arkansas River WWAC from Red Rock Creek to headwaters of Keystone Lake	Higher of 7T2 or 31.6°C
Cool Water Aquatic Community (CWAC)	26.1°C

The 7T2 is defined as the 7-day maximum temperature likely to occur with a 50% probability each year. The 7T2 is calculated using a moving average of seven consecutive days for each year in a given record. These seven-day receiving stream temperature values are ranked in descending order. An order number, m , is calculated based on the number of years of record, n , with a recurrence interval of 2 years, as $m=(n+1)/2$. The m^{th} highest average temperature is the 7T2.

Trout fisheries normally exceed the 20° C temperature criterion during critical conditions. Thus, reasonable potential to exceed the temperature criterion is always presumed to exist for trout fisheries, and the WLA is set equal to the 20°C criterion to protect the trout fishery use.

For temperature criteria, the regulatory upstream flow is the greater of 1.0 cfs or 7Q2. Where 7Q2 flows are available from USGS gaging stations, they may be adjusted for known perennial contributions to or withdrawals from the receiving water between the point of discharge and the gaging station.

NUMERICAL CRITERIA FOR THE AGRICULTURE USE

Numerical criteria listed at Appendix F of OAC 785:45 for mineral constituents (chlorides, sulfates and total dissolved solids) are statistical measures of ambient levels present in specified waterbody segments around the state (see section B.2.b(3)(b)(ii) of this chapter). Segment averaged criteria are used to evaluate reasonable potential unless data specific to the site in question or to an upstream or downstream segment of the waterbody in question is available. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected upstream value is calculated as described in section B.2.b(3)(b)(ii) of this chapter.

The regulatory upstream flow is a long-term average flow for implementing the YMS and a short-term average flow for implementing the SS. The long-term average flow is the mean annual flow; and the short-term average flow is equal to 68% of the mean annual flow. Determination of mean annual flows for gaged and ungaged streams are determined as described in section E.5 of Chapter 2, Part III.

NUMERICAL CRITERIA FOR PRIMARY BODY CONTACT RECREATION (PBCR) USE

Numerical criteria for enteric bacteria (coliform bacteria, *Escherichia coli*, or *Enterococci*) are geometric mean values never to be exceeded instream, and are applied during the “recreational” season of May 1 through September 30. Since the OWQS does not specify a mixing zone for enteric bacteria criteria, they are applied end-of-pipe. Therefore, reasonable potential is presumed to exist when there is a reasonable expectation that enteric bacteria are present in the effluent.

In certain cases for modeling purposes where the PBCR use applies instantaneously at some point downstream of a point of discharge, distance and time of travel parameters must be determined to estimate enteric bacterial die-off at the point where the PBCR use applies. In such cases, the critical upstream flow is the greater of 1.0 cfs or 7Q2.

NUMERICAL CRITERIA FOR THE AESTHETICS USE

Numerical criteria for color are values never to be exceeded instream due to other than natural sources. Thus, for purposes of performing reasonable potential evaluations for color when there is a reasonable expectation that it is present in the effluent, the expected upstream value is considered zero unless upstream color is from other than natural sources.

The regulatory upstream flow is the greater of 1.0 cfs or 7Q2.

NUMERICAL CRITERIA FOR FISH CONSUMPTION USE

Criteria to protect human health for the consumption of fish flesh are long-term average values. For purposes of performing reasonable potential evaluations for these pollutants when there is a reasonable expectation that they are present in the effluent, the expected upstream concentration is the long term average of the upstream data set. It is expressed as a geometric mean where sufficient data is available to do so.

The regulatory upstream flow is a long-term average flow. The long-term average flow is the mean annual flow of the receiving water upstream of the point of effluent discharge.

REPORTING UNMEASURABLE DATA

WATER QUALITY-BASED EFFLUENT LIMITATIONS REQUIREMENTS

REASONABLE POTENTIAL DEMONSTRATED

If a reasonable potential evaluation for a facility shows that a potential exists to exceed an applicable water quality criterion for a specific pollutant then a water quality-based effluent limitation shall be placed in the permit for that pollutant.

COMPLIANCE SCHEDULES

A compliance schedule which allows no more than three years to complete any additional treatment plant construction or facility modifications needed in order to comply with a water quality-based limit may be included in the permit for existing facilities. New facilities, or existing facilities which propose increases in production or changes in operation which will result in the discharge of new pollutants or increased levels of existing pollutants, must meet the water quality-based limit at start-up.

WHOLE EFFLUENT TOXICITY

Whole effluent toxicity (WET) tests are used to assess discharger compliance with the narrative toxicity criterion to protect the fish and wildlife propagation beneficial use. WET testing involves measuring the aggregate toxicity of an effluent discharged into surface waters, including synergistic effects. The intent of this strategy is to prevent the point source discharge of wastewater which would result in either acute toxicity or chronic toxicity outside the [chronic] mixing zone of the receiving water. A WET limit may be applied to the discharge if, in the judgment of the permitting authority, reasonable potential exists to violate the narrative toxicity criterion. Reasonable potential to violate the narrative toxicity criterion is presumed to exist if a facility has a significant history of WET test failures, has been required to perform a toxicity reduction evaluation (TRE) as a result of WET test failures, or is known to discharge a toxic pollutant in toxic amounts not otherwise controlled with chemical-specific limits. Implementation procedures for WET testing and WET limits are described in sections B.3.e and B.4.a, respectively of this chapter.

OTHER WATER QUALITY CONSIDERATIONS

Development of a water quality-based limit is a multi-step process that must consider a number of factors. Some of the more important considerations are addressed below.

SITE-SPECIFIC CALCULATIONS

In many cases, criteria or requirements used to establish water quality-based limits are defined using a more general basis; e.g., waterbody segment-based criteria. A more specific value may be calculated if more detailed site-specific data is available. The following sections address the development of these more specific criteria.

SEVEN-DAY, TWO-YEAR LOW FLOW – $7Q_2$

For oxygen-demanding parameters, Oklahoma WQS define the seven-day, two-year low flow (7Q2) as the receiving stream flow for determining allowable discharge load to a stream. The flow is calculated as a moving average of seven consecutive days for each year in a given record, and represents a yearly low flow value. Authorized sources for 7Q2 values used in developing WLAs/TMDLs are as follows:

- USGS publications, such as "Statistical Summaries of Stream flow Records in Oklahoma Through 1999", USGS Water-Resources Investigations Report 02-4025, or data obtained from USGS sources; or,
- WQMP updates (only if USGS data is not available).

If neither USGS data nor WQMP updates are available, a default 7Q2 of 1 cfs is assumed as described in Chapter 2, Part III of this document.

The 7Q2 is calculated as a moving average of seven consecutive days for each year in a given record. These seven-day low flow values are ranked in ascending order. An order number (m) is calculated based upon the number of years of record (n), with a recurrence interval (R) of two years, as $m=(n+1)/R$, where R = two years. A value of flow corresponding to the mth order is taken as the seven day, two-year low flow for those historical data. Seasonal 7Q2s may also be determined in this same manner using flow data appropriate to the period covered by each season: April-May (Spring), June – October (Summer) and November – March (Winter).

OAC 785:45-5-12(f)(1)(B)(iii) allows use of a seasonal 7Q2 on streams designated as habitat-limited and warm water aquatic communities (HLAC and WWAC) for determination of allowable BOD loading. The seasonal 7Q2 is calculated as a moving average of seven consecutive days for the applicable dates specified in OAC 785:45-5-12(e)(1)(C) in a given period of record. These seven-day low flow values are ranked in ascending order. An order number (m) is calculated based upon the number of seasons (n) specified in OAC 785:45-5-12(e)(1)(C) during the period of record, with a recurrence interval (R) of two years, as $m = (n+1)/R$, where R = two years. A value of flow corresponding to the m^{th} order is taken as the seasonal seven-day, two-year low flow for those historical data.

A minimum of ten years of daily flow measurements for a particular site are required to calculate a 7Q2. If sufficient continuous data are not available to develop low-flow frequency curves then low-flow characteristics may be estimated by relating this data to nearby continuous-record sites. The partial-record site must have enough flow measurements to establish a correlation between it and a continuous-record (index) station. An index station must represent a specific area of the State with respect to topographic and geologic conditions that may have an effect on low flow and have no major regulation or other manmade changes in the drainage basin. Also, an index station must have the same period of record as the partial-record site. An attempt should be made to use streams of relatively small drainage area to avoid incorporating many varied topographic and geologic factors into one record. The index site should be less intermittent than any partial record site.

Other appropriate methods may be used to estimate low-flow if approved by the permitting agency.

APPROPRIATE SEASONAL TEMPERATURE

The OWQS require that allowable loadings to meet dissolved oxygen criteria be calculated using the seven-day, two-year low flow and the appropriate seasonal temperature. The values for the appropriate seasonal temperature are given in the OWQS as a seasonal temperature associated with a particular fishery class, applicable season date, and associated DO criteria. However, the use of an appropriate seasonal temperature other than the one specified may be allowed where site-specific data of sufficient quantity and quality are available.

In those cases where sufficient site-specific data is available, the appropriate seasonal temperature should be calculated as the upper 90th percentile value of the average daily temperatures for the season or a portion thereof, if appropriate.

If sufficient continuous data are not available to develop low-flow, high-temperature frequency curves, then low-flow, high-temperature characteristics may be estimated by relating this data to nearby continuous-record sites. The partial-record site must have enough flow and temperature measurements to establish a correlation between it and a continuous-record (index) station. An index station must represent a specific area of the State with respect to topographic and geologic conditions that may have an effect on low flow and temperature and have no major regulation or other manmade changes in the drainage basin. Also, an index station must have the same period of record as the partial-record site. An attempt should be made to use streams of relatively small drainage area to avoid incorporating many varied topographic and geologic factors into one record. The index site should be less intermittent than any partial record site.

Other appropriate methods may be used to estimate an appropriate seasonal temperature if approved by the permitting agency.

WATER QUALITY-BASED LIMIT DEVELOPMENT

TOXICS CONTROL

The Water Quality Act of 1987 placed increased emphasis on control of toxic pollutants. As a result, considerable effort has been directed to identify discharges of concern and develop water quality based permit limits to control them.

There are two basic approaches to toxics control: chemical-specific and whole effluent. EPA regulations require the use of a strategy that integrates both approaches to control aquatic toxicity. The whole effluent toxicity approach can deal with the combined (synergistic) effect of a complex mix of toxic substances in an effluent, but the chemical specific approach cannot. Additionally, numerical criteria may not yet be included in the OWQS for some toxicants present in an effluent. On the other hand, the chemical specific approach can deal with background toxicity, where the whole effluent approach cannot. Additionally, certain chemical-specific properties, such as bioaccumulation, are not directly addressable through the whole effluent toxicity approach.

NPDES regulations at 40 CFR Part 122.44(d)(1)(i) state, "Limitations "must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which . . . are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." Chemical-specific limits are established to control for violations of numerical water quality criteria. Whole effluent toxicity (WET) limits are established to control against exceedance of narrative criteria. Permits may also contain numeric limits for pollutants of concern that are derived through an interpretation of the narrative toxicity criterion, such as that described for ammonia toxicity in sections B.3.c(2) and B.3.d(2) of this chapter.

The first decision is to determine which discharges to evaluate for possible water quality impacts from toxic pollutants. Resource constraints and analytical costs preclude a detailed analysis of every discharge. Therefore, attention is focused on those direct discharges most likely to contain toxic pollutants, as follows:

- All major industrial discharges and all major municipal discharges, including those from POTWs with approved pretreatment programs or which are in the process of developing pretreatment programs in accordance with 40 CFR Part 403.
- Discharges from POTWs in non-pretreatment program cities that receive wastewater from one or more categorical industries.
- Discharges from categorical industries.
- Discharges known or suspected to contribute to instream toxicity problems.

Other discharges may also be designated on a case-by-case basis.

Toxic pollutants of concern are screened to determine whether water quality-based limitations in accordance with the procedures for reasonable potential evaluation in section B.2.b of this chapter and Chapter 2, Part III of this document. Dischargers to be evaluated will be required to submit toxic pollutant information with their permit application. This information will be required in the permit application form or through a request letter from the Executive Director. Industrial facilities will submit quantitative data in accordance with 40 CFR 122, Appendix D. Municipal facilities will submit quantitative data for pollutants listed in 40 CFR 122, Appendix J. Certain other toxic pollutant data may also be requested on a case-by-case basis.

In calculating water quality-based permit limits, the general approach given in the Technical Support Document for Water Quality- Based Toxics Control, EPA/505/2-90-001, March 1991, will be utilized for aquatic life and human health protection. This approach recognizes the variability of both effluent and receiving water pollutant levels and uses a statistical method to derive an effluent limitation that meets the requirements of the WLA derived to meet a specific water quality criterion.

STATISTICAL PERMIT LIMIT DERIVATION

The method used to translate a WLA into permit limits is dependent on the type of model, steady state or dynamic, used to develop the allocation. The WLA provides a definition of effluent quality that is necessary to meet the water quality standards of the receiving water. The variability of both the effluent and receiving stream pollutant levels must be addressed in development of the WLA. If not considered specifically in the water quality model used in development of the WLA (i.e., dynamic model) then this variability must be specifically considered in translation of the WLA into a permit limitation.

DYNAMIC MODEL ALLOCATIONS

Dynamic models use estimates of effluent variability and the variability of receiving water assimilation factors to develop effluent requirements in terms of concentration and variability. They account for the daily variations of and relationships between flow, effluent, and environmental conditions and therefore directly determine the actual probability that a water quality standards criteria exceedance will occur. Since variability is directly accounted for in a dynamic model the WLA determined by the model can usually be used directly in developing permit limits. Dynamic models, although very data- and resource-intensive, are acceptable for determining WLAs and corresponding permit limits. Their use, as appropriate, will be approved on a case-by-case basis.

STEADY STATE MODEL ALLOCATIONS

Steady state models are the most commonly used basis for developing water quality based permit limits. Development of a technically defensible water quality based permit limitation from a steady state wasteload allocation is a multi-step process. In most cases more than one water quality standards criteria applies to a particular pollutant (e.g., acute, chronic, and human health criteria). As a result, WLAs are determined for each applicable water quality criterion. Permit limits (the monthly average for aquatic-toxicity-based limits and the daily maximum for human health and raw water column-based limits) vary with the prescribed monitoring frequency. To ensure that the most protective water quality-based limit is established in the permit, the monthly average limits for all applicable criteria for a pollutant are compared and the most stringent monthly average limit is selected for that particular pollutant.

EFFLUENT VARIABILITY

Effluent quality and quantity vary over time in terms of volumes discharged and constituent concentrations. Variations occur due to a number of factors, including changes in human activity over a 24-hour period for publicly owned treatments works, changes in production cycles for industries, variation in responses of wastewater treatment systems to influent changes, variation in treatment system performance, and changes in climate. Very few effluents remain constant over long periods of time. Even in industries that operate continuous processes, variations in the quality of raw materials and activities, such as back-washing of filters, cause peaks in effluent constituent concentrations and volumes.

If effluent data for a particular pollutant or pollutant parameter for a typical POTW are plotted against time, the daily concentration variations can be seen. This behavior can be described by constructing frequency-concentration plots of the same data. This frequency concentration plot

can be described in terms of a particular type of statistical distribution. Treated effluent data, unless specific data show otherwise, usually follows a log normal distribution. This is because effluent values are non-negative and treatment efficiency at the low end of the concentration scale is limited, while effluent concentrations may vary widely at the high end of the scale, reflecting various degrees of treatment system performance and loadings. These factors combine to produce the characteristically positively skewed appearance of the lognormal curve when data are plotted in a frequency histogram.

Effluent data from any treatment system may be described using standard descriptive statistics, such as the mean concentration of the pollutant or pollutant parameters (i.e., the long-term average, LTA, and the coefficient of variation, CV). Using a statistical model, such as the log normal, an entire distribution of values can be projected from limited data, and limits can be set at a specified probability of occurrence. All permit limits, whether technology-based or water quality-based, are set at the upper bounds of acceptable performance. The purpose of a permit limit is to specify an upper bound of acceptable effluent quality. For water quality-based requirements, the limits are based on maintaining the effluent quality at a level that will comply with water quality standards, even during critical conditions in the receiving water. The requirements are determined by the WLA. The WLA dictates the required effluent quality, which defines the desired level of treatment plant performance or target LTA. Permit limits may then be derived from this targeted LTA and CV. Note that highly variable effluents require a much lower targeted LTA to meet the WLA and account for the variability that occurs in effluent concentration above the LTA.

CALCULATION OF WASTELOAD ALLOCATIONS (WLAs) AND CRITERION LONG TERM AVERAGES (LTAs)

CALCULATION OF WLA AND CRITERION LTA FOR ACUTE AND CHRONIC TOXICITY CRITERIA

WLA_A AND WLA_C FOR DISCHARGES TO STREAMS

ACUTE CRITERIA WLA

$$WLA_A = C_b + \frac{100 (C_A - C_b)}{Q_e}, \text{ where } Q_e \text{ is expressed in cfs. (32)}$$

$$WLA_A = C_b + \frac{64.63 (C_A - C_b)}{Q_e}, \text{ where } Q_e \text{ is expressed in MGD. (33)}$$

CHRONIC CRITERIA WLA

$$WLA_C = C_b + \frac{(1 + Q^*) (C_C - C_b)}{(1.94 Q^*)}, \text{ where } Q^* \leq 0.1823. (34)$$

$$WLA_C = C_b + (6.17 - 15.51 Q^*) (C_C - C_b), (35)$$

where $0.1823 < Q^* < 0.3333$.

$$WLA_C = C_C, \text{ where } Q^* \geq 0.3333. (36)$$

WLA_A AND WLA_C FOR DISCHARGES TO LAKES

The chronic WLA is calculated if a chronic criterion applies. An acute WLA is used only in the absence of a chronic criterion.

$$WLA_{C,A} = C_b + \frac{20.15 (C_{C,A} - C_b)}{D}, \quad (37)$$

where the discharge is by pipe of diameter D in feet (3 ft minimum).

$$WLA_{C,A} = C_b + \frac{4.2 (C_{C,A} - C_b)}{\sqrt{W}}, \quad (38)$$

where the discharge is by canal of width W in feet (3 ft minimum).

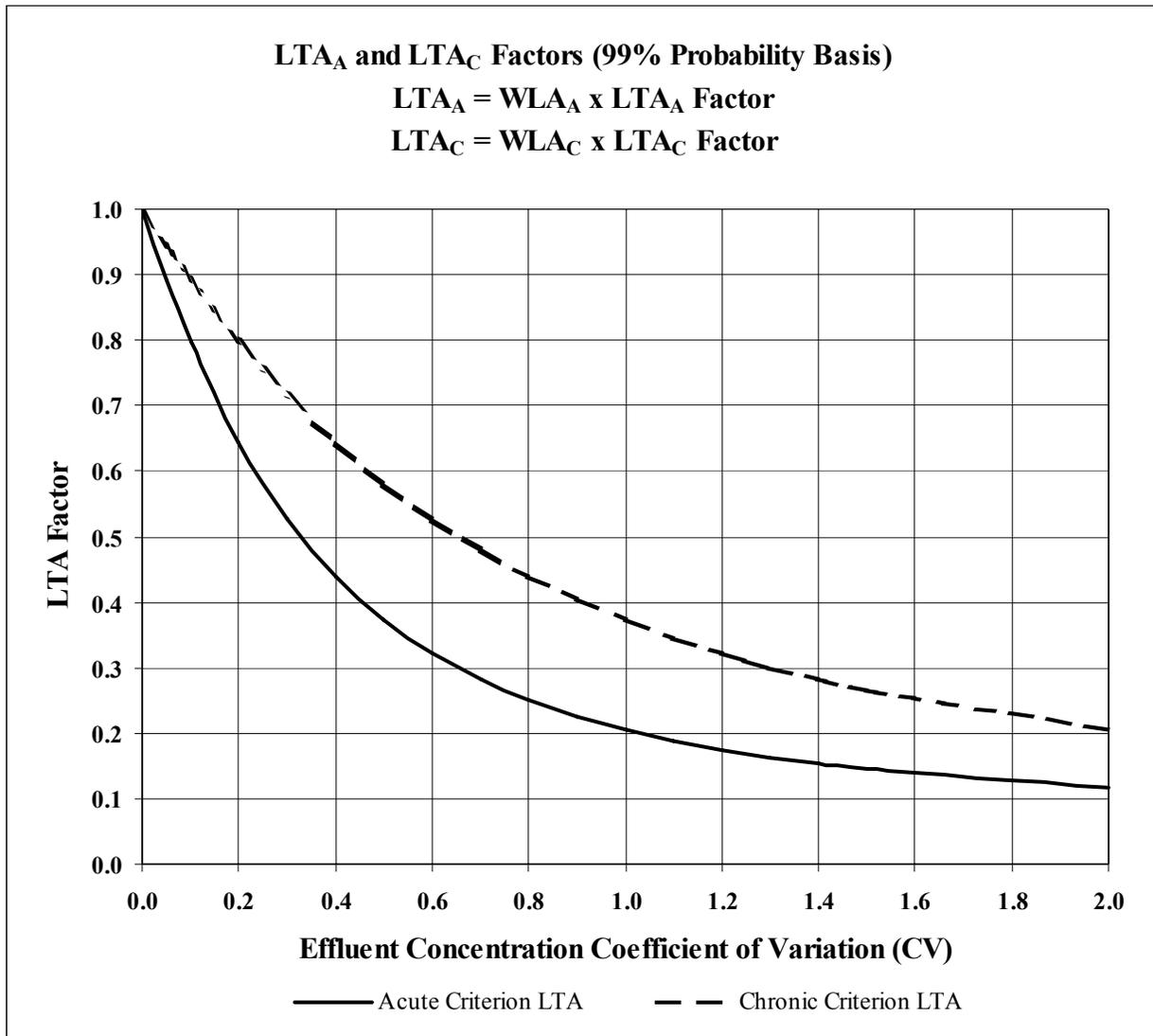
LTA_A AND LTA_C

Aquatic toxicity criterion LTAs are calculated on a 99% probability basis. Whether the receiving water is a stream or lake, toxicity criterion LTAs are calculated in the same fashion. LTA_{TOX} is the more stringent of the two (acute or chronic) toxicity LTAs.

$$LTA_A = WLA_A \times \text{EXP} \left(0.5 \ln \left(1 + CV^2 \right) - 2.326 \sqrt{\ln \left(1 + CV^2 \right)} \right) \quad (39)$$

$$LTA_C = WLA_C \times \text{EXP} \left(0.5 \ln \left(1 + \frac{CV^2}{4} \right) - 2.326 \sqrt{\ln \left(1 + \frac{CV^2}{4} \right)} \right), \quad (40)$$

FIGURE 12: AQUATIC TOXICITY LTA FACTORS VS. EFFLUENT COEFFICIENT OF VARIATION



CALCULATION OF WLA AND CRITERION LTA FOR AMMONIA TOXICITY

Control of toxicity from ammonia can be a potential problem where only technology- or dissolved oxygen-based ammonia limits for ammonia are established in a permit. As a means of controlling for chronic toxicity for ammonia in such cases, the DEQ, OWRB and EPA Region 6 cooperatively developed an interim ammonia toxicity control strategy in January 2001. This interim control strategy is implemented as a component of the narrative toxicity criterion (for major municipal and industrial dischargers only) until such time as ammonia toxicity criteria are officially promulgated by the OWRB in the OWQS.

A chronic toxicity-based WLA and criterion LTA is determined for major municipal POTWs which have DO-based WLAs for ammonia and for major industries which produce ammonia as a commercial product or as a by-product of their industrial processes, or which have technology-based ammonia limits or DO-based WLAs for ammonia. A zero background is assumed, and a screening threshold level (criterion) of 6 mg/L is used as the maximum concentration at the edge of the chronic mixing zone. All concentrations in the calculations are in mg/L.

WLA_{NH3}

Where $Q^* \leq 0.1823$,

$$WLA_{NH3} = C_b + \frac{(1 + Q^*)(C_{NH3} - C_b)}{(1.94 Q^*)} \quad (41)$$

$$\text{Simplifying, } WLA_{NH3} = \frac{(1 + Q^*)(6)}{(1.94 Q^*)} \quad (42)$$

Where $0.1823 < Q^* < 0.3333$,

$$WLA_{NH3} = C_b + (6.17 - 15.51 Q^*)(C_{NH3} - C_b) \quad (43)$$

$$\text{Simplifying, } WLA_{NH3} = (6.17 - 15.51 Q^*)(6) \quad (43)$$

Where $Q^* \geq 0.3333$,

$$WLA_{NH3} = C_{NH3}, \text{ or simply } WLA_{NH3} = 6 \text{ mg/l.}$$

LTA_{NH3}

$$LTA_{NH3} = WLA_{NH3} \times \text{EXP} \left(0.5 \ln \left(1 + \frac{CV^2}{4} \right) - 2.326 \sqrt{\ln \left(1 + \frac{CV^2}{4} \right)} \right) \quad (44)$$

CALCULATION OF WLA AND CRITERION LTA FOR HUMAN HEALTH AND RAW WATER COLUMN CRITERIA

WLA_{FF}, WLA_{FFW} AND WLA_{RAW}

$$WLA_{FF} = C_{FF} + \frac{(C_{FF} - C_b)}{Q^*} \quad (45)$$

$$WLA_{FFW} = C_{FFW} + \frac{(C_{FFW} - C_b)}{Q^*} \quad (46)$$

$$WLA_{RAW} = C_{RAW} + \frac{(C_{RAW} - C_b)}{Q^*} \quad (47)$$

LTA_{FF}, LTA_{FFW} AND LTA_{RAW}

Because human health and raw water column wasteload allocations are already long term average values, their respective criterion LTAs are set equal to the respective wasteload allocations.

$$LTA_{FF} = WLA_{FF} \quad (48)$$

$$LTA_{FFW} = WLA_{FFW} \quad (49)$$

$$LTA_{RAW} = WLA_{RAW} \quad (50)$$

CALCULATIONS OF WLA AND CRITERION LTA FOR AGRICULTURE CRITERIA

WLA_{YMS} AND WLA_{SS}

$$WLA_{YMS} = C_{YMS} + \frac{(C_{YMS} - C_b)}{Q^*} \quad (51)$$

$$WLA_{SS} = C_{SS} + \frac{(C_{SS} - C_b)}{Q^*} \quad (52)$$

LTAYMS AND LTASS FOR AGRICULTURE CRITERIA

WLAs for the YMS criteria are already a long term average values. Hence YMS criteria LTAs are equal to their respective WLAs.

$$LTA_{YMS} = WLA_{YMS} \quad (53)$$

However, a SS WLA is a short term average, so the SS LTA is calculated on a 99% probability basis.

$$LTA_{SS} = WLA_{SS} \times \text{EXP} \left(0.5 \ln \left(1 + \frac{CV^2}{4} \right) - 2.326 \sqrt{\ln \left(1 + \frac{CV^2}{4} \right)} \right) \quad (54)$$

LTA_{CL}, LTA_{SO4}, AND LTA_{TDS}

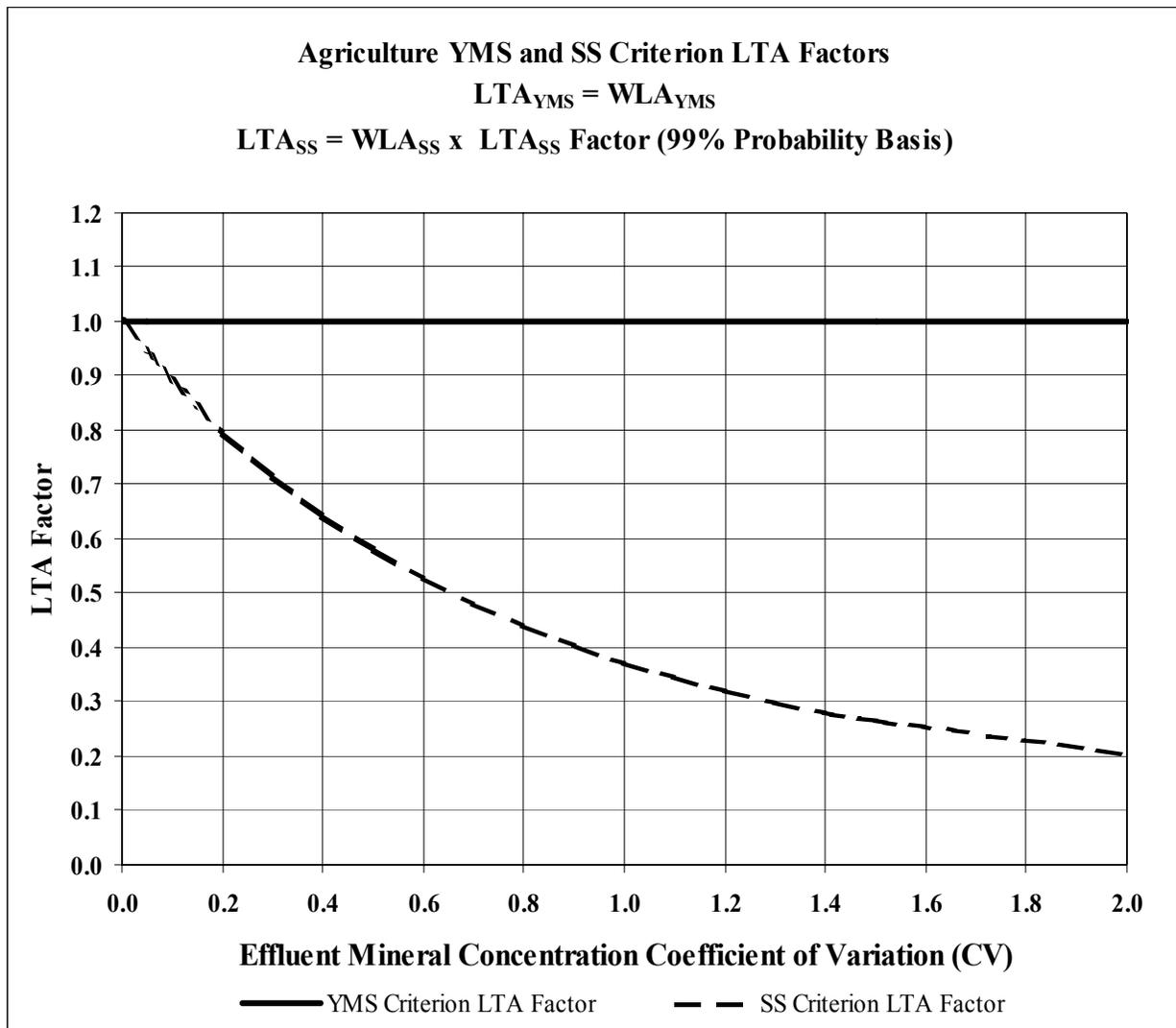
The more stringent of the YMS and SS LTAs for each mineral constituent is used to develop water quality-based permit limitations for that substance. OAC 785:45 requires that the long term average mineral constituent concentrations used to develop permit limitations be not less than 700 mg/L for TDS and not less than 250 mg/L for chlorides and sulfates. The following permit criterion LTA equations account for this minimum LTA requirement.

$$LTA_{CL} = \text{MAX}(250, \text{MIN}(LTA_{YMS}, LTA_{SS})) \text{ for chlorides} \quad (55)$$

$$LTA_{SO4} = \text{MAX}(250, \text{MIN}(LTA_{YMS}, LTA_{SS})) \text{ for sulfates} \quad (56)$$

$$LTA_{TDS} = \text{MAX}(700, \text{MIN}(LTA_{YMS}, LTA_{SS})) \text{ for total dissolved solids} \quad (57)$$

FIGURE 13: AGRICULTURE CRITERIA LTA FACTORS VS. EFFLUENT COEFFICIENT OF VARIATION



CALCULATION OF WLA AND CRITERION LTA FOR TEMPERATURE CRITERIA

Trout fisheries by definition require a WLA_T of 20°C (see OAC 252:690-3-53). Other than for trout fisheries, if $\Delta T_{max} > 2.8^\circ C$, a WLA is required.

All temperature calculations are performed in degrees Celsius (°C).

WLA_T FOR DISCHARGES TO STREAMS

$$WLA_T = T_a + \frac{1.44 (1 + Q^*)}{Q^*}, \text{ where } Q^* \leq 0.1823. \tag{58}$$

$$WLA_T = T_a + 17.276 - 43.428 Q^*, \text{ where } 0.1823 < Q^* < 0.3333. \tag{59}$$

$$WLA_T = T_a + 2.8, \text{ where } Q^* \geq 0.3333. \quad (60)$$

WLA_T FOR DISCHARGES TO LAKES

$$WLA_T = T_a + \frac{56.42}{D}, \quad (61)$$

where the discharge is by pipe of diameter D in feet (3 ft minimum).

$$WLA_T = T_a + \frac{11.76}{\sqrt{W}}, \quad (62)$$

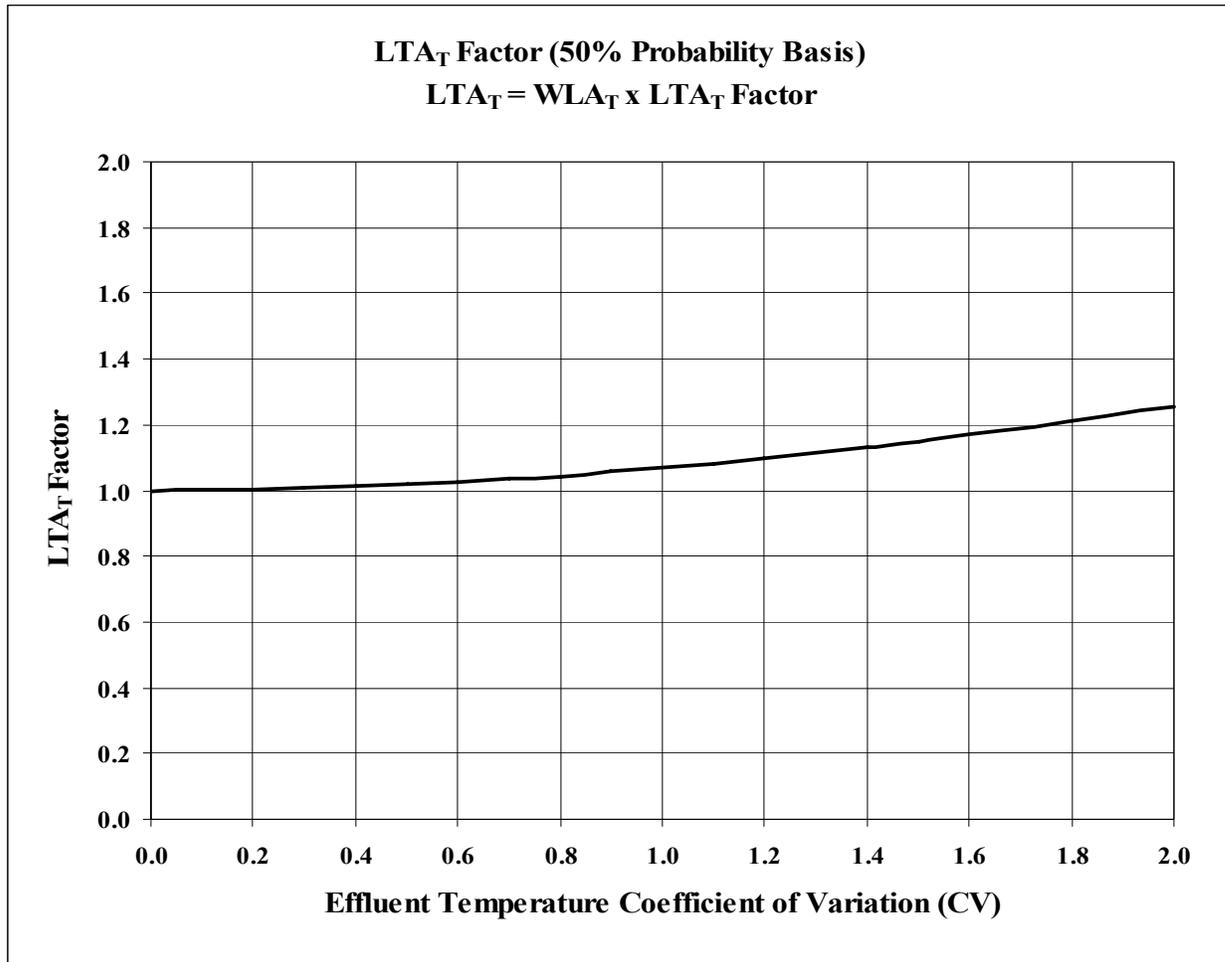
where the discharge is by canal of width W in feet (3 ft minimum).

LTA_T (50% PROBABILITY BASIS)

Temperature criterion LTAs are calculated on a 50% probability basis.

$$LTA_T = WLA_T \times \text{EXP} \left(0.5 \ln \left(1 + \frac{CV^2}{7} \right) \right) \quad (63)$$

FIGURE 14: TEMPERATURE LTA FACTOR VS. EFFLUENT COEFFICIENT OF VARIATION



CALCULATION OF PERMIT LIMITS FROM CRITERION LTAS

CALCULATION OF MONTHLY AVERAGE AND DAILY MAXIMUM LIMITS FOR ACUTE AND CHRONIC TOXICITY CRITERIA

MALs and DMLs are calculated for aquatic toxicity criteria according to the following equations, where “TOX” is used as the common descriptor for both criteria. MALs are calculated on a 95% probability basis and DMLs are calculated on a 99% probability basis.

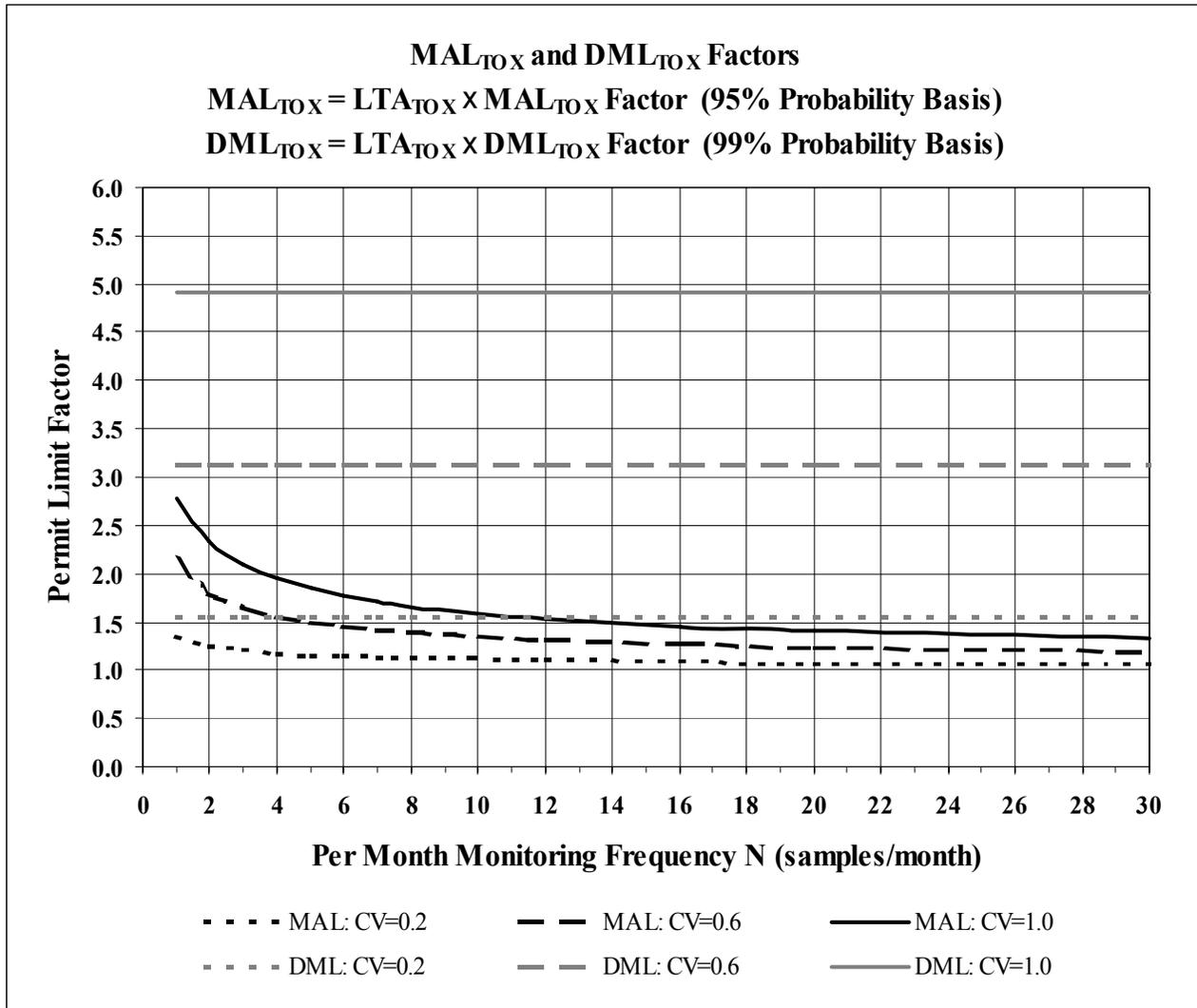
MAL_{TOX}

$$MAL_{TOX} = LTA_{TOX} \times \text{EXP} \left(1.645 \sqrt{\ln \left(1 + \frac{CV^2}{N_m} \right)} - 0.5 \ln \left(1 + \frac{CV^2}{N_m} \right) \right), (65)$$

DML_{TOX}

$$DML_{TOX} = LTA_{TOX} \times \text{EXP} \left(2.326 \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2) \right), (66)$$

FIGURE 15: TOXICITY-BASED MAL AND DML PERMIT LIMIT FACTORS VS. PER MONTH MONITORING FREQ N_m



CALCULATION OF MONTHLY AVERAGE AND DAILY MAXIMUM LIMITS FOR AMMONIA TOXICITY

As described in section B.3.c(2), control of toxicity from ammonia can be a potential problem where only technology- or dissolved oxygen-based ammonia limits for ammonia are established in a permit. Toxicity-based ammonia limits for use in the interim ammonia toxicity control strategy are calculated and compared with technology- and dissolved oxygen-based limits. A coefficient of variation of 0.6 is assumed, and a monitoring frequency N_m of 12/month (3/week) is required.

