TO: California Urban Water Agencies Central Valley Drinking Water Program Work Group

FROM: Bonny Starr, Starr Consulting, and Robin Zander, CVRWQCB

DATE: October 1, 2007

SUBJECT: Final Technical Memorandum No. 3 –Identify Water Quality Goals or Policies Adopted by Other States and Countries

The objective of these tasks is to determine if other states or countries have adopted ambient water quality criteria, objectives, or goals for the drinking water constituents of interest listed in **Table 1** or adopted policies to protect drinking water supplies.

Table 1
Constituents of Interest to Drinking Water

Constituent Class	Specific Constituents
Disinfection Byproduct Precursors	Total organic carbon, dissolved organic carbon, bromide
Dissolved Minerals	Total dissolved solids
Nutrients	Nitrogen species (total, total Kjeldahl, organic, nitrate, nitrite, ammonia) Phosphorus species (total, dissolved)
Pathogens and Indicator Organisms	*Giardia*, *Cryptosporidium*, total coliform, fecal coliform, *Enterococcus*, *E. coli*

IDENTIFY WATER QUALITY GOALS OR POLICIES ADOPTED BY OTHER STATES

This subtask will focus on other state's programs that may have adopted ambient water quality criteria, objectives, or goals for the drinking water constituents listed in **Table 1** or have adopted policies to protect drinking water supplies or other beneficial uses. This subtask will also identify how implementation of any such policies is funded.

Twelve states were initially targeted based on an assessment of several criteria, including known incidences of water quality concerns related to the constituent of interest, presence of unfiltered drinking water supplies, historically progressive regulatory arena, and presence of large number of impacted source waters for the Clean Water Act Total Maximum Daily Load program. The EPA assisted with initial contacts for many states as well as provided input on two additional states. A summary table of the EPA and state contacts is provided in **Attachment A**. A final list of states contacted includes: Alabama, Florida, Indiana, Kansas, Maryland, Massachusetts, Michigan, Mississippi, New Jersey, New York, North Carolina, Oklahoma, Utah, and Wisconsin. No information was obtained for Alabama.

Provided below is a summary of the other state programs for each of the constituents of interest. Most states classify their water supplies, both by type and use, and have variable standards based on those classifications.

Disinfectant Byproduct Precursors

A review of the state programs showed that no states have developed criteria, objectives or goals, or are currently planning to, for either total organic carbon or dissolved organic carbon.

Two states have criteria for bromide. Michigan has a bromide standard as follows: aquatic maximum value (to sustain aquatic life) of 2.4 µg/L, final acute value (no more than 50 percent mortality for 96 hour exposure) of 4.8 µg/L, and a final chronic value (long term exposure with no adverse effects) of 0.27 µg/L. New York has set a guidance value for bromide at 2,000 µg/L, for both surface water and groundwater. A guidance value may be used when a standard has not been established for a constituent.

Florida has a criterion for free molecular bromine in surface water of 0.1 mg/L. This is developed for Class II and III waters, based on fisheries impacts.

Dissolved Minerals

Dissolved minerals, specifically total dissolved solids (TDS), has criteria in eight of the states.

- Florida has a surface water criterion with a monthly average of 500 mg/L, not to exceed 1,000 mg/L. Groundwaters used for potable supplies are classified by their TDS levels, either Class G-1 less than 3,000 mg/L or Glass G-II less than 10,000 mg/L.

- Michigan has an ambient standard of 500 mg/L (monthly average) that can't be exceeded in surface waters (this is TDS from controllable point source discharges) and TDS can't exceed 750 mg/L as a maximum in surface waters (from controllable point source discharges).

- Mississippi and North Carolina regulations state that there shall be no substances added that will cause the TDS to exceed 500 mg/L in freshwater streams.

- New Jersey has a standard which prohibits an increase in background levels of TDS which may adversely affect the survival, growth or propagation of the aquatic biota or 500 mg/L, whichever is more stringent.

- New York has two standards based on the classification of the waterway.
    - For A-Special (pristine) the amount shall not exceed 200 mg/L.

