NHDES Guidance for Water Systems

- What are cyanobacteria?
- Why are they of concern to water systems?
  - Production of toxics
  - Taste and odor issues
- How big is the problem in N.H.?
  - Not known
  - Microcystins in all lakes tested
- How can you tell whether you have a problem?
  - Some blooms recognizable by appearance
  - DES recommends monitoring program
    - Several years of baseline data; characterize risk factors
    - Focus on-going monitoring based on risk factors
    - Grants available

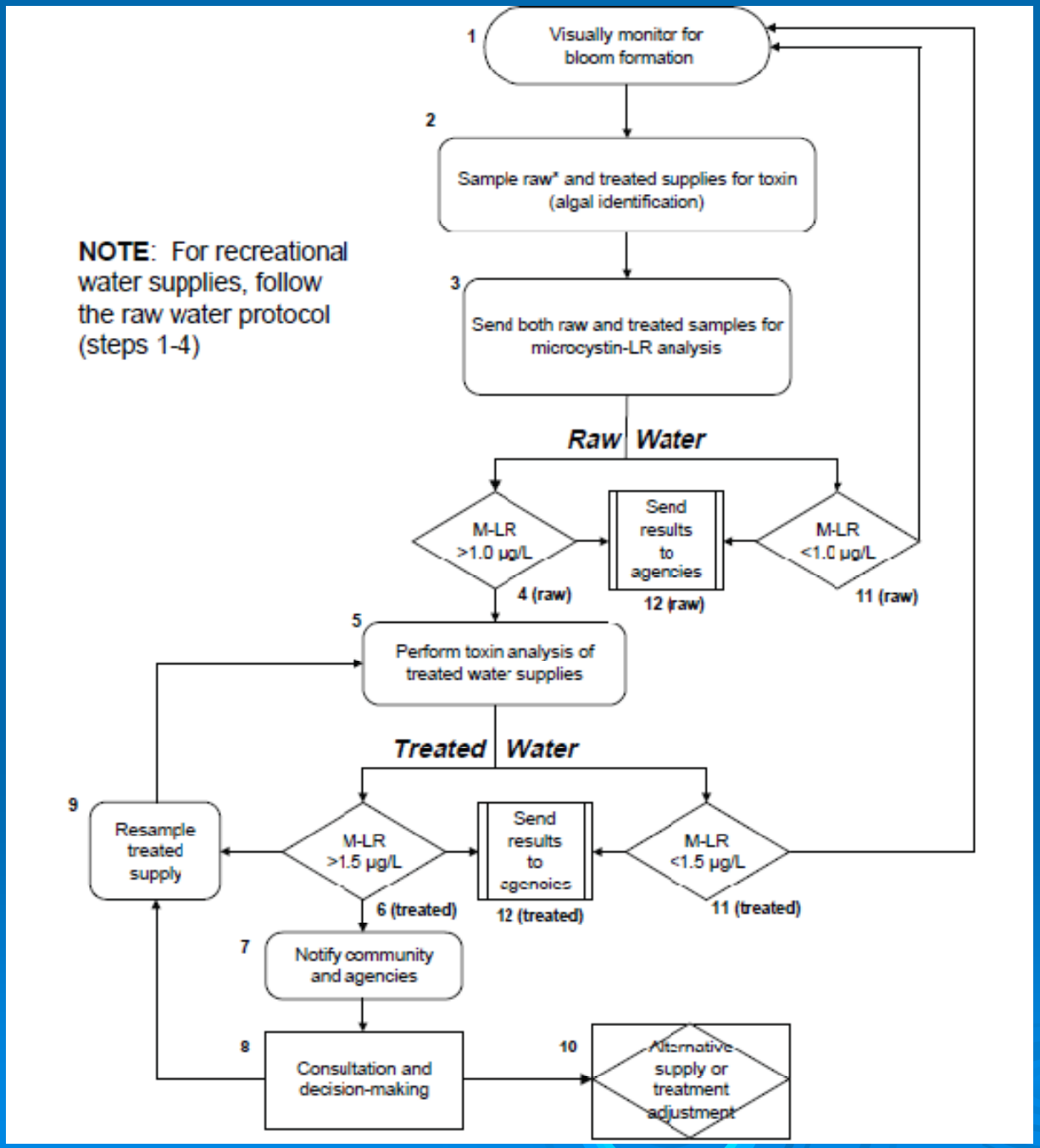
NHDES Guidance, cont'd

- What can water systems do?
  - Source water protection: P and sediment
  - Monitoring
  - Develop a response protocol . . .