MAL_{NH3}

$$MAL_{NH3} = LTA_{NH3} \times \exp \left(1.645 \sqrt{\ln \left(1 + \frac{CV^2}{N_m} \right)} - 0.5 \ln \left(1 + \frac{CV^2}{N_m} \right) \right) \quad (67)$$

DML_{NH3}

$$DML_{NH3} = LTA_{NH3} \times \text{EXP} \left(2.326 \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2) \right) \quad (68)$$

COMPARISON OF TOXICITY-BASED AMMONIA LIMITS WITH DO-BASED AND TECHNOLOGY-BASED LIMITS

Where either technology- or dissolved oxygen-based ammonia limits apply, they are compared with the toxicity-based ammonia limits calculated according to (a) and (b) above. The most stringent monthly average limit and its associated weekly average or daily maximum limit, as appropriate, is established in the permit. This interim strategy will be utilized until such time as the OWRB promulgates aquatic toxicity criteria for ammonia in the OWQS.

PERFORMANCE-BASED MONITORING FREQUENCY REDUCTION FOR AMMONIA

Where a toxicity-based ammonia limit is established in a permit, a provision is included allowing the permittee to request a monitoring frequency reduction from 3/week to 1/week if the highest daily maximum level reported during the first year the toxicity-based limit is in effect is no greater than 1.5 times the monthly average permit limit.

CALCULATING OF MONTHLY AVERAGE AND DAILY MAXIMUM LIMITS FOR HUMAN HEALTH AND RAW WATER COLUMN CRITERIA

MALs and DMLs are calculated for the human health/fish flesh, human health/fish flesh and water, and raw water column criteria according to the following equations, where “HH” is used as the common descriptor for all three criteria.

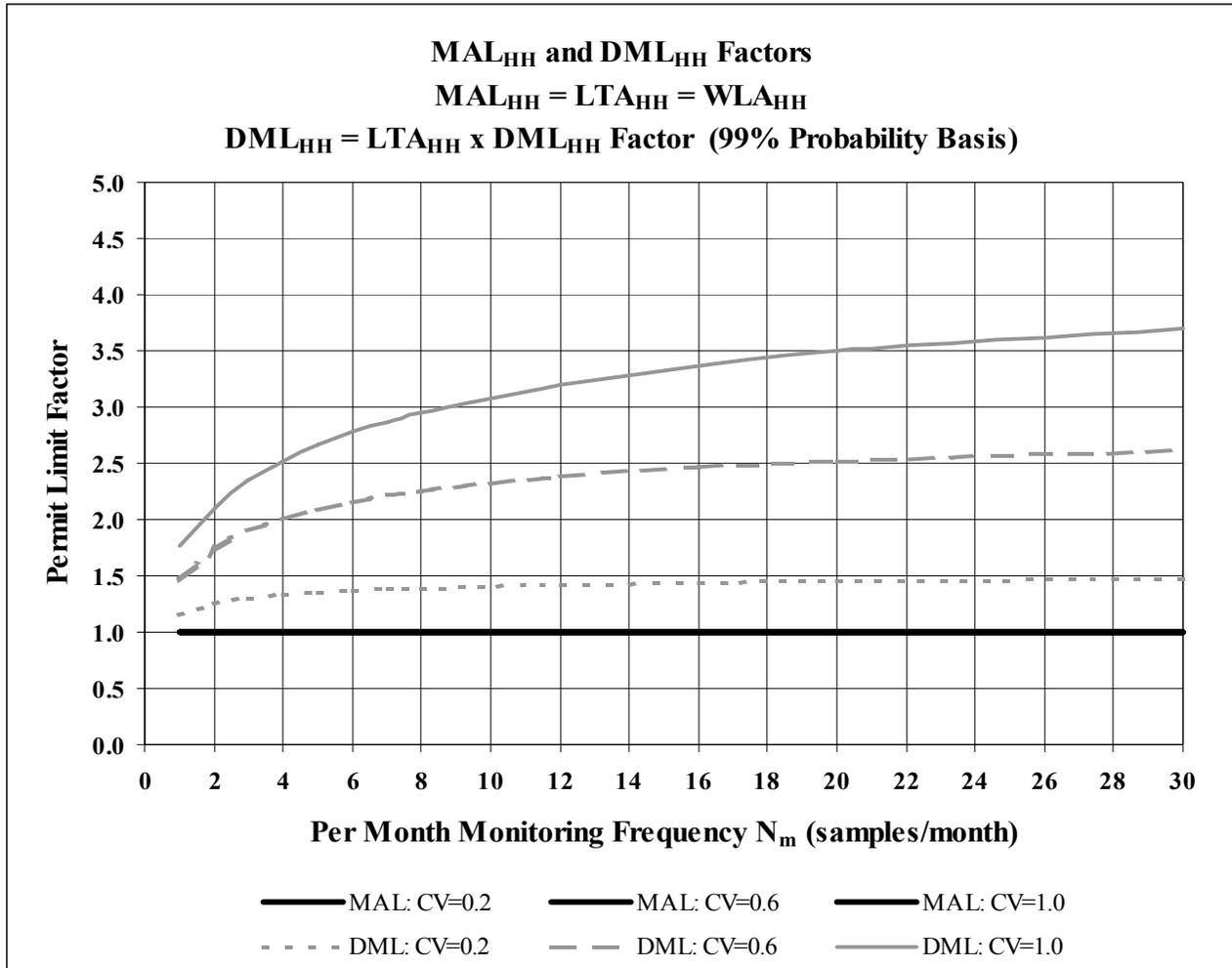
MAL_{HH} (95% PROBABILITY BASIS)

$$MAL_{HH} = LTA_{HH} \quad (69)$$

DML_{HH} (99% PROBABILITY BASIS)

$$DML_{HH} = LTA_{HH} \times \text{EXP} \left(\frac{2.326 \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2)}{1.645 \sqrt{\ln \left(1 + \frac{CV^2}{N_m} \right)} - 0.5 \ln \left(1 + \frac{CV^2}{N_m} \right)} \right) \quad (70)$$

FIGURE 16: HUMAN HEALTH-BASED MAL AND DML PERMIT FACTORS VS. PER MONTH MONITORING FREQ N_m



CALCULATION OF MONTHLY AVERAGE AND DAILY MAXIMUM LIMITS FOR AGRICULTURE CRITERIA

The more stringent of the YMS and SS LTAs for each mineral constituent is used to develop water quality-based permit limitations for that substance. OAC 785:45 requires that the long term average mineral constituent concentrations used to develop permit limitations be not less than 700 mg/L for TDS and not less than 250 mg/L for chlorides and sulfates. The following permit limit development equations account for this minimum LTA requirement. Both MALs and DMLs are calculated on a 95% probability basis.

MAL_{CL}, MAL_{SO4}, AND MAL_{TDS}

$$MAL_{CL} = LTA_{CL} \times \text{EXP} \left(1.645 \sqrt{\ln \left(1 + \frac{CV^2}{N_m} \right)} - 0.5 \ln \left(1 + \frac{CV^2}{N_m} \right) \right) \quad (71)$$

$$\text{MAL}_{\text{SO}_4} = \text{LTA}_{\text{SO}_4} \times \text{EXP} \left(1.645 \sqrt{\ln \left(1 + \frac{\text{CV}^2}{\text{N}_m} \right)} - 0.5 \ln \left(1 + \frac{\text{CV}^2}{\text{N}_m} \right) \right) \quad (72)$$

$$\text{MAL}_{\text{TDS}} = \text{LTA}_{\text{TDS}} \times \text{EXP} \left(1.645 \sqrt{\ln \left(1 + \frac{\text{CV}^2}{\text{N}_m} \right)} - 0.5 \ln \left(1 + \frac{\text{CV}^2}{\text{N}_m} \right) \right) \quad (73)$$

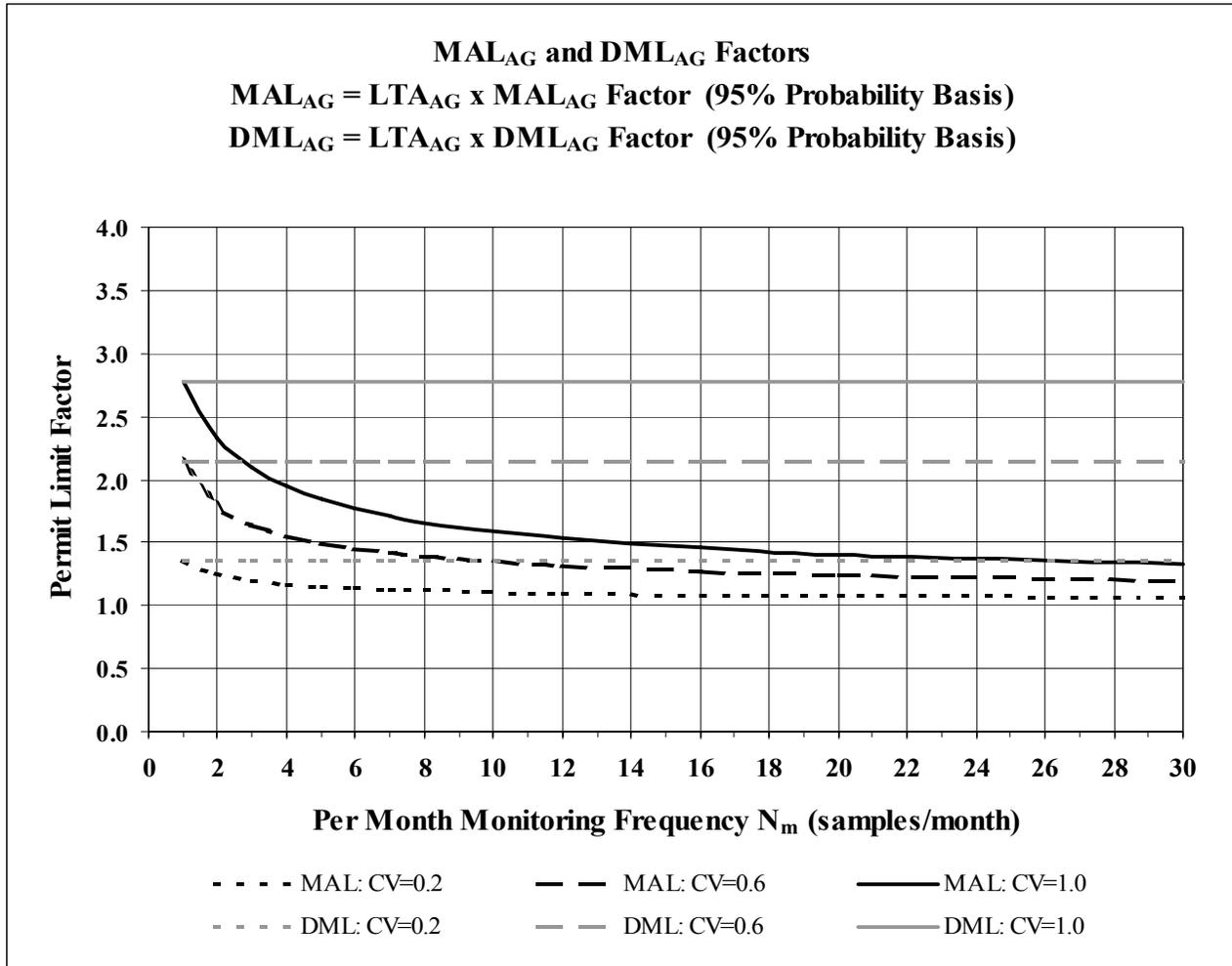
DML_{CL}, DML_{SO4}, AND DML_{TDS}

$$\text{DML}_{\text{CL}} = \text{LTA}_{\text{CL}} \times \text{EXP} \left(1.645 \sqrt{\ln(1 + \text{CV}^2)} - 0.5 \ln(1 + \text{CV}^2) \right) \quad (74)$$

$$\text{DML}_{\text{SO}_4} = \text{LTA}_{\text{SO}_4} \times \text{EXP} \left(1.645 \sqrt{\ln(1 + \text{CV}^2)} - 0.5 \ln(1 + \text{CV}^2) \right) \quad (75)$$

$$\text{DML}_{\text{TDS}} = \text{LTA}_{\text{TDS}} \times \text{EXP} \left(1.645 \sqrt{\ln(1 + \text{CV}^2)} - 0.5 \ln(1 + \text{CV}^2) \right) \quad (76)$$

FIGURE 17: AGRICULTURE MAL AND DML PERMIT LIMIT FACTORS VS. PER MONTH MONITORING FREQ N_m



CALCULATION OF MONTHLY AVERAGE, WEEKLY AVERAGE, AND DAILY MAXIMUM PERMIT LIMITS FOR TEMPERATURE

Both MALs and DMLs are calculated on a 95% probability basis.

MAL_T (95% PROBABILITY BASIS)

$$MAL_T = LTA_T \times \exp\left(1.645 \sqrt{\ln\left(1 + \frac{CV^2}{N_m}\right)} - 0.5 \ln\left(1 + \frac{CV^2}{N_m}\right)\right) \quad (77)$$

If the MAL_T calculated according to the above equation exceeds 52°C, it is capped at 52°C for antidegradation purposes.

WAL_T (95% PROBABILITY BASIS).

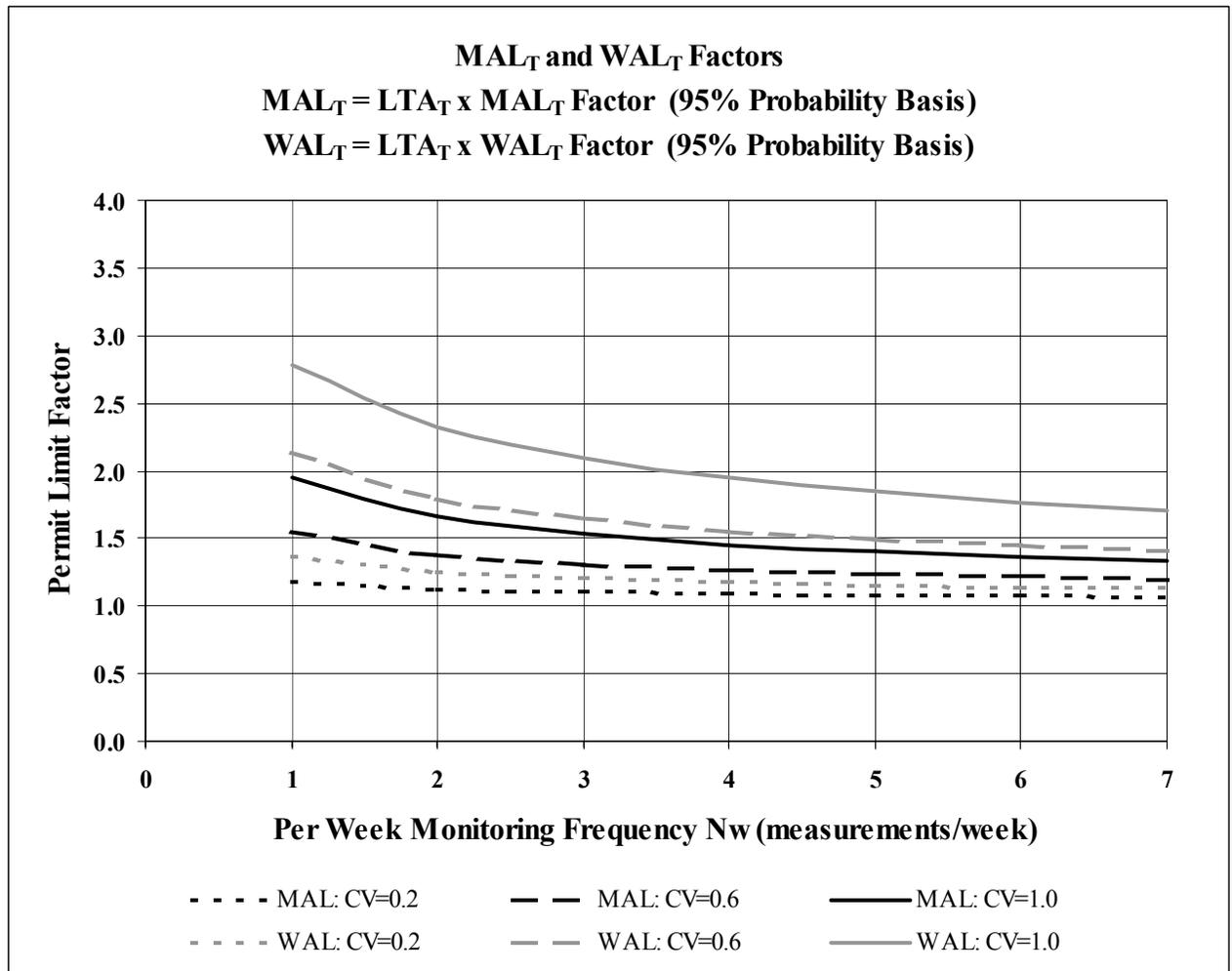
$$WAL_T = LTA_T \times \text{EXP} \left(1.645 \sqrt{\ln \left(1 + \frac{CV^2}{N_w} \right)} - 0.5 \ln \left(1 + \frac{CV^2}{N_w} \right) \right) \quad (78)$$

If the WAL_T calculated according to the above equation exceeds 52°C, it is capped at 52°C for antidegradation purposes.

DML_T

If a daily maximum limit is required for thermal antidegradation purposes, then DML_T = 52°C.

FIGURE 18: TEMPERATURE MAL AND WAL PERMIT LIMIT FACTORS VS. PER WEEK MONITORING FREQ N_w



WHOLE EFFLUENT TOXICITY LIMITS

As described in OAC 252:690-3-19 and in section B.2.b(7) of this chapter, WET limits are established in a permit when there is reasonable potential to violate the narrative toxicity criterion.

WET testing requirements (type of test required, frequency of testing, critical dilution(s) and dilution series) associated with the WET limit are further described in section B.4.a of this chapter.

Where a WET limit is required, it is normally applied to both test species, even if the toxicity of concern occurs in only one species. Since acute critical dilutions are always 100%, acute WET limits are always expressed as “ $LC_{50} > 100\%$ ”. A chronic WET limit is expressed as “ $NOEC_L \geq CCD$ ”, where $NOEC_L$ is the no observed lethal effect concentration and CCD is the chronic critical dilution. Where a WET limit is established in a permit, a WET test survival failure is considered a permit violation.

WATER QUALITY-BASED EFFLUENT MONITORING REQUIREMENTS

BIOMONITORING (WHOLE EFFLUENT TOXICITY TESTING) REQUIREMENTS

Biomonitoring requirements implementing EPA Region 6’s revised post-third round WET testing frequency policy of June 30, 2000, are described in OAC 252:690-3-19, 3-27 and 3-29 through 3-43. DEQ’s implementation of EPA Region 6’s revised policy allows permittees which have not had a significant history of whole effluent toxicity or which do not present a significant toxicity potential (determined on a case-by-case basis) to request WET testing frequency reductions if they no lethal WET test failures (and no sublethal WET test failures for those facilities performing chronic testing) during a “trial period” of quarterly testing for one to two years.

WET TESTING METHODS

- **Acute test/*Daphnia pulex*:** Acute 48-hour static renewal toxicity test using *Daphnia pulex* as described in the Fifth Edition, EPA publication no. 821-R-02-012(October 2002), Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms or most recent version thereof.
- **Acute test/*Pimephales promelas* (Fathead minnow):** Acute 48-hour static renewal toxicity test using *Pimephales promelas* as described in the Fifth Edition, EPA publication no. 821-R-02-012(October 2002), Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms or most recent version thereof.
- **Chronic test/*Ceriodaphnia dubia*:** Chronic static renewal 7 day survival and reproduction test using *Ceriodaphnia dubia* (Method 1002.0), as described in the Fourth Edition, 821-R-02-013 (October 2002), Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms or most recent version thereof.
- **Chronic test/*Pimephales promelas* (Fathead minnow):** Chronic static renewal 7 day larval survival and growth test using *Pimephales promelas* (fathead minnow) (Method 1000.0), as described in Fourth Edition, EPA publication no. 821-R-02-013(October 2002), Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms or most recent version thereof.

APPLICABILITY AND TYPE OF WET TEST REQUIRED

WET testing is required for all major dischargers and those minor dischargers identified by DEQ as posing a significant unaddressed toxic risk. Q* is calculated as described in Appendix D. The following WET testing requirements apply:

- **Acute testing only.** Acute testing only is required for all discharges to lakes and where $Q^* < 0.054$ in streams.
- **Chronic testing only.** Chronic testing only is required where $Q^* > 0.3333$ in streams.
- **Acute and chronic testing.** Both acute and chronic testing are required where $0.054 \leq Q^* \leq 0.3333$ in streams.

CRITICAL DILUTIONS

The acute critical dilution (ACD) is always 100% effluent. The chronic critical dilution (CCD) is expressed in percent effluent is a function of the value of Q^* and is calculated according to the following equations:

$$CCD = 100 \times \frac{1.94 Q^*}{(1 + Q^*)}, \text{ where } Q^* \leq 0.1823 \tag{79}$$

$$CCD = 100 \times \frac{1}{(6.17 - 15.51 Q^*)}, \text{ where } 0.1823 < Q^* < 0.3333 \tag{80}$$

$$CCD = 100, \text{ where } Q^* \geq 0.3333 \tag{81}$$

WET TEST DILUTION SERIES

All WET testing utilizes a 0.75 dilution series as described in Table 3 and Table 4. Because of the criteria for selection of the type of WET test required, the lowest possible CCD is 10%, corresponding to a Q^* value of 0.054. At values of $Q^* < 0.054$, only acute testing is required. At CCDs between 75% and 95%, an additional 100% effluent dilution is added to the series in order to bracket the critical dilution. Bracketing is considered unnecessary at CCDs above 95%.

TABLE 3: 0.75 DILUTION SERIES FOR CRITICAL DILUTIONS FROM 10% THROUGH 75%

Percent Effluent					
Dilution 1	Dilution 2	Dilution 3	Dilution 4 (Critical Dil)	Dilution 5	Dilution 6
4.2	5.6	7.5	10	13	---
4.6	6.2	8.3	11	15	---
5.1	6.8	9.0	12	16	---
5.6	7.5	10	13	17	---
5.9	7.9	11	14	19	---
6.3	8.4	11	15	20	---
6.8	9.0	12	16	21	---
7.2	9.6	13	17	23	---
7.6	10	14	18	24	---
8.0	11	14	19	25	---
8.4	11	15	20	27	---
9.0	12	16	21	28	---
9.3	12	17	22	29	---

Percent Effluent					
Dilution 1	Dilution 2	Dilution 3	Dilution 4 (Critical Dil)	Dilution 5	Dilution 6
9.7	13	17	23	31	---
10	14	18	24	32	---
11	14	19	25	33	---
11	15	20	26	35	---
11	15	20	27	36	---
12	16	21	28	37	---
12	16	22	29	39	---
13	17	23	30	40	---
13	17	23	31	41	---
14	18	24	32	43	---
14	19	25	33	44	---
14	19	26	34	45	---
15	20	26	35	47	---
15	20	27	36	48	---
16	21	28	37	49	---
16	21	29	38	51	---
16	22	29	39	52	---
17	23	30	40	53	---
17	23	31	41	55	---
18	24	32	42	56	---
18	24	32	43	57	---
19	25	33	44	59	---
19	25	34	45	60	---
19	26	35	46	61	---
20	26	35	47	63	---
20	27	36	48	64	---
21	28	37	49	65	---
21	28	38	50	67	---
22	29	38	51	68	---
22	29	39	52	69	---
22	30	40	53	71	---
23	30	41	54	72	---
23	31	41	55	73	---
24	32	42	56	75	---
24	32	43	57	76	---
24	33	44	58	77	---
25	33	44	59	79	---
25	34	45	60	80	---
26	34	46	61	81	---
26	35	47	62	83	---
27	35	47	63	84	---
27	36	48	64	85	---

Percent Effluent					
Dilution 1	Dilution 2	Dilution 3	Dilution 4 (Critical Dil)	Dilution 5	Dilution 6
27	37	49	65	87	---
28	37	50	66	88	---
28	38	50	67	89	---
29	38	51	68	91	---
29	39	52	69	92	---
30	39	53	70	93	---
30	40	53	71	95	---
30	41	54	72	96	---
31	41	55	73	97	---
31	42	56	74	99	---
32	42	56	75	100	---

TABLE 4: 0.75 DILUTION SERIES FOR CRITICAL DILUTIONS FROM ABOVE 75%

Percent Effluent					
Dilution 1	Dilution 2	Dilution 3	Dilution 4	Dilution 5 (Critical Dil)	Dilution 6
24	32	43	57	76	100
24	32	43	58	77	100
25	33	44	59	78	100
25	33	44	59	79	100
25	34	45	60	80	100
26	34	46	61	81	100
26	35	46	62	82	100
26	35	47	62	83	100
27	35	47	63	84	100
27	36	48	64	85	100
27	36	48	65	86	100
28	37	49	65	87	100
28	37	50	66	88	100
28	38	50	67	89	100
28	38	51	68	90	100
29	38	51	68	91	100
29	39	52	69	92	100
29	39	52	70	93	100
30	40	53	71	94	100
30	40	53	71	95	100
30	41	54	72	96	---
31	41	55	73	97	---
31	41	55	74	98	---
31	42	56	74	99	---
32	42	56	75	100	---

WET TESTING ENDPOINT AND TEST FAILURE CRITERIA

ACUTE TESTS

The endpoint for acute WET testing is the LC₅₀.

Acute test failure is greater than or equal to 50% mortality to a test species in any of the effluent dilutions after 48 hours. Statistical analysis must be consistent with the methods described in the documents referenced in OAC 252:690-3-29(a) and (b).

CHRONIC TESTS

LETHAL EFFECT (SURVIVAL)

The endpoint for lethality for routine chronic WET testing and retesting is the NOEC_L. Chronic lethal effect test failure is a statistically significant difference at the 95% confidence level between survival of the test organisms in an effluent dilution at or below the CCD after 7 or 8 days and the control. Statistical analysis must be consistent with the methods described in the documents referenced in OAC 252:690-3-29(c) and (d). Where a WET limit is established, it is expressed as an NOEC_L and must be greater than or equal to the CCD.

SUBLETHAL EFFECTS

The endpoint for sublethality for routine chronic WET testing and retesting is the NOEC_S. Chronic sublethal effect test failure is a statistically significant difference at the 95% confidence level between reproduction in the *C. dubia* test or larval growth in the Fathead minnow test in an effluent dilution at or below the CCD after three broods or 7 or 8 days, and the control. Statistical analysis must be consistent with the methods described in the documents referenced in OAC 252:690-3-29(c) and (d).

TEST FAILURE NOTIFICATION AND RETESTING

Permittees must notify the DEQ by telephone within 24 hours and in writing within five days of becoming aware of a WET test failure and must perform WET retests on the affected test species.

If a permit contains a WET limit, monthly WET retests of the same type as the failed test are required until the permittee achieves three consecutive passing retests, at which time the permittee returns to the routine WET testing frequency.

If a permit does not contain a WET limit, two monthly WET retests of the same type as the failed test are required during the two-month period following the month in which the test failure is experienced. The first retest must be initiated no sooner than 20 days and no longer than 40 days past the initial test failure. If the routine testing frequency is monthly, a retest may be used to fulfill a routine testing requirement only if a routine test would have been required for that month. If the routine testing frequency is other than monthly, neither of the retests may be substituted for routine WET testing.

Retests required as a result of acute test failure only are not required to include chronic retesting. Similarly, retests required as a result of chronic test failure only are not required to include acute retesting.

CONCURRENT CHEMICAL-SPECIFIC SAMPLING AND ANALYSIS

The DEQ may require concurrent chemical-specific analyses on samples collected for WET testing purposes where there is reason to believe substances may cause or contribute to whole effluent toxicity. Permittees must submit the results of concurrent chemical-specific testing with the WET test report. Permittees must collect sufficient sample volumes for the testing laboratory to perform concurrent chemical-specific testing in addition to the WET testing.

TOXICITY REDUCTION EVALUATIONS/TOXICITY IDENTIFICATION EVALUATIONS (TRES/TIES)

Where the permittee has demonstrated intermittent lethality in either acute or chronic WET testing, the DEQ will require an increase in the frequency of WET testing and may require the permittee to perform a TRE/TIE for the affected species. A WET limit, chemical-specific numerical limit, or toxicity-specific management practices may be required at the completion of a TRE/TIE if the DEQ determines it is warranted. Where the permittee has demonstrated persistent sublethality in chronic WET testing, the DEQ will require an increase in the frequency of WET testing and may require the permittee to perform a TRE/TIE for the affected species. Permit provisions for toxicity-specific management practices may be established to control persistent sublethality.

WET TEST DILUTION WATER

For discharges where there is no receiving water available when the sample is collected, permittees must use synthetic dilution water having a pH, hardness, and alkalinity similar to that of the closest downstream perennial water.

For discharges to perennial streams, permittees must use receiving water collected as close to the point of discharge as possible but unaffected by the discharge. Receiving water must be collected outside the regulatory mixing zone for discharges to lakes. If the receiving water control fails to fulfill the test acceptability criteria in OAC 252:690-3-38, the permittee must substitute synthetic dilution water for the receiving water in all subsequent tests, provided:

- a synthetic dilution water control which fulfills the test acceptability requirements in OAC 252:690-3-38 was run concurrently with the receiving water control.
- the test indicating receiving water toxicity was carried out to completion.
- the synthetic dilution water had a pH, hardness and alkalinity similar to that of the receiving water, provided the magnitude of these three parameters did not cause toxicity in the synthetic dilution water.

WET TESTING FREQUENCY

All biomonitoring permits require quarterly WET testing at least during the first year of renewed permit. New permits require quarterly WET testing for the life of the permit

Monitoring frequency reductions may be granted in accordance with OAC 252:690-3-42 after completion of a trial period as described in OAC 252:690-3-41(b).

TRIAL PERIOD

The length of the WET testing trial period will be established by the DEQ based on whether and to what degree a facility poses an increased toxicity risk due to the nature of its activities (e.g., accepting external waste streams, a history of WET test failures, or reported discharges of toxic compounds in toxic amounts). The minimum WET testing trial period is one year. The length of the WET testing trial period will be specified in the permit. If the DEQ determines that an increased toxicity risk so warrants, quarterly or more frequent testing may be required for the life of the permit.

WET TESTING FREQUENCY REDUCTIONS

Permittees may request reduction of the WET testing frequency for the remaining term of the permit depending on the results of WET testing during the WET testing trial period. To qualify for a WET testing frequency reduction, the permittee must certify that tests submitted in fulfillment of its WET testing requirements during the WET testing trial period meet all test acceptability criteria set forth in OAC 252:690-3-38 and EPA WET test method documents. In addition the following apply:

WET LIMIT ESTABLISHED IN PERMIT

Reductions in WET testing frequency are not allowed during the first five years of applicability of a WET limit. The DEQ may consider a reduced testing frequency when the permit is renewed, based on the WET testing results during the term of the then previous permit.

ELIGIBILITY

To be eligible for a WET test frequency reduction under this provision, the permittee must:

- demonstrate no lethal or sublethal test failures for either test species during the WET testing trial period, and
- certify in writing to the DEQ that it has fulfilled the test acceptability requirements set forth in OAC 252:690-3-38.

APPROVAL OF CERTIFICATION

The DEQ will either approve or deny the certification in writing within 90 days of receipt. The DEQ may deny the certification based on facility specific criteria if it finds that any of the permittee's WET test reports during the period for which certification is submitted:

- are substantively incomplete,
- are in error regarding test acceptability criteria or statistical interpretation of results; or
- were not received by the DEQ by the due date prescribed in the permit.

TEST FAILURE DEMONSTRATED DURING THE WET TESTING TRIAL PERIOD

If a lethal test failure is demonstrated at any time during the WET testing trial period, the permittee must continue testing at a frequency of once per quarter for the affected species for the remaining life of the permit upon completion of the WET testing trial period. If a sublethal test failure is demonstrated at any time during the WET testing trial period, the permittee must continue testing at a frequency of once per quarter for the affected species until no sublethal effects are demonstrated for four consecutive quarters. Following this demonstration, the DEQ may reduce the testing frequency for the affected species to twice per year. The DEQ may reduce the testing frequency for the species not affected, if applicable, to not less than twice per year for the remaining term of the permit, provided the permittee submits the certification prescribed in OAC 252:690-3-42(b) for the unaffected species.

POLLUTANT-SPECIFIC EFFLUENT MONITORING REQUIREMENTS

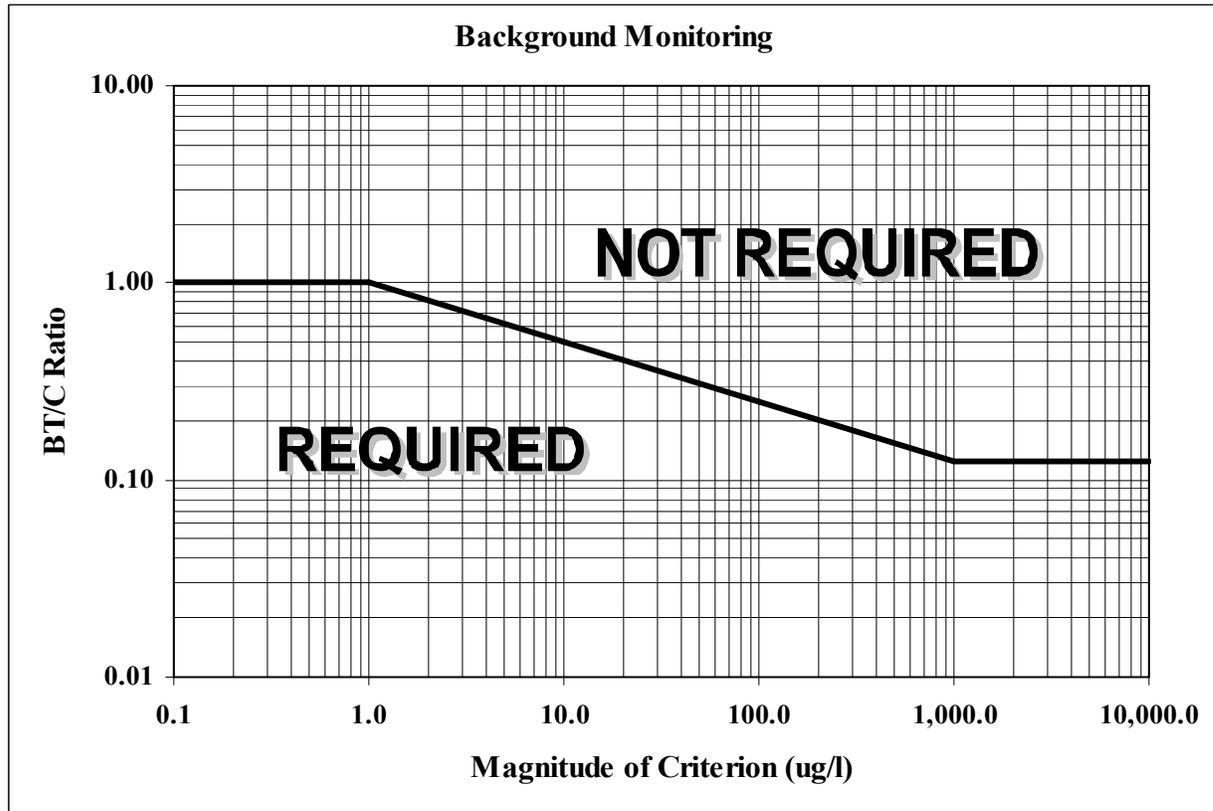
Should reasonable potential to exceed an applicable water quality criterion be exhibited using $C_{95(M)}$ (refer to section B.2.b(3)(b)(i)), an effluent monitoring requirement for that pollutant is established in the permit in accordance with OAC 252:690-3-90 such that at least 10 data points are obtained within a 12 month time frame. The permit must also require that the laboratory reports for such effluent samples be submitted to the DEQ at the conclusion of the monitoring period.

WATER QUALITY-BASED BACKGROUND MONITORING REQUIREMENTS

Background monitoring requirements are described at OAC 252:690-3-12 through 3-13. The BT/C (background trigger/criterion) ratio is used to determine if background monitoring is justified where effluent limits are not established for a substance and a complete background data set is not available. The background trigger for an applicable numerical criterion is defined as the background concentration in a specific discharge situation necessary to trigger reasonable potential for a substance given a specified mean effluent concentration. Where the BT/C ratio is less than 1.0, C_{95} exceeds the associated water quality criterion, indicating that reasonable potential could be exhibited were the background level high enough. If the BT/C ratio is less than or equal to a certain threshold concentration, called $(BT/C)_{max}$, which is a function of the value of each applicable criterion, background monitoring is required. This need occur (i.e., where $BT/C \text{ ratio} \leq (BT/C)_{max}$) for only one applicable criterion to require the background monitoring. The background monitoring frequency must be sufficient to provide at least 10 data points over a period of one year.

The value of the $(BT/C)_{max}$ threshold decreases as the magnitude of a criterion increases. In this manner, background monitoring is more likely to be required for pollutants with criteria of very low magnitude, where knowledge of the background level is more critical in the reasonable potential screening process. This relationship is illustrated in Figure 19.

FIGURE 19: (BT/C)_{MAX} THRESHOLD FOR BACKGROUND MONITORING



Background samples in streams must be collected at a point away from the stream bank, as close as is feasible to the channel, immediately upstream of the point of discharge, but not affected by it. Background samples in lakes must be collected at a point away from the waters edge and outside the regulatory mixing zone.

EXPRESSING WATER QUALITY-BASED EFFLUENT LIMITATIONS

Limits must be expressed clearly in the permit so that they clearly are enforceable and unambiguous. All limits, both chemical specific and whole effluent, should appear in the permit.

MASS-BASED EFFLUENT LIMITS

Mass-based effluent limits are required by NPDES regulations at 40 CFR 122.45(f). The regulation requires that all pollutants limited in NPDES permits have limits, standards, or prohibitions expressed in terms of mass with three exceptions, including one for pollutants that cannot be expressed appropriately by mass. Examples of such pollutants are pH, temperature, radiation, and whole effluent toxicity. Mass limitations in terms of pounds per day can be calculated for all chemical-specific toxics such as arsenic or chromium. Mass-based limits should be calculated using concentration limits at the same effluent flow used to calculate the WLA. This is done as:

$$\text{Daily Max Concentration Limit} \times Q_e \times 8.34 = \text{Daily Max Mass Loading Limit, and}$$

$$\text{Monthly Avg Concentration Limit} \times Q_e \times 8.34 = \text{Monthly Avg Mass Loading Limit,}$$

where concentration is expressed in mg/L, flow in MGD and mass loading in lb/day.

CONCENTRATION-BASED EFFLUENT LIMITS

Mass-based effluent limits alone may not assure attainment of water quality standards in water with low dilution. In these waters, the quantity of effluent discharged has a strong effect on the instream dilution and the instream pollutant concentration. In this situation, it is the effluent concentration rather than the effluent mass discharge that dictates the instream concentration. In addition, concentration is a most often a readily apparent measure of treatment performance. Including concentration limits encourages the proper operation of the treatment facility at all times.

In some instances, the use of concentration limits may be counter-productive since they may discourage the use of innovative techniques such as water conservation. If a facility has a history of providing efficient treatment of its wastewater and also wishes to practice water conservation, inclusion of concentration limits would probably not be appropriate. Flow reductions and their associated energy savings should be encouraged where appropriate by allowing water quality-based permit limits to be mass-based and by allowing concentration based limits to vary in accordance with flow reduction requirements.

Therefore, effluent limitations should usually be expressed in terms of both concentration and mass loading. Concentration-based limits may be waived if a discharger can demonstrate, on a site-specific basis, that concentration-based limits are not appropriate and that sufficient dilution exists to provide an adequate margin of safety to protect the WLA.

DETECTION LEVEL LIMITS

Where water quality-based limits are calculated which are below the MQL for that particular pollutant, a level of compliance will be established in the permit based upon the MQL. The calculated water quality-based limit will be placed in the permit and if any analytical test result for that pollutant is less than the MQL a value of zero may be used for monitoring report calculations and reporting requirements, provided that the analytical detection level is reported in the comments section of the DMR. If a pollutant is of particular concern (i.e., if the pollutant has a high bioconcentration factor) the permittee may also be required to develop an effluent specific method detection limit. Additional requirements such as fish tissue collection and analyses, limits and/or monitoring requirements on internal waste streams, and limits and/or monitoring for surrogate parameters may also be required in the permit.

EFFLUENT MONITORING FREQUENCY

A minimum of two samples per month is required for those pollutants for which water quality-based limits are developed from acute toxicity, chronic toxicity, human health or raw water column criteria. However, a number of factors must be considered in establishing monitoring frequency. These factors include:

- The type of treatment process, including retention time.
- Environmental significance and nature of the pollutant or pollutant parameter.
- Cost of monitoring relative to the discharger's capabilities and benefit obtained.
- Compliance history.
- Number of monthly samples used in developing the permit limit.
- Effluent variability.

Therefore, monitoring frequency is usually determined on a case specific basis for each discharger. For municipal dischargers, a minimum frequency of testing for conventional pollutants is based on the requirements listed in the following tables taken from OAC 252:605, Appendix D.