  - For other classes of potable waters it shall be kept as low as practicable to maintain the best usage of waters but in no case shall it exceed 500mg/L.

- Oklahoma has a narrative criteria for TDS stating that the waters will be maintained so as to be essentially free of substances of a persistent nature, from other than natural sources.

- Utah set their TDS criteria at 1,200 mg/L.

Nutrients

Most states have developed limited nutrient criteria that are typically narrative in nature, however many states are in the process of creating and implementing a nutrient criteria implementation plan as required by the US Environmental Protection Agency (EPA). There are no criteria for total nitrogen species, total Kjeldahl nitrogen, organic nitrogen, or dissolved phosphorus. Since many water sources have been determined phosphorus limited, several states have proceeded with total phosphorus criteria and standards.

- Florida has narrative criteria which state that the discharge of nutrients shall continue to be limited as needed to prevent violations of other standards contained in this chapter. Man-induced nutrient enrichment (total nitrogen or total phosphorus) shall be considered degradation and in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna. Additionally, Florida has set a criterion for ammonia in Class I potable waters of 0.02 mg/L as un-ionized ammonia. There is also a criterion for nitrate and combined nitrate and nitrite at 10 mg/L as nitrogen and for nitrite at 1 mg/L as nitrogen.

- Indiana regulates ammonia (in waters other than the great lakes basin) as unionized ammonia as nitrogen. This standard is based on the EPA criteria from the “Gold Book” and is dependent upon pH and temperature. In the Great Lakes basin total ammonia as nitrogen is measured and that is also dependent on pH and temperature.

- Kansas has a narrative criterion for nutrients that states the introduction of nutrients shall be controlled to prevent accelerated plant growth or succession. There is also a criterion set for nitrate at 10 mg/L as nitrogen.

- Maryland regulates ammonia based on the EPA criteria from the “Gold Book” and is dependent on pH and temperature.

- Massachusetts is in the process of developing criteria for nutrients, but is leaning towards a translator rather than criteria. This is due to the belief that the response variables are more important than the actual nutrient concentration.

- Michigan has no criteria for nutrients yet. There is a 1 mg/l total phosphorus effluent standard, as a monthly average, for point source discharges. There is also a narrative statement to limit nutrients to prevent excessive growth of aquatic plants, fungi, or bacteria which could impair designated uses.

- Mississippi sets a dissolved concentration for nitrates at 10 mg/L as nitrogen.

- New Jersey has an ammonia standard with acute and chronic conditions set, based on season, temperature and pH. Nitrate also has a standard of 10,000 µg/L as nitrogen. There is also a standard for total phosphorus for both lakes and streams. Lakes shall be less than 0.05 mg/L (unless site-specific criteria are developed) and streams shall be less than 0.1 mg/L (unless it discharges to a lake, is not the limiting nutrient, or has a site-specific standard.

- New York has a narrative standard for nitrogen and phosphorus that states there is none allowed that will result in growths of algae, weeds and slimes that will impair the waters for their best usages. New York has set nitrate and combined nitrate and nitrite at 10,000 µg/L as nitrogen. Nitrite is set at 1,000 µg/L as nitrogen. New York also regulates ammonia based on criteria from the EPA "Gold Book" that takes into consideration pH and temperature.

- North Carolina is in the process of initiating a Nutrient Criteria Implementation Plan as required by the EPA. Currently, there is a standard for chlorophyll a that limits it to not greater than 40 µg/l for lakes, reservoirs, and other waters subject to growths of macroscopic or microscopic vegetation not designated as trout waters, and not greater than 15 µg/l for lakes, reservoirs, and other waters subject to growths of macroscopic or microscopic vegetation designated as trout waters (not applicable to lakes and reservoirs less than 10 acres in surface area). North Carolina also set a standard for nitrate at 10 mg/L as nitrogen.