TABLE 5: DISCHARGING LAGOONS

PARAMETERS & SAMPLE SITE	DESIGN CAPACITY (MGD)					
	0 < 0.1	0.1 < 0.5	0.5 < 1.0	1.0 < 5.0	5.0 < 10.0	≥10.0
PH-EACH CELL & EFFLUENT	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk
D.O.-EACH CELL & EFFLUENT	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk
ALKALINITY-EACH CELL & EFFLUENT	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk
TEMPERATURE-EACH CELL & EFFLUENT	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk
FLOW-EFFLUENT	2/wk Instantaneous	5/wk Instantaneous	7/wk Totalized	7/wk Totalized	7/wk Totalized	7/wk Totalized
BOD ₅ -INFLUENT & EFFLUENT	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
TSS-EFFLUENT	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
APPEARANCE OF EFFLUENT	2/wk	2/wk	2/wk	2/wk	2/wk	2/wk

TABLE 6: TRICKLING FILTER PLANTS

PARAMETERS & SAMPLE SITE	DESIGN CAPACITY (MGD)					
	0 < 0.1	0.1 < 0.5	0.5 < 1.0	1.0 < 5.0	5.0 < 10.0	≥10.0
PH-EACH INFLUENT & EFFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
D.O.-EFFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
TEMPERATURE-EFFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
SETTLEMENT SOLIDS-INFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
FLOW	Daily	Daily	Daily	Daily	Daily	Daily
BOD ₅ -INFLUENT & EFFLUENT	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
TSS-INFLUENT & EFFLUENT	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
CHLORINE RESIDUAL (ONLY IF CL IS ADDED AS PART OF TREATMENT)	Daily	Daily	Daily	Daily	Daily	Daily

TABLE 7: ACTIVATED SLUDGE FACILITIES (INCLUDING EXTENDED AERATION, OXIDATION DITCHES, AND SEQUENTIAL BATCH REACTORS)

PARAMETERS & SAMPLE SITE	DESIGN CAPACITY (MGD)					
	0 < 0.1	0.1 < 0.5	0.5 < 1.0	1.0 < 5.0	5.0 < 10.0	≥10.0
PH INFLUENT & EFFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
D.O.-EFFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
TEMPERATURE- EFFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
SETTLABLE SOLIDS-INFLUENT	Daily	Daily	Daily	Daily	Daily	Daily
FLOW	Daily	Daily	Daily	Daily	Daily	Daily
BOD ₅ -INFLUENT & EFFLUENT	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
TSS-INFLUENT & EFFLUENT	1/mo grab	2/mo grab	3/mo 3 hr comp	1/wk 6 hr comp	5/wk 12 hr comp	7/wk 12 hr comp
BOD ₅ AND TSS EFFLUENT FOR SBR PROCESS	1/mo single composite SBR sample	2/mo single composite SBR sample	3/mo single composite SBR sample	1/wk 2-cycle composite SBR sample	5/wk 3-cycle composite SBR sample	7/wk 3-cycle composite SBR sample
CHLORINE RESIDUAL (IF CL ADDED AS PART OF TREATMENT)	Daily	Daily	Daily	Daily	Daily	Daily
30 MINUTE SETTLEABILITY-MIXED LIQUOR	Daily	Daily	Daily	Daily	Daily	Daily
SLUDGE VOLUME INDEX	2/wk	2/wk	3/wk	3/wk	5/wk	7/wk
D.O.-AERATION BASINS	2/wk	2/wk	3/wk	3/wk	5/wk	7/wk
WASTE ACTIVATED SLUDGE CONTROL TESTS-SELECT 1, 2, OR 3 BELOW- 1. FOOD/MASS 2. MEAN CELL 3. SLUDGE AGE	as to necessary control operation		3/wk	3/wk	3/wk	3/wk

TABLE 8: AEROBIC DIGESTERS

PARAMETERS & SAMPLE SITE	DESIGN CAPACITY (MGD)					
	0 < 0.1	0.1 < 0.5	0.5 < 1.0	1.0 < 5.0	5.0 < 10.0	≥10.0
D.O.-BASIN CONTENTS	2/wk	2/wk	3/wk	5/wk	7/wk	7/wk
PH-BASIN CONTENTS	2/wk	2/wk	3/wk	5/wk	7/wk	7/wk
% VOLATILE SUSPENDED SOLIDS DESTRUCTION	None	None	None	None	3/wk	3/wk
% SOLIDS	None	None	None	when drawn	when drawn	when drawn

TABLE 9: ANAEROBIC DIGESTERS

PARAMETERS & SAMPLE SITE	DESIGN CAPACITY (MGD)					
	0 < 0.1	0.1 < 0.5	0.5 < 1.0	1.0 < 5.0	5.0 < 10.0	≥10.0
pH	1/wk	1/wk	3/wk	5/wk	7/wk	7/wk
TEMPERATURE	1/wk	1/wk	3/wk	5/wk	7/wk	7/wk
VOLATILE ACIDS	when drawn	when drawn	2/wk	3/wk	3/wk	3/wk
TOTAL ALKALINITY	when drawn	when drawn	2/wk	3/wk	3/wk	3/wk
% VOLATILE SUSPENDED SOLIDS	None	None	None	None	3/wk	3/wk
% SOLIDS	None	None	None	when drawn	when drawn	when drawn

PERFORMANCE-BASED MONITORING REDUCTIONS

NPDES authorities can grant relief to regulated facilities that have a record of good compliance and pollutant discharges at levels below permit requirements. This relief provides incentives for voluntary reductions of pollutant discharges through such means as reuse and recycling. The approach outlined below is based on EPA's "Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies" (April 1996). It applies to both major and minor individual NPDES permits for direct discharges, and will be implemented through the existing NPDES permitting cycle for facilities.

TIMING OF DECISIONS

Monitoring reductions will be considered during permit reissuance. Reductions based on facility performance may also be considered if the permit is reopened to accommodate other issues. ODEQ may modify the permit solely to reduce monitoring requirements if sufficient resources are available.

ENTRY CRITERIA FOR PARTICIPATION**FACILITY ENFORCEMENT HISTORY****CRIMINAL ACTIONS (ALL ENVIRONMENTAL STATUTES)**

Facilities which have been criminally convicted under any federal or state environmental statute of falsifying monitoring data or committing violations, which presented an imminent and substantial endangerment to public health or welfare are permanently ineligible for performance-based monitoring frequency reductions. The sole exception shall be that, whenever the permit writer, on a case-by-case basis, determines that there has been a wholesale change in ownership and management, that facility may become eligible for consideration under this guidance as a new permittee. Facilities convicted of any other criminal violation under federal or state environmental statute will not receive any reductions for five years. Reductions will be available for those facilities where an individual employed by the permittee, but not the permittee itself, was convicted of a criminal violation under any federal or state statute, provided the permittee discovered and self-disclosed the violation, and took prompt action to correct the root cause in order to prevent future criminal violations.

CIVIL JUDICIAL ACTIONS (CWA/NPDES/OPDES RELATED)

Facilities are eligible for consideration of reductions one year after completion of injunctive relief and payment of penalty.

ADMINISTRATIVE ACTIONS (CWA/NPDES/OPDES RELATED)

Facilities are eligible for consideration after the permittee has complied with Administrative Penalty Order (APO) or Administrative Order (AO) requirements, and payment of any assessed penalty. A permittee that is issued an AO, in conjunction with reissuance of its permit, to extend a compliance schedule, may be eligible if the permittee is in compliance with the interim milestones and schedule in the AO.

For example, in order to comply with a newly promulgated effluent guideline, an industrial sector may be required to install a new technology. Some facilities may not be able to attain the new technology immediately so an AO is issued at the time the facility's permit is reissued. The AO sets a compliance schedule to allow the permittee additional time to install the technology needed to meet the new effluent guideline limitation.

PARAMETER-BY-PARAMETER COMPLIANCE

ODEQ will examine each of the following entry criteria:

SIGNIFICANT NONCOMPLIANCE FOR PARAMETERS UNDER CONSIDERATION

A facility may not have had any Significant Noncompliance (SNC) violations for the parameters for which monitoring/reporting reductions are being considered during the last two years.

ANY EFFLUENT VIOLATIONS OF SELECTED PARAMETERS

A facility may not have had any effluent violations of selected (critical) pollutants during the last year. These critical pollutants are permit-specific and are determined at the DEQ's discretion. Typical of such pollutants - would be those, which are highly toxic or bioaccumulative.

PARAMETER-BY-PARAMETER PERFORMANCE HISTORY

At a minimum, the two most recent years of monthly average effluent data representative of current operating conditions for the parameter at the particular outfall will be used to calculate the long-term average discharge rate for use in Table 10 and Table 11.

The baseline frequencies in Table and Table below will normally be considered the level of monitoring in the existing effective NPDES permit. It is important to recognize that permittees that receive monitoring frequency reductions in accordance with Table 10 or Table 11 are still expected to take all appropriate measures to control both the average level of pollutants of concern in their discharge as well as the variability of such parameters in the discharge, regardless of any reductions in monitoring frequencies granted from the baseline levels. Reliance on monitoring the discharge at a reduced frequency as the sole means of tracking and controlling the discharge could increase the risk of violations. Monitoring frequency reductions for facilities with one or more permit violations (short of significant noncompliance and) for the parameter under consideration (which may not be a "critical" parameter) over the two-year period of record are found in

Table 10. Monitoring frequency reductions for facilities with no permit violations over the two-year period of record are found in Table 11.

New permittees should go through one permit cycle (5 years) before being eligible for consideration for reduced monitoring.

Facilities would not normally be considered for reductions in monitoring frequencies below once per quarter, except in unusual circumstances of highly reliable performance at the requisite levels and outstanding compliance/enforcement histories.

Ideally, parameters, which are candidates for monitoring frequency reductions should demonstrate a coefficient of variation (ratio of standard deviation to arithmetic average) of 20% or less. An additional safeguard should stipulate that parameters, which showed any exceedance of the monthly average limitation during the two-year averaging period should not be eligible for monitoring frequency reductions. It should be noted that discharges with a long-term average at or near the permit limit have a probability of reporting a violation approximately 50% of the time, regardless of low coefficient of variation or sample size.

MASS LOADING-EQUIVALENT CONCENTRATIONS

If a permit contains a monthly average mass loading limit, but not a monthly average concentration limit, the equivalent monthly average concentration limit may be derived from the monthly average mass loading limit and the flow basis (the high 30-day average flow during the two year period of record for industrial facilities and the design flow for municipal facilities). Performance-based monitoring frequency reductions shall not be based on a weekly average, a daily minimum or a daily maximum concentration limit.

TABLE 10: PERFORMANCE BASED MONITORING FREQUENCY REDUCTIONS (ONE OR MORE PERMIT VIOLATIONS DURING TWO YEAR PERIOD OF RECORD NOT RESULTING IN SIGNIFICANT NONCOMPLIANCE)

Baseline Monitoring Frequency (previous permit)	Ratio (Percent) of Long-term Average Effluent Concentration for Two Year Period of Record to Monthly Average Concentration Limit ^a				
	< 25%	≥25% and <50%	≥50% and <65%	≥65% and <75%	≥75%
7/week (daily)	3/week	4/week	5/week	6/week	NR
6/week	3/week	4/week	4/week	5/week	NR
5/week	3/week	3/week	4/week	NR	NR
4/week	2/week	3/week	NR	NR	NR
3/week	2/week	2/week	NR	NR	NR
2/week	1/week	NR	NR	NR	NR
1/week	2/month	NR	NR	NR	NR
2/month	NR	NR	NR	NR	NR
1/month	NR	NR	NR	NR	NR

^a NR means “no reduction”

TABLE 11: PERFORMANCE BASED MONITORING FREQUENCY REDUCTIONS (NO PERMIT VIOLATIONS DURING TWO YEAR PERIOD OF RECORD)

Baseline Monitoring Frequency (previous permit)	Ratio (Percent) of Long-term Average Effluent Concentration for Two Year Period of Record to Monthly Average Concentration Limit ^a				
	< 25%	≥25% and <50%	≥50% and <65%	≥65% and <75%	≥75%
7/week (daily)	2/week	3/week	4/week	5/week	6/week
6/week	2/week	3/week	3/week	4/week	5/week
5/week	1/week	2/week	3/week	4/week	4/week
4/week	1/week	2/week	2/week	3/week	NR
3/week	1/week	2/week	2/week	NR	NR
2/week	2/month	1/week	1/week	NR	NR
1/week	1/month	2/month	NR	NR	NR
2/month	1/month	NR	NR	NR	NR
1/month	1/2 months	NR	NR	NR	NR
1/2 months	NR	NR	NR	NR	NR

^a NR means “no reduction.”

RESIDENCY CRITERIA FOR CONTINUED PARTICIPATION

Permittees are expected to maintain the performance levels that were used as the basis for granting monitoring reductions. To remain eligible for these reductions, the permittee may not have any SNC violations for effluent limitations of the parameters for which reductions have been granted or failure to submit DMRs, or may not be subject to a new formal enforcement action. For facilities that do not maintain performance levels, the permitting authority may require increased monitoring in accordance with a Section 308 or 309 Order (or State equivalent).

SPECIAL CONSIDERATIONS

DISCONTINUOUS DATA

Monitoring should not be reduced using the methodology described above if effluent data have not been continuously reported over the period of time being considered. Effluent averages from interrupted or discontinuous data sets may not be representative of long-term performance. Monitoring frequencies for discharges that are intermittent or short-term, such as seasonal discharges and highly variable batch processes, should not be assessed or reduced using the methods described above and would need to be considered on a case-by-case basis.

INDEPENDENT/DEPENDENT CONTROL PARAMETERS

The procedures for reductions described in this guidance are intended for effluent parameters, which are normally independently controlled by the permittee. That is, for each parameter limited in the permit there should be significantly different control mechanisms/factors—either in the permittee’s treatment, pretreatment or process operations. In situations where there are several parameters, each of which could be used to measure the performance of a given system, it will generally be appropriate to primarily monitor only the best indicator parameter. For example, if a biological treatment system can be evaluated by either BOD, CBOD, COD or TOC measurements, it would normally be appropriate to require monitoring of only one of these oxygen demanding parameters.

The permitting authority should, therefore, examine the parameters being monitored from each facility during the permit issuance process to establish which parameters are independently controlled and/or which can be used to determine the proper operation of a facility. Monitoring of other parameters can be either eliminated or reduced to a minimum frequency.

MONITORING FREQUENCY “FLOOR”

Current federal NPDES regulations do not establish a monitoring frequency “floor” but do establish a reporting frequency floor of once per year. The monitoring frequency from which reductions could be made is considered to be the level of the monitoring in the existing effective NPDES permit. It is important to recognize that the guidance given in Table 11 does not advocate any reductions in statistical confidence in the ability of a permitting authority to determine whether or not a permit limit is being violated at reduced monitoring frequencies. The guidance also does not advocate any reductions for parameters that are currently monitored only once per quarter.

The permitting authority may, however, consider other factors specific to the State or facility. For example, a State policy may establish the baseline. If a facility has already been given monitoring reductions due to superior performance, the baseline may be a previous permit. As a point of reference, federal regulations do not stipulate minimum monitoring frequencies but do require that reporting cannot be less than once per year. Future guidance may also be used to establish a baseline for monitoring.

EXCEPTIONS

The permitting authority may elect to maintain higher monitoring levels in individual situations where there may be a particular interest in human health, endangered species or a sensitive aquatic environment. An example would be where a permitting authority has assessed water quality problems in a watershed and determined which point and nonpoint sources are particularly critical from the standpoint of protection of aquatic resources (e.g., endangered species) and human health (e.g., drinking water source). The permitting authority may well decide not to reduce monitoring of critical point sources in these instances, while continuing to monitor the overall situation.

APPLICABILITY TO MINOR FACILITIES

Minor facilities are fully eligible for reductions under this guidance, even though they are not automatically tracked for SNC in the Permits Compliance System database. (Avoidance of SNC is one of the minimum criteria that should be met for participation in this program.) However, permitting authorities may apply the SNC criteria on a case-by-case basis to minor facilities in order to allow them to participate in this program based on permit-specific effluent compliance.

LIMITS BELOW LEVELS OF DETECTION

Reductions in monitoring frequencies are not recommended in cases where stringent water quality-based limits are below levels of quantification (the level at which a constituent present in a wastewater sample can be reliably detected and quantified). Permittees with these types of limits will normally be deemed to be in compliance when monitored levels are below the level of quantification; however, by definition, it is not scientifically possible (until analytical methods improve) to certify that the water quality based limits are actually being achieved. However, the permitting authority may still use its discretion in considering reductions on a case-by-case basis.

USE OF DAILY MAXIMUM VALUES

This guidance does not provide a specific methodology for considering daily maximum permit values when considering monitoring/reporting reductions. However, EPA is in the process of implementing a revised definition of SNC that accounts for daily maximum violations. The new definition will be included in the entry criteria of this guidance at a later date. In the interim, permitting authorities should consider such situations on a case-by-case basis. There may be concerns over instances where, for example, there are acutely toxic conditions in a receiving water due to violations of daily maximum permit limitations. In such cases, the permitting authority may elect to maintain higher monitoring levels. In addition, it is important to recognize that dischargers who frequently violate daily maximum permit limitations will likely be unable to achieve high levels of performance in monthly average limits and effectively would not be eligible to participate in this program on that basis. In addition, such facilities may also trigger one of the various compliance/enforcement-based entry criteria.

THE TMDL PROCESS

The Total Maximum Daily Load (TMDL) process provides a reasonable, technically sound, and consistent procedure for measuring and managing the impact of point and non-point source discharges on the quality of Oklahoma waterbodies. State water quality standards (WQS) serve as the benchmark from which to measure these impacts. Recommended reductions in pollutant loadings developed as part of the TMDL process serve as a framework within which the various State agencies can work to ensure that both point and non-point source discharges do not contribute to violations of water quality standards.

Water quality standards include three elements: designated beneficial uses, narrative or numerical criteria (physical, chemical, and biological) to protect the designated beneficial uses, and an antidegradation policy. Waters identified as not meeting any one of these components of water quality standards require the development and implementation of water-quality based point and non-point source pollution control measures.

Before The TMDL Process begins, a modeling Quality Assurance Project Plan (QAPP_ will be developed and submitted to EPA for review and approval before starting modeling work for each EPA funded TMDL/WLA project.

The TMDL process begins by determining which waters do not meet, or are not expected to meet, water quality standards after the implementation of technology-based controls. Waters identified through this process are considered impaired and must be prioritized so that an overall management plan can be developed to reduce the excess pollutants. Then, the quantity and quality of pollutant sources is determined. Once quantified, reductions for point source and non-point sources that are protective of water quality standards are determined. After these reductions are implemented, a follow-up assessment is made to determine their effectiveness.

THE TMDL OBJECTIVE

The objective of a TMDL is to achieve water quality standards by allocating allowable loads and implementing appropriate control actions on the various pollutant sources.

The first step in developing a TMDL involves establishing a goal, or target, which is usually related to achieving a particular numerical or narrative water quality criterion. Because of the complexity of the WQS, this goal may be specific to a particular pollutant or may involve a number of pollutants. In addition, this goal may be set differently depending on the type of waterbody. Multiple targets are appropriate in cases where different requirements must be applied to different points in the waterbody or where differing requirements are associated with multiple uses. A phased approach can be appropriate in some cases.

ASSESSMENT OF EXISTING CONDITIONS

WATER QUALITY

The first step in assessing the current conditions is to gather available data and information on the water body. At a minimum, obtain the water quality data (if available) that was used for listing the water body. When Federal funds are committed to a project then a quality assurance project plan (QAPP) will be developed for all data collection activities.

EXISTING DATA

The sufficiency and adequacy of existing data will be evaluated and described. The DEQ will consider data to be sufficient and adequate when the data accurately characterize the conditions of the water body, watershed, pollutant, and pollutant sources throughout typical geographic and temporal conditions with reasonable certainty.

DATA REQUIREMENTS

Some TMDL projects will require additional watershed information relating to particular water quality conditions, as existing data alone may be insufficient to support the analytical needs of TMDL projects. Data on low-flow conditions, storm-flow conditions, and seasonal variations should be gathered when appropriate to the situation.

POLLUTANT LOAD

Before pollutant loads are allocated among sources, the location and types of sources, and the current and projected pollutant load for each source will be identified. Data needed for pollutant source analysis include:

CURRENT LOADING

Source contributions will be established by measuring pollutant loads directly, calculating or estimating loads from water quality and flow data, estimating loads with mathematical models, or using a combination of these methods.

POLLUTANT SOURCE(S) ANALYSIS

Before pollutant loads are allocated among sources, the location and types of sources, and the current and projected pollutant load (flow, concentration, permit limits) for each source must be identified. Examples of data needed for pollutant source analysis include:

- watershed and sub watershed boundaries
- hydrologic interaction between surface water and groundwater
- locations of stream segments
- locations of pollutant sources
- types of pollutant sources
- anticipated growth of discharges
- meteorological/rainfall data and runoff coefficients
- land uses and land cover
- soil types

DIFFERENTIATE POINT AND NONPOINT SOURCES

An inventory will be developed of all known factors in the watershed, which influence water quality. These factors might include permitted industrial and municipal wastewater discharges, concentrated animal feeding operations (CAFOs), waste application sites, cropland, forestry operations, industrial stormwater, urban runoff, construction activities, and other sources such as natural background. This information will be collected and maintained by sub watershed where possible to enhance the identification of cause-and-effect relationships. The watershed inventory will be compiled from land-use data, special investigations, DEQ complaint investigations, DEQ permit databases, surface water monitoring data, and watershed stakeholder input.

MAXIMUM ALLOWABLE LOADING NECESSARY TO MEET WATER QUALITY STANDARDS

A water body's loading capacity is an estimate of the maximum amount of pollutant loading the water body considering critical conditions (i.e. flow, temperature, etc.) can receive over time without exceeding water quality standards. Hydrological, biological, chemical, and pollutant fate and transport data are required to calculate a water body's loading capacity. The maximum loading capacities of a waterbody will be determined, in most cases, using a water quality model(s) developed specifically for the waterbody in question. The model used will be selected on a case-by-case basis and based on available resources, the identified pollutant source(s) and the availability of historical water quality data.

ALLOCATION OF LOADINGS

ALLOCATION CONSIDERATIONS

The following factors must be considered and incorporated when developing a loading, unless it is demonstrated that one or more of these factors is not relevant to the particular load allocation:

FUTURE GROWTH

Future growth (such as new sources and source expansion) will be considered when allocating pollutant loads. Loading allocations that will be implemented to achieve water quality standards in the future must account for foreseeable increases in pollutant loading. All anticipated increases in loading should be included in models or other analyses that project water quality responses or conditions into the relatively distant future.

FLOW AND LOAD VARIATIONS

Variability in hydrology and effluent discharge needs to be considered in allocating pollutant loads. The pollutant load and concentration can vary depending on a number of factors, including rainfall and normal seasonal variations.

TEMPORAL VARIATIONS

The period of time over which a total load will be evaluated for the purposes of TMDL loading allocation is a function of hydrologic and seasonal variations in pollutant loads. Determination of an appropriate time frame should focus on watershed conditions, including water quality, hydrology, source locations, and climatic patterns.

ANTIBACKSLIDING

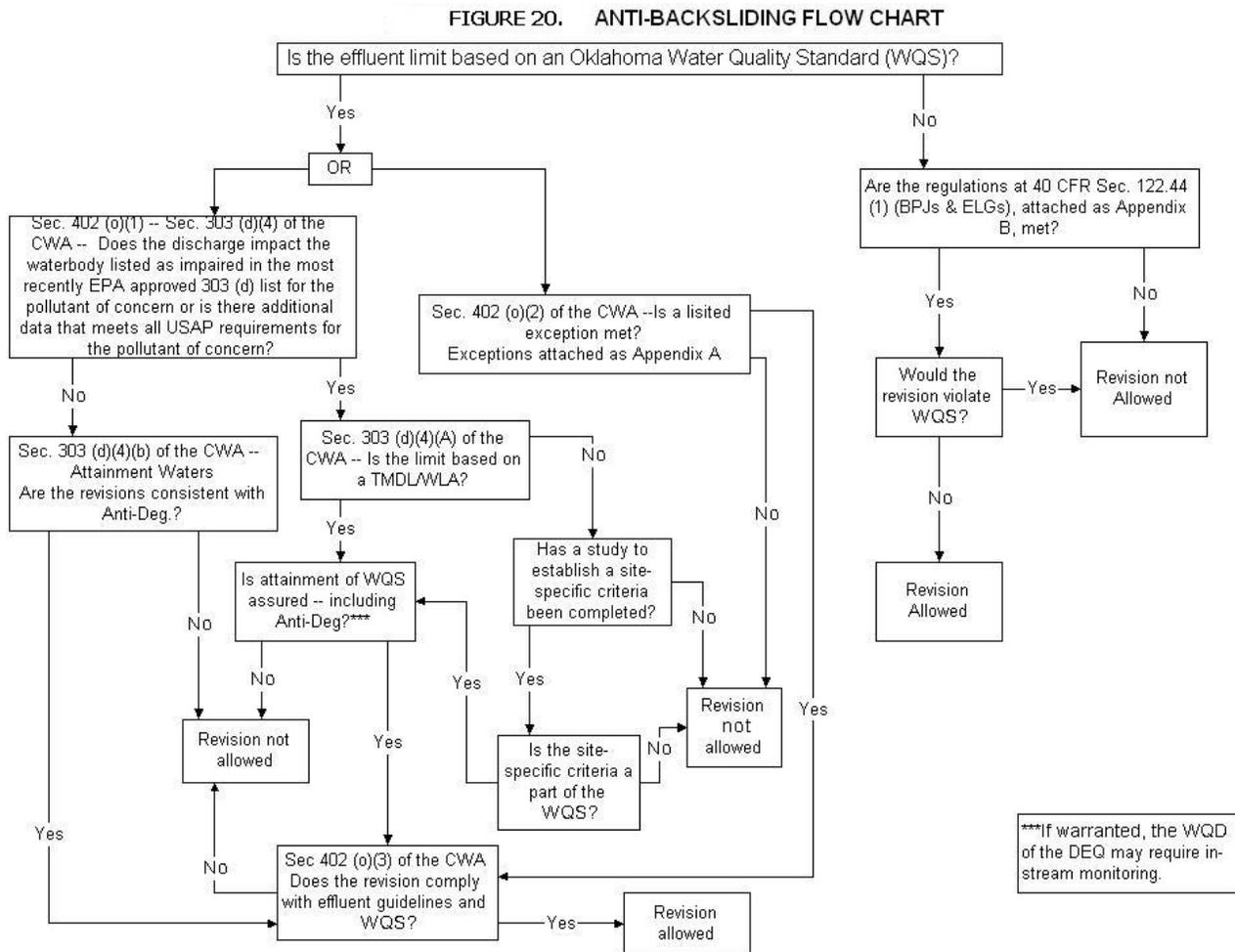
When evaluating loading allocation alternatives, consideration must be given to the constraints imposed by the CWA antibacksliding requirements. These requirements generally prohibit reissuing an OPDES permit with less-stringent technology-based effluent limits than those

contained in an existing permit. Note that a technology-based permit condition cannot be overridden with a less stringent TMDL condition.

The DEQ policy regarding antibacksliding is summarized here and shown in the flowchart (Figure 20). This policy will be used whenever DEQ is considering a less stringent permit limit or is requested by a permittee to make an effluent limit less stringent. An effluent limitation cannot be made less stringent in the following situations:

- The permittee has demonstrated, through reporting, that the permit limit requested to be changed has been met.
- The permit limit is a technology based effluent limit derived from an ELG.
- The permittee previously demonstrated reasonable potential (RP), but currently does not demonstrate RP due to treatment.

In these cases, the effluent limit will not change, but the sampling frequency for the effluent limit may change.



ANTIDegradation

The antidegradation policy in the Oklahoma Water Quality Standards prohibits an increase in loading that would impair or further impair an existing use. In addition, the policy prohibits degradation of outstanding resource waters and high-quality waters, even if designated uses would still be attained. Loading allocations must be consistent with these provisions.

POLLUTANT SOURCES AND SOURCE CATEGORIES

The pollutant load inventory developed during the assessment phase will be further refined to establish a list of pollutant sources and source categories to be used in the load allocation process.

POLLUTION ALLOCATION SCHEMES

Three common methods for allocating loads (equal percent removal, equal effluent concentrations, and a hybrid method) are discussed below. Other methods will be considered if necessary.

EQUAL PERCENT REMOVAL

Equal percent removal exists in two forms. In one, the overall removal efficiencies of the sources are set so they are all equal. In the latter, the incremental removal efficiencies beyond the current discharge are equal.

EQUAL EFFLUENT CONCENTRATION

This is similar to equal percent removal if influent concentrations at all sources are approximately the same.

HYBRID METHOD

With this method, the criteria for waste reduction may not be the same from one source to the next. One source may be allowed to operate unchanged while another may be required to provide the entire load reduction. More generally, a proportionality rule may be assigned that requires the percent removal to be proportional to the input source loading or flow rate.

ALLOCATION TRADEOFFS

Where appropriate and technically feasible, tradeoffs among wasteload allocations will be considered. Technological feasibility, economic issues, and regulatory authority will be evaluated when trading allocations. Pollutant trades are acceptable so long as water quality standards (including antidegradation regulations and policies) and minimum applicable technology-based controls are met.

MARGIN OF SAFETY

The margin of safety (MOS) is the prescribed mechanism to account for the uncertainty associated with TMDL projects. The MOS can be included in more than one of the TMDL analytical steps. To represent the MOS conservative assumptions should be used to complete one or more of these steps:

- derive numeric water quality targets
- determine pollutant sources
- represent pollutant fate and transport relationships
- determine the degree of pollutant reduction achievable through management measures and control actions

LOADING CAPACITY AND ALLOCATIONS

The TMDL loading allocation process culminates in allocating pollutant loads among various point, nonpoint, natural background sources, and margin of safety. The equation and recommendations listed below will be used to develop and evaluate TMDL loading allocations.

LC = WLA + LA + MOS where:

LOADING CAPACITY (LC) is the maximum amount of pollutant loading a water body can receive without violating water quality standards. The LC is equivalent in meaning to the Total Maximum Daily Load, though it may be expressed in terms other than pounds per day.

WASTELOAD ALLOCATION (WLA) is the portion of a receiving water's loading capacity that is allocated to existing and future point sources. The WLA should incorporate the potential for growth in the point sources, such as using a long-range design flow for municipal facilities and flows base on projected growth in commercial sources.

The primary method of allocating wasteloads among multiple point sources is typically determined by priority of permit application and demonstration of need. Subsequent applications for permit, or permit modifications, may be allocated pollutant load only within the established WLA for that pollutant. New dischargers, or increased loadings from existing dischargers to a waterbody may be allowed only to the extent that the existing TMDL can be reallocated among all dischargers, based on demonstration of need, in an equitable manner.

LOAD ALLOCATION (LA) is the portion of a receiving water's loading capacity that is allocated to existing and future nonpoint sources and to natural background sources.

MARGIN OF SAFETY (MOS) or safety factor, is the prescribed mechanism to account for the uncertainty in determining the amount of pollutant load and its effect on water quality. MOS may be incorporated implicitly – using conservative assumptions within calculations or models – or explicitly during allocation of loads, or both. MOS guidelines are shown below:

TABLE 12: MODELING EFFORT/TMDL SAFETY FACTOR

Model	System Complexity	Margin of Safety
Uncalibrated	Multiple Source/Complex Waste	25%
	Single Source/Uniform Waste	20%
Calibrated	Multiple Source/Complex Waste	15%
	Single Source/Uniform Waste	10%
Verified	–	5%

WATER-QUALITY MODELING

The primary tool used in establishing a link between sources and water quality standards in the TMDL process is the water quality model. Results provided in TMDL studies from these models are used to assist in making effective decisions on recommended levels of reduction of pollutant loading. A complete discussion of the process of water quality modeling is beyond the scope of this document. However, the remainder of this section attempts to present the technical framework and policies by which DEQ conducts its water quality modeling exercises.

MIXING ZONES

STREAMS AND RIVERS

Oklahoma's WQS define a regulatory mixing zone for discharges into different types of waterbodies. In streams, the mixing zone extends downstream a distance equivalent to thirteen times the width of the water within the receiving stream at the point of effluent discharge and encompasses 25% of the total stream flow of the $7Q_2$ or 1 cfs, whichever is larger, immediately downstream of the point of effluent discharge. Where overlapping mixing zones occur because of multiple outfalls, the total length of the mixing zone will extend thirteen stream widths downstream from the downstream discharge point. It is important to note that the total stream flow includes both the upstream and the effluent flow.

Dependent on the use being protected a standard may apply in the mixing zone, at the edge of the mixing zone, or after complete mixing. In addition, beneficial uses may change in a waterbody segment. Since the zone of impact of a discharge may extend through multiple waterbody segments this change may result in multiple requirements and targets. In general, if more than one narrative or numerical criteria are assigned to a stream, the most stringent shall be maintained. These multiple requirements should be considered in setting a target for a TMDL.

LAKES

Oklahoma's WQS require that mixing zones for lakes be designated on a case-by-case basis. Dependent on the use being protected a standard may apply in the mixing zone, at the edge of the mixing zone, or after complete mixing. For purposes of implementation of numerical toxics criteria for protection of fish and wildlife, the lake mixing zone extends one hundred feet from the source, unless otherwise specified in the Oklahoma WQS.

The dynamics between lake hydrology, water quality, and attainment of beneficial uses is very complex. For other than numerical toxics criteria for protection of fish and wildlife, implementation of water pollution control strategies for lakes may sometimes be directed more towards a qualitative rather than quantitative objective (e.g., change in trophic state).

As with TMDLs for streams and rivers, multiple requirements may necessitate setting multiple goals. These multiple goals may lend themselves more readily to a phased approach for lakes than for streams and rivers.

LEVEL OF EFFORT

The level of modeling effort necessary to establish an adequate TMDL may vary with the system complexity, potential for environmental impact, sensitivity of the system to the pollutants of concern, available resources, and other factors. Four modeling methods, each having varying levels of effort, are presented below. The levels of analysis are listed in order of increasing complexity, data requirements, and cost of application. In general, the more complicated approaches provide more detailed and accurate analyses, assuming enough data is available for proper model calibration. As a rule, an Uncalibrated Model should be used initially in all modeling analyses. The results from this analysis may then be used to determine if further data collection or analysis is needed.

METHOD 1 – UNCALIBRATED MODEL

This includes any 1-, 2-, or 3-dimensional, steady state or dynamic model in which water quality data and/or kinetics are estimated from existing literature or other data, rather than from an intensive survey. At a minimum, the model should account for the more significant pollutant related transport mechanisms. Model inputs should be based on expected values at critical conditions. Initially, this method should be used for all modeling analyses. Development of a TMDL or wasteload allocation should then be made with regard to the degree of confidence placed in the modeling. An uncertainty

analysis should be performed to assure that variations in critical parameters do not substantially alter the WLA.

CONSERVATIVE SUBSTANCE MIXING ZONE MODEL

The Conservative Substance Mixing Zone Model (Hutcheson, 1992) will be used for calculating effluent wasteload allocation concentrations based on meeting Oklahoma's WQS at the edge of the mixing zone. The following equations are used to calculate the WLA:

$$WLA = C_b + \frac{(1 + Q^*)(C_t - C_b)}{1.94Q^*} \tag{115}$$

when Q* is less than or equal to 0.1823, or

$$WLA = C_b + (6.17 - 15.51Q^*)(C_t - C_b) \tag{116}$$

when Q* is greater than 0.1823 and less than 0.3333, or

$$WLA = C_t \tag{117}$$

when Q* is greater than or equal to 0.3333.

such that

$$WLA \geq C_t \text{ for wasteload allocation purposes}$$

where:

- C = water quality standards criterion
- C_b = background concentration
- Q* = QE/QU
- QE = effluent flow (MGD)
- QU = upstream flow (MGD)

Complete mix mass balance model

A complete mix mass balance model will be used in calculating effluent wasteload allocation concentrations based on meeting Oklahoma's WQS after complete mix in the receiving water. For a single source discharger this can be expressed as:

$$WLA = C + \frac{(C - C_b)}{Q^*} \tag{118}$$

where:

- C = water quality standards criterion
- C_b = background concentration

- Q^* = QE/QU
 QE = effluent flow (MGD)
 QU = upstream flow (MGD)

HORIZONTAL JET MODEL

The horizontal jet model for a simple jet, as described in Section 9.2.1 of *Mixing in Inland and Coastal Waters*, Fischer et al, 1979, can be used to calculate the concentration of a surface plume for lentic waterbodies in the absence of site-specific data. If an applicant can provide site-specific data, this data may be used in lieu of the Fischer model.

The model represents the jet as a constantly spreading fan. Time averaged concentrations can be shown to fit a Gaussian distribution dependent on the width and distance along the centerline of the jet.

The following equations are used to calculate the WLA:

$$\text{pipe:} \quad WLA = C_b + \frac{20.15(C_t - C_b)}{D} \quad (119)$$

when D is greater than or equal to 3 feet, or

$$\text{canal:} \quad WLA = C_b + \frac{4.2(C_t - C_b)}{\sqrt{W}} \quad (120)$$

when W is greater than or equal to 3 feet.

where

- C_t = water quality standards criterion
 C_b = background concentration
 D = pipe diameter in feet
 W = canal width in feet

MULTI-DISCHARGER DESKTOP DISSOLVED OXYGEN MODEL

The Multi-discharger Desktop Model (MULTID) is a Fortran program for performing dissolved oxygen related wasteload allocations for single or multiple dischargers. MULTID should be utilized initially for all modeling analysis as a screening method and to identify model sensitivity to various parameters. Selection of a treatment level should then be made with regard to the degree of confidence placed in the modeling. If the results indicate limits more stringent than technology based, a calibrated/verified model may be required, or desired.

The model is a modified version of the classic Streeter-Phelps formulation. The approach incorporates both carbonaceous (CBOD) and nitrogenous (NBOD) oxygen demands in the analysis, as well as CBOD settling and sediment oxygen demand. Figure 20 shows the interaction between state variables.

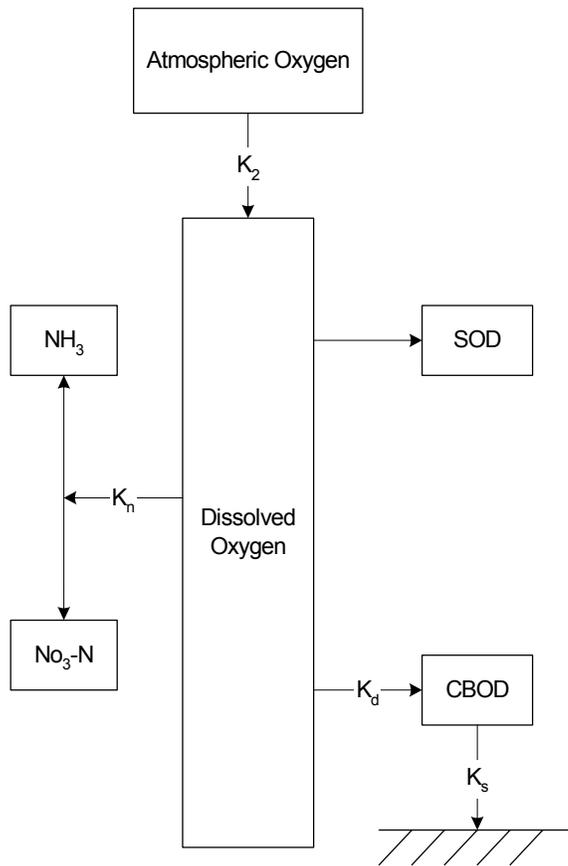
The basis of the model is the principle of conservation of mass. The general transport equation in one dimension for a uniform cross sectional plug flow reactor can be written as:

$$\frac{\partial C}{\partial t} = E \frac{\partial^2 C}{\partial x^2} - U \frac{\partial C}{\partial x} \pm \sum S \quad (121)$$

where:

- C = concentration of dissolved oxygen (mg/L)
- t = time at a stationary point (days)
- U = velocity of flow in the x direction (meters/day)
- E = coefficient of dispersion in the x direction (m²/day)
- x = distance downstream (miles)
- S = sources and sinks of oxygen

FIGURE 21: MULTID OXYGEN BALANCE



When considering streams, the turbulent diffusion (longitudinal mixing) is generally insignificant and equation (121) becomes:

$$\frac{\partial C}{\partial t} = -U \frac{\partial C}{\partial x} \pm \sum S \quad (122)$$

Under low flow conditions steady state is assumed and the above expression can be further simplified to

$$O = -U \frac{dC}{dx} \pm \sum S \quad (123)$$

The more significant sources and sinks of reaeration, carbonaceous biochemical oxygen demand, nitrogenous biochemical oxygen demand, and sediment (benthic) demand, are included in the analysis. If first order rate models are hypothesized for CBOD removal, NBOD removal, and reaeration, these can be written as:

$$\frac{dL}{dt} = -K_r L \quad (124)$$

where:

- $K_r = K_d + K_s$
- $K_r =$ overall rate of CBOD removal from water column
- $K_d =$ instream CBOD decay rate (1/day, base e)
- $K_s =$ CBOD settling rate (1/day, base e)
- $L =$ concentration of CBOD (mg/L)

Solution of this equation, using the boundary condition (B.C.) that $L = L_o$ at $t = 0$, gives:

$$L = L_o e^{(-K_r)t} \quad (125)$$

$$= L_o e^{-(K_d+K_s)t} \quad (126)$$

$$= L_o e^{(-K_d)t} e^{(-K_s)t} \quad (127)$$

For NBOD removal, a semi-empirical approach is used to formulate a 1st order model which represents the overall oxidation rate of the organic plus ammonia nitrogen (the TKN) to nitrate nitrogen:

$$\frac{dL^n}{dt} = -K_n L^n \quad (128)$$

where:

- $K_n =$ NBOD oxidation rate (1/day, base e)
- $L^n =$ concentration of NBOD (mg/L)

Solution of this equation using the B.C. that $L^n = L_o^n$ at $t = 0$ gives:

$$L^n = L_o^n e^{(-K_n)t} \quad (129)$$

The formulation for reaeration can be written as:

$$\frac{dC}{dt} = K_2(C_s - C) \quad (130)$$

where:

K_2 = reaeration rate coefficient (1/day, base e)

C_s = O₂ saturation concentration (mg/L)

If the oxygen deficit is defined as:

$$D = C_s - C \quad (131)$$

substitution into (130) gives:

$$\frac{dD}{dt} = -K_2 D - \frac{dC_s}{dt} \quad (132)$$

If the assumption is made that the temperature, salinity, and pressure are constant in time, then C_s

= constant and $\frac{dC_s}{dt} = 0$. Thus,

$$\frac{dD}{dt} = K_2 D \quad (133)$$

Solution of this equation using the B.C. that $D = D_o$, the initial deficit ($C_s - C_o$), at time $t = 0$, gives:

$$D = D_o e^{(-K_2)t} \quad (134)$$

$$C = C_s - (C_s - C_o) e^{(-K_2)t} \quad (135)$$

The final sink included in the analysis is sediment oxygen demand, which is usually formulated as a zero order model:

$$\frac{dC}{dt} = -\frac{SOD}{H} \quad (136)$$

where:

SOD = sediment oxygen demand (gm O₂/ft²-day)

H = water depth, ft.

Substitution of these sources and sinks into equation (123) gives the general equation:

$$O = -U \frac{dC}{dx} + K_2(C_s - C) - K_r L - K_n L^n - \frac{SOD}{H} \quad (137)$$

or, using the more specific terms for the sources and sinks:

$$U \frac{dD}{dx} = -K_2 D + K_d L_o e^{(-K_r)t} + K_n L_o^n e^{(-k_n)t} + \frac{SOD}{H} \quad (138)$$

Assuming a uniform cross section, at steady state

$$t = \frac{U}{x} \quad (139)$$

which results in:

$$\frac{dD}{dx} = \frac{K_2}{U} D + \frac{K_d L_o}{U} e^{-k_r \left(\frac{U}{x}\right)} + \frac{K_n L_o^n}{U} e^{-K_n \left(\frac{U}{x}\right)} + \frac{SOD}{H} \quad (140)$$

This is a nonhomogeneous first-order linear ordinary differential equation. Assuming no change of the saturation value with distance, and using the B.C. that $D = D_o$ at $x = 0$, the solution is given by:

$$D = D_o e^{(-K_2)t} + \frac{K_d L_o}{K_2 - K_r} (e^{(-K_r)t} - e^{(-K_2)t}) + \frac{K_n L_o^n}{K_2 - K_n} (e^{(-K_n)t} - e^{(-K_2)t}) + \frac{SOD}{HK_2} (1 - e^{(-K_2)t}) \quad (141)$$

or, in terms of DO concentration:

$$C = C_s - (C_s - C_o) e^{(-K_2)t} - \frac{K_d L_o}{K_2 - K_r} (e^{(-K_r)t} - e^{(-K_2)t}) - \frac{K_n L_o^n}{K_2 - K_n} (e^{(-K_n)t} - e^{(-K_2)t}) - \frac{SOD}{HK_2} (1 - e^{(-K_2)t}) \quad (142)$$

This final equation for DO () is utilized in the modeling approach. The DO concentration is calculated at time t (with $t = U/x$) for the user specified number of points in a reach. The DO at the sag point is then compared to the required DO target for the reach. Changes in effluent levels are made until DO standards are met. Instream levels of CBOD and NBOD are also calculated at the specified number of points using the integrated forms of the first order decay models.

The resolution of the model can be adjusted by increasing or decreasing the number of stream reaches, as well as the number of calculation points in a reach. The level of resolution should be selected so that sufficient detail can be maintained to adequately reproduce the primary variable interactions and their effect on the DO concentration at the sag point.

OTHER MODELS

Other models, as appropriate for a particular evaluation, may be used in a method 1 analysis with prior approval of the permitting agency.

METHOD 2 – CALIBRATED MODEL

This includes any model in which the hydraulic parameters, water quality conditions, and biochemical kinetic rates are determined from data collected during an intensive survey conducted as near as

possible to critical conditions. The model should be calibrated to those parameters, which most affect the receiving water. As with Method 1 an uncertainty analysis should be performed to determine the degree of confidence placed in the model and resulting allocation.

METHOD 3 – CONFIRMED

This level of analysis requires all the elements specified for Method 2 along with a second intensive stream survey. The model should again be calibrated using the second set of data with the same parameters used in the original calibration. Coefficients determined during both calibrations should then be compared. If there is no significant difference between the two sets of coefficients the models are confirmed. The final step in the wasteload evaluation involves using both calibration data sets to again estimate all coefficients so that all of the data is used in the final model. It would be expected that the level of uncertainty associated with the final model would be less than that associated with each individual calibrated model.

METHOD 4 – POST AUDIT MODEL

If the level of uncertainty associated with a calibrated or confirmed model is unacceptably high a subsequent intensive survey may be required after implementation of a wasteload allocation or other control mechanism. The post audit model is used to further confirm the model as well as the effectiveness of the control mechanism developed from the previous wasteload evaluation.

UNCERTAINTY ANALYSIS

A final step in the WLE process involves assessment of the uncertainty level associated with a particular TMDL or WLA. Several methods are available for the quantification of uncertainty in water quality modeling. Some of the more often used are sensitivity analysis, first order error analysis, and Monte Carlo Simulation. The method used should be consistent with the type of model and available data. At a minimum, a sensitivity analysis should be performed for any of the four levels of analysis used in Oklahoma. For a calibrated model the magnitude of the perturbation should reflect the actual uncertainty of that parameter. Results of an uncertainty analysis should be reviewed within the context of the effluent quality expected for various treatment levels. If a required treatment level is heavily sensitive to, and dependent on, the selection of an input value, further study may be appropriate to adequately characterize that model variable.

INTEGRATED WATER QUALITY REPORT LISTING METHODOLOGY

The following methodologies, along with the procedures described in Figure 22 near the end of this section, shall be used to determine the attainment status of a waterbody's designated beneficial uses and its subsequent categorization in the State's Integrated Water Quality Report, which is a combination of the State's Water Quality Assessment Report [305(b) report] and the Impaired Waters List [303(d) list].

A waterbody that is listed on the State's current 303(d) list may only be placed in category 1,2, or 3 of the Integrated Report for "good cause" or if it is demonstrated that new data or information indicate that the waterbody is attaining its designated beneficial uses. "Good cause" shall mean that the State will provide a reasonable basis for the recommendation such as flaws in the original analysis that led to the water being listed; more recent or accurate data; more sophisticated water quality modeling; changes in conditions (e.g., new control equipment or elimination of discharges); or data is insufficient or non-existent to assess that all uses are met and the water should more appropriately be in Category 2 or 3.

Waterbodies in categories 2 & 3 will be prioritized in a manner similar to the category 5 waterbodies. A monitoring schedule will be included for categories 2 & 3 as part of the Integrated Report. Waterbodies included on the most recent 303(d) list will receive the highest priority for future monitoring.

USAP

These procedures closely follow those set forth in the State's Use Support Assessment Protocol (USAP), which can be found in OAC 785:46-15. Where the USAP is silent, this listing methodology should be used. Where there are discrepancies between this methodology and the USAP, the USAP controls.

BENEFICIAL USES

The Listing Methodology is categorized into beneficial uses. Each beneficial use has a procedure for determining attainment of that use based on various kinds of biological, chemical, and historical data. The result of applying this methodology for any given beneficial use must be one of three choices: "attained", "not attained," and "not enough data to make a determination."

Some beneficial uses have procedures for several different types of data, all of which must be determinable – unless otherwise specified – in order to determine that the beneficial use is attained. Otherwise, the attainment decision must be designated "not enough data to make a determination."

DATA REQUIREMENTS

The data used to make a determination must meet various quantity, quality, spatial, and temporal requirements in order to satisfy the attainment procedures. The following general requirements apply unless otherwise specified in the use-specific procedures that follow. If neither an "attained" nor "not attained" determination can be made, then the overall determination for that beneficial use or subcategory shall be "not enough data to make a determination."

SPATIAL

- In general, stream sampling locations should take into consideration existing data, spatial distribution of monitoring sites, sources of pollution, and major hydrological features such as tributaries and dams.
- Non-wadable stream samples may represent a maximum of 25 stream miles.
- Wadable stream samples may represent a maximum of 10 stream miles.
- Lake samples may represent a maximum of 250 acres per sample. Arms or portions of lakes may be treated separately from the main body of a lake.
- Samples may not be taken within regulatory mixing zones.

TEMPORAL

- Sampling must represent seasonal variation. Temporal bias should be avoided.
- Stream data older than five (5) years should not be used to make use attainment determinations unless insufficient data exists for the previous five (5) year period.
- Lake data older than ten (10) years should not be used to make use attainment determinations unless insufficient data exists for the previous ten (10) year period.

QUANTITY

- For streams, a minimum of ten (10) samples is required to determine use attainment for parameters such as DO, pH, temperature, coliform bacteria, dissolved solids, and salts.
- For lakes of more than 250 surface acres, a minimum of twenty (20) samples is required to determine use attainment for parameters such as DO, pH, temperature, coliform bacteria, chlorophyll a, and dissolved solids. For lakes of 250 surface acres or less, a minimum of ten (10) samples is required.
- For toxicants, a minimum of five (5) samples is required to determine use attainment.

- For any type of sample, if existing samples already assure a "not attained" determination, the minimum sample quantity requirement does not apply.

PQLs

CRITERIA ABOVE PQL

If sample values are below the PQL for a parameter whose criterion is above the PQL, appropriate nonparametric statistical measures shall be used to determine the reporting value.

For waterbodies identified as impaired on the current Integrated Report, if sample values are nondetectable for a parameter whose criterion is above the PQL, then such value shall be deemed to be one-half (1/2) of the parameter PQL.

All sample values that are above the PQL shall be the reported values.

CRITERIA BELOW PQL

If sample values are below the PQL for a criterion which is less than one-half (1/2) of the PQL, then the values shall be deemed to be zero (0) until the first test result above the PQL appears. After that time, sample values which are below the PQL shall be deemed to be equal to the criterion value until four (4) subsequent contiguous samples are shown to be below the PQL. Any subsequent sample values which are nondetectable may be treated as zero (0) until the next test result appears above the PQL.

For those parameters whose criteria are at least two (2) orders of magnitude below the PQL, evidence considered with respect to assessment of use support shall include fish tissue analysis, biological community analysis, biological thresholds wherever available, or other holistic indicators which are appropriate for the beneficial use in question.

If sample values are below the PQL for a criterion which is greater than or equal to one-half (1/2) of the PQL but less than the PQL, then the values shall be deemed to be one-half (1/2) of the criterion value until the first test result above the PQL appears. After that time, sample values which are below the PQL shall be deemed to be equal to the criterion value until four (4) subsequent contiguous samples are shown to be below the PQL. Any subsequent sample values which are nondetectable may be treated as equal to one-half (1/2) of the criterion value until the next test result appears above the PQL.

For waterbodies identified as impaired in the current Integrated Report, if sample values are nondetectable for a parameter whose criterion is below the PQL, then such value shall be deemed to be one-half (1/2) of the criterion value.

All sample values that are above the PQL shall be the reported values.

MAGNITUDE OF EXCEEDANCE

- For toxicants, if two or more samples exceed water quality criteria or screening levels by two orders of magnitude or more, the associated beneficial use is determined to be "not attained."
- For DO, if more than two samples in a stream are below 2 mg/L in a given year, the Fish & Wildlife Propagation beneficial use is determined to be "not attained."

QUALITY ASSURANCE

Data collected for purposes of use support assessment shall be collected using documented programmatic quality assurance and quality control methods substantially in accordance with those

required by "EPA Requirements for Quality Assurance Project Plans", EPA publication no. EPA/240/B-01/003 (March 2001).

The methods used shall include protections for sample integrity and the documentation of details on analysis methodologies.

DEFAULT PROTOCOL

This method for determining beneficial use attainment should be used where another, more specific method is not provided.

SHORT TERM AVERAGE PARAMETERS

Short term average parameters are based on exposure periods of less than seven days, such as sample standards (agriculture beneficial use) and turbidity.

A beneficial use is considered *attained based on the default protocol for a given short term average parameter* if:

10% or fewer of the samples exceed the appropriate screening level or water quality criterion

or

the determination using the default protocol yields "fully supporting but threatened" and the threat will not yield a determination of other than fully supporting within two years of the determination.

A beneficial use is considered *not attained based on the default protocol for a given short term average parameter* if:

greater than 10% of the samples exceed the appropriate screening level or water quality criterion

or

the determination using the default protocol yields "fully supporting but threatened" and the threat will yield a determination of other than fully supporting within two years of the determination.

LONG TERM AVERAGE PARAMETERS

Long term average parameters are based on exposure periods of seven days or longer, such as yearly mean standards (agriculture beneficial use) and fish consumption water column numerical criteria.

A beneficial use is considered *attained based on the default protocol for a given long term average parameter* if:

each 2-year rolling average of the sample results does not exceed the long term average criterion or screening level

or

the determination using the default protocol yields "fully supporting but threatened" and the threat will not yield a determination of other than fully supporting within two years of the determination.

A beneficial use is considered *not attained based on the default protocol for a given long term average parameter* if:

any 2-year rolling average of the sample results exceeds the long term average criterion or screening level

or

the determination using the default protocol yields "fully supporting but threatened" and the threat will yield a determination of other than fully supporting within two years of the determination.

FISH & WILDLIFE PROPAGATION (F&WP)

The methodology for the Fish & Wildlife Propagation (F&WP) beneficial use consists of eight types of data, each with its own attainment methodology.

The F&WP beneficial use is considered *attained* if:

in the absence of biological data, all six *chemical* methodologies (DO, Toxicants, pH, Turbidity, Oil & Grease, and Toxicants Not Assessed & Not Likely to Occur or Violate Criteria) result in a determination of *attained*

or

in the absence of adequate data for all six chemical data types, the biological data methodology results in a determination of *attained*.

The F&WP beneficial use is considered *not attained* if *any* of the eight data type methodologies result in a determination of *not attained*.

DISSOLVED OXYGEN (DO)

STREAMS

A minimum of ten (10) samples is required to make an attainment determination.

The F&WP beneficial use is considered *attained with respect to dissolved oxygen* if 10% or fewer of the samples from a waterbody have a DO concentration of less than:

- 3.0 mg/L (4.0 mg/L from April 1 – June 15) for habitat limited aquatic communities (HLAC)
- 5.0 mg/L (4.0 mg/L from June 16 – October 15) for warm water aquatic communities (WWAC)
- 6.0 mg/L (5.0 mg/L from June 1 – October 15) for trout fisheries and cool water aquatic communities (CWAC)

The F&WP beneficial use is considered *not attained with respect to dissolved oxygen* if more than 10% of the samples from a waterbody have DO concentrations less than those shown above or if more than 2 samples in a given year are below 2 mg/L.

LAKES

For lakes or arms of 250 acres or less, a minimum of ten (10) samples is required to make an attainment determination. For lakes or arms of greater than 250 acres, a minimum of twenty (20) samples is required.

The F&WP beneficial use is considered *attained with respect to dissolved oxygen* if:

more than 50% of the lake water column has a DO concentration of 2.0 mg/L or more

and

90% or more of the surface samples have a DO concentration of 5 mg/L (4.0 mg/L from June 16 – October 15) or more.

The F&WP beneficial use is considered *not attained with respect to dissolved oxygen* if:

50% or more of the lake water column has a DO concentration of less than 2.0 mg/L

or

more than 10% of the surface samples have a DO concentration of less than 5 mg/L (4.0 mg/L from June 16 – October 15).

TOXICANTS

A minimum of five (5) samples is required to make an attainment determination.

The following screening values shall be used to make attainment decisions for toxicants:

- the acute and/or chronic criteria for a given toxicant, as described in Appendix G, Table 2 of the Oklahoma Water Quality Standards, OAC 785:45
- the chronic ammonia toxicity value shown in Table 13 corresponding to the stream pH and temperature at the time of sampling

For metals, preference shall be given to attainment decisions based on dissolved metals in accordance with the procedures specified in OAC 785:46-15-5(h).

ACUTE EFFECTS

The F&WP beneficial use is considered *attained with respect to an individual toxicant* if no more than one (1) of the samples have concentrations of a toxicant that exceed the acute criterion or screening value for that toxicant.

The F&WP beneficial use is considered not attained with respect to an individual toxicant if more than one (1) of the samples have concentrations of a toxicant that exceed the acute criterion or screening value for that toxicant.

CHRONIC EFFECTS

The F&WP beneficial use is considered *attained with respect to an individual toxicant* if:

not more than one (1) of the samples have concentrations of a toxicant that exceed the chronic criterion or screening value for that toxicant

or

not more than 10% of the samples have concentrations of a toxicant that exceed the chronic criterion or screening value for that toxicant

The F&WP beneficial use is considered *not attained with respect to an individual toxicant* if more than 10% of the samples have concentrations of a toxicant that exceed the chronic criterion or screening value.

Table 13: Temperature- and pH-Dependent Screening Values for Ammonia

pH	Temperature (°C)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

pH

A minimum of ten (10) samples is required to make an attainment determination.

The F&WP beneficial use is considered *attained with respect to pH* if 10% or fewer of the samples fall outside the screening range of 6.5 (minimum) and 9.0 (maximum).

The F&WP beneficial use is considered *not attained with respect to pH* if more than 10% of the samples fall outside the screening range of 6.5 (minimum) and 9.0 (maximum).

BIOLOGICAL DATA

Biological criteria have been established for various ecoregions in Oklahoma under OAC 785:46-15-5. See Figure 21. These biocriteria should be referenced when making attainment determinations. OAC 785:46 Appendix C Index of Biological Integrity should be used for these ecoregions. This methodology is only applicable to wadable streams.

For waterbodies where no biological data is available, a resulting determination of “*attained*” with respect to all six chemical data type methodologies (DO, pH, Toxicants, Turbidity, Oil & Grease, and Toxicants Not Assessed & Not Likely to Occur or Violate Criteria) may serve to determine attainment of the F&WP beneficial use.

For waterbodies where *only* biological data is available, a determination of “*attained*” with respect to biological criteria may serve to determine attainment of the F&WP beneficial use.

The F&WP beneficial use is considered *attained with respect to biological criteria* if:

for streams in ecoregions where biological thresholds have been determined, a biological assessment yields an Index of Biotic Integrity (IBI) associated with "fully supported."

or

for streams outside of ecoregions where biological thresholds have been determined, fish and benthic invertebrate communities are at least 70% similar to communities found in regional reference conditions considering the beneficial use sub-category appropriate for the stream in question.

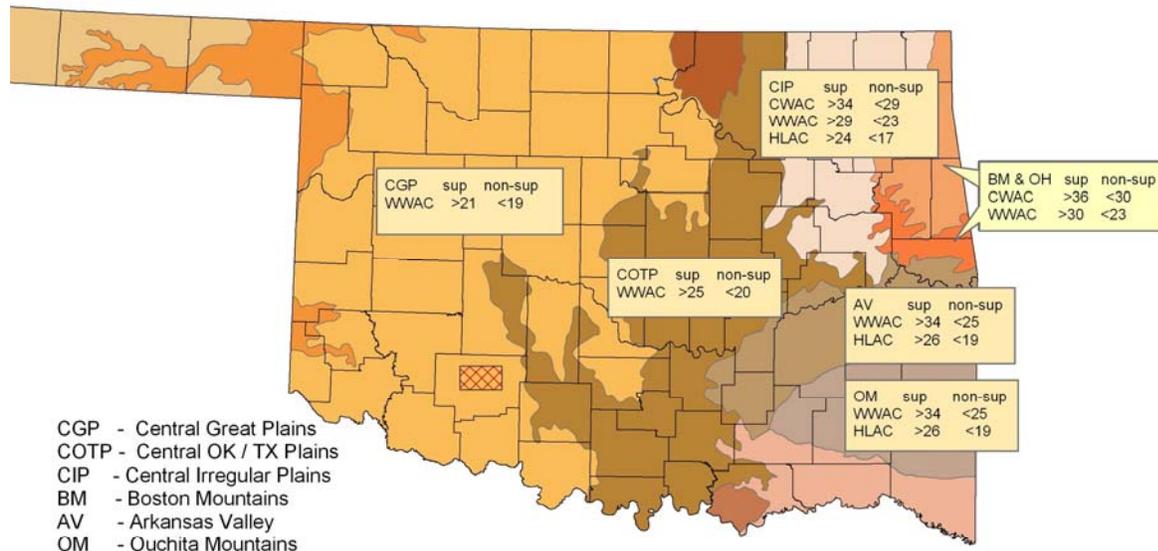
The F&WP beneficial use is considered *not attained with respect to biological criteria* if:

for streams in ecoregions where biological thresholds have been determined, a biological assessment yields an Index of Biotic Integrity (IBI) associated with "partially supported" or "not supported."

or

for streams outside of ecoregions where biological thresholds have been determined, fish and benthic invertebrate communities are less than 40% similar to communities found in regional reference conditions considering the beneficial use sub-category appropriate for the stream in question.

FIGURE 4: COREGIONS WHERE BIOCRITERIA HAVE BEEN ESTABLISHED



NOTE: criteria do not apply to crosshatched area

Ref: OAC 785:46-15-5(h) through (m)

TURBIDITY

A minimum of ten (10) samples collected under seasonal base flow conditions is required to make an attainment determination.

The following numerical criteria shall be used to make attainment decisions for turbidity:

- 10 Nephelometric Turbidity Units (NTUs) for cool water aquatic communities and trout fisheries
- 25 NTUs for lakes
- 50 NTUs for other surface waters

The F&WP beneficial use is considered *attained with respect to turbidity* if:

10% or fewer of the samples exceed the appropriate screening level or water quality criterion.

or

the numerical criteria yield a determination of "fully supporting but threatened" and the threat will not yield a determination of other than fully supporting within two years of the determination.

The F&WP beneficial use is considered *not attained with respect to turbidity* if:

greater than 10% of the samples exceed the appropriate screening level or water quality criterion

or

the numerical criteria yield a determination of "fully supporting but threatened" and the threat will yield a determination of other than fully supporting within two years of the determination.

OIL & GREASE

A minimum of ten (10) visual observations made over a period of at least ten (10) months is required to make an attainment determination.

Any of the following visual characteristics shall indicate the presence of oil or grease:

- a rainbow sheen that flows when stirred, rather than crackling
- a golden tan to dark brown coating or globules on the water or in stream sediment

The F&WP beneficial use is considered *attained with respect to oil & grease* if 10% or fewer observations reveal the presence of oil or grease.

The F&WP beneficial use is considered *not attained with respect to oil & grease* if more than 10% of the observations reveal the presence of oil or grease.

SEDIMENT

The F&WP beneficial use is considered *attained with respect to sediment* if the use is also attained with respect to biological criteria.

If the biological data assessment results in a determination of "not attained," a habitat assessment must be conducted using the habitat assessment protocols found in OWRB Technical Report TRWQ2001-1, "Unified Protocols for Beneficial Use Assignment for Oklahoma Wadable Streams."

The results of the habitat assessment shall then be compared to either historical conditions or regional reference conditions in order to determine attainment with respect to sediment. The method for establishing reference conditions shall meet the following requirements:

- a minimum of five (5) reference streams or reaches shall be assessed
- the reference streams or reaches must be within the same ecoregion as the test stream
- the reference streams or reaches must exhibit similar flow regimes and be within ± 2 Strahler stream orders as the test stream
- the reference streams or reaches shall be selected from the least impacted streams within the ecoregion whose watersheds contain soils, vegetation, land uses, and topography typical of the watershed of the test stream.

The F&WP beneficial use is considered *not attained with respect to sediment* if any of the following habitat parameters deviate from the reference conditions by the specified amount:

- Pool Bottom Substrate – the total percent of clay, silt, and loose sand in the test stream is increased by more than 30% over the reference condition
- Cobble Embeddedness – cobble embeddedness is increased by 15% or more over the reference condition
- Point Bars and/or Islands – reach length percentage containing fresh (non-vegetated) point bars and/or islands is 20 or more percentage points above that of the reference condition
- Deep Pools – percentage of reach dominated by deep pools (0.5 meters or more) is less than 70% of that of the reference condition

TOXICANTS NOT ASSESSED AND NOT LIKELY TO OCCUR OR VIOLATE CRITERIA

The data required to assess every water quality criterion – specifically toxicants – associated with the F&WP use do not always exist for a particular waterbody. The following procedure may be used to determine attainment of the F&WP beneficial use with respect to toxicants that have not been assessed, but are not likely to occur or violate criteria.

The following three types of information must be available in order to apply this procedure:

1. The results of a review of watershed-specific landuse and historical data that yields patterns of use or nonuse of the toxicant(s) not assessed.
2. A result of either “attained” or “not enough information” for the Toxicants methodology.
3. A result of either “attained” or “not enough information” for the Biological Data methodology.

NOTE: The decision matrix below may be used to determine *attainment of the F&WP beneficial use with respect to the unassessed toxicants only if* the landuse and historical data review yields no indication that the unassessed toxicants are present or likely to impact the waterbody in question.

TABLE 14: DECISION MATRIX FOR TOXICANTS NOT ASSESSED OR LIKELY TO OCCUR OR VIOLATE F&WP CRITERIA

		Biological Data	
		Attained	Not Enough Information
Toxicants	Attained	F&WP <i>Attained</i> With Respect To Unassessed Toxicants	F&WP <i>Attained</i> With Respect To Unassessed Toxicants

	Not Enough Information	F&WP <i>Attained</i> With Respect To Unassessed Toxicants	<i>Not Enough Information</i> to Determine F&WP Attainment With Respect to Unassessed Toxicants
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PRIMARY BODY CONTACT RECREATION (PBCR)

A minimum of ten (10) samples is required to make an attainment determination. Samples must be taken during the recreation period of May 1 – September 30.

Geometric means will be calculated using all data meeting the temporal data requirements. The geometric means will be compared to the appropriate screening value.

FECAL COLIFORM

The PBCR beneficial use is considered *attained with respect to fecal coliform* if:

the geometric mean of the samples does not exceed 400 colonies/100 mL

and

25% or fewer of the individual samples exceed 400 colonies/100 mL

The PBCR beneficial use is considered *not attained with respect to fecal coliform* if:

the geometric mean of the samples exceeds 400 colonies/100 mL

or

more than 25% of the individual samples exceed 400 colonies/100 mL

ESCHERICHIA COLI (E. COLI)

The PBCR beneficial use is considered *attained with respect to E. coli* if:

the geometric mean of the samples does not exceed 126 colonies/100 mL

or

no sample exceeds 406 colonies/100 mL (235 colonies/100 mL for Scenic Rivers and lakes) The PBCR beneficial use is considered *not attained with respect to E. coli* if:

the geometric mean of the samples exceeds 126 colonies/100 mL

and

any sample exceeds 406 colonies/100 mL (235 colonies/100 mL for Scenic Rivers and lakes)

ENTEROCOCCI

The PBCR beneficial use is considered *attained with respect to Enterococci* if:

the geometric mean of the samples does not exceed 33 colonies/100 mL

or

no sample exceeds 406 colonies/100 mL (61 colonies/100 mL for Scenic Rivers and lakes)

The PBCR beneficial use is considered *not attained with respect to Enterococci* if:

the geometric mean of the samples exceeds 33 colonies/100 mL

and

any sample exceeds 406 colonies/100 mL (61 colonies/100 mL for Scenic Rivers and lakes)

SECONDARY BODY CONTACT

Attainment for the SBCR beneficial use is identical to the PBCR attainment methodology, but using five times (5x) the PBCR numerical criteria and screening levels.

PUBLIC AND PRIVATE WATER SUPPLY (PPWS)

In order to determine attainment of the PPWS beneficial use, samples must be taken within 5 stream miles of a drinking water intake.

TOXICANTS

A minimum of ten (10) samples is required to make an attainment determination.

The PPWS beneficial use is considered *attained with respect to any individual toxicant* for which there is a water quality criterion established if:

10% or fewer of the samples have concentrations of a toxicant that exceed the criterion for that toxicant

and

no drinking water use restrictions related to source water contamination are in effect

The PPWS beneficial use is considered *not attained with respect to any individual toxicant* for which there is a water quality criterion established if:

more than 10% of the samples have concentrations of a toxicant that exceed the criterion for that toxicant

or

a drinking water use restriction related to source water contamination is in effect

TOTAL COLIFORM

A minimum of ten (10) samples is required to make an attainment determination.

In order to determine attainment of the PPWS beneficial use, samples must be taken within 5 stream miles of a drinking water intake.

The following numerical criterion shall be used to make attainment decisions for bacteria:

- 5000 colonies/100 mL

The PPWS beneficial use is considered *attained with respect to bacteria* if:

the numerical criterion yields a determination of "fully supporting" using the default protocol

or

the numerical criterion yields a determination of "fully supporting but threatened" using the default protocol if the threat will not yield a determination of other than fully supporting within two years of the determination.

or

the Primary Body Contact Recreation use is attained

The PPWS beneficial use is considered *not attained with respect to bacteria* if:

the numerical criterion yields a determination of "not supporting" using the default protocol

or

the numerical criterion yields a determination of "fully supporting but threatened" using the default protocol *if* the threat will yield a determination of other than fully supporting within two years of the determination.

OIL & GREASE

A minimum of ten (10) visual observations made over a period of at least ten (10) months is required to make an attainment determination.

Any of the following visual characteristics shall indicate the presence of oil or grease:

- a rainbow sheen that flows when stirred, rather than crackling
- a golden tan to dark brown coating or globules on the water or in stream sediment

The PPWS beneficial use is considered *attained with respect to oil & grease* if 10% or fewer observations reveal the presence of oil or grease.

The PPWS beneficial use is considered *not attained with respect to oil & grease* if more than 10% of the observations reveal the presence of oil or grease.

PARAMETERS NOT ASSESSED AND NOT LIKELY TO OCCUR OR VIOLATE CRITERIA

The data required to assess every water quality criterion associated with PPWS does not always exist for a particular waterbody. In those cases, the following procedure should be followed in order to make an attainment decision.

For parameters not assessed or which are not likely to occur or violate criteria, attainment decisions should be made based on two kinds of information:

1. the results of analysis of chemical-specific parameters routinely monitored by the State's Beneficial Use Monitoring Program (BUMP) as compared to state criteria associated with PPWS
2. the results of a review of watershed-specific landuse and historical data that yields patterns of use for the pollutant in question

The PPWS beneficial use is considered *attained with respect to unassessed parameters* if:

the waterbody is attaining the PPWS use for BUMP parameters according to the Toxicants section of this listing methodology

and

no suspicion of the presence of the unassessed parameters exists based on landuse and historical data review

CHLOROPHYLL-A AND PHOSPHORUS

Certain water supplies have specific criteria for chlorophyll-a and/or total phosphorus as specified in OAC 785:45-5-10(7) and (8). Attainment of these criteria will be evaluated using the specified criteria and the long-term average default protocol.

EMERGENCY WATER SUPPLY (EWS)

All waterbodies designated with the Emergency Water Supply beneficial use shall be deemed to be attaining the beneficial use for all water quality related issues.

AGRICULTURE

A minimum of ten (10) samples is required to make an attainment determination.

TDS

The Agriculture beneficial use is considered *attained with respect to TDS* if:

no TDS sample exceeds 700 mg/l

or

the mean of all TDS samples does not exceed the yearly mean standard (YMS) for TDS as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria

and

10% or fewer TDS samples exceed the sample standard (SS) for TDS as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria.

The Agriculture beneficial use is considered *not attained with respect to TDS* if:

At least one TDS sample exceeds 700 mg/l

and

more than 10% of the samples exceed the sample standard (SS) for TDS as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria

or

the mean of all samples exceeds the yearly mean standard (YMS) for TDS as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria.

CHLORIDES

The Agriculture beneficial use is considered *attained with respect to chlorides* if:

no chloride sample exceeds 250 mg/l

or

the mean of all samples does not exceed the yearly mean standard (YMS) for chlorides as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria

and

10% or fewer samples exceed the sample standard (SS) for chlorides as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria.

The Agriculture beneficial use is considered *not attained with respect to chlorides* if:

At least one chloride sample exceeds 250 mg/l

and

more than 10% of the samples exceed the sample standard (SS) for chlorides as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria

or

the mean of all samples exceeds the yearly mean standard (YMS) for chlorides as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria.

SULFATES

The Agriculture beneficial use is considered *attained with respect to sulfates* if:

no sulfate sample exceeds 250 mg/l

or

the mean of all samples does not exceed the yearly mean standard (YMS) for sulfates as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria

and

10% or fewer samples exceed the sample standard (SS) for sulfates as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria.

The Agriculture beneficial use is considered *not attained with respect to sulfates* if:

At least one sulfate sample exceeds 250 mg/l

and

more than 10% of the samples exceed the sample standard (SS) for sulfates as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria

or

the mean of all samples exceeds the yearly mean standard (YMS) for sulfates as listed in the Oklahoma Water Quality Standards (OAC 785:45 Appendix F) or site-specific/watershed-specific criteria.

NAVIGATION

All waterbodies designated with the Navigation beneficial use shall be deemed to be attaining the beneficial use for all water quality related issues.

AESTHETICS

NUTRIENTS

The Aesthetics beneficial use is considered *attained with respect to nutrients* if a nutrient impairment study yields a results of "fully supporting."

The Aesthetics beneficial use is considered *not attained with respect to nutrients* if a nutrient impairment study yields a result of "impaired."

Only a nutrient impairment study may be used to make a determination of *not attained* for aesthetics with respect to nutrients.

WADABLE STREAMS

The aesthetics beneficial use for wadable streams is considered *attained with respect to nutrients* if application of the dichotomous process or application of the alternative to dichotomous process specified in OAC 785:46-15-10 yields a result of "not threatened."

LAKES AND NONWADABLE STREAMS

The aesthetics beneficial use for lakes and nonwadable streams is considered *attained with respect to nutrients* if planktonic chlorophyll-a values in the water column indicate a Carlson's Trophic State Index of less than 62.

PHOSPHORUS

The phosphorus water quality standard applies to waters designated as a Scenic River.

A minimum of ten (10) samples is required to make an attainment determination. Samples must meet the data requirements of OAC 785:46-15-10(h)(2).

Attainment decisions will be made using the procedure specified in OAC 785:46-15-10(h).

OIL & GREASE

A minimum of ten (10) visual observations made over a period of at least ten (10) months is required to make an attainment determination.

Any of the following visual characteristics shall indicate the presence of oil or grease:

- a rainbow sheen that flows when stirred, rather than crackling
- a golden tan to dark brown coating or globules on the water or in stream sediment

The aesthetics beneficial use is considered *attained with respect to oil & grease* if 10% or fewer observations reveal the presence of oil or grease.

The aesthetics beneficial use is considered *not attained with respect to oil & grease* if more than 10% of the observations reveal the presence of oil or grease.

SEDIMENT

A habitat assessment shall be conducted using the habitat assessment protocols found in OWRB Technical Report TRWQ2001-1, "Unified Protocols for Beneficial Use Assignment for Oklahoma Wadable Streams."

The results of the habitat assessment shall then be compared to historical or regional reference conditions in order to determine attainment with respect to sediment. The method for establishing reference conditions shall meet the following requirements:

- a minimum of five (5) reference streams or reaches shall be assessed
- the reference streams or reaches must be within the same ecoregion as the test stream
- the reference streams or reaches must exhibit similar flow regimes and be within ± 2 Strahler stream orders as the test stream
- the reference streams or reaches must be selected from the *least impacted streams* within the ecoregion whose watersheds contain soils, vegetation, land uses, and topography typical of the watershed of the test stream.

The Aesthetics beneficial use is considered *attained with respect to sediment* if either of the following conditions is true:

- pools greater than 0.5 meter deep are free of soft, unconsolidated sediment deposits
- the total area of pool bottoms having soft, unconsolidated sediment deposits is no more than 25% greater than that of the reference condition

FISH CONSUMPTION

The Fish Consumption beneficial use is considered *attained* if:

the numerical criteria for fish consumption in the Oklahoma Water Quality Standards [OAC 785:45-5-20(b)] yields a determination of "fully supporting" using the default protocol for long-term average numerical parameters

or

the numerical criteria for fish consumption in the Oklahoma Water Quality Standards [OAC 785:45-5-20(b)] yields a determination of "fully supporting but threatened" using the default protocol for long-term average numerical parameters if the threat will not yield a determination of other than fully supporting within two years of the determination.

The Fish Consumption beneficial use is considered *not attained* if any of the following conditions apply:

- The numerical criteria for fish consumption in the Oklahoma Water Quality Standards [OAC 785:45-5-20(B)] yields a determination of "not supporting" or "partially supporting" using the default protocol for long-term average numerical parameters.
- a site-specific consumption restriction is imposed
- a site-specific fish or shellfish ban is in effect for a sub-population thereof
- a site-specific aquatic life closure is in effect
- a site-specific "no consumption" advisory is in effect

CATEGORY DECISION METHODOLOGY

The Integrated Water Quality Report contains five categories that describe different levels of beneficial use attainment in each of the State's waters. Each waterbody should be assessed for attainment of each of its individual designated beneficial uses using the methodology outlined above. Following that assessment, the decision tree below should be used to assign each waterbody to an appropriate category.

Causes of Non-Attainment

The previous methodology outlines the procedures for determining attainment of each of a waterbody's designated beneficial uses. Causes of non-attainment must also be included in the State's Integrated Water Quality Assessment Report.

The following causes and cause codes should be applied where applicable to each waterbody upon making a determination of non-attainment for any given designated beneficial use or subcategory of that use. Additional cause codes may be added to the State's Integrated Report in order to provide for numerical criteria in the State's Water Quality Standards not already represented with a cause code.