- Oklahoma has a narrative criterion for nutrients stating that nutrients form point source discharges of other sources shall not cause excessive growth of periphyton, phytoplankton, or aquatic macrophyte communities which impairs any existing or designated beneficial use. In addition, for selected drinking water supplies a criterion has been set for chlorophyll a, of 0.01 mg/L at a depth of 0.5 meters from the surface. If this criterion is exceeded, then phosphorus and nitrogen criteria for the source could be promulgated. Several sources have phosphorus criterion developed for them. There is also a criterion set for nitrate at 10 mg/L as nitrogen.

- Utah has a criterion of 10 mg/L as nitrogen for nitrate. Utah also set a 0.05 mg/L criterion for total phosphorus as phosphorus.

- Wisconsin only deals with nitrogen as ammonia and considers it a toxic substance, not a nutrient. According to the state, this may change as they explore phosphorus options, but for the time being it will be addressed as is. The

Wisconsin Department of Natural Resources is beginning to develop phosphorus criteria and hopes to have standards developed by the end of 2008. For nutrients, they are required to form a Technical Advisory Committee which will help provide some "expert advice" in their final recommendations to the legislature. Federal guidance is not going to be relied on to adopt nutrient criteria. According to the state, the approach is to use Wisconsin-specific biological data to identify correlations with total phosphorus concentrations and different biologic metrics. Once the relationships are plotted, they will use this to identify concentrations with adverse impacts to the metric being evaluated.

Pathogens and Indicator Organisms

Most states implement indicator organism criteria or standards, but none have developed, or are developing, criteria or standards for the pathogens *Giardia* and *Cryptosporidium*.

- Florida states that for Class I (potable water supply) the most probable number (MPN) or membrane filter (MF) counts for fecal coliform shall not exceed a monthly average of 200 per 100 mL, nor exceed 400 per 100 mL in 10 percent of the samples, nor exceed 800 per 100 mL on any one day. Monthly averages shall be expressed as geometric means based on a minimum of five samples taken over a 30 day period. Florida further states that groundwater sources used for potable water (Class G-I and G-II) shall have maximum total coliform levels of 4 per 100 mL.

- Indiana standards state that the coliform group shall not exceed 5,000 per 100 mL as a monthly average (either MPN or MF counts) or in more than 20 percent of the samples examined, and not more than 20,000 per 100 mL in more than five percent of the samples examined during any month. Indiana standards also state that the *E. coli* count shall not exceed 125 per 100 mL in as a geometric mean based on no less than five samples in 30 days and 235 per 100 mL in any one sample within those 30 days.

- Kansas has a criterion for fecal coliform that ranges from 160 to 3,843 Colony Forming Units (CFUs) per 100 mL depending on the season and the classification of the stream in question. See the following table below.

USE	Colony Forming Units (CFUs)/100mL	
PRIMARY CONTACT RECREATION	Geometric Mean April 1 – Oct. 31	Geometric Mean Nov. 1 – March 31
Class A	160	2358
Class B	262	2358
Class C	427	3843
SECONDARY CONTACT RECREATION	Geometric Mean Jan. 1 – Dec. 31	
Class a	2358	
Class b	3843	

- Maryland follows EPA guidelines for *Enterococcus* of 33 per 100 mL as a geometric mean with four single sample maximums that range from 61 to 151 per 100 mL, depending on intensity of use of the waterway. Maryland also follows EPA guidelines for *E. coli* of 126 per 100 mL as a geometric mean with four single sample maximums that range from 235 to 575 per 100 mL, depending on intensity of use of the waterway.

- Massachusetts has recently revised their criteria from total and fecal coliform to include *E. coli* and *Enterococcus,* in accordance with EPA guidance, since they have been determined to be better indicators of human health. Massachusetts now follows EPA guidelines for *Enterococcus* of 33 per 100 mL as a geometric mean with four single sample maximums that range from 61 to 151 per 100 mL, depending on intensity of use of the waterway. They also follows EPA guidelines for *E. coli* of 126 per 100 mL as a geometric mean with four single sample maximums that range from 235 to 575 per 100 mL, depending on intensity of use of the waterway. At water supply intakes in unfiltered public water supplies: either fecal coliform shall not exceed 20 fecal coliform organisms per 100 ml in all samples taken in any six month period, or total coliform shall not exceed 100 organisms per 100 ml in 90% of the samples taken in any six month period.