Cause Code	Cause
1	.alpha.-BHC
2	.alpha.-Endosulfan(Endosulfan 1)
3	.beta.-BHC
4	.beta.-Endosulfan (Endosulfan 2)
5	.delta.-BHC
6	1,1,1,2-Tetrachloroethane
7	1,1,1-Trichloroethane
8	1,1,2,2-Tetrachloroethane
9	1,1,2-Trichloroethane
10	1,1-Dichloro-1,2,2-trifluoroethane
11	1,1-Dichloroethane
12	1,2,3,4-Tetrachlorobenzene
13	1,2,4,5-Tetrachlorobenzene
14	1,2,4-Trichlorobenzene
15	1,2,4-Trimethylbenzene
16	1,2-Butylene oxide
17	1,2-Dibromo-3-chloropropane
18	1,2-Dibromo-3-chloropropane (DBCP)
19	1,2-Dichloroethane
20	1,2-Dichloroethylene
21	1,2-Dichloropropane
22	1,2-Diphenylhydrazine
23	1,3-Butadiene
24	1,3-Dichloropropene
25	1,4-Dioxane
26	2,2'-Dichlorodiethyl ether
27	2,2'-Dichlorodiisopropyl ether
28	2,3,7,8-Tetrachlorodibenzofuran
29	2,3-Dichloropropene
30	2,4,5-TP (Silvex)
31	2,4,5-Trichlorophenol
32	2,4,5-Trichlorophenol
33	2,4,6-Trichlorophenol
34	2,4-D
35	2,4-Diaminotoluene
36	2,4-Dichlorophenol

Cause Code	Cause
37	2,4-Dimethylphenol
38	2,4-Dinitrophenol
39	2,4-Dinitrotoluene
40	2,5-Dichlorophenol
41	2,6-Dinitrotoluene
42	2-Acetylaminofluorene
43	2-Chloroethyl vinyl ether
44	2-Chloronaphthalene
45	2-Chlorophenol
46	2-Ethoxyethanol
47	2-Methoxyethanol
48	2-Methylnaphthalene
49	2-Methylpyridine
50	2-Nitrophenol
51	3,3'-Dichlorobenzidine
52	3,3'-Dimethoxybenzidine
53	3,3'-Dimethylbenzidine
54	3,4-Dichlorophenol
55	3-Chlorophenol
56	4,4'-Isopropylidenediphenol
57	4,4'-Methylenebis
58	4,4-Dichloro-2-butene
59	4-Aminobiphenyl
60	4-Bromophenylphenyl ether
61	4-Chloro-3-methylphenol (3-Methyl-4-Chlorophenol)
62	4-Chlorophenol
63	4-Dimethylaminoazobenzene
64	4-Methylphenol
65	4-Nitrophenol
66	5-Nitro-o-toluidine
67	Abnormal Fish Histology (Lesions)
68	Acenaphthene
69	Acenaphthylene
70	Acetaldehyde
71	Acetamide
72	Acetochlor
73	Acetonitrile
74	Acrolein
75	Acrylamide
76	Acrylonitrile
77	Alachlor
78	Aldicarb
79	Aldrin
80	Alkalinity, Carbonate as CaCO ₃
81	Allyl alcohol

Cause Code	Cause
82	Allyl chloride
83	Alpha particles
84	Alteration in stream-side or littoral vegetative covers
85	Alterations in wetland habitats
86	Alum (aluminum Sulfate)
87	Aluminum
88	Ambient Bioassays -- Acute Aquatic Toxicity
89	Ambient Bioassays -- Chronic Aquatic Toxicity
90	Amitrole
91	Ammonia (Unionized)
92	Amnesic shellfish poisoning (ASP) biotoxins
93	Aniline
94	Anthracene
95	Antimony
96	Arsenic
97	Asbestos
98	Atlantic Sea Lamprey, <i>Petromyzon marinus</i>
99	Atrazine
100	BOD, Biochemical oxygen demand
101	BOD, carbonaceous
102	BOD, nitrogenous
103	BOD, sediment load (Sediment Oxygen Demand)
104	Barium
105	Benthic-Macroinvertebrate Bioassessments (Streams)
106	Benzal chloride
107	Benzene
108	Benzidine
109	Benzo(a)pyrene (PAHs)
110	Benzo[a]anthracene
111	Benzo[b]fluoranthene
112	Benzo[g,h,i]perylene
113	Benzo[k]fluoranthene
114	Benzoic Acid
115	Benzoyl chloride
116	Benzyl chloride
117	Beryllium
118	Beta particles and photon emitters
119	Biphenyl
120	Bis(2-Chloroethoxy)methane
121	Bis(2-chloro-1-methylethyl)
122	Bis(n-octyl) phthalate
123	Boron
124	Bromoform
125	Butyl benzyl phthalate
126	Butyraldehyde

Cause Code	Cause
127	Cadmium
128	Captan
129	Carbaryl
130	Carbofuran
131	Carbon Disulfide
132	Carbon tetrachloride
133	Cesium
134	Chemical oxygen demand (COD)
135	Chloramben
136	Chloramines
137	Chlordane
138	Chloride
139	Chlorine
140	Chlorine dioxide (as ClO ₂)
141	Chloroacetic acid
142	Chlorobenzene (mono)
143	Chlorobenzilate
144	Chlorodibromomethane
145	Chlorodifluoromethane
146	Chloroethane
147	Chloroform
148	Chloromethyl methyl ether
149	Chlorophenyl-4 phenyl ether
150	Chlorophyll-a
151	Chloroprene
152	Chlorothalonil
153	Chlorpyrifos
154	Chromium (total)
155	Chromium, hexavalent
156	Chromium, trivalent
157	Chrysene (C1-C4)
158	Ciguatera fish poisoning (CFP) biotoxins
159	Cobalt
160	Color
161	Combination Benthic/Fishes Bioassessments (Streams)
162	Combined Biota/Habitat Bioassessments (Streams)
163	Copper
164	Creosote
165	Cresol (mixed isomers)
166	Cryptosporidium
167	Cumene
168	Cyanide
169	Cyanide (as free cyanide)
170	Cyanobacteria hepatotoxic microcystins
171	Cyanobacteria hepatotoxic nodularins

Cause Code	Cause
172	Cyanobacteria neurotoxic anatoxins
173	Cyanobacteria neurotoxic saxitoxins
174	Cyclohexane
175	DDD
176	DDE
177	DDT
178	DEHP (Di-sec-octyl phthalate)
179	Dacthal
180	Dalapon
181	Debris/Floatables/Trash
182	Demeton
183	Di(2-ethylhexyl) adipate
184	Diallate
185	Diaminotoluene (mixed isomers)
186	Diarrhetic shellfish poisoning (DSP) biotoxins
187	Diazinon
188	Dibenz[a,h]anthracene
189	Dibenzofuran
190	Dibutyl phthalate
191	Dichlorobenzene (mixed isomers)
192	Dichlorobromomethane
193	Dichlorodifluoromethane
194	Dichloromethane
195	Dichlorotrifluoroethane
196	Dichlorvos
197	Dicofol
198	Dieldrin
199	Diethyl phthalate
200	Dimethyl phthalate
201	Dinitro-o-cresol
202	Dinoseb
203	Dioxin (including 2,3,7,8-TCDD)
204	Diquat
205	Dissolved oxygen saturation
206	Disulfoton
207	Diuron
208	Dyfonate (Fonofos or Fonophos)
209	EPTC
210	Endosulfan
211	Endosulfan sulfate
212	Endothall
213	Endrin
214	Endrin aldehyde
215	Enterococcus
216	Epichlorohydrin

Cause Code	Cause
217	Escherichia coli
218	Estuarine Bioassessments
219	Ethelyne dibromide
220	Ether, bis Chloromethyl
221	Ethylbenzene
222	Ethylene
223	Ethylene Glycol
224	Ethylene oxide
225	Ethylene thiourea
226	Eurasian Water Milfoil, Myriophyllum spicatum
227	Excess Algal Growth
228	Fish Barriers (Fish Passage)
229	Fish Kills
230	Fishes Bioassessments (Streams)
231	Fluometuron
232	Fluoranthene
233	Fluorene
234	Fluoride
235	Foam/Flocs/Scum
236	Formaldehyde
237	Formic acid
238	Furan Compounds
239	Giardia lamblia
240	Glyphosate
241	Gold
242	Guthion
243	Habitat Indicator Bioassessments (Streams)
244	Heptachlor
245	Heptachlor epoxide
246	Hexachlorobenzene
247	Hexachlorobutadiene
248	Hexachlorocyclohexane
249	Hexachlorocyclohexane
250	Hexachlorocyclohexane (mixture)
251	Hexachlorocyclopentadiene
252	Hexachloroethane
253	Hexachlorophene
254	Hexamethylphosphoramide
255	Hydrazine
256	Hydrochloric acid
257	Hydrogen cyanide
258	Hydroquinone
259	Indeno[1,2,3-cd]pyrene
260	Iron
261	Isobutyraldehyde

Cause Code	Cause
262	Isophorone
263	Isopropanol
264	Isosafrole
265	Kepone
266	Lake Bioassessments
267	Lead
268	Lindane
269	Linuron
270	Low flow alterations
271	Malathion
272	Maleic anhydride
273	Manganese
274	Mercury
275	Methacrylonitrile
276	Methanol
277	Methoxychlor
278	Methyl Parathion
279	Methyl Tertiary-Butyl Ether (MTBE)
280	Methyl bromide
281	Methyl chloride
282	Methyl ethyl ketone
283	Methyl hydrazine
284	Methyl iodide
285	Methyl isobutyl ketone
286	Methyl methacrylate
287	Methylene bromide
288	Methylmercury
289	Mirex
290	Molinate
291	Molybdenum
292	N-Nitroso-N-ethylurea
293	N-Nitroso-N-methylurea
294	N-Nitrosodimethylamine
295	N-Nitrosodiphenylamine
296	N-Nitrosodipropylamine
297	N-Nitrosomorpholine
298	N-Nitrosopiperidine
299	Naphthalene
300	Neurotoxic shellfish poisoning (NSP) biotoxins
301	Nickel
302	Nitrates
303	Nitrilotriacetic acid
304	Nitrobenzene
305	Nitrodibutylamine,N
306	Nitrofen

Cause Code	Cause
307	Nitrogen, Nitrite
308	Nitrogen, ammonia
309	Nitroglycerin
310	Nitrosamines
311	Nitrosodiethylamine,N
312	Non-Native Aquatic Plants
313	Non-Native Fish/Shellfish/Zooplankton Species
314	Octachlorostyrene
315	Octochloronaphthalene
316	Odor threshold number
317	Oil and Grease
318	Other anthropogenic substrate alterations
319	Other flow regime alterations
320	Oxadiazon
321	Oxamyl (Vydate)
322	Oxygen, Dissolved
323	PCB-1242
324	PCB-1248
325	PCB-1254
326	PCB-1260
327	Paraldehyde
328	Paralytic shellfish poisoning (PSP) biotoxins
329	Parathion
330	Partial pressure of dissolved gases
331	Particle distribution (Embeddedness)
332	Pentachlorobenzene
333	Pentachloroethane
334	Pentachlorophenol (PCP)
335	Perchlorate
336	Periphyton (Aufwuchs) Indicator Bioassessments (Streams)
337	Phenanthrene
338	Phenol
339	Phenols
340	Phosphate
341	Phosphorus, Elemental
342	Photomirex
343	Phthalic anhydride
344	Physical substrate habitat alterations
345	Picloram
346	Picric acid
347	Polybrominated Biphenyls
348	Polychlorinated biphenyls
349	Prometon (Prometone)
350	Pronamide
351	Propanil (DCPA mono- and di-acid degrad

Cause Code	Cause
352	Propionaldehyde
353	Propoxur
354	Propylene Glycol
355	Propylene oxide
356	Pyrene
357	Pyridine
358	Quinoline
359	Quinone
360	Quintozene
361	RDX
362	Radium
363	Radium 226
364	Radium 228
365	Riparian Habitat Alteration
366	Safrole
367	Salinity
368	Secchi disk transparency
369	Sediment Bioassays -- Chronic Toxicity -- Freshwater
370	Sediment Bioassays for Estuarine and Marine Water
371	Sedimentation/Siltation
372	Selenium
373	Silica
374	Silicate
375	Silver
376	Simazine
377	Sodium
378	Solids (Suspended/Bedload)
379	Specific Conductance
380	Stream bank alterations
381	Streptococcus, fecal
382	Strontium
383	Styrene
384	Styrene oxide
385	Sulfates
386	Sulfide-Hydrogen Sulfide
387	Suspended Algae
388	Temperature, water
389	Terbacil
390	Terbufos
391	Tetrachloroethylene
392	Tetrachlorvinphos
393	Thallium
394	Thiourea
395	Tin
396	Toluene

Cause Code	Cause
397	Total Benzofluoranthenes
398	Total Coliform
399	Total Dissolved Solids
400	Total Fecal Coliform
401	Total Kjehldahl Nitrogen (TKN)
402	Total Organic Carbon (TOC)
403	Total Suspended Solids (TSS)
404	Total Trihalomethane (TTHM)
405	Toxaphene
406	Tributyltin TBT (Tributylstanne)
407	Trichlorfon
408	Trichloroethylene
409	Trichlorofluoromethane (CFC-11)
410	Triethylene Glycol Dichloride
411	Trifluralin
412	Trophic State Index
413	Turbidity
414	Uranium
415	Vanadium (fume or dust)
416	Vinyl acetate
417	Vinyl bromide
418	Vinyl chloride
419	Vinylidene chloride
420	Viruses (enteric)
421	Xylenes (total) (mixed)
422	Zebra mussel, Dreissena polymorph
423	Zinc
424	Zineb
425	alpha-Naphthylamine
426	beta-Naphthylamine
427	cis-1,2-Dichloroethylene
428	m-Cresol
429	m-Dichlorobenzene
430	m-Dinitrobenzene
431	m-Xylene
432	n-Butyl alcohol
433	o-Cresol (2-Methylphenol)
434	o-Dichlorobenzene
435	o-Toluidine
436	o-Toluidine hydrochloride
437	o-Xylene
438	p-Dichlorobenzene
439	p-Phenylenediamine
440	p-Xylene
441	pH

Cause Code	Cause
442	sec-Butyl alcohol
443	tert-Butyl alcohol
444	trans-1,2-Dichloroethylene
458	Total Nitrogen as N
462	Total Phosphorus
463	Impairment Unknown

SOURCES OF NON-ATTAINMENT

Sources are the activities, facilities, or conditions that contribute pollutants or stressors resulting in impairment of designated uses in a waterbody.

Determining the sources of designated use impairment can be a difficult process. Ambient monitoring data can give good evidence of the causes of impairment. In some cases, field observations can provide information on obvious, nearby problems; e.g., land use, substrate, and habitat may provide a basis for identifying sources. This is especially the case for "hydromodification" sources.

In most cases, additional information is needed – watershed land use inventories, records of permit compliance, locations of areas with highly erodible soils, areas with poor BMP (best management practice) implementation, measurements of in-place contaminants, or loadings from atmospheric transport or ground water.

A partial list of sources is shown below. Other source codes may be added as the need arises. Table 15 provides guidance on how to determine sources of impairment for various categories.

Source Code	Source
1	ABOVE GROUND STORAGE TANK LEAKS (TANK FARMS)
2	ACID MINE DRAINAGE
3	AIRPORTS
4	ANIMAL FEEDING OPERATIONS (NPS)
5	ANIMAL SHOWS AND RACETRACKS
6	AQUACULTURE (NOT PERMITTED)
7	AQUACULTURE (PERMITTED)
8	ATMOSPHERIC DEPOSITON - ACIDITY
9	ATMOSPHERIC DEPOSITON - NITROGEN
10	ATMOSPHERIC DEPOSITON - TOXICS
11	AUCTION BARNs
12	BALLAST WATER RELEASES
13	BASEFLOW DEPLETION FROM GROUNDWATER WITHDRAWALS
14	BROWNFIELD (NON-NPL) SITES
15	CARGO LOADING/UNLOADING
16	CERCLA NPL (SUPERFUND) SITES
17	CHANGES IN ORDINARY STRATIFICATION AND BOTTOM WATER HYPOXIA/ANOXIA
18	CHANGES IN TIDAL CIRCULATION/FLUSHING
19	CHANNEL EROSION/INCISION FROM UPSTREAM HYDROMODIFICATIONS
20	CHANNELIZATION
21	CLEAN SEDIMENTS
22	COAL MINING DISCHARGES (PERMITTED)
23	COMBINED SEWER OVERFLOWS
24	COMMERCIAL DISTRICTS (INDUSTRIAL PARKS)
25	COMMERCIAL FERRIES
26	COMMERCIAL DISTRICTS (SHOPPING/OFFICE COMPLEXES)
27	CONSTRUCTION STORMWATER DISCHARGE (PERMITTED)
28	CONTAMINATED SEDIMENTS

Source Code	Source
29	COOLING WATER INTAKE STRUCTURES (IMPINGEMENT OR ENTRAINMENT)
30	CROP PRODUCTION WITH SUBSURFACE DRAINAGE
31	DAIRIES (OUTSIDE MILK PARLOR AREAS)
32	DAM CONSTRUCTION (OTHER THAN UPSTREAM FLOOD CONTROL PROJECTS)
33	DISCHARGES FROM BIOSOLIDS (SLUDGE) STORAGE, APPLICATION OR DISPOSAL
34	DISCHARGES FROM MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4)
35	DISCHARGES FROM OFFSHORE OIL & GAS EXPLORATION (PERMITTED)
36	DRAINAGE/FILLING/LOSS OF WETLANDS
37	DREDGE MINING
38	DREDGING (E.G., FOR NAVIGATION CHANNELS)
39	DROUGHT-RELATED IMPACTS
40	DRY WEATHER FLOWS WITH NPS POLLUTANTS
41	EROSION FROM DERELICT LAND (BARREN LAND)
42	FLOW ALTERATIONS FROM WATER DIVERSIONS
43	FOREST ROADS (ROAD CONSTRUCTION AND USE)
44	FRESHETTES OR MAJOR FLOODING
45	GOLF COURSES
46	GRAZING IN RIPARIAN OR SHORELINE ZONES
47	HARDROCK MINING DISCHARGES (PERMITTED)
48	HEAP-LEACH EXTRACTION MINING
49	HIGHWAY/ROAD/BRIDGE RUNOFF (NON-CONSTRUCTION RELATED)
50	HIGHWAYS, ROADS, BRIDGES, INFRASTRUCTURE (NEW CONSTRUCTION)
51	HISTORIC BOTTOM DEPOSITS (NOT SEDIMENT)
52	HYDROSTRUCTURE IMPACTS ON FISH PASSAGE
53	ILLEGAL DUMPING
54	ILLEGAL DUMPS OR OTHER INAPPROPRIATE WASTE DISPOSAL
55	ILLICIT CONNECTIONS/HOOK-UPS TO STORM SEWERS
56	IMPACTS FROM ABANDONED MINE LANDS (INACTIVE)
57	IMPACTS FROM GEOTHERMAL DEVELOPMENT
58	IMPACTS FROM HYDROSTRUCTURE FLOW REGULATION/MODIFICATION
59	IMPACTS FROM LAND APPLICATION OF WASTES
60	IMPACTS FROM RESORT AREAS (WINTER AND NON-WINTER RESORTS)
61	INDUSTRIAL LAND TREATMENT
62	INDUSTRIAL POINT SOURCE DISCHARGE
63	INDUSTRIAL THERMAL DISCHARGES
64	INDUSTRIAL/COMMERCIAL SITE STORMWATER DISCHARGE (PERMITTED)
65	INTERNAL NUTRIENT RECYCLING
66	IRRIGATED CROP PRODUCTION
67	LAND APPLICATION OF WASTEWATER (NON-AGRICULTURAL)
68	LAND APPLICATION OF WASTEWATER BIOSOLIDS (NON-AGRICULTURAL)
69	LANDFILLS
70	LEAKING UNDERGROUND STORAGE TANKS
71	LITTORAL/SHORE AREA MODIFICATIONS (NON-RIVERINE)
72	LOSS OF RIPARIAN HABITAT

Source Code	Source
73	MANAGED PASTURE GRAZING
74	MARINA BOAT CONSTRUCTION
75	MARINA BOAT MAINTENANCE
76	MARINA DREDGING OPERATIONS
77	MARINA FUELING OPERATIONS
78	MARINA-RELATED SHORELINE EROSION
79	MARINA/BOATING PUMPOUT RELEASES
80	MARINA/BOATING SANITARY ON-VESSEL DISCHARGES
81	MILL TAILINGS
82	MINE TAILINGS
83	MOUNTAINTOP MINING
84	MUNICIPAL (URBANIZED HIGH DENSITY AREA)
85	MUNICIPAL POINT SOURCE DISCHARGES
86	MUNICIPAL POINT SOURCE IMPACTS FROM INADEQUATE INDUSTRIAL/COMMERCIAL PRETREATMENT
87	NON-IRRIGATED CROP PRODUCTION
88	NON-METALS MINING DISCHARGES (PERMITTED)
89	NPS POLLUTION FROM MILITARY BASE FACILITIES (OTHER THAN PORT FACILITIES)
90	NPS POLLUTION FROM MILITARY PORT FACILITIES
91	OFF-ROAD VEHICLES
92	ON-SITE TREATMENT SYSTEMS (SEPTIC SYSTEMS AND SIMILAR DECENTRALIZED SYSTEMS)
93	OPEN PIT MINING
94	OTHER MARINA/BOATING ON-VESSEL DISCHARGES
95	OTHER RECREATIONAL POLLUTION SOURCES
96	OTHER SHIPPING RELEASES (WASTES AND DETRITUS)
97	OTHER SPILL RELATED IMPACTS
98	OTHER TURF MANAGEMENT
99	PACKAGE PLANT OR OTHER PERMITTED SMALL FLOWS DISCHARGES
100	PERMITTED RUNOFF FROM CONFINED ANIMAL FEEDING OPERATIONS (CAFOS)
101	PERMITTED SILVICULTURAL ACTIVITIES
102	PETROLEUM/NATURAL GAS ACTIVITIES (LEGACY)
103	PETROLEUM/NATURAL GAS PRODUCTION ACTIVITIES (PERMITTED)
104	PIPELINE BREAKS
105	PLACER MINING
106	POLLUTANTS FROM PUBLIC BATHING AREAS
107	POST-DEVELOPMENT EROSION AND SEDIMENTATION
108	RANGELAND (UNMANAGED PASTURE) GRAZING
109	RCRA HAZARDOUS WASTE SITES
110	RELEASES FROM WASTE SITES OR DUMPS
111	RESIDENTIAL DISTRICTS
112	SALT STORAGE SITES
113	SALTWATER INTRUSION FROM GROUNDWATER OVERDRAFTING
114	SAND/GRAVEL/ROCK MINING OR QUARRIES

Source Code	Source
115	SANITARY SEWER OVERFLOWS (COLLECTION SYSTEM FAILURES)
116	SEPTAGE DISPOSAL
117	SHIPBUILDING, REPAIRS, DRYDOCKING
118	SILVICULTURE - LARGE SCALE (INDUSTRIAL) UNPERMITTED FORESTRY
119	SILVICULTURE HARVESTING
120	SILVICULTURE PLANTATION MANAGEMENT
121	SILVICULTURE REFORESTATION
122	SITE CLEARANCE (LAND DEVELOPMENT OR REDEVELOPMENT)
123	SPECIALITY CROP PRODUCTION
124	SPILLS FROM TRUCKS OR TRAINS
125	STREAMBANK MODIFICATIONS/DESTABILIZATION
126	SUBSURFACE (HARDROCK) MINING
127	SURFACE MINING
128	TOTAL RETENTION DOMESTIC SEWAGE LAGOONS
129	UIC WELLS (UNDERGROUND INJECTION CONTROL WELLS)
130	UNPERMITTED DISCHARGE (DOMESTIC WASTES)
131	UNPERMITTED DISCHARGE (INDUSTRIAL/COMMERCIAL WASTES)
132	UPSTREAM IMPOUNDMENTS (E.G., PL-566 NRCS STRUCTURES)
133	WASTES FROM PETS
134	WATERFOWL
135	WET WEATHER DISCHARGES (POINT SOURCE AND COMBINATION OF STORMWATER, SSO OR CSO)
136	WILDLIFE OTHER THAN WATERFOWL
137	WOODLOT SITE CLEARANCE
138	WOODLOT SITE MANAGEMENT
139	YARD MAINTENANCE

TABLE 15: USEFUL INFORMATION IN DETERMINING SOURCES OF BENEFICIAL USE NON-ATTAINMENT

Source Category	Example Types of Information
INDUSTRIAL POINT SOURCES	Permit compliance records <ul style="list-style-type: none"> • analysis of DMRs • compliance monitoring or special monitoring in permits • WET or TIE bioassay tests Monitoring/modeling studies <ul style="list-style-type: none"> • upstream/downstream chemical, biological, and habitat monitoring • intensive surveys combined with WLA/TMDL modeling • complaint investigations • data from volunteer monitoring
MUNICIPAL POINT SOURCES	Permit compliance records <ul style="list-style-type: none"> • analysis of routine DMRs • compliance monitoring or special monitoring in permits • WET or TIE toxicity bioassay tests Monitoring/modeling studies <ul style="list-style-type: none"> • upstream/downstream chemical, biological, and habitat monitoring • intensive surveys combined with WLA/TMDL modeling • complaint investigations • data from volunteer monitoring

Source Category	Example Types of Information
<p align="center">COMBINED SEWER OVERFLOWS (CSOs)</p>	<p>Permit compliance records</p> <ul style="list-style-type: none"> records of nonachievement of targets for frequency of wet weather overflows implementation of other minimum control and pollution prevention methods (as in EPA CSO Control Policy) <p>Monitoring/modeling studies</p> <ul style="list-style-type: none"> upstream/downstream chemical, biological, or physical monitoring comparing wet weather and normal flow conditions intensive surveys combined with WLA/TMDL modeling complaint investigations
<p align="center">AGRICULTURAL POINT SOURCES (e.g., CAFOs)</p>	<p>Permit compliance records</p> <ul style="list-style-type: none"> observation of overflows from total retention (non-discharge) facilities compliance with provisions for off-site disposal of animal wastes (e.g., land application, composting) <p>Monitoring studies</p> <ul style="list-style-type: none"> upstream/downstream chemical, biological, or physical monitoring (especially for nutrients and pathogens) complaint investigations
<p align="center">AGRICULTURE (NPS)</p>	<p>Information from monitoring and field observations (e.g., to document bad actors)</p> <ul style="list-style-type: none"> edge of field monitoring of runoff from animal holding areas, cropped areas, or pastures monitoring of inputs from irrigation return flows, sub-surface drains, or drainage ditches proper installation of screens or other measures to avoid fish losses in drainage/irrigation ditches serious rill or gully erosion in agricultural fields sedimentation problems in agricultural watersheds indications of unmanaged livestock in streamside management zones complaint investigations or data from volunteer monitoring or inventories <p>Records on watershed BMP implementation status</p> <ul style="list-style-type: none"> documented low implementation level (e.g., less than a 70% target) of recommended water quality BMPs documented problems with specific agricultural operators <p>Modeling</p> <ul style="list-style-type: none"> use of such models as AGNPS, SWAT or ANSWERS to estimate pollutant loads and improvement from BMP implementation intensive surveys combined with WLA/TMDL modeling
<p align="center">SILVICULTURE (NPS)</p>	<p>Monitoring and field observations documenting instances of high sediment delivery to receiving waters</p> <ul style="list-style-type: none"> BMPs not followed on logging road, skid paths, or stream crossings BMPs not followed to protect streamside management zones serious sedimentation problems (cobble embeddedness or interstitial D.O. problems) in watersheds that are largely silvicultural <p>Records on watershed BMP/management measure)</p> <ul style="list-style-type: none"> implementation status documented low implementation level of recommended water quality-oriented BMPs <p>Results of modeling or cumulative effects analyses</p> <ul style="list-style-type: none"> use of such models as WRENSS to estimate pollutant loads and likely improvement from BMP implementation use of water temperature models to help quantify impacts on cold water fisheries use of landscape analysis techniques (e.g., the RAPID method or Integrated Riparian Area Evaluation method) to document cumulative effects intensive surveys combined with WLA/ TMDL modeling
<p align="center">CONSTRUCTION</p>	<p>Information from monitoring and field observations (primarily to document problem areas or bad actors)</p> <ul style="list-style-type: none"> sedimentation problems documented in watersheds with major construction activity complaint investigations and volunteer monitoring data <p>Information from sediment control management agencies</p> <ul style="list-style-type: none"> records of implementation of sediment control measures

Source Category	Example Types of Information
<p align="center">URBAN RUNOFF & STORM SEWERS</p>	<p>Monitoring/modeling studies</p> <ul style="list-style-type: none"> • upstream/downstream chemical, biological, or habitat monitoring comparing wet weather and normal flow conditions near outfalls • special monitoring for BMP effectiveness-wet ponds, artificial wetlands, grass swales • intensive surveys combined with WLA/ TMDL modeling and catchment models such as SWMM • complaint investigations <p>Information from management agencies</p> <ul style="list-style-type: none"> • documented low implementation level of recommended/required water quality-oriented BMPs • documented problems with BMP operation and maintenance information from monitoring and field observations (primarily to document problem areas or bad actors)
<p>RESOURCE EXTRACTION (Petroleum)</p>	<p>Information from monitoring and field observations (primarily to document problem areas or bad actors)</p> <ul style="list-style-type: none"> • evidence of oil and brine spills affecting sizable areas near receiving waters; elevated TDS, toxicity, oil and grease aesthetic impacts; increased erosion and sedimentation problems • complaint investigations and volunteer monitoring data <p>Information from petroleum management agencies</p> <ul style="list-style-type: none"> • records of recurrent problems with spills, pipeline breaks, over-berming of reserve pits, waste-hauler dumping
<p>RESOURCE EXTRACTION (MAINLY SURFACE MINING)</p>	<p>Information from monitoring and field observations (primarily to document problem areas or bad actors)</p> <ul style="list-style-type: none"> • evidence of decreases in pH, toxicity from heavy metals, excessive sedimentation, or stream reaches with iron bacteria in watersheds with active mining • complaint investigations and volunteer monitoring data <p>Information from mining management agencies</p> <ul style="list-style-type: none"> • records of recurrent permit violations (e.g., over-berming of settling ponds, failure to contain leachates, or failure to revegetate or restore mined areas)
<p align="center">LAND DISPOSAL</p>	<p>Monitoring and field observations (primarily to document problem areas or bad actors)</p> <ul style="list-style-type: none"> • monitoring indicates leachate migration from disposal area or industrial or domestic leach field failures • complaint investigations and volunteer monitoring <p>Modeling</p> <ul style="list-style-type: none"> • solute transport or plume models (e.g., PRIZM) indicate high potential for pollutants to reach receiving water
<p align="center">HYDROMODIFICATION (DAMS, FLOW REGULATION)</p>	<p>Monitoring and field observations</p> <ul style="list-style-type: none"> • recurring problems with inadequate instream flows (e.g., dewatering of streams, reduced pollutant assimilation, unnatural water temperatures) • documented interference with fish migration and spawning movements (e.g., for such anadromous fish as salmon or rockfish but also for inland fish that seek spawning habitat outside lakes or large rivers) <p>Modeling</p> <ul style="list-style-type: none"> • analysis using PHABSIM or other instream flow models to document adverse impacts • analysis related to FERC permit renewal and State 401 Certification, habitat recovery plans under the ESA, or TMDL studies (e.g., problems with anoxic or nutrient-laden releases from hydrostructures)
<p align="center">HYDROMODIFICATION (CHANNELIZATION, DREDGING, REMOVAL OF RIPARIAN VEGETATION, STREAMBANK MODIFICATION, DRAINING/FILLING OF WETLANDS)</p>	<p>Monitoring (usually over considerable period of time) documenting adverse changes:</p> <ul style="list-style-type: none"> • severe channel downcutting or widening • elimination of vegetation in streamside management zones • excessive streambank erosion and sloughing • loss of significant wetland area in watershed • failure of wetland mitigation projects <p>Modeling studies</p> <ul style="list-style-type: none"> • decreases in pollutant assimilation from habitat modification • adverse impacts on hydrology, water temperatures, or habitat

Source Category	Example Types of Information
NATURAL	<p>Monitoring and field observations of the presence of sources that are clearly not anthropogenic</p> <ul style="list-style-type: none"> • saline water due to natural mineral salt deposits • low DO or pH caused by poor aeration and natural organic materials • excessive siltation due to glacial deposits • high temperatures due to low flow conditions or drought <p>Note: the Natural Sources category should be reserved for waterbodies impaired due to naturally occurring conditions</p>

PRIORITIZATION OF TMDL DEVELOPMENT & FUTURE MONITORING

After the final determination of beneficial use attainment is made, a four-level priority ranking for TMDL development will be established including waters targeted for TMDL development within the next two years (Priority 1). In accordance with EPA guidelines, priority determinations will take into account the severity of the impairments and the designated uses of the waters impacted. Waters in Category 5 (the State's 303(d) list) will be aggregated and prioritized according to their eleven digit hydrologic unit code (HUC11) watershed. The prioritization process will closely follow that used to develop the Unified Watershed Assessment except where changes are necessary due to programmatic and logistical differences between the two programs. Primary and secondary criteria were developed to evaluate and prioritize watersheds for TMDL development. The primary evaluation criteria used were the vulnerability of waters to degradation, the risks to public health and the threat to aquatic life.

A watershed's vulnerability for degradation was evaluated by first calculating the percentage of impaired waters for each HUC11 watershed based on the stream miles or equivalent stream miles (for lakes) listed as impaired divided by the total equivalent stream miles within the watershed. A Pollutant Priority Score was also developed and used based on a pairwise comparison matrix rank of all pollutant(s) and then calculating the mean of the values for those pollutants causing impairments within each watershed. The presence of protected waters or EQIP local emphasis areas were also used to evaluate watershed vulnerability.

The threat to public health was also considered in the prioritization by evaluating both the population served by Public Water Supplies (PWS) and number of PWS intakes in the watershed. In both cases the more population served and the higher the number of intakes the more weight given to the risks to public health.

In assessing of the threats to aquatic life within a watershed consideration was given to the presence of threatened or endangered species along with the area of waters of recreational and/or ecological significance listed in Appendix B of the Oklahoma Water Quality Standards. Calculating the percent change in wetland area for each HUC11 watershed along with the presence of priority wetlands designated by the United States Fish and Wildlife Service were also used to evaluate the threats to aquatic life.

The outline below summarizes both the primary and secondary criteria used to establish the TMDL priority for each HUC11 watershed.

- 1) Vulnerability of waterbodies to degradation**
 - a) Percent Stream Length/Lake Area Impaired
 - b) Pollutant Priority Score (Pairwise pollutant comparison rating)
 - c) Pristine Waters
 - i) Scenic Rivers
 - ii) Outstanding Resource Waters
 - iii) High Quality Waters
 - iv) Sensitive Water Supplies
 - d) EQIP Local Emphasis Area
- 2) Risks to public health**
 - a) Public Water Supply Customers

- b) Public Water Supply Intakes
- 3) Threat to aquatic life and other water-dependent wildlife**
 - a) Presence of threatened and endangered species.
 - b) Area of Waters of Recreational and/or Ecological Significance (Appendix B)
 - c) Wetland Area
 - i) Presence of USFWS Priority Wetlands
 - ii) Change in Wetland Area

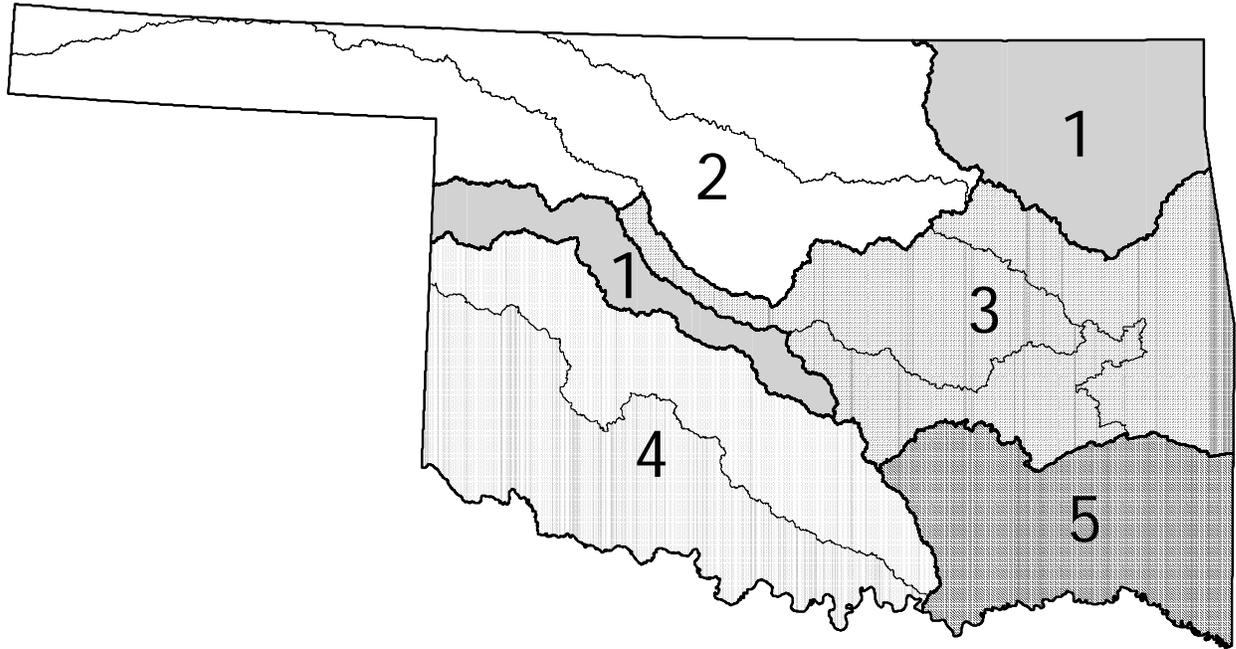
The priority ranking was established by giving each of the criteria above a ranking/points based on its overall importance. The criteria rankings or points were then totaled to give an overall score for each watershed. Table 16 below contains a more detailed summary of the actual weight given to each criterion.

TABLE 16: TMDL PRIORITIZATION-POINT RANKING

Points	Total Percent Impaired	Pollutant Priority Score	Wetland Percent Change	USFWS T&E Species	USFWS Wetland Priority	EQIP Local Emphasis Area	Highest Designated Protected Waterbody	Percent Appendix B Areas	PWS Intakes in HUC	PWS Customers Served
15	85	> 75th Quartile	>20%	≥ 3			Scenic R or ORW		≥ 4	≥ 100,000
10	65	Median to 75th Quartile	>10% to 20%	2			HQW		3	99,999 to 10,000
5	45	25th Quartile to Median	>5 to 10%	1	Yes	Yes	SWS	Upper 50th Percentile	2	9,999 to 1,000
3	25	< 25th Quartile	1 to 5%					Lower 50th Percentile	1	999 to 1
0	0	No Impairments	Gain or <1%		No	No		None	0	0

Where practicable, the State's Rotating Basin plan (Figure 24) will be used to schedule data collection projects in Category 2 & 3 waterbodies.

FIGURE 6: ROTATING BASIN PLAN WATERSHEDS BY YEAR



COORDINATION, REVIEW, AND APPROVAL

The Department of Environmental Quality (DEQ) is responsible for coordinating the development and submittal of the Integrated Water Quality Report. The process will begin with a notice and request for input sent to EPA Region 6, state environmental agencies, and Tribal environmental offices. A series of interagency meetings will be conducted to review the listing methodology, review and discuss the draft list along with priority rankings and scheduling, and facilitate the exchange of information. The draft list will be circulated to EPA Region 6 and state environmental agencies for comment prior to release for public participation.

Public participation will be undertaken in two phases. When the process to identify candidate waters is begun, nominations from the public will be solicited. This will involve the distribution of press releases, announcements, articles for publication, posting on the DEQ and/or other state environmental agency websites, and limited mailings. Once the final draft list is compiled, it is submitted for formal public review with notice and a 30-day comment period. Upon the close of the comment period, a responsiveness summary will be prepared. OSE will coordinate public participation activities. After the public review period and finalization of the list, it is formally submitted to EPA Region 6 for review and approval.

CONTROL OF RESIDUAL WASTE

PERMIT REQUIREMENTS

In accordance with Section 208(b)(2)(J) of the Act, Federal Regulations 40 CFR 130.6.(c)(4)(iii)(A) requires the identification of a process to control the disposition of all residual waste in the area which could affect water quality. Under 40 CFR Part 503, the use or disposal of sewage sludge including domestic/municipal sludge and domestic septage are regulated. Likewise, 40 CFR Part 257 regulates grit and screenings removed from the treatment of domestic sewage, drinking water treatment sludge, commercial and industrial septage, industrial/sewage sludges generated at an industrial facility during the treatment of industrial wastewater or a combination of industrial and domestic wastewater. The NPDES regulations on sludge management allow the permit writer the discretion to permit any entity/facility that has the potential for adverse effects on public health and environment. These facilities either generate sewage sludge or otherwise effectively control the quality of sewage sludge or the manner in which it is disposed. Thus, NPDES permit will not only be issued to wastewater discharging facilities, but also to sludge producing and/or disposal facilities. In case of a discharging facility, sludge requirements are included in the joint Oklahoma DEQ/EPA NPDES permit. The permit language on sludge requirements reflects the most updated EPA's version on sludge pertaining to 40 CFR Parts 257, 258 and 503. Under the Oklahoma Pollutant Discharge (OPDES) Regulations (State Rules; OAC 252:605-7-7), all facilities which generate sludge shall comply with the requirements of the State Solid Waste Management Act and rules of the Department promulgated thereunder (State Rules; OAC 252:510, Municipal Solid Waste Landfill Rules; and OAC 252:647 Sludge Management Rules), and any requirement of the discharge permit regarding sludge.

SLUDGE MANAGEMENT PLANS

The OPDES Regulations also require facilities generating sludge to comply with sludge management plan. The plan shall be approved by the Department prior to any disposal of sludge, and will be appended to the facility's discharge permit or other Department-issued permit.

The Plan shall include at least the following information:

- The source and type of sludge,
- Sludge treatment process,
- Amount of sludge generated,
- Sludge characteristics: chemical, physical and biological characteristics,
- Storage, transportation to the disposal site and disposal techniques
- Disposal site location and site characteristics (surface area, soil type, water table, certain chemical characteristics of the soil, if land applied....),
- Life expectancy of the disposal site and closure plan,
- Sludge testing, sampling and report requirements
- Administration of the sludge treatment and disposal program.

PERMIT ISSUANCE PRIORITIES

The following priorities will be observed in allocating resources for issuance/reissuance/modification of NPDES permits.

1. Issuance or re-issuance of permits for major dischargers
2. Issuance or reissuance or modification of permits for minor dischargers in order to address toxicity or toxic pollutants
3. Issuance of permits for minor industrial dischargers with expired "First Round" NPDES permits

4. Issuance or reissuance of permits for all other minor dischargers
5. Issuance of storm water permits
6. Issuance of other general permits

With the exception of item 3, these activities are anticipated to occur as they come up. However, item 3, minor industrial dischargers with expired "First Round" NPDES permits, involves a significant number of facilities. These will be prioritized using a watershed approach. The State's existing planning segments will be utilized for watershed boundaries. Individual watersheds will be prioritized by considering such factors as the 303(d) list, the 305(b) water quality assessment, special designations (such as ORW or HQW) in the WQS, and the number of dischargers in the watershed.

These priorities may be modified in some cases for businesses who are considering locating in Oklahoma and bringing new jobs to the State. As the DEQ Customer Services Division begins to work with a new business, they will identify those permits that need to be placed at the head of the permit processing line and coordinate directly with the Water Quality Division to arrange for this level of treatment. In order to minimize processing time for certain high profile permit applications, they may be assigned a priority status so that every step of the process can be accomplished in the absolute minimum time. When it appears that a high profile permit may require such expedited treatment, the Customer Services Division will seek approval from the Office of the Executive Director to arrange for this level of priority.

CHAPTER 4

PLANNING AND INTERGOVERNMENTAL COOPERATION

INTRODUCTION

This Chapter describes the planning process and the process for assuring adequate authority for intergovernmental cooperation in the implementation of Oklahoma's Water Quality Management Programs. The first part is a historical summary regarding the development of planning documents and the participation of the various state agencies, which have authority related to water quality. The second part is a general description of the public participation process and its opportunities. The next part deals with the planning process and procedures for making major, minor, and comprehensive updates to the State's Water Quality Management (WQM) Plan. The last section describes, in detail, the intergovernmental coordination with regard to local, regional, state and federal entities.

HISTORICAL SUMMARY

Section 208 of the Federal Water Pollution Control Act of 1972 (as amended) mandates that the states develop a process and procedure for managing and planning their waters. The outcome of this process was the development of a planning document called the "Water Quality Management Plan" (WQM Plan or the 208 Plan). The 208 Plan describes the process used in identifying point and nonpoint sources of pollution and the implementation of programs and procedures for the abatement or prevention of pollution to waters of the state.

For the purpose of water quality management planning, the State was divided into seven major planning basins for each river system. This was mainly due to the State's great diversity in climate, topography, geology, and population distribution. The seven major basins are further subdivided into fifty-nine subbasins, or stream segments, allowing for more precise water quality assessment, planning and management. The boundary of each segment was based on either hydrological features such as flow patterns, dams, reservoirs or gauging stations, political constraints such as county boundaries, or in some cases it was due to the convenience of a bridge or road crossing. These 208 segments are utilized as the basic units in establishing the Oklahoma WQS.

The initial State WQM Plan consisted of seven separate Basin Plans, which were completed and approved by EPA in 1975. These plans were completed under Section 303(e) of the Clean Water Act as part of the continuing planning process. This planning process constituted Phase I in the development of basin-wide WQM Plans. Phase I planning dealt largely with developing wasteload allocations for point sources. Neither nonpoint source pollution, nor the required management and implementation steps, were included in the Phase I plans.

Phase II of the planning process was completed under Section 208 of the Clean Water Act. Phase II WQM Plans for each basin were completed and approved by EPA in 1979. The purpose of Phase II planning was to utilize, update, and expand the water quality planning information gained in the Phase I planning and to coordinate and integrate area wide 208 planning into the overall Statewide 208 Plan. One goal of water quality management planning was to identify all sources of pollution. Pollution information derived in the original seven basin plans was reviewed and incorporated into the more comprehensive 208 Plan.

Since the initial WQM Plans were completed, planning efforts have focused on identifying water quality pollution problems in the State and developing implementable plans for control, abatement, or prevention of pollution. In 1981, the WQM Plan Updates for each of the seven basins were completed by the State. These updates were addenda to the WQM Plan completed in 1979 and served to expand, with more detail, Chapters II and III of the initial plan (Basin Description and Point Sources Analysis).

In FY 1981, the State developed a single document format, which could be easily and less expensively updated instead of the previous seven separate Basin Plans. Statewide information was included in the

single plan with more specific information for each basin being discussed as appropriate. The 1981 updates included both Industrial and Municipal Inventories as appendices to the plan.

In FY 81, funding under Section 208 of the Clean Water Act ended. Since that time, the State's efforts in water quality management planning have been greatly curtailed. Other funding sources that have been used for water quality management planning effort have included sections 205(j), 604(b)(3), and 106. To date, only funds from sections 604(b)(3) and 106 are being used. The utilization of other funding sources, federal, state, and local, for water quality management planning will continue to be explored.

In FY 1985, the WQM Plan was updated again to reflect advancements in monitoring, quality, assessment, and pollution identification in various stream segments.

PUBLIC PARTICIPATION IN THE CONTINUING PLANNING PROCESS

GENERAL DESCRIPTION

Public participation opportunities in the planning processes are offered primarily through four procedures, generally described as follows:

1. Revision and update of the water quality management plans,
2. Permitting procedures for point source discharge permits and 401 water quality certifications,
3. Rulemaking activities of the DEQ and other state and federal agencies, and
4. Public forums designed to allow public comment and input on issues of public concern.

The specific procedures for allowing public participation are described as follows:

REVISION AND UPDATE OF THE WATER QUALITY MANAGEMENT PLANS

Opportunity for public participation is provided through and in compliance with 40 CFR Part 25 and this Chapter. One of these opportunities include the issuance of 45 day notices for public comment and request for public formal meeting issued to interested persons, news media, and other special interest groups. These opportunities are further described in detail below:

1. "Press Releases" to amend the WQM Plan with a 45-day comment period required:
 - a. Contents as required by 40 CFR 25.4: timetable for decision, issues, tentative determinations made by the agency, cite applicable law and rules, location where relevant documents can be reviewed or obtained, identification of public participation opportunities such as meeting (if significant interest), name of contact person for additional information, an address to mail in comments, the type of revision, facility, location, limits/loadings, etc.
 - b. Press Releases distributed to:
 - (1) Mailing list (kept current as needed),
 - (2) State/local government agencies including Oklahoma Department of Wildlife Conservation, Oklahoma Department of Tourism and Recreation, substate planning agencies (COGs), and DEQ local offices,
 - (3) Minimum of 2 newspapers in area affected - to be published at their discretion only (DEQ will not be responsible for cost of publication of any "Press Releases").
2. DEQ determines if there is "significant public interest" or if a public meeting would be useful.
 - a. If answer is no, then prepare a Responsiveness Summary for any comments received and forward with draft letter for Water Quality Division Director's signature to send to EPA requesting final approval of WQM Plan amendments.
 - b. If answer is yes, go to #3.
3. Notification made to Customer Assistance of the need for a meeting:
 - a. Make arrangements for date, time, and location of the meeting;

- b. Must be not less than 45 days after notice is given to hold the meeting;
 - c. Preferable in the evening, and in the area affected;
4. "Press Releases" to hold public meeting:
- a. 45-day notice and comment period required;
 - b. Press Releases must comply with 40 CFR 25.5: identify the matters to be discussed at the formal public meeting, include a discussion of the agency's tentative determination on major issues, procedures for obtaining further information, notice of meeting not less than 45 days after the notice given. Reports, information, data must be available to the public at least 30 days before the date of the meeting;
 - c. Location, time, (preferable in the evening) and place of meeting, (in the area affected if possible);
 - d. Notice distributed to:
 - (1) Mailing list (kept current as needed),
 - (2) State/local government agencies including Oklahoma Department of Wildlife Conservation, Oklahoma Department of Tourism and Recreation, substate planning agencies (COGs), DEQ local offices, and to all persons submitting comments.
 - (3) Additional mailing list to include all respondents to first "Press Releases."
5. Holding Public Meetings:
- a. First part of the meeting is to be an informal presentation, question and answer period, and discussion of the issues;
 - b. Second part is to be a formal meeting with tape recording of the meeting;
 - c. Written comments and oral statements will be included in the record;
 - d. Must comply with 40 CFR 25.5(e) and (f);
 - e. The record may be kept open for not more than five (5) days following the meeting to allow for additional comments.
6. Prepare Responsiveness Summary in compliance with 40 CFR 25.8. Make it available to the public.
7. Make any necessary modifications in response to comments received during public participation process.
8. Draft final letter for the Water Quality Division Director's signature, or if unavailable then the Water Quality Division Assistant Director's signature to send to EPA requesting final approval with description of the public participation process attached. See Figure 25

PERMITTING PROCEDURES FOR POINT SOURCE DISCHARGE PERMITS AND 401 WATER QUALITY CERTIFICATION

Public notice, comment, opportunity for public meeting, and (after authorization of DEQ's proposed NPDES program) opportunity to request an administrative permit hearing are provided under the DEQ discharge permit program as specified in OAC 252:605. The rules contained in OAC 252:605 incorporate by reference applicable regulations of the EPA regarding public participation in the discharge permit program, except that the process for administrative hearings will be slightly different. OAC 252:605 procedures will also apply to sewage sludge permits encompassed by the EPA program. Opportunities for public notice regarding 401 water quality certifications are described in applicable federal regulations of the federal permitting authority and in the DEQ's rules contained in OAC 252:610.

RULEMAKING ACTIVITIES OF THE OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY AND OTHER STATE AND FEDERAL AGENCIES

The APA, 75 OS 1991 §251 et seq., requires public participation in rulemaking activities for all permanent rules through publication of notice in *The Oklahoma Register*, public comment for 20 days, rulemaking hearing to accept verbal comments, and publication of final rules. The APA's definition of "rule" is quite broad in scope, so that the state will be required to promulgate rules even in situations where federal agencies might not be required to do so. All requirements relating to water quality management plans, pollution abatement, wastewater treatment and disposition,

permitting, approval of remediation plans, enforcement of Oklahoma WQS, administrative proceedings, natural resource damage assessments, and similar requirements shall be contained in appropriate Chapters of the DEQ's rules. These requirements are for the most part now contained in OAC 252 Chapters 600 through 660.

PUBLIC FORUMS DESIGNED TO ALLOW PUBLIC COMMENT AND INPUT ON ISSUES OF PUBLIC CONCERN

Both the Water Quality Management Advisory Council and the Environmental Quality Board are authorized by law to conduct public forums around the State of Oklahoma. The Environmental Quality Code provides this authority, implemented by the Board in quarterly meetings at different locations in the state. It is anticipated that water quality issues such as those involved in the CPP and WQM Plan will be addressed at such public forums.

TMDLS AND THE PUBLIC PARTICIPATION PROCESS

Opportunity for public participation during the development of TMDLs and WLAs is provided through, and in compliance with, 40 CFR Part 25 and this chapter. The Department encourages public involvement and awareness by issuing various notices using available media outlets and current mailing lists. The specific procedures for soliciting public participation during the development of TMDLs for watersheds and WLAs for wastewater treatment facilities are described below.

WATERSHED TMDLS

Watershed TMDLs address one or more pollutants from all sources in an identified watershed. A variety of flow conditions are simulated and non-point source contributions may be significant. After EPA approval, the TMDL is integrated into the State's Water Quality Management Plan following the appropriate procedures.

Prior to the beginning of the public participation phase, the Department will forward the TMDL to EPA Region VI for technical approval. Upon receipt of technical approval, the Department issues a public notice that summarizes the findings of the TMDL. The notice is distributed using a current mailing list, which includes state and local government agencies, environmental groups, stakeholders, citizen groups, etc., and at least two newspapers in the affected area. The Public Notice and supporting documents are also posted on the DEQ website. Public comments are accepted for a 45-day period, beginning on the issue date. If no public meeting is held, a response to any comments is prepared. The TMDL is finalized and submitted to the EPA for final approval.

If a public meeting is requested and the DEQ determines that a significant degree of public interest exists, a public meeting is scheduled. The Department's Customer Service Division may assist with the necessary meeting arrangements. A second public notice that identifies the matters to be discussed, the Department's tentative determination on major issues, procedures for obtaining additional information, and the meeting time and date is issued at least 45-days prior to the meeting. Any reports, data, or other information is also available for public review at least 30-days prior to the meeting. The second public notice is mailed like the first notice and any person or group who submitted comments on the TMDL is mailed the second notice. In lieu of the notice of an opportunity to request a public meeting, notice of the date, time, and place of a public meeting may be given in the initial notice, provided the public meeting is scheduled at least 45-days after the distribution of the initial notice.

The public meeting is conducted in two parts. The first portion of the meeting is informal and consists of a presentation of the scheduled topic, a question and answer period, and a discussion period, while the second part of the meeting is formal and at a minimum, recorded on audiocassette. Following adjournment, the formal record remains open for no more than five-days to allow for additional comments. Preparation of a Responsive Summary and inclusion of any necessary TMDL

modifications is the next step. Once comments are resolved, the Department finalizes the TMDL and submits it to the EPA for final approval.

POINT SOURCE TMDLS

Point source TMDLs evaluate the impact of one or a limited number of point source discharges. The analysis simulates low flow, high temperature conditions when non-point sources are not a significant factor. Prior to the beginning of the public participation phase for a WLA, the requesting facility is allowed a 30-day review period. The Department then forwards the WLA to EPA Region VI for technical approval. Upon receipt of technical approval, the Department issues a public notice that summarizes the facility's proposed WLA changes. The notice is distributed using a current mailing list, which includes state and local government agencies, environmental groups, stakeholders, citizen groups, etc., and at least two newspapers in the affected area. Public comments are accepted for a 45-day period, beginning on the issue date.

If no public meeting is held, a response to any comments is prepared and, the WLA is forwarded to EPA for final approval and inclusion in the State's Water Quality Management Plan. If a public meeting is requested and the DEQ determines that a significant degree of public interest exists, comments are received, a public meeting is scheduled. As with the watershed TMDL, the Department's Customer Service Division may assist with the necessary meeting arrangements. A second public notice that identifies the matters to be discussed, the Department's tentative determination on major issues, procedures for obtaining additional information, and the meeting time and date is issued at least 45-days prior to the meeting. Any reports, data, or other information is also available for public review at least 30-days prior to the meeting. The second public notice is mailed like the first notice and any person or group who submitted comments on the WLA is mailed the second notice. In lieu of the notice of an opportunity to request a public meeting, notice of the date, time, and place of a public meeting may be given in the initial notice, provided the public meeting is scheduled at least 45 days after the distribution of the initial notice.

The public meeting is conducted in two parts. The first portion of the meeting is informal and consists of a presentation of the scheduled topic, a question and answer period, and a discussion period, while the second part of the meeting is formal and at a minimum, is recorded on audiocassette. Following adjournment, the formal record remains open for no more than five-days to allow for additional comments. Preparation of a Responsive Summary and inclusion of any necessary WLA modifications is the next step. Once comments are resolved, the Department forwards the WLA to EPA Region VI for final approval.

UPDATING AND MAINTAINING THE WATER QUALITY MANAGEMENT PLAN

AUTHORITIES OF STATE AGENCIES AND OTHERS

Prior to enactment of the Environmental Quality Code, 27A OS Supp. 1993, §2-1-101 et seq., seven state agencies (the OCC, OSDH, ODWC, OSDA, the Conservation Commission, the Department of Mines and OWRB) had some statutory authority over water quality in Oklahoma and all were involved to some extent in water quality management planning and in developing the State WQM Plan. Designated Area wide Agencies were also involved with water quality management planning by development of area plans and preparation of planning reports for their regions.

This information was provided to the State (the Pollution Control Coordinating Board and the Department of Pollution Control) for review and incorporation into the Statewide WQM Plan.

Since the enactment of the Environmental Quality Code, effective July 1, 1993, primary authority over water quality planning resides with the DEQ as follows:

1. The DEQ has statutory authority under the Environmental Quality Code, 27A OS Supp., 1993, §2-6-103(6), to "...Establish, implement and enforce the Water Quality Management Plan, the continuing planning process documents, and wasteload allocations..."
2. The Environmental Quality Board has the authority under 27A OS Supp., 1993, §2-6-103 to adopt by reference Oklahoma Water Quality Standards and "... to promulgate other rules to protect, maintain and improve the best uses of waters of this State in the interest of the public under such conditions as may be necessary or appropriate for the prevention, control and abatement of pollution."
3. The Executive Director, or his appointed elective, has the authority to issue point source discharge permits for all municipal and industrial facilities regulated by the DEQ, sources and activities, coextensive authority over non-point source pollution, the authority on behalf of the State of Oklahoma to issue water quality certifications for all activities subject to Section 401 of the Clean Water Act, and authority to exercise all incidental powers necessary to carry out the duties of the DEQ relating to the CPP, the WQM Plan, and other water quality matters (27A OS Supp., 1993, §2-1-103(C)). The powers of the Executive Director include the authority to enter into any appropriate or necessary intergovernmental agreements, contracts or memoranda of understanding in order to carry out the duties of the DEQ relating to the CPP and WQM Plan.

REQUIRED CONTENTS OF PLANS

Sections 205(j), 208 and 303 of the Clean Water Act and 40 CFR Part 130 specify water quality planning requirements. Key provisions, which set forth required elements of the WQM Plans are included here for reference.

Section 208 of the Clean Water Act requires each state to prepare, and update as needed, a WQM Plan which contains the following:

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, including an analysis of alternative waste treatment systems, including any requirements for the acquisition of land for treatment purposes; the necessary waste water collection and urban storm water runoff systems; and a program to provide the necessary financial arrangements for the development of such treatment works, and an identification of open space and recreation opportunities that can be expected to result from improved water quality, including consideration of potential use of lands associated with treatment works and increased access to water-based recreation;
2. the establishment of construction priorities for such treatment works and time schedules for the initiation and completion of all treatment works;
3. the establishment of a regulatory program to
 - a. implement the waste treatment management requirements of Section 201(c),
 - b. regulate the location, modification, and construction of any facilities within such area which may result in any discharge in such area, and,
 - c. assure that any industrial or commercial waste discharged into any treatment works in such area meet applicable pretreatment requirements,
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;
5. the identification of the measures necessary to carry out the plan including financing, period of time, costs, and the economic, social, and environmental impacts;
6. a process to
 - a. identify, if appropriate, agriculturally and silviculturally related nonpoint sources of pollution, including return flows from irrigated areas, and from land used for livestock and crop production, and;
 - b. set forth procedures and methods (including land use requirements) to control to the extent feasible such sources;
7. a process to

- a. identify, if appropriate, mine-related sources of pollution including new, current, and abandoned surface and underground mine runoff, and;
 - b. set forth procedures and methods (including land use requirements) to control to the extent feasible such sources;
8. a process to
 - a. identify construction activity related sources of pollution, and;
 - b. set forth procedures and methods (including land use requirements) to control to the extent feasible such sources.
 9. a process to control the disposition of all residual waste generated in such area which should affect water quality; and
 10. a process to control the disposal of pollutants on land or in subsurface excavations within such area to protect ground and surface water quality.

The DEQ in revising the WQM Plans will ensure that the requirements of 40 CFR Part 130, adopted by reference in DEQ rules at OAC 252:610, are met. The plans will be updated and revised to include all required elements set forth in 40 CFR Section 130.6(c), including the following:

1. Total Maximum Daily Loads (TMDLs);
2. Effluent limitations including water quality based limitations and schedules of compliance in accordance with CWA Section 303(e)(3)(A) and 40 CFR §130.5;
3. Municipal and industrial waste treatment, including identification of anticipated treatment works, financial programs, construction priorities and schedules;
4. Nonpoint source management and control, including description of programs and BMPs;
5. Description of agencies, authorities and intergovernmental coordination;
6. Implementation measures, including financing, time schedule and impacts of plans;
7. Identification of dredge and fill regulatory programs;
8. Basin plans; and
9. Description of groundwater pollution programs.

FORMAT OF PLANS AND INFORMATION SOURCES

The format of the statewide WQM Plan should be structured to facilitate utilization of its contents and it should contain adequate information to describe the water quality, pollution problems and management activities in each basin. The goal should be to identify all municipal, industrial, nonindustrial, agricultural, oil and gas related, and other dischargers as well as potential sources of nonpoint source pollution, prioritize water quality problems, consider alternative solutions and recommend control measures for implementing solutions.

There are currently three "designated area" WQM Plans affecting Oklahoma. These are the Association of Central Oklahoma Governments' (ACOG) plan of the greater Oklahoma City area (Oklahoma, Cleveland, Canadian and Logan Counties); the Indian Nations Council of Governments' (INCOG) plan for the greater Tulsa area (all of Tulsa, Creek and Osage Counties, as well as parts of Rogers and Wagoner Counties); and the Arkhoma Regional Planning Commission's (ARKHOMA) plan for the area surrounding Fort Smith, Arkansas (including all of Sequoyah and LeFlore Counties in Oklahoma and Crawford and Sebastian Counties in Arkansas). The area wide plans go through a certification process similar to the statewide plan, with the exception that the plans must be formally adopted by the governing board of the designated agency.

Historically, information, which was utilized in updating/developing the overall statewide plan resulted from specific studies conducted by state agencies under the 208 Plan to identify pollution problems, develop implementation strategies, abatement and prevention programs, and to develop educational programs. Additional information came from 208 studies that were carried out by Designated Area wide Agencies and the associated WQM Plans developed for their respective areas. It is anticipated that these information sources will continue to be utilized in future updates.

SCHEDULES AND PROCEDURES FOR REVISION

State and/or area wide agency WQM Plans "...shall be updated as needed to reflect changing water quality conditions, results of implementation actions, new requirements or to remove conditions in prior conditional or partial plan approvals", as required by 40 CFR 130.6(e) of EPA regulations and OAC 252:610 of DEQ rules. OAC 252:605 incorporates by reference applicable EPA regulations relating to revisions of the WQM Plan for point source discharges contained in 40 CFR Parts 122 and 124. Updates and revisions shall comply with the public participation requirements of 40 CFR Part 25.

The state will distinguish between "comprehensive updates" conducted yearly or at larger intervals as needed, and more frequent updates ("as-needed updates"), which generally relate to particular stream segments and/or discharges. As-needed updates are subject to slightly different procedures according to their classification as "major" or "minor" modifications of the Plan(s). The procedures for updates are discussed in the following sections.

COMPREHENSIVE UPDATES

The process by which the Statewide WQM Plan will be comprehensively updated is as follows:

- a. The DEQ and area wide agencies prepare planning outputs, which serve as technical support for the plan.
- b. The DEQ synthesizes the information and compiles recommendations into the WQM Plan document.
- c. All significant outputs (or their executive summaries) and draft plans are submitted to appropriate state agencies, area wide agencies and EPA for review and comment.
- d. The draft updates are submitted for review and comment to the local environmental committees and other local decision makers, and through the area wide programs.
- e. The proposed revisions are subject to public participation procedures consistent with 40 CFR 25, as detailed in this Chapter. For comprehensive updates, a minimum public comment period of sixty days shall be provided and at least two public meetings shall be held in different locations across the state (usually in Tulsa and in Oklahoma City).
- f. A responsiveness summary is prepared in accordance with 40 CFR Part 25 and is made available to the public for review.
- g. Changes and revisions are made by the DEQ in response to comments received and a final output or revised plan update is developed. The proposed update is provided to the Division Director of the Water Quality Division of the Department of Environmental Quality for certification.
- h. The approved plan or output is forwarded to the Regional Administrator of the EPA with the letter of certification signed by the Water Quality Division Director of the DEQ.
- i. The EPA then approves or disapproves the document and notifies the Water Quality Division Director of the DEQ.

CHANGES, ADDITIONS, OR DELETIONS TO THE WATER QUALITY MANAGEMENT PLAN UPDATE ON AN "AS-NEEDED BASIS"

Procedures have been established to allow for changes in "Appendix A" (Industrial Inventory) and "Appendix B" (Municipal Point Source Inventory) or other appropriate portions of the last certified fiscal year plan update on an "as-needed" basis. These procedures are designed to meet the requirements of applicable state and federal law and regulations relating to point source discharges, including 40 CFR 122.44(d), 122.4, 130.6(e) and 130.7, and OAC 252:610 Subchapter 9 (General Water Quality - Planning and Wasteload Allocations). More frequent updates allow resolution of Section 201, Section 208, and other issues on a timely basis.

Criteria have been established which distinguish between major or minor modifications to the last updated WQM Plan. The difference between minor and major modifications establishes the level

of public participation and review each will receive; minor modifications may be postponed where allowed until the next comprehensive update of the Plan.

MINOR MODIFICATIONS

Minor Modifications may be made when changes to the Plan will not result in a significantly different plan recommendation and any water quality impacts of the change are negligible. Minor modifications will be subject to administrative approval by the Water Quality Division Director of the DEQ and submitted to EPA as needed, but without the public notice and comment period prior to this first submittal. All minor modifications will later be subject to public review and comment at the next comprehensive update. EPA will notify the Water Quality Division Director of their decision on each minor modification within 45 days of receipt. Proposed modifications, which are not determined to be minor will require formal public notice and public comment period prior to recommendation by the Water Quality Division Director.

The following modifications may be considered minor.

- (1) Make corrections to the facility name, legal description for the facility, NPDES number, legal description for the Point of Discharge for the facility, etc.
- (2) Corrections to the facility's current treatment process, assuming the change does not require a modification to the WLA.
- (3) Increase in Effluent Flow
 - (a) The increase in design flow for municipal facilities does not exceed the smaller of the following two: a maximum increase in flow of 30% of the approved WQM Plan occurring since its last major update, or any increase in flow which is not more than 0.5 MGD.

or

The increase in the present average daily flow for industrial facilities, does not exceed the smaller of the following two: a maximum increase in flow of 30% of the approved WQM Plan occurring since its last major update, or any increase in flow which is not more than 0.5 MGD.

 - (b) Water quality modeling shows that the increased flow will have a negligible impact on the receiving water, will not result in a change of existing effluent limits, and that applicable water quality standards will be met. The results of the water quality model will be submitted to EPA in advance for initial review and approval.
 - (c) The design flow for municipal facilities or present average daily flow for industrial facilities, has not been previously increased under these criteria. and
 - (d) The receiving water is not designated "ORW", "HQW", or "SWS" in the WQS or considered environmentally sensitive for other reasons.
- (4) Corrections to the receiving stream for the facility without effecting the WLA for the facility.
- (5) Correction in 7Q2 of receiving stream without effecting the WLA for the facility.
- (6) Change or correction the in Designated Management Agency (DMA) and its Status for Municipal Facilities. The status of DMA may be changed to "approved" if the necessary acceptance form has been signed, filed, and approved by the DEQ provided the DMA has been previously designated in the WQM Plan.
- (7) Change in Facility Ownership for Industrial Facilities. A change in ownership or operational control may be reflected in the WQM Plan if a request for permit modification has been approved by the regulating state agency.
- (8) Increase in Population Projections (Municipal Facilities)
 - (a) Projections to the end of a 20-year planning period which extends beyond the design year of the WQM Plan may be added to the WQM Plan provided they do not exceed the projection most recently published by the Oklahoma Department of Commerce (ODOC) for that year.

- (b) Present or projected population may be modified so as to exceed the ODOC figures only if:
 - i) The service area of the facility is larger than the community boundary on which the ODOC figure is based; and/or
 - ii) Industrial flows to the facility are included as a population equivalent. The population equivalent will be calculated based on one person for each 100 gpd of industrial flow.

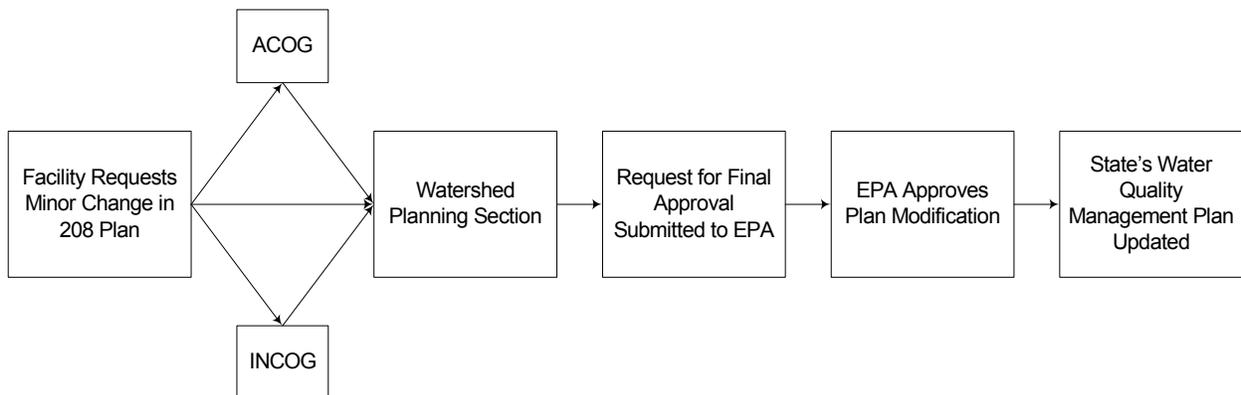
These changes must be adequately justified in a facility plan or an engineering report.
- (c) Population projections developed and adopted by a designated area wide planning agency may be incorporated in the state plan. These projections will be reviewed on a case-by-case basis and may exceed the ODOC figures if adequate justification is provided.

PROCEDURES FOR MINOR UPDATES

The following procedures will apply to updates that qualify as minor changes to the WQM Plan:

- (a) PDES Permitting Section of DEQ receives the request from the municipal or industrial discharger to modify the WQM Plan or otherwise determines such a change is necessary or appropriate.
- (b) PDES Permitting Section prepares a modified 208 fact sheet.
- (c) PDES Permitting Section forwards the proposed 208 Plan modification to the Water Quality Division Director and then to EPA for their approval.
- (d) When EPA's approval is received, PDES Permitting Section will update all appropriate records and database of the modification; PDES Permitting Section will update, as appropriate, the Appendices of the WQM Plan.
- (e) The minor changes will be subject to public comment at the next comprehensive update of the WQM Plan.

FIGURE 25: FLOW CHART OF MINOR CHANGES TO THE WQM PLAN



PUBLIC PARTICIPATION AND STATE REVIEW OF "AS-NEEDED" MAJOR REVISIONS OF THE WATER QUALITY MANAGEMENT PLAN

Changes, which do not qualify under the described criteria as "minor changes," will follow the procedures described in the following paragraphs. The DEQ has incorporated by reference applicable provisions of 40 CFR Part 130 relating to the planning process in OAC 252:610. Applicable provisions of 40 CFR Part 25 describing adequate public participation shall be followed. The DEQ's policy is to enhance and encourage public participation and education about matters of public interest.

PROCEDURES FOR MAJOR CHANGES

In order to provide public notification to the persons identified by federal regulations in 40 CFR Part 25, the public participation procedures detailed earlier in this Chapter will be followed. These procedures will conform to the requirements of 40 CFR Part 25.

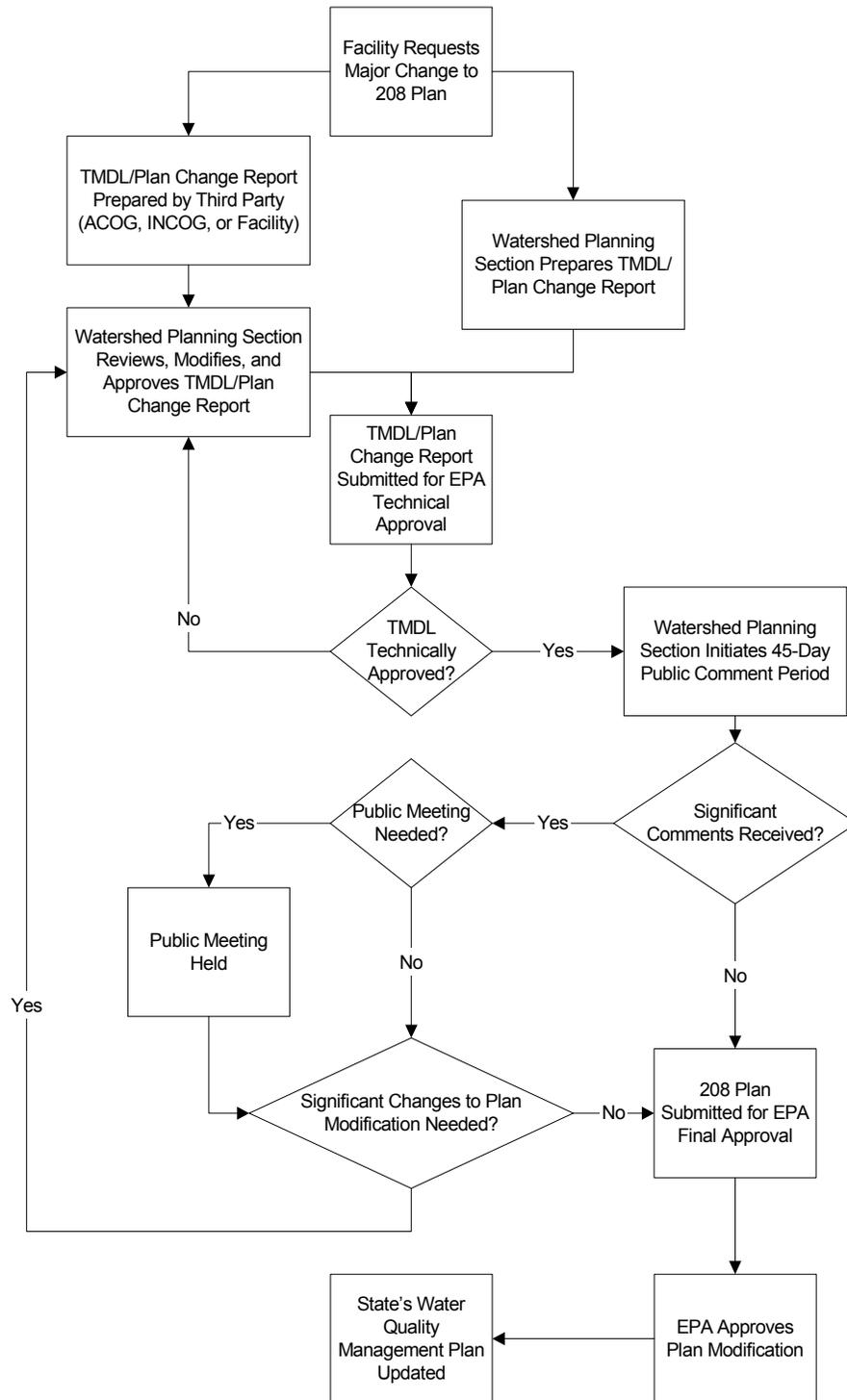
In addition, the following administrative procedures shall apply to major as-needed updates of WQM Plans:

- (1) Watershed Planning Section of the DEQ receives a request from the municipal or industrial discharger to modify the WQM Plan or the DEQ otherwise determines that such a change is appropriate or necessary.
- (2) If WLA/TMDL modeling work is needed or required, the discharger may perform the work itself, contract with a consultant to perform the work, or request DEQ to perform the work. If DEQ accepts the request, they will prepare an estimate of all cost for such work and submit a contract to conduct said work to a requesting entity or other responsible party. Upon execution of the contract and agreement to pay for costs, the DEQ will perform the necessary modeling work and send the results to EPA for review and technical approval. If the requesting entity or responsible party chooses to use an outside contractor to perform all necessary work, the work must be performed in a timely manner and submitted to the DEQ for approval and transmittal to EPA.
- (3) Upon EPA's technical approval of the WLA/TMDL, the requesting entity or other responsible party shall pay to the DEQ within 30 days all costs and expenses of the modeling work, if it is performed by the DEQ.
- (4) When EPA's approval is received, the DEQ PDES Permitting Section will prepare a modified 208 fact sheet, reflecting all necessary changes.
- (5) Watershed Planning Section will prepare public notification documents for the Plan modification and send it out for public comment in accordance with the requirements of 40 CFR Part 25, applicable state law, and the procedures of this Chapter. Watershed Planning Section will be responsible for responding to comment(s) received from the public. Requests from the News Media will be forwarded to the Public Information and Education Section to answer questions about public notification and participation procedures. The Public Information and Education Section will forward the caller back to the Watershed Planning Section for specific information regarding the WQM Plan.
- (6) After the public comment period is over, if no comments are received and the DEQ determines that there is not significant interest or that a public meeting is not otherwise appropriate, the Watershed Planning Section will forward the proposed 208 Plan modification to the Water Quality Division Director for certification and for forwarding the proposed 208 Plan modification to EPA for their final approval.
- (7) If public comments are received, the DEQ will determine if there is significant public interest or if a meeting is otherwise appropriate. If a public meeting is to be held, arrangements for a public hearing (a formal meeting) will be made by the Customer Assistance Division in coordination with the Water Quality Division. The procedures in 40 CFR Part 25 will be followed in developing the contents of and

issuing a notice of the public meeting/hearing and in conducting the same. A tape recording of the formal portion of the public hearing will be kept with any comments received. The public hearing will be held, if possible, within the town or locality being affected by the proposed modification to the WQM Plan. If it is impossible to hold the public hearing in the affected location, an alternative site as close as possible to the affected site will be utilized for the public hearing.

- (8) After any public hearing, or after the end of the comment period, the DEQ shall prepare a responsiveness summary responding to comments and make the same available to the public. The DEQ will make any appropriate changes to the update, which is recommended to the Water Quality Division Director for his certification. Upon certification, the Water Quality Division Director will forward the update to EPA Region VI for final approval.
- (9) When EPA's final approval is received, Watershed Planning Section will update their records and database of the modification; Watershed Planning Section will update, as appropriate, the Appendices of the WQM Plan.
- (10) Sample form for 208 Plan format is provided in Appendix A.
- (11) The process for approval of a plan revision may be conducted simultaneously with the public participation process for a draft point source discharge permit.
- (12) WLA/TMDL for non-dissolved-oxygen-demanding substances:
To expedite the WQM planning and permitting process, EPA in a memorandum of understanding (MOU) of June 8, 1996, has authorized DEQ to proceed with public notification of the plan change/update prior to EPA's approval for WLAs/TMDLs for non-dissolved oxygen-demanding substances. For this type of change, EPA's approval as outlined above in steps (2), (4), (8), and (9) shall not be required. However, EPA shall be informed of the plan change/update during the public notification process (step 5). EPA may review and comment on the proposed changes(s) when necessary.

FIGURE 7: FLOW CHART OF MAJOR CHANGES TO THE WQM PLAN



DEQ/EPA 208 MOU MODIFICATIONS FOR INDUSTRIAL DISCHARGERS

The EPA Region 6 and the DEQ have developed a MOU that designates and changes some of the agency's roles in the process of updating the WQMP. This MOU will assist both agencies in providing more timely updates for permit issuance.

The WQMP had included guidelines for processing all the municipal discharging facilities but there were very few guidelines for the industrial dischargers to be incorporated into the WQMP. In the past, most of the industrial dischargers did not have their approved effluent limitations listed in the WQMP. A backlog had developed in an effort to incorporate all industrial dischargers. Executing this MOU established an expedited method to allow routine updates to the WQMP. This will avoid excessive delays in the permit issuance process.

The MOU designated both agencies' responsibilities as:

DEQ will utilize the procedures set forth in the approved CPP. If the proposed effluent limitations for draft permits indicate a need to update or modify the WQMP, DEQ will prepare all necessary documentation and justifications including the public participation procedures for modifications to the WQMP. The public participation process for WQMP modifications may be undertaken concurrently with public participation activities for the facility's draft permit. DEQ will notify EPA of the proposed modifications to the WQMP when public participation commences.

EPA reserved the right to review and formally approve or disapprove any individual proposed modification to the WQMP. EPA will notify DEQ of their intentions within 20 working days of receiving the request. Unless the WQMP modification is exempted from the MOU (see below), EPA will waive its review and formal approval of any WQMP modification and allow DEQ to approve the modification and incorporate it into the approved WQMP. The exemptions are as follows:

- a. Effluent limitations for oxygen-demanding substances derived from a wasteload allocation model;
- b. Effluent limitations derived from a TMDL that includes multiple waste sources;
- c. Any modification for which EPA has exercised its right of review and approval.

The MOU does not restrict EPA's authority to review and modify all draft permits.

This MOU became effective June 1996.

UPDATES AND OTHER INFORMATION SUBMITTALS

Water quality limited stream segments requiring WLAs/LAs and TMDLs identified under 40 CFR 130.7(b) will be updated and submitted to EPA as required under 40 CFR 130.7(d). The DEQ, in coordination with other appropriate federal, state, regional and local governmental agencies, will also update and revise required lists of waters and provide information required under 40 CFR §130.10, including:

- (1) waters which cannot reasonably be anticipated to attain or maintain water quality standards due to toxic pollutants or that water quality which will assure protection of public health, water supplies, and designated uses;

- (2) waters for which the applicable standard under Section 303 of the CWA (numeric criteria for priority pollutants) is not expected to be achieved due to discharges of toxic pollutants; and
- (3) determination of point sources discharging toxic pollutants and amount of pollutants discharged for sources believed to be the cause of impairment of water quality for stream segments on the lists.

The lists required under §130.10(d) will be prepared and revised utilizing the information and data specified in 40 CFR 130.10(d)(6), including information relating to waters identified under Section 303(d) of the CWA as waters needing water quality-based controls, waters identified in the 305(b) Report, waters identified as priority waterbodies, and other available information identified in 40 CFR 130.10(d).

PROCEDURE FOR APPROVAL OF NEW DISCHARGERS

When planning for the development of an area, consideration must be given to providing an adequate collection and wastewater treatment system. Individual sewage treatment systems may be used as a means of wastewater disposal where soils are suitable, the wastewater is compatible, and lot size is sufficient. However, individual systems are not appropriate for industrial wastewater or when soils are not suitable. When individual systems are not workable, several alternatives must be considered. These include:

1. The collection and discharge of the wastes into an existing sewage system.
2. A total retention lagoon.
3. The treatment and use of the effluent for irrigation to avoid discharge.
4. A new discharging system.

The above alternatives are listed in the order of preference for types of treatment and disposal of wastewater.

The construction of a new discharging facility is the least desirable alternative and should be avoided if at all possible. Should a discharging facility be proposed, the Oklahoma Department of Environmental Quality will offer opportunity for public comment as part of the WQM Plan update process. If one is requested and the DEQ determines there is a significant degree of public interest, a public meeting will be held prior to deciding whether the proposed discharge alternative can be approved. When a new discharge is proposed, a request including the following information must be submitted to the DEQ for review, as part of a request to update the WQM Plan.

1. The name, address, and phone number of the applicant.
2. Acreage and legal description of the proposed development. Proposed use, such as a single or multiple family dwelling, commercial etc.
3. The population equivalent and estimated flow to the proposed treatment facility. The location of the proposed treatment facility within the above described development. If the treatment facility will be located outside the described development, provide the legal description of the proposed site.
4. The name of the stream that will receive the wastewater.
5. Latitude and longitude of the proposed discharge point.
6. A topographic map showing the location of the development, treatment facility, and discharge point.
7. The proposed arrangements for operation and maintenance of the facility.
8. An engineer's report that fully explains why each of the preferred alternatives mentioned above were not selected and provides data supporting the rejection of the preferred alternatives, including economic comparisons of the cost of each alternative.

These guidelines do not require submission of a formal application for a permit, nor do they require the submission of engineering plans and specifications. Preparation of these documents and commitments

to purchase materials and equipment for the collection and treatment systems should be deferred until a determination is made regarding the approval of the proposed facility. This determination comes after the closure of the public comment period and conclusion of any public meetings (if applicable).

PROCESSES FOR INTERGOVERNMENTAL COOPERATION

REQUIREMENTS AND AUTHORITIES

A description of the process for assuring adequate authority for intergovernmental cooperation in the implementation of Oklahoma's Water Quality Management Program is a required component of the Continuing Planning Process pursuant to 40 CFR §130.5(b)(5) and Section 303(e)(3)(E). This Chapter will describe the process for intergovernmental coordination in these major areas:

- Coordinate activities with federal agencies as required under applicable federal laws,
- Ensure participation by all state agencies with jurisdiction over certain point and nonpoint sources of pollutants as set forth by 27A OS Supp., 1993, §1-3-101,
- Ensure adequate involvement of entities with functions related to area wide waste management plans under Section 208 and applicable basin plans under Section 201 of the Clean Water Act, and
- Coordinate planning efforts with other states, interstate compact commissions, and regional entities.

COORDINATE ACTIVITIES WITH FEDERAL AGENCIES AS REQUIRED UNDER APPLICABLE FEDERAL LAWS

Compliance with state water quality requirements by applicants for federal permits and coordination with the federal permitting authority is ensured in part through the 401 water quality certification program implemented by the DEQ under OAC 252:610. Other coordination activities are carried out as required by applicable federal legislation, including but not limited to, the following:

- a. The Solid Waste Disposal Act, as amended (PL 91-512)
- b. The Safe Drinking Water Act (PL 99-339)
- c. The Clean Water Act, as amended (PL 91-604)
- d. The Coastal Zone Management Act (PL 92-583)
- e. The Watershed Protection and Flood Protection Act (PL 83-566)
- f. The Wild and Scenic Rivers Act (PL 90-542)
- g. The Rural Development Act of 1972 (PL 92-542)
- h. The Land and Water Conservation Fund Act, as amended (PL 88-578)
- i. The National Historic Preservation Act (PL 89-665)
- j. The Fish Restoration Act (PL 81-081) and the Federal Aid in Wildlife Restoration Act (PL 75-415)
- k. The Endangered Species Act (PL 93-205)
- l. Wastewater Management Urban Studies Programs administered by the U.S. Army Corps of Engineers (PL 685, 1938, PL 429, 1913)
- m. Transportation Planning administered by the Department of Transportation (PL 87-866, PL 93-366, PL 93-503)
- n. The Housing and Community Development Act of 1974 (PL 93-383)
- o. The Resource Conservation and Recovery Act of 1976 (PL 94-580)
- p. The Comprehensive Environmental Response, Compensation, and Liability Act (popularly known as "Superfund") of 1980 (PL 96-510)
- q. The Clean Water Act of 1977 (PL 97-117, PL 92-500, PL 95-217)
- r. The Fish and Wildlife Coordination Act
- s. National Environmental Policy Act and other Federally assisted planning and management programs being carried on in Oklahoma.

Additionally, Oklahoma will coordinate with specific State and Federal water quality and natural resource agencies such as the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, Bureau of Land Management, Bureau of Reclamation, U.S. Forest Service, and others.

ENSURE PARTICIPATION BY ALL STATE AGENCIES WITH JURISDICTION OVER CERTAIN POINT AND NONPOINT SOURCES OF POLLUTANTS AS SET FORTH BY 27A OS SUPP., 1993, § 1-3-101

GENERAL

The respective jurisdictions of Oklahoma state environmental agencies over nonpoint and point sources discharges of pollutants to waters of the state are clearly defined in 27A OS Supp. 1993, §1-3-101. "Waters of the state" is defined to include both surface waters and ground water, and in all cases includes "waters of the United States which are contained within the boundaries of, flow through or border upon this state or any portion thereof". 27A OS Supp., 1993, §2-6-101(16).