- Michigan has an *E. coli* standard of 130 per 100 mL (30 day geometric mean) and 300 per 100 mL (maximum concentration) for waters protected for total body contact. There is also a standard of 1,000 per 100 mL (a maximum) to protect partial body contact. Michigan also has a fecal coliform standard of 200 per 100 mL (30 day geometric mean) and 400 per 100 mL (maximum geometric mean during any 7 day period) for effluent discharges.

- Mississippi regulates fecal coliform based on season. From May through October levels are not to exceed a geometric mean of 200 per 100 mL based on a minimum of five samples a month, and not to exceed 400 per 100 mL more than 10 percent of the time in any given month. From November to April that level is set at 2,000 per 100 mL based on a minimum of five samples a month, and not to exceed 4,000 per 100 mL more than 10 percent of the time.

- New Jersey has standards for primary and secondary contact recreation. For primary contact recreation *Enterococci* levels shall not exceed a geometric mean of 35 per 100 ml, or a single sample maximum of 104 per 100 ml and *E. coli* levels shall not exceed a geometric mean of 126 per 100 ml or a single sample maximum of 235 per 100 ml. For secondary contact recreation fecal coliform levels shall not exceed a geometric mean of 770 per 100 ml and levels shall not exceed a maximum of 1,500 per 100ml. The groundwater standards also state that any detection of fecal coliform in groundwater is a violation of the water quality criteria.

- New York has standards based on the source water classification. For class AA waters (pristine) the total coliform monthly median value shall not exceed 50 per 100mL and 240 per 100mL for more than 20 percent of the samples from a minimum of five. For waters classified as A-Special, the geometric mean of no less than five samples in a 30 day period shall not exceed 1,000 MPN per 100mL. For other source waters (A [drinking water], B and C) the monthly median shall not exceed 2,400 MPN per 100mL and 5,000 MPN per 100mL for more than 20 percent of the samples from a minimum of five. New York has set the geometric mean of fecal coliform in no less than five samples in a 30 day period shall not exceed 200 MPN per 100mL.

- North Carolina sets its standard for fecal coliform to not exceed a geometric mean of 200 per 100mL (MF count) based upon at least five consecutive samples examined during any 30 day period, nor exceed 400 per 100mL in more than 20 percent of the samples examined during such period. Violations of the fecal coliform standard are expected during rainfall events and, in some cases, this violation is expected to be caused by uncontrollable nonpoint source pollution It further states that total coliforms are not to exceed 50 per 100 ml (MF count) as a monthly geometric mean value in watersheds serving as unfiltered water supplies.

- Oklahoma has a total coliform criterion of 5,000 per 100 mL as a monthly geometric mean of not less than five samples over 30 days and no more than five percent of those samples shall exceed 20,000 per 100mL, for the drinking water beneficial use. For primary body contact recreation, Oklahoma has a fecal coliform criterion of 200 per 100mL as a monthly geometric mean of not less than five samples over 30 days and no more than five percent of those samples shall exceed 400 per 100mL. Oklahoma also follows the 33 per 100 mL *Enterococcus* criterion, but their single sample range is from 61 to 108 per 100 mL, depending on intensity of use of the waterway. The Oklahoma criterion for *E. coli* shall not exceed a monthly geometric mean of 126 per 100mL with a range of 235 to 406 per 100mL, depending on the intensity of the water use.

- Utah sets a bacteriological maximum of *E. coli* at 940 per 100 mL for domestic supplies and secondary recreation at 576 per 100mL for primary recreation. A criterion for a 30 day geometric mean is set at 206 per 100 mL for domestic supplies and secondary recreation and 126 per 100mL for primary recreation. The criterion for domestic supplies has been developed in the past few years with support from the EPA Region VIII office. The geometric mean of 206 per 100 mL is based on the illness rate of 10 per 1,000 from the 2004 EPA Implementation Guidance for Ambient Water Quality Criteria for Bacteria (Table 1-1). This criterion has not been the controlling level on any permit generated to date, as the primary recreation criterion is lower and typically applies as well.