JURISDICTION AND AUTHORITIES

POINT SOURCE DISCHARGERS

The DEQ has authority pursuant to 27A OS Supp., 1993, §1-3-103(B) over all point source discharges of pollutants and storm water to waters of the state which originate from municipal, industrial, commercial, mining, transportation and utilities, construction, trade, real estate and finance, services, public administration, manufacturing, and other sources, facilities and activities, except those under the jurisdiction of the Corporation Commission and Department of Agriculture as specified in Sections 1-3-101 (D) and (E). Those under the jurisdiction of the Corporation Commission and Department of Agriculture, to the extent a permit is required under the NPDES program, are by state law required to obtain a permit only from the EPA and these NPDES permits will be subject to the 401 Certification authority of the DEQ.

NONPOINT SOURCES

The DEQ has authority under Section 1-3-101(B)(2) over all nonpoint source discharges of pollutants, except as provided in Subsection (D) [Department of Agriculture] Subsection (E) [Corporation Commission], and Subsection (F) [Conservation Commission].

OTHER STATUTORY AUTHORITY

The DEQ has additional, unqualified, authority under Section 1-3-101(B) of the Code for "surface and groundwater quality and protection and water quality certifications", "public and private water supplies", "freshwater wellhead protection", and "environmental regulation of any entity or activity, and the prevention, control and abatement of any pollution, not subject to the specific statutory authority of another state environmental agency."

RULES

The DEQ has codified rules for point source discharges in OAC 252:605 and rules relating to nonpoint source, groundwater quality, general water quality, and the CPP in OAC 252:610. OAC 252:610 incorporates 40 CFR Part 130 by reference.

METHODS OF COORDINATION

DISCHARGERS

The DEQ will ensure coordination with regard to sources, activities and facilities, which have point source discharges of pollutants requiring an NPDES permit from EPA in part through its 401 water quality certification program. Rules relating to certifications (OAC 252:610) provide that the federal agency, EPA, may provide public notice and both the rules and Section 401 of the CWA allow the DEQ to take measures to provide public notice on applications for 401 certifications. The DEQ and EPA will cooperate to ensure that mailing lists for providing notice of NPDES draft permits and applications for 401 certification, include all appropriate state, local, and federal agencies, and other governmental entities.

For point source discharges requiring a permit from the DEQ, joint permitting will ensure coordination with EPA. Notices of applications filed with the DEQ will be published in a newspaper and mailing lists for notices of draft permits will include all affected states, and all local, municipal and federal agencies as required under 40 CFR §124.10. Comments will be accepted and public meetings will be held as required under 40 CFR §122.10, OAC 252:605 and applicable state law.

NONPOINT SOURCES

The DEQ will coordinate with the Oklahoma Conservation Commission, which has the authority for monitoring, evaluation and assessment of waters to determine the extent of nonpoint source pollution and the development of conservation plans, including the authority to serve as the technical lead agency for Section 319 of the CWA except for activities related to industrial and municipal stormwater. The DEQ will consult with the Conservation Commission to coordinate information and controls of pollutants relating to abandoned mine reclamation sites, soil conservation and erosion controls, conservation plans for clean lake watersheds, and wetlands strategy. The Department of Agriculture and Corporation Commission will be involved in consultations and implementation of controls for nonpoint source discharges from all sources, activities and facilities under their respective jurisdictions as specified in the Code.

IMPLEMENTATION AND ENFORCEMENT OF THE OKLAHOMA WATER QUALITY STANDARDS

The CPP and updates thereof will be written by the DEQ in cooperation with the Oklahoma Water Resources Board, which has authority under the Code and other statutes for promulgation of Oklahoma Water Quality Standards and implementation documents for such Standards. 27A OS Supp., 1993, §1-3-103(C) and 82 OS Supp. 1993, §1082.6. Enforcement actions for violations of the Oklahoma WQS will be conducted by the DEQ, Corporation Commission, and Department of Agriculture, in accordance with delineated boundaries of their jurisdictions under Section 1-3-101 of Title 27A of the Oklahoma Statutes.

FUNDING AND PRIORITIZATION

For wastewater treatment facilities and other funding activities, the DEQ will coordinate and exchange information with the Oklahoma Water Resources Board (OWRB) and the Secretary of the Environment (OSE), which have authorities as follows:

OWRB the Sate Revolving Fund (SRF) program, state water/wastewater loans and grants revolving fund and other related financial aid programs,

OSE other federal funding under the CWA.

The OWRB has authority for inventory and ranking of construction needs, and has established rules relating thereto in OAC 785. The 1987 Amendments to the Clean Water Act set forth a schedule and mechanism for completing the transition to achieve full state and municipal responsibility for financing, building, operating, maintaining and replacing wastewater treatment facilities. To facilitate the transition from the construction grants to the SRF program, the Clean Water Act provides each state with the option to transfer a portion of its allotment from Title II authorizations for deposit, through a capitalization grant into a revolving fund.

EPA is authorized to make grants to capitalize State water pollution control revolving funds. The primary purpose of this authority is to provide loans and other financial assistance to municipalities for the construction of publicly owned wastewater treatment facilities. The last year in which funds could be appropriated for direct project funding through construction grants was FY-90. Separate appropriations for SRF capitalization grants are authorized from FY-89 through FY-96. Thereafter, the states and municipalities have the sole responsibility for providing financing to meet the enforceable requirements of the act unless funding for State SRF programs is re-authorized.

The Oklahoma Revolving Fund is a loan program that applies to all public projects receiving financial assistance from the Wastewater Facility Construction Revolving Loan Account for the construction or replacement of wastewater treatment works.

Development of the Oklahoma Revolving Fund was authorized by 82 OS Supp. 1988, Sections 1085.56 et seq. The program regulations are necessary for determining the eligibility and priority of entities to receive financial assistance pursuant to the Federal Water Quality Act of 1987 and the Wastewater Facility Construction Revolving Loan Account, and are contained in OAC 785. Legislation was passed in 2002 to allow state revolving funds to be used for nonpoint source pollution projects, and to give DEQ and OCC a greater role in prioritizing the applications for funds.

Projects, which are funded in whole or in part with assistance from the SRF will be required to comply with the requirements applicable state law and rules promulgated by the OWRB in OAC 785.

The categories of wastewater treatment projects eligible for assistance are as follows:

Secondary Treatment	Category I
Advanced Treatment.....	Category II
Infiltration/Inflow Correction	Category IIIA
Major Sewer System Rehabilitation	Category IIIB
New Collection Systems.....	Category IVA
New Interceptors.....	Category IVB
Combined Sewer Overflow Correction	Category V

The OWRB will determine annually the amount of funding necessary and the project categories that will be placed on the fundable portion of the Priority List (See Appendix 4-C).

Costs associated with the planning, design and building of the eligible categories of wastewater projects are considered allowable by the OWRB. Maximum eligible non-construction costs will be determined by guidelines developed by the OWRB. Eligible construction costs will be based on the lowest responsible bidder.

Eligibility for projects is subject to the applicable Subchapter 9, SRF Regulations (Parts 1, 3, 5 and 7) of the OWRB's rules in OAC 785. Funding and prioritization criteria and requirements are set forth in Appendix D of this Chapter.

ENSURE ADEQUATE INVOLVEMENT OF ENTITIES WITH FUNCTIONS RELATED TO AREA WIDE WASTE MANAGEMENT PLANS UNDER SECTION 208 AND APPLICABLE BASIN PLANS UNDER SECTION 201 OF THE CLEAN WATER ACT

For permits which require revisions of the WQM Plan, coordination with other agencies and entities will be achieved through providing notice and opportunity for participation in compliance with 40 CFR Part 25, Chapter VI of the Environmental Quality Code, other applicable federal regulations, and the provisions of the CPP as set forth in herein.

RULEMAKING

Additional coordination can be achieved through allowing other state, local and federal entities an opportunity to comment on rules promulgated by the Environmental Quality Board which relate to the CPP and WQM Plan, nonpoint source pollution, groundwater quality, and point source discharges, contained in OAC 252:605 and OAC 252:610. Public comment and public meeting opportunities are provided for all permanent rules by the DEQ in conjunction with the Water Quality Management Advisory Council and the Environmental Quality Board, as required by the Oklahoma Administrative Procedures Act, 75 OS 1991 §302 et seq. All state, local and federal entities may request to be placed on the mailing list for notices of rulemakings and a Notice of Rulemaking Intent with a description of proposed rules and other appropriate information is published in the *Oklahoma Register* a minimum of 20 days prior to a public meeting. The composition of both the Water Quality Management Advisory Council and the Environmental Quality Board, by law, must include members representing major interests such as agriculture, industry, nonprofit environmental organizations, local government, etc.

COMPLAINTS AND DATA MANAGEMENT

Guidelines and computerized systems for recording and analyzing information about complaints have been developed, are being utilized by all state environmental agencies, and information resulting from this process will be subject to disclosure to the public, including other agencies, pursuant to the Open Records Act. The complaint system is designed to direct complaints to the appropriate state agency with jurisdiction over the subject matter, to produce a timely response to each complaint and document the resolution of the complaint.

OFFICES OF CITIZEN, LOCAL GOVERNMENT AND BUSINESS ASSISTANCE AND POLLUTION PREVENTION ACTIVITIES

The Environmental Quality Code established within the DEQ, a separate office with the express purpose of assisting citizens, local governments and businesses in interacting with the DEQ and to provide these interests with information. The Office of Customer Services is staffed with persons with expertise in water quality and other environmental areas, and will act as a liaison with the Water Quality Division and other Divisions of the DEQ in matters directed to them. Development and implementation of new pollution prevention activities are also a priority in the new DEQ, and these activities are being coordinated with local, regional and state governmental entities as appropriate.

WATER QUANTITY/WATER QUALITY

Coordination with the Oklahoma Water Resources Board, which has jurisdiction over water quantity matters, is ongoing with respect to matters with water quality implications. The

OWRB and DEQ are coordinating agency rules involving construction requirements for wells to avoid inconsistency or overlap. The OWRB also has authority for Oklahoma's Comprehensive Water Plan, which has water quality implications. DEQ staff are cooperating with the OWRB in providing input to the Water Law Advisory Council on how water quality considerations may be accounted for in granting stream water appropriations and permits to withdraw groundwater under state statutes, assessing the need for state policy or law relating to minimum instream flows, flow augmentation, and resolving other water quantity/water quality issues.

NATURAL RESOURCE DAMAGES

The Secretary of Environment has been designated under the Environmental Quality Code as the Natural Resource Trustee of Oklahoma for purposes of the Oil Pollution Act of 1990 and CERCLA responsibilities. The Secretary will utilize appropriate state environmental agencies in carrying out natural resource trustee duties. The Board of Environmental Quality has adopted rules, contained in OAC 252:610, which provide the DEQ with authority to fulfill duties pursuant to any contracts or memoranda of understanding with the Secretary regarding natural resource damage assessments and related activities. The Department of Wildlife Conservation will be promulgating rules relating to wildlife damage assessments in relation to pollution incidents.

COORDINATE PLANNING EFFORTS WITH OTHER STATES, INTERSTATE COMPACT COMMISSIONS, AND REGIONAL ENTITIES

LOCAL GOVERNMENT COORDINATION

Coordination with local governmental entities, such as municipalities, is achieved by providing notices on individual point source discharge permits which may affect their area (in compliance with 40 CFR §124.10), the stormwater program and through cooperation in development of ordinances and regulations such as those designed for reservoir protection (see OAC 252:635).

REGIONAL PLANNING AGENCIES

Three substate planning agencies have been designated in Oklahoma, the Indian Nations Council of Governments (INCOG), the Association of Central Oklahoma Government (ACOG), and the Arkhoma Regional Planning Commission. These substate planning agencies have participated through past development of 208 WQM Plans for their respective areas, which have been incorporated into the State's WQM Basin Plans conditionally approved by EPA in 1979. Currently, the substate planning agencies are cooperating with the DEQ in planning efforts to the extent resources allow.

Within the respective boundaries of the INCOG and ACOG areas, these entities will be responsible for the following activities:

- (1) Identification of any new or modified Designated Management Agencies and coordination to secure properly executed acceptance forms;
- (2) Preparation and submittal of requests for modifications to the WQM Plan, along with supporting documentation;
- (3) Conducting "desktop" level wasteload allocations/TMDLs for municipal dischargers;
- (4) Assisting with public participation activities related to the respective area;
- (5) On-going review and recommendation of changes to the WQM Plan;
- (6) Developing population projections including disaggregation to facility service areas;
- (7) Additional targeted projects, including more detailed wasteload allocations/TMDL studies needed to comply with state and federal water quality modeling requirements and

guidelines, whether grant funded or locally funded, may be negotiated as part of an annual workplan agreement.

When needed modifications to the Plan are identified by INCOG or ACOG, a request will be submitted to DEQ, Water Quality Division along with all necessary supporting documentation and technical justification. These materials will be reviewed by the technical staff and any comments addressed prior to submitting the modification to the Water Quality Division Director for approval. The proposed modification will be subject to the public participation procedures of this Chapter identified for minor and major modifications.

The ARKHOMA Regional Planning Commission has indicated their desire to be de-designated and relieved of any responsibility for water quality management planning activities in the two Oklahoma counties for which they had previous planning responsibility. The ARKHOMA Regional Planning Commission has not performed any water quality management planning activities in Oklahoma for several years. As soon as the official request is received, the de-designation process will be initiated. Responsibility for planning activities in LeFlore and Sequoyah counties will be exercised by the DEQ. Proposed major and minor modifications identified by the DEQ or others will be subject to the public participation procedures identified in this Chapter.

INTERSTATE COORDINATION

In addition to coordination through appropriate notification of affected states under the permit program for point source discharges, as specified in OAC 252:605, water quality issues and planning efforts are coordinated by the State through the following:

- (1) Provision of draft plans such as 201 facility plans, updates to the State WQM Plan or basin plans, and similar documents will be provided to affected states where interstate implications are involved, and an opportunity to comment will be provided.
- (2) Entities such as the Illinois River Task Force and the Scenic Rivers Commission are established to address specific situations and these entities regularly confer with pertinent governmental bodies in neighboring states. Other more informal contacts are also regularly made to address issues of mutual concern.
- (3) Interstate Compact Commissions have been established and approved by appropriate state legislation as follows:

KANSAS-OKLAHOMA ARKANSAS RIVER BASIN COMPACT

The major purposes of this Compact are:

- (a) To promote interstate comity between the states of Kansas and Oklahoma;
- (b) To divide and apportion equitably between the states of Kansas and Oklahoma the waters of the Arkansas River Basin and to promote the orderly development thereof;
- (c) To provide an agency for administering the water apportionment agreed to herein; and
- (d) To encourage the maintenance of an active pollution-abatement program in each of the two states and to seek further reduction of both natural and man-made pollution in the waters of the Arkansas River Basin.

ARKANSAS-OKLAHOMA ARKANSAS RIVER BASIN COMPACT

The major purposes of this Compact are:

- (a) To promote interstate comity between the states of Arkansas and Oklahoma;
- (b) To provide for an equitable apportionment of the waters of the Arkansas River between the states of Arkansas and Oklahoma and to promote the orderly development thereof;

- (c) To provide an agency for administering the water apportionment agreed to herein;
- (d) To encourage the maintenance of an active pollution-abatement program in each of the two states and to seek the further reduction of both natural and man-made pollution in the waters of the Arkansas River Basin; and
- (e) To facilitate the cooperation of the water administration agencies of the States of Arkansas and Oklahoma in the total development and management of the water resources of the Arkansas River Basin.

RED RIVER COMPACT

The principle purposes of this Compact are:

- (a) To promote comity and remove causes of controversy each of the affected states by governing the use, control and distribution of interstate water of the Red River and its tributaries;
- (b) To promote an equitable apportionment among the signatory states of the water of the Red River and its tributaries;
- (c) To promote an active program for the control and alleviation of natural deterioration and pollution of the water of the Red River Basin and to provide for enforcement of the laws related thereto;
- (d) To provide the means for an active program for the conservation of water, protection of lives and property from floods, improvement of water quality, development of navigation and regulation of flows in the Red River Basin; and
- (e) To provide a basis for state or joint state planning and action by ascertaining and identifying each state share in the interstate water of the Red River Basin and the apportionment thereof.

CANADIAN RIVER COMPACT

The major purposes of this compact are:

- (a) To promote interstate comity;
- (b) To remove causes of present and future controversy;
- (c) To make secure and to protect present developments within the states and;
- (d) To provide for the construction of additional works for the conservation of the waters of the Canadian River.

The State interacts with these Compacts primarily through the Secretary of the Environment and the Oklahoma Water Resources Board. The Board has statutory authority for water quantity, including but not limited to, water rights, surface and underground water, planning and interstate stream compacts pursuant to 27A OS Supp. 1993, §1-3-103(C).

PROCEDURES FOR ISSUING FISH CONSUMPTION ADVISORIES

The ODEQ has statutory authority to issue fish consumption advisories pursuant to OAC 27A: 2-6-1-6. Fish tissue contaminant levels, which would trigger an advisory, are calculated according to EPA risk assessment guidance. This is a departure from the older policy of accepting FDA levels for commercial-caught fish. This approach is consistent with the agency-wide policy on risk-based decisions and allows protection of the public, especially vulnerable populations such as fetuses and children. It also encourages the beneficial consumption of fish.

The method for determining fish tissue contaminant levels, which trigger a consumption advisory can be found in the EPA Guidance Document, Fish Assessment and Fish Consumption Limits, 2000. DEQ may also use alternate methods for specific advisory scenarios not covered by EPA's Guidance, such as site-specific advisory levels for lead.

The chemical concentration at which pregnant women and children, the vulnerable population, could not safely eat fish is first calculated. Then, that concentration was used in calculations for the effect of this level of chemical on the rest of the population. Generally, at the level at which the vulnerable population could not consume fish at all, the general population could still consume fish but in limited quantities. A separate calculation of the concentration of chemical at which the general population could not safely eat fish was also done. For most of the chemicals, this has resulted in a two-tiered advisory system. At the lower level, or restricted level, the vulnerable population is warned not to eat the contaminated fish at all and the general population is warned to limit consumption. At the higher level, no consumption of the contaminated fish is allowed. Since these are risk based consumption levels, if, in the future, EPA should modify a risk number for a chemical, this would change the consumption level. ODEQ uses a standard consumption rate of two-8oz meals per month in setting consumption advisory values.

TOXICS AND RESERVOIRS PROGRAM

GOALS

The goal of the Toxics and Reservoirs program is to protect the public’s health by evaluating levels of commonly found toxic compounds in fish flesh from Oklahoma’s reservoirs.

This will be accomplished by targeting three general categories of fish for collection and analysis: predator species, bottom feeders, and rough fish. This will ensure that species analyzed are those most susceptible to bioaccumulation of toxics and most frequently consumed.

SAMPLE COLLECTION

METHODS

Since the intent of the program is to measure toxics in fish flesh, any legal method of obtaining uncontaminated samples is acceptable. DEQ personnel will collect samples by use of gill nets, seines, or electrofishing. In addition, samples may also be provided by ODWC or other cooperating agencies. ODWC generally uses electrofishing as a collection method.

Generally, reservoirs will be routinely sampled every 7 years. If sample results indicate elevated levels of toxics, sampling frequency will be increased to at least annual.

The table below lists the reservoirs routinely sampled.

TABLE 17: RESERVOIRS ROUTINELY SAMPLED

Reservoir			
Lake Arcadia	Lake Fuqua	McAlester City Lake	Lake Texoma
Altus-Lugert Reservoir	Fort Supply Reservoir	McGee Creek Reservoir	Webbers Falls Lock & Dam
Lake Arbuckle	Grand Lake	Lake McMurtry	Lake Wister
Lake Atoka	Great Salt Plains Reservoir	Lake Murray	Waurika Lake
Broken Bow Reservoir	Greenleaf Lake	Newt-Graham Lock & Dam	
Birch Lake	Guthrie Lake	Lake Oologah	
Boomer Lake	Lake Hudson	Lake Overholser	
Lake Carl Blackwell	Lake Hefner	Pine Creek Reservoir	
Canton Lake	Hugo Lake	R.S. Kerr Reservoir	
Copan Reservoir	Hulah Reservoir	Sardis Lake	
Draper Lake	Lake Heyburn	Shawnee Lake	
Lake Eufaula	Kaw Reservoir	Skiatook Lake	
Lake Ellsworth	Lake Keystone	Lake Thunderbird	

Ft. Gibson Reservoir	Liberty Lake	Lake Tenkiller	
Foss Reservoir	Lake Lawtonka	Tom Steed Reservoir	

SPECIES SELECTION

For organics analysis, fish will be composited according to size and species for analysis. A valid composite consists of 3 to 8 individuals of the same species with the smallest fish being at least 75% the length of the largest. Only valid composites will be analyzed.

For Hg analysis, individual analyses will be performed. Results will be averaged for evaluation. The same rules of compositing apply.

To provide the best screening tool for the evaluation of concentrations of toxics that could effect human health, it is desired that each category of fish be available for analysis. For screening purposes, it is necessary that only one composite be run for each category of fish. If the preferred species is available, that species should be chosen for analysis. If the preferred species is not available for a given category, then one of the other acceptable species may be analyzed. If more than one composite of a selected species is available, the composite of the largest individual fish should be chosen for analysis.

Table lists the preferred fish and other acceptable species.

TABLE 18: PREFERRED FISH AND OTHER ACCEPTABLE SPECIES

Category	Preferred Species	Acceptable Species
Predators	Largemouth Bass	Hydbrid, White, or Striped Bass, Walleye, or Flathead Catfish
Bottom Feeders	Channel Catfish or Blue Catfish	Black Bullhead
Rough Fish	Smallmouth Buffalo	Carp, River Carpsucker, Largemouth Buffalo

Upon receipt in the laboratory, all fish will be separated by species and weighed and measured. These values will be recorded and the fish will be composited according to length recommendations. Filets will be collected from each fish and combined into the appropriate composites. The composited filets will be wrapped in aluminum foil and labeled according to site, species, and size. All composites will be held frozen until sample analysis and data evaluation is complete. Composites selected for analysis will be logged in and held in a separate plastic container. Composites not selected for analysis will be combined according to site and held frozen in labeled plastic bags until the screening process is complete.

The samples chosen for analysis will be logged into the SELs Aquarius data management system. They will be held frozen separately until prepared for analysis. Fields in the Aquarius system will be filled out as in **Error! Reference source not found.**

TABLE 19: FIELDS IN THE AQUARIUS SYSTEM TO BE FILLED OUT

Field	Description
Project Code	The appropriate project code – generally TS-XF
Date Collected	Date of collection
Station ID	The Aquarius station ID, if available. Reserve this field if station ID has not yet been assigned.
Source	The total number, number analyzed, and species of the sample, e.g “5 of 7 Largemouth Bass.”
Samplers Comments	The site name, collecting agency (if not ODEQ), and other pertinent information.

SAMPLE ANALYSIS

Sample preparation, analytical methods, detection limits, and QA/QC procedures are spelled out in the SEL Quality Assurance Project Plan.

DATA ANALYSIS

Screening values will be used to determine potential problems and if other samples and species need to be analyzed. Screening levels for chlorinated organics will be set at 75 percent of the lowest level at which a consumption advisory would be issued. Screening levels for Hg will be set at 0.3 mg/kg, which corresponds to EPA's WQ criterion for methyl mercury. Screening levels are shown in Table below.

TABLE 20: SCREENING VALUES FOR POTENTIAL CONSUMPTION PROBLEMS

Contaminant	Screening Value (mg/kg)	Lowest Consumption Advisory Value (mg/kg)
Aldrin	0.006	0.006
Chlordane	0.225	0.300
DDT	2.250	3.000
Dieldrin	0.012	0.012
Endrin	1.500	2.000
Heptachlor	0.150	0.200
Mercury	0.300	0.500
PCBs	0.750	1.000
Toxaphene	3.750	5.000

If all composite values at a given site fall below the screening values, the other composites will not be analyzed. If a composite value exceeds the screening value, all the held samples from that site will then be logged in and analyzed.

SAMPLE FREQUENCY

Reservoirs will be routinely sampled once every 7 years.

If during routine sampling screening values are exceeded, samples will be recollected as soon as practicable with emphasis on collecting the species and categories of fish that showed contamination. As long as sample results for a site remain above screening levels, that site will be recollected annually for the species and categories showing contamination.

If a site has a consumption advisory issued for it, that site will be sampled annually for the species or category of fish for which the consumption advisory applies.

CONSUMPTION ADVISORIES

Consumption advisories may be issued for a particular species or a general category of fish, e.g. predator species. Consumption advisories may also be issued within size ranges, e.g., Largemouth bass greater than 14" in length.

Consumption advisories will only be issued after sampling indicates contaminant levels consistently above ODEQ standards. Generally, this will mean at least two sampling events. The use of selective sampling techniques will be used to try to determine if only certain species or categories of fish are affected.

Consumption advisories will only be issued with the cooperation of the Oklahoma Department of Wildlife Conservation. In addition other interested parties will be notified and consulted before consumption advisories are issued. These may include other state and federal agencies, tribes, and municipalities.

Consumption advisories will be rescinded only after sampling indicates contaminant levels consistently below ODEQ standards. Generally, this will mean three consecutive sampling events. Table lists the levels at which consumption advisories will be issued.

TABLE 21: LEVELS AT WHICH CONSUMPTION ADVISORIES WILL BE ISSUED

Contaminant	Level (mg/kg)	Recommendation
Aldrin	0.006	No consumption.
Chlordane	0.300	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month either broiled or baked.
	0.500	No consumption.
DDT	3.000	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month with fat trimmed and fish either broiled or baked.
	5.000	No consumption.
Dieldrin	0.012	No consumption.
Endrin	2.000	No consumption.
Heptachlor	0.200	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month with fat trimmed and fish either broiled or baked.
	0.300	No consumption.
Mercury	0.500	2 meals per month by women of child bearing age (15-45), or children up to age 15.
	1.000	No consumption by women of child bearing age (15-45) or children up to 15 years of age. General population should consume no more than 2 meals per month.
	1.500	No consumption.
PCBs	1.000	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month with fat trimmed and fish either broiled or baked.
	2.000	No consumption.
Toxaphene	5.000	No consumption by pregnant women or children less than 7 years of age. General population should consume no more than 2 meals per month with fat trimmed and fish either broiled or baked.
	8.000	No consumption.

APPENDIX B. SAMPLE 208 PLAN FORMAT FOR MUNICIPALITY

FACILITY:

CITY/TOWN:

LEGAL:

COUNTY:

POD:

SEGMENT:

NPDES #

PRIORITY RANKING LIST:

CURRENT TREATMENT PROCESS:

PRESENT AVG. DAILY FLOW (MGD):

PRESENT POPULATION:

DESIGN AVG. DAILY FLOW (MGD):

YEAR 2020 POPULATION:

RECEIVING STREAM:

STREAM CLASS:

7 DAY 2 YEAR LOW FLOW (MGD):

WATER QUALITY RANKING:

DMA:

DMA STATUS:

WASTELOAD ALLOCATION:

STRATEGY:

RECOMMENDED TREATMENT ALTERNATIVES

A)

B)

C)

PREVIOUS EPA APPROVAL DATE:

RECORD LAST UPDATE:

APPENDIX C. FY2003-2004 SRF PRIORITY LIST

STATE OF OKLAHOMA
 Fiscal Year 2008-2012 Clean Water State Revolving Fund Project Priority List
 Final Draft
 June 29, 2007

OPDES Permit #	Loan Type	Name	Project No.	Target B.C. Date	Priority List Amount	Project Description
FY 2008 Fundable Projects (July 2007 - June 2008)						
1	OK0028128 R	Westville UA	ORF-03-0011	10/09/07	700,000	WWTP Upgrade to Meet New Phosphorus Limits (Cat. II)
2	OK0026077 LC	Bethany PWA	ORF-05-0001	10/09/07	5,190,000	Sanitary Sewer Rehabilitation Improvements (Cat. IIIB)
3	OK0033618 LC	Inola PWA	ORF-06-0011	09/11/07	1,800,000	WWTP Upgrade to Advanced Treatment (new discharge location) (Cat. I & II)
4	OK0034541 LC	Kellyville PWA	ORF-06-0008	09/11/07	210,000	Sewer System Evaluation Survey (Cat. IIIA)
5	OK0026069 LC	Ponca City UA	ORF-01-0001	12/11/07	6,000,000	Collection System Improvements and New Interceptor Sewer Systems and Appurtenances (Cat. IIIB and IVB)
6	OK0022535 LC	Spencer	ORF-07-0002	12/11/07	344,424	New Sewer Collection System (Cat. IVA)
7	OK0022527 LC	East Duke PWA	Unassigned	09/11/07	1,000,000	New Total Retention Lagoons (Cat. I)
8	OK0030392 LC	Roland	Unassigned	09/11/07	3,250,000	WWTP Expansion (Add extended aeration activated sludge mechanical plant) to Meet Compliance (Cat. II)
9	OK00 NONE LC	Nicoma Park	Unassigned	11/13/07	250,000	New Sewer Collection System (Cat. IVA)
10	N/A LC	TMUA NPS	Unassigned	10/09/07	1,250,000	Purchase of Riparian Easements as a Component of the Conservation Reserve Enhancement Program (CREP) (Cat. VII)
11	OK0027049 LC	Claremore PWA	Unassigned	05/13/08	21,000,000	WWTP Expansion (Cat. I)
12	OK0028649 LC	Hobart PWA	Unassigned	05/13/08	1,000,000	WWTP Improvements (Cat. I)
13	OK0020168 LC	Copan PWA	ORF-00-0008	12/11/07	464,660	I/I Correction & Rehabilitation (Cat. IIIA & B)
14	OK0031682 LC	Ochelata UA	Unassigned	12/11/07	500,000	Sanitary Sewer Pump Station and Force Main (Cat. IVA & IVB)
15	OK0027391 LC	Moore PWA	Unassigned	05/13/08	25,000,000	New WWTP and Collection System Improvements (Cat. I & IIIB)
16	OK00 NONE LC	Guymon UA	Unassigned	08/14/07	14,000,000	New WWTP and Expansion of Lagoon/Land Application System (Cat. II)
17	OK0020303 LC	Owasso PWA	Unassigned	12/11/07	7,500,000	WWTP Improvements, Pump Station (Cat. I, IIIA, & IIIB)
FY 2009 Planning/Contingency Projects (July 2008 - June 2009)						
1	OK0035246 LC	Lawton WA	Unassigned	05/12/09	7,250,000	Phase IIC Citywide Collec. Sys. Rehab.- SE "D" Ave., NW 75th St., Rock Island Railroad & Sub-basins (Cat. IIIB)
2	NS-OK0026221 SS-OK0026239	LC Tulsa MUA	Unassigned	10/14/08	26,410,000	NS WWTP - Sludge Lagoon Improv Construction, Primary Gravity Sludge Thickener Rehab, Digesters 3 & 4 Engineering, Digesters 1 & 2 Construction, Head Works Improvements Construction, Security & Safety Improvements to Disinfection Facilities.; SS WWTP Activ
3	OK0029131 LC	Muskogee UA	Unassigned	11/11/08	7,000,000	Phase II Coody Creek Interceptor, replace East side collector, review I&I problems (Cat. IIIB, & IVA)
4	OK0029131 LC	Muskogee UA	Unassigned	05/12/09	1,600,000	Chandler Road Detention Basin (Cat. VI)
5	OK0029131 LC	Muskogee UA	Unassigned	05/12/09	6,300,000	Beacon Street Outfall Replacement (Cat. I, IIIA, & IIIB)
6	OK0021628 LC	Enid MA	Unassigned	08/12/08	42,796,500	New WWTP (Cat. I & II)
7	OK0032417 R	Wewoka PWA	Unassigned	12/09/08	3,200,000	New WWTP and Rehabilitation of Collection Lines(Cat. I & IIIB)
8	OK0034266 LC	Lone Grove W&STA	Unassigned	01/13/09	2,800,000	New WWTP (Cat. II)
9	OK0026816 LC	Mustang IA	ORF-99-0003	08/12/08	6,750,000	WWTP Expansion and Modification and Rehab of Lift Stations (Cat. II & IIIB)
10	N/A LC	Spavinaw PWA	ORF-00-0009	08/12/08	2,400,000	STP & Collection (Cat. II & IVA)
11	OK0036153 OK0026913	LC Bixby PWA	Unassigned	09/09/08	3,000,000	Phase 2 Collection/Interceptor (Cat. IVA & B)
FY 2010 Planning/Contingency Projects (July 2009 - June 2010)						
1	NS-OK0026221 SS-OK0026239	LC Tulsa MUA	Unassigned	10/13/09	17,410,000	NS WWTP Anaerobic Digesters 3&4 Const, Non-potable Water, Cl2 basin & Effluent Improvements, Nitrification Improvements; Newblock Emprov Contract 3 Relief Eng.; SS WWTP Facilities Odor Control-Construction.; Sewer Rehab Area Wide.; Haikey Creek FEB Improv
2	OK0039071 LC	Sand Springs MA	Unassigned	02/09/10	12,500,000	WWTP Expansion to Meet Compliance (Cat. I)
FY 2011 Planning/Contingency Projects (July 2010 - June 2011)						
1	OK0022764 LC	Chouteau PWA	Unassigned	03/08/11	903,400	Phase II WWTP (Cat. I)
FY 2012 Planning/Contingency Projects (July 2011 - June 2012)						

Note: Bold lettering indicates the loan has been approved by the OWRB and a Binding Commitment has been issued.

	Loan Totals (All Loans)
	FY 08 \$89,459,084
	FY 09 \$109,506,500
	FY 10 \$29,910,000
	FY 11 \$903,400
	FY 12 \$0
	TOTALS \$229,778,984

LC = Long-term Construction Loan
 NC = Non-Construction Loan
 R = Refinance

Category I = Secondary Treatment
Category II = Advanced Treatment
Category IIIA = Infiltration/Inflow Correction
Category IIIB = Replace or Major Sewer Rehab.
Category IVA = Sewer Collection System
Category IVB = Interceptor Sewer
Category VI = Storm Sewer
Category VII = Nonpoint Source Activities

APPENDIX D. SRF REQUIREMENTS

CAPACITY FUNDING LIMITATIONS

The eligible capacity shall be determined using average dry weather flow and peak flows in accordance with population and per capita flow estimates provided by the applicant. Project capacity must be consistent with environmental constraints.

Eligible capacity for treatment plants will be up to a period of 20 years from the estimated date of initiation of construction.

Eligible capacity for interceptors and outfalls will be up to 40 years from the estimated date of initiation of construction.

Eligible capacity shall be calculated by multiplying the OWRB's approved local population projection by an appropriate local per capita flow figure. The flow thus calculated will be deemed to include all the eligible project flows (residential, commercial, federal facilities, industrial, and infiltration/inflow). Eligible capacity will be determined during the development of the planning documents. The applicant will be responsible for documenting, in the planning document, the peaking factors used for the project. Eligible capacity will be determined when planning documents are approved by the Board.

COLLECTION SYSTEMS

Construction of new collection systems necessary to serve existing communities will be eligible for assistance. Collection systems, which will primarily serve undeveloped areas will not be eligible for assistance.

POPULATION AND FLOW PROJECTIONS

Section 208 Water Quality Management Plan population and flow projections will be used to determine the eligible project capacity. A discussion of the local projections should be included in the planning document.

LAND COSTS

Land costs will be ineligible, except as allowed by the Clean Water Act.

REVENUE PROGRAM

The applicant must demonstrate that it has legal, institutional, managerial and financial capability to construct, operate and maintain the treatment works. The applicant will be required to prepare a revenue program, user charge system and establish an acceptable dedicated sources of revenue to repay the loan. The applicant will be required to identify and make projections of the amount of revenue available from specific sources necessary to repay the loan.

A proposed Revenue Program must be prepared and submitted with the Planning Report. The proposed Revenue Program shall be updated as appropriate prior to submission of the formal assistance application. As indicated, the recipient will be required to demonstrate, at the time of the actual application (at the approval to award stage), that a "dedicated" source of revenue is available to repay the loan. Revenue will be considered dedicated when the recipient passes an ordinance or a resolution committing a source or sources of funds for repayment.

The resolution or ordinance dedicating a source of funding for repayment of the loan and final Revenue Program must be adopted before finalization of the loan agreement. The final approved Revenue Program should be reviewed annually during the useful life of the project and modified as necessary by the Board.

PRIORITY RANKING FORMULA

SRF PROJECT PRIORITY SYSTEM PREPARATION

Each year, the OWRB shall prepare a SRF Project Priority List for the next federal fiscal year, listing potential eligible projects in the order of priority.

PROJECTS INCLUDED

FUNDABLE PORTION

The fundable portion includes projects scheduled for financial assistance during the first year of the planning period, and which are within the limits of currently available funds.

PLANNING PORTION

That portion of the priority list containing all of those projects outside the fundable portion of the list, and which are anticipated to receive financial assistance in future fiscal years. The planning portion will also include contingency projects which are scheduled for assistance during the first year of the planning period, but for which adequate funds are not available to provide financial assistance during that first year. Contingency projects may receive assistance due to bypass provisions or due to additional funds becoming available.

PUBLIC PARTICIPATION

Before the OWRB adopts its annual SRF Project Priority List and SRF Project Priority System, the OWRB shall ensure that adequate public participation has taken place. A public meeting will be held to discuss the SRF Project Priority List and any revisions that were made to the SRF Project Priority System. The notice of public meeting shall precede the public meeting by 30 days and shall be published in a statewide publication. At this time, the OWRB shall circulate information about the Project Priority List including a description of each proposed project. Attendees of the public meeting will be allowed to express their views concerning the list and system.

SRF PROJECT PRIORITY LIST

A SRF Project Priority List shall become effective and supersede all previous lists upon the beginning of the federal fiscal year for which it is designated.

PROJECT RANKING

The ranking factors are based on the relative impact of the project in achieving the pollution control objectives of the Act.

FORMULA

The project priority points (P) are derived from the formula:

$$P = T + S + Q + H$$

where:

T = Project Type Factor

S = Segment Ranking Factor

Q = Effluent Quality Factor

H = Public Health Factor

PROJECT TYPE FACTOR (T)

The system establishes a priority factor for each of the following categories of need. These categories comprise mutually exclusive classes of facilities. Included are:

Category I	The treatment facility necessary to discharge an effluent meeting the secondary treatment definition. This category may include outfall lines and lines which take existing treatment plants out of operation by transporting the effluent to a different plant.
Category II	The additional treatment necessary to meet more stringent than secondary effluent requirements as established in water quality management plans.
Category IIIA	Infiltration/Inflow Correction. The correction of infiltration/inflow conditions including all costs necessary for removing excessive infiltration/inflow from the sewer system, such as replacement or relining sewer sections, flow routing systems, etc.
Category IIIB	Replacement or major rehabilitation of sewers, where it has been determined that such replacement or rehabilitation is necessary to the total integrity and performance of the wastewater treatment works.
Category IVA	Sewage collection system is the common lateral sewers, within a publicly owned treatment system, which are primarily installed to receive wastewater directly from facilities which convey wastewater from individual structures or from private property, and which include service connection "Y" fittings designed for connection with those facilities. Pumping units, and pressurized lines, for individual structures or groups of structures when such units are cost effective and are owned and maintained by the applicant are included in this category.
Category IVB	Interceptor Sewer and Appurtenances. A sewer whose primary purpose is to transport wastewater from collector sewers to a treatment facility.
Category V	Correction of Combined Sewer Overflows. Correction of combined sewer overflows including cost of new collectors, interceptors, storm sewers, retention basin, etc., necessary to alleviate the overflow problem.
Category factors	The factors for the above categories are:

CATEGORY	RANKING FACTOR
I	10
II	10
IIIA	4
IIIB	2
IVA	2
IVB	2
V	2

SEGMENT RANKING FACTOR (S)

The segment ranking factor is assigned to each segment or a part of a segment based on the severity of the pollution and the uses to be made of such waters. These segments are priority water quality areas which have been ranked based on an evaluation of which regulatory or water quality control decisions are most needed to prevent or reverse the impairment of a designated use adopted under State Water Quality Standards.

EFFLUENT QUALITY FACTOR (Q)

The effluent quality factor (Q) is calculated by use of the following formula:

$$\begin{aligned}
 Q = & \frac{(\text{Monitored BOD5 in mg/L})}{(\text{Required BOD5 in mg/L})} + \frac{(\text{Monitored TSS in mg/L})}{(\text{Required TSS in mg/L})} \\
 + & \frac{(\text{Monitored NH3 in mg/L})}{(\text{Required NH3 in mg/L})} + \frac{(\text{Monitored PO4 in mg/L})}{(\text{Required PO4 in mg/L})} \\
 \times & \text{Flow in MGD} \times 8.34
 \end{aligned}$$

For proposed projects to replace, upgrade, expand or modify a single existing facility, Q will be calculated from the existing facility data.

For proposed projects to eliminate more than one existing facility, Q will be the summation of the effluent quality factors for each existing facility.

The monitored element shall be the average concentration of the effluent for the preceding calendar year indicated by the Discharge Monitoring Reports. The required element shall be the limit of concentration in the most currently approved water quality management plan. The ratio of the monitored parameter concentration over the required parameter concentration must be greater than 1. Any ratio not greater than 1 will be considered to be 0. The flow will be the design flow for proposed facility in MGD. When any element of the formula is not established, that portion of the effluent quality factor (Q) shall be zero (0). This factor may be applied only to Category I and Category II projects. Where seasonal limits have been established, the most stringent limits will be used in calculating Q.

PUBLIC HEALTH FACTOR (H)

The Executive Director of the Oklahoma Water Resources Board, may determine that a project is necessary to preclude or alleviate a threat to public health. Projects so identified will receive a factor of 10. Such a condition will be considered to exist if there is an administrative fine order or a signed consent order between the applicant and the Department of Environmental Quality, or EPA has issued an Administrative Order or an NPDES permit with compliance schedules which require construction/modification of the facility. The project will receive an additional five points if the Department of Environmental Quality has issued a moratorium of the existing system. The H factor will apply only to those categories for which the enforcement orders and moratorium are issued.

READINESS TO PROCEED

Projects ready to proceed during the current fiscal year will receive an additional 5000 points. Projects ready to proceed during the second year of the priority list will receive an additional 4000 points. Projects ready to proceed during the third year of the priority list will receive an additional 3000 points. Projects ready to proceed during the fourth year of the priority list will receive an additional 2000 points. Projects ready to proceed during the fifth year of the priority list will receive an additional 1000 points. This determination will be based on projected funds available

and best estimates of the date of the project would qualify to receive financial assistance from the SRF.