- Wisconsin sets regulations for fecal coliform that may not exceed 200 per 100 mL as a geometric mean based on no less than five samples per month nor 400

per 100 mL in more than 10 percent of all samples in any month. Although standards are currently limited to fecal coliform they are pursuing the switch to *E. coli*, but no timeline has been set for that switch.

Funding

Most states rely on federal funding to fund programs and cover monitoring costs, including Michigan, New York, North Carolina, Oklahoma, Utah, and Wisconsin. Federal dollars cover a large majority of funding, as much as 95 percent of state efforts, both in staff and in funding for contracts and/or analyses. Clean Water Act Sections 106 and 319 funds are the most notable, the latter of which must be directed at non-point impacted waters. This money was the source for nutrient studies that were recently conducted in Wisconsin.

Some states, including Maryland and protected sources in Massachusetts, do not actively monitor source waters. But rather rely on drinking water intakes to characterize source water quality.

IDENTIFY WATER QUALITY GOALS OR POLICIES ADOPTED BY OTHER COUNTRIES OR ORGANIZATIONS

The objective of this task is to determine if other countries or organizations have adopted ambient water quality criteria, objectives, or goals for the drinking water constituents listed in **Table 1** or have adopted policies to protect drinking water supplies. This task will also identify how implementation of any such policies is funded, if available. A list of countries/organizations was developed based on prevalence of similar drinking water quality concerns, probability of progress, and language to allow for communication. The list of countries/organizations included: World Health Organization, Australia, Canada (Walkerton, Ontario), Netherlands, New Zealand, and United Kingdom. No specific information was able to be obtained from the Netherlands. Only limited information was obtained from the United Kingdom.

World Health Organization

The World Health Organization has adopted water quality guideline values for nitrogen species as chemical runoff from agriculture that affects drinking water. Guidelines for nitrates (as nitrate) is 50 mg/L and for nitrites (as nitrite) is 3 mg/L for short-term exposure. For long-term exposure, nitrite guidelines are 0.2 mg/L as nitrite.

Australia/New Zealand

In Australia and New Zealand national water quality guidelines are set under the National Water Quality Management Strategy for ambient and drinking water. No information was found for state-specific standards. For recreational uses, guidelines are set for nitrogen species and are regulated as nitrate, nitrite and ammonia as N, as well as coliform.

- Nitrate guideline is set at 10,000 µg/L, as nitrogen.
- Nitrite guideline is set at 1,000 µg/L, as nitrogen.
- Ammonia guideline is set at 10 µg/L, as nitrogen.
- Fecal coliform guideline for primary recreation is set at 150 organisms/100 mL and for secondary recreation is set at 1,000 organisms/100 mL. Primary recreation waters should be free of free-living protozoa.

There is also a guideline for TDS which is set at 1,000 mg/L.

Australia and New Zealand also set guidelines for water used for irrigation, including coliforms, salinity, and nutrients, as well as for livestock consumption, including coliform, salt, and nutrients.

Canada

Canada appears to have the most thorough water protection program, which monitors and manages water quality from the source to the tap. It is a multi-barrier approach to safe drinking water, and starts with source water protection. Watershed management is used as a tool to minimize operating costs and the degree to which drinking water treatment is required, thereby reducing the amount of chemicals used during treatment and the creation of byproducts.

The federal government provides financial assistance to drinking water system owners through cost sharing arrangements. If the area is outside of federal jurisdiction, regulatory oversight is a provincial or territorial government responsibility. Funding is generally found in programs from the respective governing body fro large scale watersheds. Small scale watersheds typically look for local funding, such as local utilities, non-profits, and municipalities. Government incentives are also used to try to encourage industries to prevent pollution from entering the waterway.

All jurisdictions have established guidelines, objectives or standards for drinking recreational and ambient water quality in their boundaries. Guidelines are benchmarks, but are not legally enforceable. Objectives are site specific values for the protection of water users. These are based on guidelines but incorporate site specific factors. Standards are legally enforceable limits for water quality when referenced in legislation and cannot be exceeded for the protection of human/aquatic health.

National Guidelines for recreational water quality:

- *E. coli* and fecal coliforms are set at maximum limits. The geometric mean of at least five samples taken within 30 days should not exceed 200 *E. coli* per 100 mL. Resampling is to be performed when any sample exceeds 400 *E. coli* per 100 mL.

- For *Enterococci*, the geometric mean of at least five samples taken within 30 days should not exceed 35 *Enterococci* per 100 mL. Resampling is to be performed when any sample exceeds 70 *Enterococci* per 100 mL.

National Guidelines for drinking water:

- Health based guideline is set for nitrate at 45 mg/L as nitrate.
- Health based guideline is set for TDS at 500 mg/L.

Canada also set guidelines for water used for irrigation, including coliforms and salinity, as well as for livestock consumption, including salt and nutrients.

The Province of British Columbia has developed some regional guidelines in addition to the ones identified above.

- For lakes that are drinking water sources, total phosphorus is limited to 10 µg/L. For lakes with a residence time greater than six months, this is based on the spring overturn concentration. For lakes with a residence time less than six months, this is based on the mean epilimnetic growing season concentration.
- For sources that are used as drinking water supplies, and if the water treatment includes the use of chlorination, the source water TOC is limited to 4 mg/L. This is based on an article in the Journal of the American Water Works Association from March 1999, JAWWA 91 (3), 16 – 32. This is a summary of complying with the Stage 1 Disinfectants/Disinfection By-Products Rule.
- Ammonia is limited based on pH and temperature.
- Indicator organisms are limited in drinking water supplies at variable levels, depending on the level of treatment provided by the existing drinking water treatment plants. Where no treatment of water is provided, coliform must be absent. For systems providing disinfection only, source water levels are limited to *E. coli* less than 10 MPN/100 mL (based on the 90th percentile). For systems providing partial treatment, source water levels are limited to *E. coli* less than 100 MPN/100 mL (based on the 90th percentile). For systems providing full treatment there is no limit on the source water levels.
- There is also a working guide for bromide set at 50 µg/L, this is based on the CALFED program work.

United Kingdom

Only limited information could be extracted from the United Kingdom website and it was supplemented only slightly by email contact with staff in the regulations bureau. The Environment Agency is responsible for monitoring and regulating source waters. There are Environmental Quality Standards for the source waters, specifically river quality objectives. The specific standards could not be identified. However, there are two groups of constituents that are monitored to assess source water quality; nutrients and chemistry. Nutrients include phosphate and nitrate. Chemistry includes ammonia, biochemical oxygen demand, and dissolved oxygen.

For nutrients, there is a six-tier source water classification system based on the maximum average concentration. **Table 2** shows the classifications and maximums for nitrate and phosphate.

Table 2
Nutrient Classification System for the United Kingdom

Classification	Phosphate Maximum Average (mg P/L)	Nitrate Maximum Average (mg NO3/L)	Nutrient Level Description
1	0.02	5	Very Low
2	0.06	10	Low
3	0.1	20	Moderate
4	0.2	30	High
5	1.0	40	Very High
6	>1.0	>40	Excessively High

For chemistry, there is also a six-tier source water classification system based on the limits set for each of the three constituents. The lowest grade for each constituent governs the source water. The specific constituent limits for the various grades could not be obtained. **Table 3** shows the classifications.