MANAGEMENT OF THE PROJECT PRIORITY LIST

TIE BREAKING PROCEDURE

A tie breaking procedure shall be utilized when two or more projects have equal points under the Project Priority System and are in competition for funds. Projects will be ranked according to existing population. According to the most recent Water Quality Management Plan, i.e., the project with the greatest existing population will receive the higher ranking.

PROJECT BYPASS

A project on the fundable portion of the list may be bypassed if it is determined that the project will not be ready to proceed during the funding year. This determination will be made on projects that are unable to meet the schedule established on the priority list. The applicant whose project is affected shall be given written notices that the project is to be bypassed. Projects that have been bypassed may be reinstated on the funded portion of the list if the following conditions are met:

- sufficient funds are available, and
- the project completes the necessary tasks to proceed.

Funds which become available due to the utilization of these bypass procedures will be treated in the same manner as additional allotments.

PROJECT PRIORITY LIST UPDATE

The priority list is continually reviewed and changes (i.e., loan award dates, estimated construction assistance amounts, project bypass, addition of new projects, etc.) may occur at least quarterly.

ADDITIONAL ALLOTMENTS

After defining the fundable portion of the SRF Project Priority List, the Board may determine that it is necessary or desirable to obligate additional funds that are available and the list may be extended to include the next highest ranked project or projects on the contingency section of the planning portion of the list. Any sum made available to a state by reallocation or de-obligation shall be treated in the same manner as the most recent allotment.

PROJECT REMOVAL

The Board may remove a project from the SRF Project Priority List when (1) the project has been funded, (2) the project is found to be ineligible, (3) it is indicated that the applicant does not intend to continue in the State Revolving Loan Program, or (4) the Board has determined that the applicant does not have financial capability to construct the project.

AMOUNT OF FINANCIAL ASSISTANCE

The amount of financial assistance shall be the sum of the total eligible costs related to construction. The amount is contingent upon the availability of funds for this purpose. During each funding year, loans totaling 25% of the funds available from the capitalization grant and state match for that year shall be provided to those eligible small municipalities with a population of 10,000 or less. Until the last federal CAP grant is awarded, if the state has not

met the federal requirement of making binding commitments in an amount equal to 120% of each quarterly grant payment within one year of receipt of each quarterly payment, other eligible applicants may apply for a loan or an increase to an existing loan to utilize the small community set aside. This can occur if such actions will permit the state to comply with the federal binding commitment requirement.

PLACEMENT OF PROJECTS ON THE FUNDABLE PORTION OF THE SRF PROJECT PRIORITY LIST

Prior to projects being considered for placement on the fundable portion of the SRF Project Priority List, applicants must have met the following requirements:

- The applicant has completed the Environmental Information Document (EID) and submitted it to the Board for review. The Board must have prepared the Environmental Assessment and Finding of No Significant Impact (FNSI);
- In the case of an Environmental Impact Statement (EIS) the Board must have prepared a Record of Decision; or,
- The project must have received a categorical exclusion.

ADDITION OF NEW PROJECTS TO THE SRF PROJECT PRIORITY LIST

Prior to the placement of any new projects on the SRF Project Priority List, the applicant must submit a request for such placement to the Board. The request must specify that the applicant intends to apply for financial assistance from the SRF. The Board will evaluate the request, and if it is indicated that a viable project could result which would be in conformance with the requirements of the Act, the applicant will be required to submit a schedule including, but not limited to, the submittal and completion of the following: Infiltration/Inflow analysis, SSES (if required), revenue program, planning documents, plans and specifications, and application for construction assistance. The estimated construction start and initiation of operation of the project should be included.

CATEGORIES OF NEED

All projects receiving financial assistance must fit into at least one of the categories of need. A project may include all eligible categories of need. If a project consists of more than one category, its project ranking calculation will be based on that category which will result in the greatest priority points.

CHANGE OF SCOPE

A change of scope, such as the addition of new construction items, will not be eligible after loan closing unless:

- The change of scope is necessary to result in an operable treatment works due to an oversight and not to replace faulty construction or equipment already funded, or
- The change of scope is necessary due to changes in Federal or State requirements.

ASSISTANCE

Assistance in the form of a loan may contain a contingency equivalent to 10 percent of a loan amount.

INTENDED USE PLAN

Each fiscal year (after Congress appropriates and the State receives its allocation of funds for the SRF) the Board shall prepare, an Intended Use Plan (IUP) which shall be subjected to a public meeting. The IUP will identify projects anticipated to receive financial assistance from that year's appropriation. The IUP will comply with Federal Clean Water Act SRF guidance and shall include the following items:

A description of both the short and long term goals and objectives of the fund.

A list of projects for construction of sewage facilities which are included on the priority list and a list of activities eligible for assistance under Section 319 of the Act. The list of projects will include the following items:

- Name of the recipient
- Facility description
- Project treatment/use categories
- Treatment requirements
- Terms of financial assistance
- Type of Assistance
- NPDES Permit Number
- Projects that require an EIS.

Assurances for meeting the requirements of Section 602(b) of the Act:

- The Board will enter into binding commitments equal to 120% of the capitalization grant payments within one year after the receipt of the grant payment.
- All funds will be expended in an expeditious manner.
- All capitalization grant funds will first be used toward compliance with the enforceable requirements of the Act, including the municipal compliance deadline of July 1, 1988, and
- All projects funded with capitalization grant funds with construction starts prior to October 01, 1994 will meet the requirements under Sections 201(b), 201(g)(1), 201(g)(2), 201(g)(3), 201(g)(5), 201(g)(6), 201(n)(1), 201(o), 204(a)(1), 204(a)(2), 204(b)(1), 204(d)(2), 211, 218, 511(c)(1), and 513 of the Act.

A payment and disbursement schedule.

Included in the IUP are the criteria and method that are established for distribution of funds.

- The Board shall prepare a preliminary IUP prior to the beginning of each federal fiscal year. The applicants considered for funding will be those legal entities that have indicated to the Board that they desire to receive assistance within the next federal fiscal year. The preliminary IUP will be subjected to a public participation, including a public meeting.
- Each project to be included in the IUP shall be ranked according to priority points and shall be rated under the priority rating process.
- Projects will be ranked as follows:
- Each project shall be ranked according to the priority ranking system.
- Projects which are to be refinanced shall be rated on facility conditions which existed prior to start of construction on their treatment works.

The apportionment of funds shall be as follows:

- Projects within the range of available funds shall be eligible to receive financial assistance. Other projects shall be eligible for financial assistance at such time funds become available.
- Applicants designated to receive financial assistance must submit an approvable application.

ANNUAL REPORT TO THE LEGISLATURE AND GOVERNOR

Submission of a joint report by the Board to the Governor, Speaker of the House of Representatives and the President Pro Tempore of the Senate within one hundred twenty (120) days of the end of each fiscal year concerning the Wastewater Facility Construction Revolving Loan Account and implementation of the provisions of this act.

EPA ANNUAL REPORT

As required by Section 602(b)(10) of the Act, the Board will submit Annual Reports to the Regional Administrator no later than 90 days after the end of the fiscal year. The report shall provide information as specified by EPA and shall identify assistance recipients, assistance amounts, assistance terms, project categories and other details as negotiated between the Board and EPA with the emphasis on how the State met the goals set forth in the IUP and stability of the SRF.

TYPES OF ASSISTANCE

The Fund may be used for the following purposes:

To make loans on the condition that:

- Such loans are made at or below market interest rates, including interest free loans at terms not to exceed 20 years.
- Principal and interest payments will commence not later than one year after project completion and all loans will be fully amortized not later than 20 years after project completion.
- The recipient of a loan will establish a dedicated source of revenue for repayment of loans.

To buy or refinance the debt obligation of eligible applicants within the State at or below market rates, when such debt obligations were incurred and construction started after March 7, 1985, for the sole purpose of funding projects that meet the following requirements:

- The applicant is the approved designated management agency.
- The project is consistent with the water quality management plan.
- The project must be listed on the State priority list.
- The project has complied with requirements of these regulations and has been approved by the Board.
- The project must have approved plans and specifications and construction permit issued by the Department of Environmental Quality.

For the reasonable costs of administering the fund and conducting activities under Title VI of the Act, not to exceed 4% of the federal capitalization grant awards.

REQUEST FOR PLACEMENT ON THE SRF PRIORITY LIST

- The interested applicant sends an initial letter requesting funding, stating the type and amount of the proposed project & project schedule.
- The applicant will complete ORF-1, Pre-application for funding, and submit to the Board prior to placement on the SRF Priority List.
- Pre-applications that are acceptable to the Board will be sufficient for placement on the planning portion of the State's priority list.

- The Board will advise the applicants whether or not to proceed with planning documents for financial assistance based on the information provided in the pre-application form.

PREPLANNING CONFERENCE

Potential applicants shall confer with the Board staff as early in its planning process as practical. During the conference the Board will provide information, advice, instruction, and guidance on the scope of work and level of effort needed to define eligible projects in order to ensure that the applicant expeditiously complies with the environmental and planning requirements dictated by State and Federal Law. Guidance on the scope of the required environmental information and planning requirements will also be given at the conference.

PLANNING DOCUMENTS

The purpose of the planning document is to present the findings in a precise fashion with enough attention given to detail so as to allow adequate review of the project by the owner and applicable regulatory agencies. The plan will allow the review of the alternatives from the viewpoints of function, operation, economics, reliability, safety, efficiency, cost-effectiveness and environmental compatibility.

Two copies of the planning document must be submitted to the OWRB. The document shall contain but not be limited to the following information:

- Identification of the planning area boundaries and characteristics, the existing problems and needs related to wastewater management, and the projected needs and problems for the next 20 or more years.
- Cost-effective analysis of feasible wastewater treatment or conveyance alternatives capable of meeting State and federal water quality and public health requirements. The cost effective analysis shall detail all monetary costs including but not limited to the present worth or equivalent annual value of all capital costs and operation.
- All basic information necessary for the design of the sewage system and/or treatment works.
- A Revenue Program, including a draft user charge system that complies with Boards guidelines.
- Adequate evaluation of the environmental impacts of alternatives in accordance with the regulation relating to Environmental Review and Determination to support the cost-effectiveness analysis.
- Resolution passed by the applicant, which accepts the planning documents and provides a commitment to build the proposed project.
- Proposed project must be consistent with the State's approved Water Quality Management Plan established by Section 208 of the Act.
- Fiscal Data. The applicant shall submit a statement of the project engineer's most current estimate of project cost itemized as to major facilities or items including land and right-of-way costs, fees of engineers, all legal fees, fees of financial advisors and/or consultants, contingencies (10%), and interest during construction.

Planning documents, when necessary, will contain a Sludge Management Plan consistent with the Department of Environmental Quality sludge management regulations.

A Sludge Management Plan will be submitted with the planning document if the proposed project includes any construction, modification, or upgrade of a sewage treatment plant. The Sludge Management Plan will address sludge produced by the

treatment plant after initiation of operation and will comply with applicable rules of the DEQ in OAC 252:647 and OAC 252:605. If the construction necessitates the disposal of inventoried sludge, the Sludge Management Plan will also address existing sludge.

The Sludge Management Plan will address the following minimum information requirements, and must otherwise comply with the requirements of OAC 252:605 and OAC 252:605:

- Quantity to be disposed of in dry tons per year
- Method of stabilization
- Method of disposal,
- A chemical analysis of the sludge
- Legal description of the area used for ultimate disposal of the sludge.

PRE-APPLICATION CONFERENCE

An applicant seeking financial assistance from the SRF may make an appointment with the Board for a pre-application conference. As a minimum, the preapplication conference should be attended by a member of the governing body of the political subdivision, the entity's engineer, and fiscal representative. If possible the applicant should bring information documenting the existence of a dedicated source of revenue for repaying the loan. The primary purpose of the meeting is to acquaint the applicant with program requirements and to assist the applicant in preparing an application.

PLANS AND SPECIFICATIONS

Submittals. The applicant shall prepare plans and specifications and a final engineering design report on all significant elements of the project. These documents shall conform to the Water Pollution Control Facility Standards, contained in Department rules in OAC 252. Two copies of the documents shall be submitted to the Board.

Additional requirements. The plans and specifications shall contain the following:

- Provisions assuring compliance with the Board's rules and regulations and the Oklahoma bidding laws.
- Forms by which the bid bond, statutory, performance and maintenance bonds will be provided.
- Bonding requirements outlined in 61 OS 1981, Section 113(B), as amended.

Provisions requiring the contractor to obtain and maintain the appropriate insurance coverage.

Provisions giving authorized representatives of the Board access to all such construction activities, books, records, documents, and other evidence of the contractor for the purpose of inspection, audit and copying during normal business hours.

Those conditions, specifications, and other provisions provided by or requested by the Board to comply with State law and the SRF regulations.

Bid proposal that separates eligible construction from ineligible construction.

APPROVAL OF PLANS AND SPECIFICATIONS

The Board will approve the plans and specifications if they:

- Conform to the requirements the SRF regulations and have a permit to construct issued by the Department of Environmental Quality.
- Are consistent with all relevant statutes.
- Pass a bid-ability, operability, and constructability review by the Board.
- Are consistent with Board's approved planning documents and environmental determinations.

Approval of the plans and specifications does not relieve the applicant of any liabilities or responsibilities with respect to the design, construction, operation, or performance of the project.

The applicant shall obtain authorization from the Board before advertising for bids on the project.

APPLICATION FOR FINANCIAL ASSISTANCE

Two copies of an application shall be filed with the Board along with plans and specifications. The information required on all applications for financial assistance must meet the requirements of the Board presented to the applicant at the pre-application conference and must be on the fundable portion of the State priority list and included on the current year Intended Use Plan.

A copy of the proposed Revenue Program including draft user charge system may be submitted with the application.

BINDING COMMITMENT

Upon approval of the planning and environmental documents by the Department of Environmental Quality and Board, and approval of the application by the Board, the Board will issue a letter of binding commitment. This will be a commitment of financial assistance and shall contain those conditions deemed necessary by the Board.

LOAN CLOSING

Prior to loan closing the applicant will submit to the Board, two copies of the following bid and contract documents:

- Contract documents, including all addenda.
- A tabulation of all bids received and an explanation for any rejected bids or otherwise disqualified bidders.
- Contingently executed construction contract to be entered into by the applicant for building of the projects containing the appropriately executed bonds, insurance certificates, act of assurance, and other documents required by this chapter.
- Other or additional engineering data and information, if deemed necessary by the Board staff.
- A certification that all required acquisitions, leases, easements, rights-of-way, relocations, (both voluntary and involuntary) have been obtained for the project to be built.
- Evidence that the applicant has obtained all required permits and financing to build the wastewater facilities.
- Information requested by the Board regarding loan closing documents.
- Prior to concurrence by the Board in the award of a construction contract, any and all bid protests must be resolved by the applicant.

REFINANCING CONSTRUCTION LOANS

If the project includes the refinancing of a loan, the applicant shall submit all of the items specified and any records, assurances, or appraisals concerning the construction of the project. Additionally, the project must pass Board inspection verifying that the facility was constructed in accordance with the approved plans and specifications.

MINIMUM ASSISTANCE AGREEMENT CONDITIONS

The Board will furnish a list of conditions to be included in the assistance agreement. To include as a minimum:

- Any condition identified in the letter of commitment that applies to the loan.
- Federal requirements mandated by the Clean Water Act.
- A project schedule that has been coordinated with State and Federal enforcement authorities.
- Any Federal, State or local requirement previously identified that has a significant impact on the project.
- Conditions and mitigative measures identified during the environmental review.

CONSTRUCTION PHASE

AWARDING CONSTRUCTION CONTRACTS

The recipient shall be responsible for assuring that every appropriate procedure and incidental legal requirement is observed in advertising for bids and awarding the construction contract. The text of the construction contract shall not vary from the text of the Board approved draft contract documents in the approved plans and specifications or addenda to the plans and specifications.

INSPECTION DURING CONSTRUCTION

During the building phase of the project, the recipient shall provide engineering services necessary to assure completion of the project in accordance with the loan agreement and the approved plans and specifications.

RESIDENT INSPECTION

After the construction contract is awarded, the recipient shall provide for adequate full-time resident inspection of the project and require assurance that the work is being performed in a satisfactory manner in accordance with the approved plans and specifications, approved alterations, sound engineering principles and building practices. The Board is authorized to inspect the building of any project at any time in order to assure that plans and specifications are being followed and that the works are being built in accordance with sound engineering principles and building practices, but such inspection shall never subject the State of Oklahoma to any action for damages. The Board shall bring to the attention of the recipient and the project engineer any variances from the approved plans and specifications. The recipient and the project engineer shall immediately initiate necessary action rectifying construction deficiencies.

INSPECTION OF MATERIALS

- The Board is also authorized to inspect all materials furnished, including inspection of the preparation or manufacture of the materials to be used. The state inspector is to report the manner and progress of the building or to report conditions relating to the materials furnished and the compliance by the contractor with approved plans and specifications for the project. Such inspection will not release the contractor from any obligation to perform the work in accordance with the requirements of the contract documents or the project engineer from determining compliance with the requirements of the contract documents.
- In the event building procedures or materials are determined by the Board to be substandard or otherwise unsatisfactory and/or not in conformity with approved plans and specifications, the Board may order the recipient to take such action in the manner provided for in the construction contract to correct any such deficiency.
- In those instances of dispute between the recipient project engineer and the Board's representative as to whether material furnished or work performed conforms with the terms of the construction contract, the Board may order the recipient to direct the project engineer to reject questionable materials and/or initiate other action provided for in the construction contract, including suspension where necessary, until all disputed issues are resolved in accordance with the terms of the construction contract.
- The contractor and recipient shall furnish the Board's representative with every reasonable facility for ascertaining whether the work as performed is in accordance with the requirements and intent of the contract.
- In addition to normal testing procedures required of the recipient, the Board may require reasonable additional tests of building materials which the Board determines to be necessary during the building of projects financed in whole or in part by SRF funds. All tests, whether for the Board or the project engineer, will conform to current American Water Works Association, American Association of State Highway and Transportation Officials, American Society of Testing and Materials, and the Oklahoma Department of Transportation published procedures, or similar criteria. The Board shall specify which tests are applicable. Samples for testing shall be furnished at no cost to the Board upon request on the construction site.

PROJECT CHANGES

Minor changes in the project work that are consistent with the objectives of the project and within the scope of the assistance agreement do not require the approval of the Board before the applicant's implementation of the change. However, the amount of the funding provided by the assistance agreement may only be increased by a formal amendment which will require Board approval.

The recipient must receive approval from the Board before implementing changes which:

- Alter the project performance standards.
- Alter the type of wastewater treatment provided by the project.
- Significantly delay or accelerate the project schedule.
- Substantially alter the design drawings and specifications, or the location, size, capacity, or quality of any major part of the project.

BUILDING PHASE SUBMITTALS

The following submittals and accompanying actions by the recipient will be required during the building phase of the project.

- A complete set of as-built drawings will be submitted to the Department of Environmental Quality upon completion of all construction.
- Notice of completion of construction will be submitted to the Board upon completion of project construction.
- Any other building phase submittals required as part of the financial assistance documents will be submitted for the Board's approval.

PROGRESS PAYMENTS

Disbursements from the construction fund established by the recipient will require approval by the Board. Certified requests for payment and documentation shall be submitted to the Board monthly. Upon approval by the Board who will authorize the progress payments to be made from the fund.

RETAINAGE

Retainage withheld. Ten percent (10%) of all partial payments made may be withheld as retainage.

Partial release of retainage. At any time that the contractor has completed in excess of fifty percent (50%) of the total contract amount the retainage may be reduced to five percent (5%) of the amount earned to date, if prior approval is obtained from the Board.

Final release. After completion of construction and acceptance by the applicant, the final release of retainage may be made with approval of the project by the Board.

POST BUILDING PHASE RESPONSIBILITIES OF THE RECIPIENT

After the satisfactory completion of the project, the recipient shall be held accountable by the Board for the continued validity of all representations and assurances made to Board. Continuing cooperation with the Board is required. To facilitate such cooperation and to enable the Board to protect the State's investment and public interest, the following provisions shall be observed:

The Board is authorized to inspect the project and the records of operation and maintenance of the project at any time. If it is found that the project is being improperly or inadequately operated and maintained to the extent that the project objectives are not being properly fulfilled or that integrity of the State's investment is being endangered, the Board shall require the recipients to take appropriate action.

The Board may request certified copies of all minutes, operating budgets, monthly operating statements, contracts, leases, deeds, audit reports, and other documents concerning the operation and maintenance of the project in addition to the requirements of the covenants of applicable bond indenture and/or the loan agreement. The financial assistance provided by the Board is based on the project's economic feasibility, and the Board shares the recipient's desire to maintain this feasibility in the project's operation and maintenance at all times. The Board may periodically inspect, analyze, and monitor the project's revenues, operation, and any other information the Board requires in order to perform its duties and to protect the public interest.

The recipient shall maintain debt service fund accounts and all other fund accounts related to the SRF debt in accordance with standards set forth by the Governmental Accounting Standards and the Board.

Recipients, which were required to implement mitigative measures as a result of the environmental review process shall continue to comply with those measures.

- Payment of principal and interest on loans shall be made to the Board as provided in the loan documents.

ACCOUNTING

The recipient shall submit with the application an adopted ordinance, resolution or similar instrument that shall contain sections providing:

That project accounts for the construction fund shall be maintained in accordance with standards set forth by the Governmental Accounting Standards and the Board. The construction fund shall be established at an official depository of the recipient and all funds in the construction fund shall be secured in the manner provided by law for the security of county funds or city funds, as appropriate. All proceeds acquired by the recipient to plan, design and construct the project shall be placed in the construction fund. All proceeds in the construction fund shall be used for the sole purpose of planning, design and building the project as approved by the Board.

Upon completion of the project a final accounting will be made to the Board. The final accounting shall provide:

- A final accounting be made to the Board of the total cost of the project upon completion of the project. Such resolution or ordinance shall also provide that if the project be completed at a total cost less than the amount of available funds for building the project, or if the Board disapproves construction of any portion of the project as not being in accordance with the plans and specifications, the recipient shall immediately, with filing the final accounting, return to the SRF the amount of any such excess and/or the cost as determined by the Board relating to the parts of the project not built in accordance with the plans and specifications, to the nearest multiple of \$1,000, or to the nearest denomination of bonds being sold (where funding was provided by bonds issued by the Board).
- That an annual audit of the recipient, prepared by a certified public accountant or licensed public accountant be provided to the Board.
- That the recipient shall maintain adequate insurance coverage on the project in an amount adequate to protect the State's interest.
- That the recipient will comply with any special conditions specified by the Board's environmental determination until all financial obligations to the State have been discharged.
- That the recipient covenants to continually abide by the terms of the financial assistance agreement, the Board's rules and regulations, and relevant State statutes for operation and maintenance of the facility.

ALLOWABLE LAND AND RIGHT-OF-WAY COSTS

Allowable costs for land and rights-of-way include the cost (including associated legal, administrative, and engineering costs) of land acquired in fee simple or by lease or easement that will be an integral part of the treatment process or that will be used for the ultimate disposal or residues resulting from such treatment.

GENERAL

The financial assistance recipient, who receives funds as a result of the federal capitalization grants to the state, must comply with all applicable federal laws and orders. These include but are not limited to the following:

1. Environmental

Archeological and Historic Preservation Act of 1974, PL 93-291
Clean Air Act, 42 U.S.C. 7506(c)
Coastal Barrier Resources Act, 16 U.S.C. 3501 et seq.
Coastal Zone Management Act of 1972, as amended.
Endangered Species Act 16 U.S.C. 1531, et seq.
Executive Order 11593, Protection and Enhancement of the Cultural Environment
Executive Order 11988, Floodplain Management
Executive Order 11990, Protection of Wetlands
Farmland Protection Policy Act, 7 U.S.C. 4201 et seq.
Fish and Wildlife Coordination Act, PL 85-624, as amended
National Historic Preservation Act of 1966, PL 89-665, as amended
Safe Drinking Water Act, Section 1424(e), PL 92-523, as amended
Wild and Scenic Rivers Act, PL 90-542, as amended

2. Economic

Demonstration Cities and Metropolitan Development Act of 1966, PL 89-754, as amended
Section 306 of the Clean Air Act and Section 508 of the Clean Water Act, including Executive Order 11738, Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans.

3. Social Legislation

Age Discrimination Act, PL 94-135
Civil Rights Act of 1964, PL 88-352
Section 13 of PL 92-500; Prohibition against sex discrimination under the Federal Water Pollution Control Act
Executive Order 11246, Equal Employment Opportunity
Executive Order 11625 and 12138, Women's and Minority Business Enterprise
Rehabilitation Act of 1973, PL 93-112 (including Executive Orders 11914 and 11250)

4. Miscellaneous authority

Uniform Relocation and Real Property Acquisition Policies Act of 1970, PL 91-646
Executive Order 12549 - Debarment and Suspension

STATE REVOLVING FUND ENVIRONMENTAL REVIEW PROCESS

As required by the provisions of Section 602(b) (6) of the 1987 Amendments to the Clean Water Act, the Board shall conduct an interdisciplinary environmental review consistent with the National Environmental Policy Act of the project proposed for funding through the Wastewater Facility Construction Revolving Loan Account. This review will insure that the project will comply with the applicable local, state and federal laws and Board regulations relating to the protection and enhancement of the environment. Based upon the staff's review, the Board will make formal determinations regarding the potential social and environmental impacts of the proposed project. As necessary, the determination will include mitigative provisions as a condition of financial assistance for building and no financial assistance will be provided until a final environmental determination has been made. Nothing in the Board's regulations shall prohibit any public, private or governmental party from seeking administrative or legal relief from the determinations of the Board. Potential applicants to the Wastewater Facility Construction Revolving Loan Account should obtain guidance from the staff regarding the scope of the environmental review to be conducted by the Board and the environmental information which the applicant will be required to submit in support of the proposed project.

BASIC ENVIRONMENTAL DETERMINATION

There are three (3) basic environmental determinations that will apply to projects proposed to be implemented with assistance from the Wastewater Facility Construction Revolving Loan Account. These are: a determination to categorically exclude a project from a formal environmental review; a finding of no significant impact (FNSI) based upon a formal environmental review supported by an environmental information document (EID); and a determination to provide or not to provide financial assistance based upon a Record of Decision following the preparation of an environmental impact statement (EIS). The appropriate determination will be based on the following criteria.

1. The categorical exclusion determination applies to categories of projects that have shown over time not to entail significant impacts on the quality of the human environment.
 - a. Projects which meet the following criteria may be categorically excluded from formal environmental review requirements.
 - i. The project is directed solely toward minor rehabilitation of existing facilities, functional replacement of equipment, or toward the construction of related facilities adjoining the existing facilities that do not affect the degree of treatment or the capacity of the works (i.e. infiltration and inflow correction, rehabilitation of existing equipment and structures, and the construction of small structures on existing sites).
 - ii. The project is in a community of less than 10,000 population and is for minor expansions or upgrading of existing treatment works or on-site disposal systems are proposed.
 - b. Categorical exclusions will not be granted for projects that entail:
 - i. the construction of new collection lines;
 - ii. a new discharge or relocation of an existing discharge;
 - iii. a substantial increase in the volume or loading of pollutants;
 - iv. providing capacity for a population thirty (30) percent or greater than the existing population;
 - v. known or expected impacts to cultural resources, threatened or endangered species, or other environmentally sensitive areas; and
 - vi. the construction of facilities that are known or expected to be not cost-effective or are likely to cause significant public controversy. The Board may exclude, by amendment to these regulations, other categories of projects for which there is sufficient documentation demonstrating that they are not likely to have significant effects on the quality of the human environment.
2. The FNSI will be based upon an environmental review by the staff supported by an EID prepared by the applicant in conformance SRF rules. Based upon its review, the staff will prepare an environmental assessment (EA) resulting in the issuance of either a FNSI or a public notice that the preparation of an EIS will be required. All applicants whose projects do not meet the criteria for either a categorical exclusion or EIS will be required to prepare an EID. The Board's issuance of a FNSI will be based upon an EA documenting that the potential environmental impacts will not be significant or that they may be mitigated without extraordinary measures.
3. The Record of Decision may only be based upon an EIS in conformance with the format and guidelines described in Board's regulation. An EIS will be required when the Board determines any of the following:
 - a. the project will significantly affect the pattern and type of land use or growth and distribution of the population;
 - b. the effects of the project's construction or operation will conflict with local or state laws or policies;
 - c. the project may have significant adverse impacts upon:
 - i. wetlands,
 - ii. floodplains,
 - iii. threatened and endangered species or their habitats,

- iv. cultural resources including parklands, reserves, other public lands or areas of recognized scenic, recreational, agricultural, archeological or historic value;
- d. the project will displace population or significantly alter the characteristics of existing residential areas;
- e. the project may directly or indirectly (i.e., through induced development) have significant adverse effect upon local ambient air quality, local noise levels, surface and ground water quality or quantity, fish, shellfish, wildlife or their natural habitats;
- f. the project may generate significant public controversy;
- g. the treated effluent will be discharged into a body of water where the present classification is too lenient or is being challenged as too low to protect present or recent uses, and the effluent will not be of sufficient quality to meet the requirements of those uses.

OTHER DETERMINATIONS THAT ARE REQUIRED OF THE BOARD

1. Recognizing that a project may be altered at some time after an environmental determination on the project has been issued, the Board will provide that, prior to approval, the plans and specifications, assistance application, and related documents will be examined for consistency with the environmental determination. If inconsistencies are found, the Board may revoke a categorical exclusion and require the preparation of an EID or an EIS, or require the preparation of amendments to an EID or supplements to an EIS, as appropriate. Based upon the staff's review of the amended project, the Board will:
 - a. Reaffirm the original determination through the issuance of a public notice or statement of finding;
 - b. Issue a FNSI for a project for which a categorical exclusion has been revoked, or issue a public notice that the preparation of an EIS will be required;
 - c. Issue an amendment to a FNSI, or revoke a FNSI and issue a public notice that the preparation of an EIS will be required, or
 - d. Issue a supplement to a record of decision, or revoke a record of decision and issue a public notice that financial assistance will not be provided.
2. When five (5) or more years have elapsed between the last environmental determination and the submittal of an application to the Fund, the Board will re-evaluate the project, environmental conditions and public views.

OTHER DETERMINATIONS THAT ARE AVAILABLE TO THE BOARD

1. An applicant may request advance authority to construct part of the proposed wastewater treatment project prior to completion of the necessary environmental review when the part of the project will:
 - a. Immediately remedy a severe public health, water quality or environmental problem;
 - b. Not preclude any reasonable alternatives identified for the complete system;
 - c. Not cause significant or indirect environmental impacts including those which cannot be acceptably mitigated without completing the entire project; and
 - d. Not be highly controversial.

Based upon the review the Board will issue a FNSI so conditioned as to prohibit construction of the remainder of the project until a complete environmental review has been performed and a subsequent environmental determination has been issued.

2. The Board may choose to accept determinations made by EPA in previously issued FNSIs in lieu of conducting a formal environmental review when the proposed project will not cause adverse impacts to the environment and is not highly controversial.

ENVIRONMENTAL INFORMATION REQUIRED BY THE BOARD

A minimum of two (2) copies of all information required in this subsection will be submitted to the Board.

1. Applicants seeking a categorical exclusion will provide the Board with sufficient documentation to demonstrate compliance with the criteria of this regulation. At a minimum, this will consist of:
 - a. a brief, complete description of the proposed project and its costs;
 - b. a statement indicating that the project is cost-effective and that the applicant is financially capable of constructing, operating and maintaining the facilities; and
 - c. a plan map or maps of the proposed project showing:
 - i. the location of all construction areas,
 - ii. the planning area boundaries, and
 - iii. any known environmentally sensitive areas.
2. An EID must be submitted by those applicants whose proposed projects do not meet the criteria for a categorical exclusion and for which the Board has made a preliminary determination that an EIS will not be required. The Board will provide guidance on both the format and contents of the EID to potential applicants prior to initiation of planning.
 - a. At a minimum, the contents of an EID will include:
 - i. the purpose and need for the project;
 - ii. the environmental setting of the project and the future of the environment without the project;
 - iii. the alternatives to the project as proposed and their potential environmental impacts;
 - iv. a description of the proposed project;
 - v. the potential environmental impacts of the project as proposed including those which cannot be avoided;
 - vi. the relationship between the short term uses of man's environment and the maintenance and enhancement of long term productivity;
 - vii. any irreversible and irretrievable commitments of resources to the proposed project;
 - viii. a description of public participation activities conducted, issues raised, and changes to the project which may be made as a result of public participation process; and
 - ix. documentation of coordination with appropriate governmental agencies.
 - b. Prior to the applicant's adoption of the planning document, the applicant will hold a public hearing on the proposed project and the EID, and provide the Board with a transcript of the hearing. The Board will provide guidance to the applicant regarding the contents of the hearing notice and of the hearing. The hearing will be advertised at least thirty (30) days in advance in a local newspaper of general circulation. Concurrent with the advertisement, a notice
 - c. of the public hearing and availability of the documents will be sent to all local, state, and federal agencies and public and private parties that may have an interest in the proposed project. Included with the transcript will be a list of attendees, written testimony, and the applicant's responses to the issues raised.
 - d. The applicant will make copies of the EID available to all federal, state, and local agencies and others with an interest in the project. The Board will provide guidance to the applicant regarding coordination requirements.
3. The format of an EIS will encourage sound analysis and clear presentation of alternatives, including the no action alternative and the selected alternative, and their environmental, economic and social impacts. The following format must be followed by the applicant unless the Board determines there are compelling reasons to do otherwise.
 - a. A cover sheet identifying the applicant, the project(s), the program through which financial assistance is requested, and the date of publication.

- b. An executive summary of the critical issues of the EIS in sufficient detail that the reader may become familiar with the proposed project and its cumulative effects. The summary will include:
- i. a description of the existing problem;
 - ii. a description of each alternative;
 - iii. a listing of each alternative's potential environmental impacts, mitigative measures and any areas of controversy; and iv. any major conclusions.
- c. The body of the EIS, which will contain the following information.
- i. A complete and clear description of the purpose and need for the proposed project that clearly identifies its goals and objectives.
 - ii. A balanced description of each alternative considered by the applicant. The description will include the size and location of the facilities, pipelines, land requirements, and construction schedules. The alternative of no action will be discussed and the applicant's preferred alternative(s) will be identified. Alternatives that are eliminated from examinations will be presented with reasons.
 - iii. A description of the alternatives available to the Board including:
 - providing financial assistance to the proposed project;
 - requiring that the proposed project be modified prior to providing financial assistance to reduce adverse impacts, or providing assistance with conditions requiring the implementation of mitigative measures; and
 - not providing financial assistance.
 - A description of the alternatives available to other local, state, and federal agencies which may have the ability to issue or deny a permit, provide financial assistance or otherwise affect or have an interest in any of the alternatives.
 - A description of the effected environment and environmental consequences of each alternative. The effected environment on which the evaluation of each alternative will be based includes, as a partial listing: hydrology, geology, air quality, noise, biology, socioeconomics, land use, and cultural resources of the facilities planning area. The Board will provide guidance, as necessary, to the applicant regarding the evaluation of the affected environment. The discussion will present the total impacts of each alternative in manner that will facilitate comparison. The effects of the no action alternative must be included to serve as a baseline for comparison of the adverse and beneficial impacts of the other alternatives. A description of the existing environment will be included in the no action section to provide background information. The detail in which the effected environment is described will be commensurate with the complexity of the situation and the significance of the anticipated impacts.
- d. The draft EIS will be provided to all local, state and federal agencies and public groups with an interest in the proposed project and be made available to the public for review. The final EIS will include all objections and suggestions made before and during the draft EIS review process, along with the issues of public concern expressed by individuals or interested groups. The final EIS must include discussions of any such comments pertinent to the project or the EIS. All persons submitting comments will be identified. If a comment has led to a change in either the project or the EIS, the reason should be given. The Board will always endeavor to resolve any conflicts that may have arisen, particularly among permitting agencies, prior to the issuance of the final EIS. In all cases, the comment period will be no less than 45 days.
- e. Material incorporated into an EIS by reference will be organized to the extent possible into a Supplemental Information Document and be made available for public review upon request. No material may be incorporated by reference unless it is reasonably available for inspection by interested persons within the comment periods specified.

- f. When an EIS is prepared by contractors, either in the service of the applicant or the Board, the Board will independently evaluate the EIS prior to issuance of the Record of Decision and take responsibility for its scope and contents. The Board staff who undertake this evaluation will be identified under the list of preparers along with those of the contractor and any other parties responsible for the content of the EIS.
- g. The public participation required for an EIS is extensive; but should, depending upon the nature and scope of the proposed project, be supplemented by the applicant. The following requirements represent the minimum allowable to the applicant and the Board.
 - i. Upon making the determination that an EIS will be required of a proposed project, the Board will publish in the Oklahoma Register and distribute a notice of intent to prepare an EIS.
 - ii. As soon as possible after the notice of intent has been issued, the Board will convene a meeting of the effected federal, state and local agencies, the applicant, and other interested parties to determine the scope of the EIS. A notice of this scoping meeting may be incorporated into the Notice of Intent and the notification period will not be less than forty-five (45) days. As part of the scoping meeting the Board will, at a minimum:
 - determine the significance of issues for and the scope of those significant issues to be analyzed in depth in the EIS;
 - identify the preliminary range of alternatives to be considered;
 - identify potential cooperating agencies and determine the information or analyses that may be needed from cooperating agencies or other parties;
 - discuss the method for EIS preparation and the public participation strategy;
 - identify consultation requirement of other laws and regulations;
 - determine the relationship between the preparation of the EIS and the completion of the facilities plan and any necessary arrangements for coordination of the preparation of both documents.
 - iii. Following the scoping process the Board will begin the identification and evaluation of all potentially viable alternatives to adequately address the range of issues developed in the scoping. A summary of this, including a list of the significant issues identified, will be provided to the applicant and other interested parties. Preparation of the EIS will be done, at the discretion of the Board: directly, by its own staff; by consultants to the Board; or by a consultant, contracted by the applicant subject to approval by the Board. In the latter two cases, the consultant will be required to execute a disclosure statement prepared by the Board signifying they have no financial or other conflicting interest in the outcome of the project. Both the draft EIS and final EIS will be distributed and made available for public review except that the advertisement and comment period for the public participation will be no less than forty-five (45) days. The Board will publish, in the Daily Oklahoman and a newspaper(s) of general circulation in the project area, a notice of availability of the EIS giving locations at which it will be available for public review at least forty-five (45) days prior to making any environmental determination.

ENVIRONMENTAL REVIEW BY THE BOARD

When the Board has determined that an applicant's proposed project may be excluded from a formal environmental review or has determined that a categorical exclusion is to be rescinded, the Board will prepare a public notice of the determination to categorically exclude the project and stating the availability of supporting documentation for public inspection. The notice will be published in a local newspaper of community-wide circulation by the applicant. The Board, concurrent with the publication, will distribute the notice to all interested parties.

An environmental review of the proposed project, supported by the applicant's EID, will be conducted by the Board to determine whether any significant impacts are anticipated and

whether any changes may be made in the proposed project to eliminate significant adverse impacts. As part of this review, the Board may require the applicant to submit additional information or undertake additional public participation and coordination to support its environmental determination. Based on the environmental review, the Board will prepare an environmental assessment, describing:

- the purpose and need for the proposed project;
- the proposed project, including its costs;
- the alternatives considered and the reasons for their rejection or acceptance;
- the existing environment;
- any potential adverse impacts and mitigative measures; and
- any proposed conditions to the provision of financial assistance and any means provided for the monitoring of compliance with the conditions.

Based upon this environmental assessment, the Board will issue a FNSI or a notice of intent to prepare an EIS. The FNSI will include a brief description of the proposed project, its costs, any mitigative measures required of the applicant as a condition of its receipt of financial assistance, and a statement to the effect that comments supporting or disagreeing with the FNSI may be submitted for consideration by the Board. The environmental assessment will be attached when mitigative measures are specified by conditions of the financial assistance. The FNSI will be distributed to all parties, governmental entities, and agencies that may have an interest in the proposed project. No action regarding approval of the facilities plan or the provision of financial assistance will be taken by the Board for at least thirty (30) days after the issuance of a FNSI.

Following the comment period and public hearings on the final EIS and at the time of the decision to approve the facilities plan or to provide or deny financial assistance to the proposed project, the Board will prepare a concise public record of decision. The record of decision will describe those mitigative measures to be taken which will make the selected alternative environmentally acceptable.

The Board will conduct environmental reviews and issue public notices or amended determinations, as appropriate.

HARDSHIP GRANT FOR RURAL COMMUNITIES (HGRC)

The 1996 congressional Appropriations Act reserved \$50,000,000.00 in federal funds from the Clean Water State Revolving Funds to establish a new grant program to help small, disadvantaged rural communities address their wastewater needs. The State of Oklahoma has a total of \$1,039,080.00 available for the HGRC during State Fiscal Year 1998 (July 1, 1997 to June 30, 1998). In consultation with the EPA Regional office, the State may provide hardship assistance, to benefit any community of more than a single household but no more than 3,000 inhabitants that is identified by the State as a rural community, is not a remote area within the corporate boundaries of a larger city, and is not served by any centralized sewage collection or wastewater treatment system. In order for an interested rural community to qualify, an eligible community will submit to the OWRB an SRF Loan Application requesting to be put on the SRF Priority List. An interested rural community must seek at least 15 % of the total amount of the project for SRF loan with the remaining 85 % being eligible for a hardship grant. The amount of SRF Loan vs. Grant will be based upon the OWRB evaluation of the communities 1994 Median Household Income (MHI), Unemployment Rate and/or Per Capita Income through the Bureau of Economic Analysis (BEA) and/or verifiable local survey data. The hardship Grant /SRF Loan request letter should include, a brief description of the project for which loan funds will be requested, identify a dollar amount of the loan request, and identify when the funds will be necessary, or target a loan closing date. The community will be rated according to the SRF Project priority system, which is based on the project type factor, the stream segment ranking factor, effluent quality factor and public health

factor. If the community is qualified for a HGRC, the hardship grant will be awarded based upon economic hardship, environmental needs, availability of hardship grant money, and the readiness to proceed of the communities project.