Table 3
Chemistry Classification System for the United Kingdom

Classification	Likely uses and characteristics *
A - very good	All abstractions, Very good salmonid fisheries Cyprinid fisheries, Natural ecosystems
B - good	All abstractions, Very good salmonid fisheries Cyprinid fisheries, Ecosystems at or close to natural
C - fairly good	Potable supply after advanced treatment, Other abstractions, Good cyprinid fisheries, Natural ecosystems, or those corresponding to good cyprinid fisheries
D - fair	Potable supply after advanced treatment, Other abstractions, Fair cyprinid fisheries, Impacted ecosystems
E - poor	Low grade abstraction for industry, Fish absent or sporadically present, vulnerable to pollution **, Impoverished ecosystems **
F - bad	Very polluted rivers which may cause nuisance, Severely restricted ecosystems
*providing other standards are met **where the grade is caused by discharges of organic pollution	

REFERENCES:

Florida State Law, Sections 62-302, 62-520, and 62-550.

Shivi Selvartnam. Indiana Dept of Environmental Management. 317.308.3088

Kansas Department of Health and Environment; Amended Regulation Article 16. – Surface Water Quality Standards 06-03-04.
http://www.kdheks.gov/water/28_16_28b_g.pdf

Dave Waldo. Bureau of Water – Public Water Supply, Kansas Department of Health and Environment.

Wisconsin Department of Natural Resources; Chapter NR 102 Water Quality Standards for Wisconsin Surface Waters. www.legis.state.wi.us/rsb/code/nr/nr102.pdf

Bob Masnado. Wisconsin Department of Natural Resources.

Dennis Dunn. State of Massachusetts, Department of Environmental Protection.

Mississippi Department of Environmental Quality Office of Pollution Control. Water Quality Criteria for Intrastate, Interstate and Coastal Waters State of Mississippi. http://www.deq.state.ms.us/newsweb/MDEQRegulations.nsf/RN/WPC-2

John Grace. Maryland Water Supply Program. 410.537.3714

New Jersey Department of Environmental Protection, Surface Water Quality Standards, October 2006.

New Jersey Department of Environmental Protection, Ground Water Quality Standards, November 2005.

http://www.dec.ny.gov/regs/4590.html

http://www.dec.state.ny.us/website/dow/togs/togs111.pdf

Jeff Myers. New York Bureau of Water Assessment and Management. 518.402.8179

Connie Brower. North Carolina Department of Environment and Natural Resources. 919-733-7015 ext 380

http://www.rules.utah.gov/publicat/code/r317/r317-002.htm#T15

Bill Molmer. Utah Department of Environmental Quality, Division of Water Quality. 801.538.6329.

Dave Moon. EPA Region VIII. 303.312.6833

http://www.owrb.state.ok.us/util/rules/pdf_rul/Chap45.pdf

Sylvia Heaton. Michigan Department of Environmental Quality. 517.373.1320

http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728_11383--,00.html

http://www.who.int/water_sanitation_health/dwq/gdwq0506_8.pdf

http://whqlibdoc.who.int/publications/9241545038.pdf

http://www.ccme.ca/assets/pdf/mba_eng.pdf

http://www.ccme.ca/assets/pdf/mba_guidance_doc_e.pdf

http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/guide_water-1992-1-guide_eau_e.pdf

http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/doc-sup-appui/sum_guide-res_recom/summary-sommaire_e.pdf

http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html#approved

http://www.environment.gov.au/water/quality/nwqms/

http://www.environment.gov.au/water/publications/quality/targets-online/index.php

http://www.epa.gov/owow/watershed/trading/WQTToolkit.html

ATTACHMENT A – OTHER STATE CONTACTS

State	EPA Contact	State Contact
Alabama	Region 4 Lauren Petter, Environmental Scientist	NONE
Florida	Region 4 Lauren Petter, Environmental Scientist	Greg Knecht is your best contact at 850 245-8428 or Greg.Knecht@dep.state.fl.us
Indiana	Region 5 Bill Spaulding	Shivi Selvaratnam Indiana Department of Environmental Management TEL;WORK:(317) 308-3088 TEL;WORK;FAX:(317) 308-3116 EMAIL:sselvara@idem.in.gov
Kansas	Region 7 Neftali Hernandez-Santiago Office (913) 551 – 7036	Dave Waldo, Chief DWaldo@kdhe.state.ks.us Bureau of Water Public Water Supply Section 1000 SW Jackson St., Suite 420 Topeka, KS 66612-1367 (785) 296-5503 FAX: (785) 296-5509 Sheryl Ervin Kansas Department of Health and Environment 785-296-8058 servin@kdhe.state.ks.us
Maryland	Region 3 Charles "Chuck" Kanetsky	John Grace is the SWP contact for MD (John Grace <jgrace@mde.state.md.us>, 410-537-3714). He does not do the designated uses/water quality criteria.
Massachusetts	Region 1 Kira Jacobs Mike Hill (617) 918-1398	Kathy Romero MassDEP Drinking Water Program (source water contact) 617-292-5727 kathleen.romero@state.ma.us Here's Rick Dunn's e-mail: dennis.dunn@state.ma.us Phone: 508.767.2874. He is the DEP contact for WQ Criteria and TMDLs

Michigan	Region 5 Bill Spaulding	Sylvia Heaton TEL;WORK:517-373-1320 TEL;WORK;FAX:517-241-8133 EMAIL:HEATONS@michigan.gov ORG:Michigan Department of Environmental Quality
Mississippi	Region 4 Lauren Petter, Environmental Scientist	
New Jersey	Region 2	The Delaware River Basin Commission has those standards. The Philadelphia water intake (half the city) is at about River mile 110. There are also a couple of Industrial intakes as well. For a contact try Dr. Sanchez. She's a planner with the Commission. I'm not sure she is the right contact, but she'll put you on the trail. Jessica Sanchez <Jessica.Sanchez@drbc.state.nj.us> (609-883-9500) http://www.state.nj.us/drbc/basinplan.htm
New York	Region 2 Stephen Gould	Scott J. Stoner, Chief, Standards and Analytical Support Section Bureau of Water Assessment and Management Division of Water New York State Dept. of Environmental Conservation (NYSDEC) 625 Broadway Albany, NY 12233-3502 phone: 518-402-8193 e-mail: sxstoner@gw.dec.state.ny.us web site: www.dec.state.ny.us/website/dow/bwam/stdsclass.htm Proposed Rule Making and Public Hearing to Amend Water Quality Regulations – NY (Ammonia)
North Carolina	Lisa Perras Gordon, Environmental Scientist U.S. Environmental Protection Agency Region 4 (404) 562-9317	NC has WQS for drinking water designated waterbodies that contain some, but not all, of the parameters listed below. NC also has a unique program in that they include some land use management strategies in their standards to protect drinking water uses, which I believe have very successful. The State standards coordinator is Connie Brower, email is connie.brower@ncmail.net, her phone is 919-733-5083, ext.380.

Oklahoma	Region 6 Ken Williams	Robert Huber, Coordinator Source Water Protection Program Environmental Complaints & Local Services Division Oklahoma Department of Environmental Quality P.O. Box 1677 Oklahoma City, OK 73101 – 1677 (405) 702-6222 (405) 702-6223 (fax) Robert.Huber@deq.state.ok.us Phil Moershel Oklahoma Water Resources Board 3800 North Classen Blvd. Oklahoma City, OK 73118 405-530-8800 405-530-8900 (fax)
Utah	Gregory Oberley US EPA Region VIII 999 18th Street, Suite 500 Denver, Colorado 80202 303-312-7043	Kate Johnson (801-536-4206) is my contact in Utah for SWP. I would think she would be a good person to direct you to a DW or a "Standards" (CWA) person. If she cannot get a contact name for you I would try talking with Bill Wuerthele (CWA standards) in our office at 303-312-6943 or Gary Carlson (DW) at 303-312-6269.
Wisconsin	Region 5 Bill Spaulding	General Water Quality Standards: Bob Masnado TEL;WORK: 608-267-7662 EMAIL:MasnaR@dnr.state.wi.us ORG:Wisconsin Department of Natural Resources Human Health: Elisabeth Harrahy Wisconsin Department of Natural Resources 608-264-6260 harrae@dnr.state.wi.us

EPA Region 9 – Kathleen Goforth, Water Quality Standards Coordinator