Environmental factor				
Potential for Cyanobacterial Growth	History of Cyanobacteria	Water Temperature (°C)	Nutrients Total Phosphorus (µg/L)	Thermal Stratification
Very Low	No	<15	<10	Rare or Never
Low	Yes	<15-20	<10	Infrequent
Moderate	Yes	20-25	10-25	Occasional
High	Yes	>25	25-100	Frequent and persistent
Very High	Yes	>25	>100	Frequent and persistent/strong

Source: Newcombe (ed.), 2009

Response Protocol for Water Supplies



Source: Federal-Provincial-Territorial Committee on Drinking Water, 2002

NHDES Guidance, cont'd

- What can water systems do?
  - Source water protection: P and sediment
  - Monitoring
  - Develop a response protocol
  - In-reservoir options
    - Modify intake location/depth
    - Divert surface scums
    - Aeration, destratification, sediment removal or covering
    - Algaecide – *prior to bloom formation*

NHDES Guidance, cont'd

- What can water systems do?
  - Source water protection: P and sediment
  - Monitoring
  - Develop a response protocol
  - In-reservoir options
  - Manage treatment
    - Optimize removal of intact cells (coagulation/filtration), *then*
    - Remove/destroy toxin (adsorption and/or oxidation)

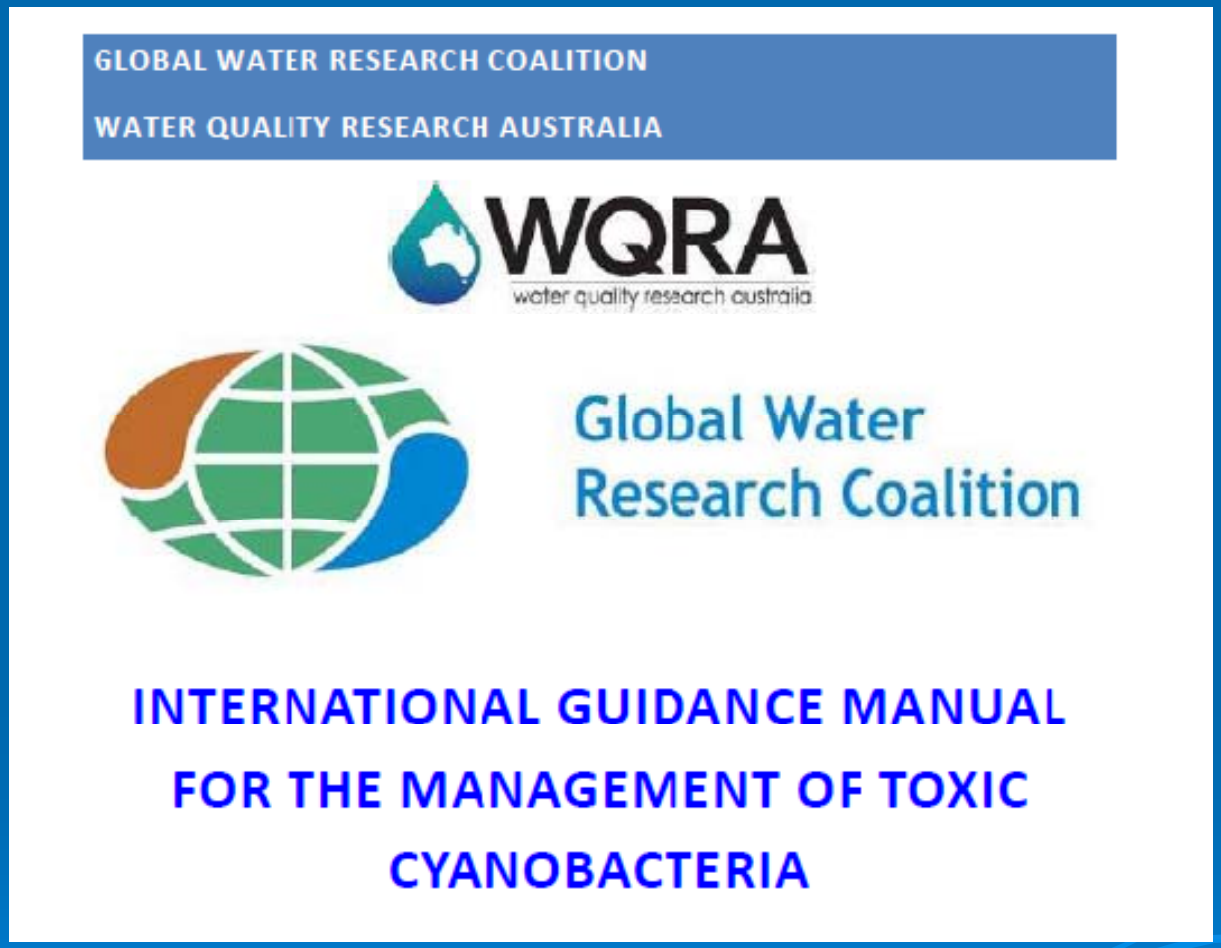
Drinking Water Treatment

- Cell removal
  - Don’t overdo pre-oxidation
  - Increase frequency of sludge removal or backwashing (do not recycle)
- Toxin removal
  - O_3, $KMnO_4$, chorine largely effective
  - Chloramines, ClO_2, H_2O_2, UV *not* effective
  - PAC, GAC *can be* . . . jar testing recommended

NHDES Fact Sheet - References

- Overview
- Recognizing a bloom
- Source water protection
- Monitoring
- Treatment
- Grant program

But wait – there's more!



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Soon to be available at www.waterresearchfoundation.org

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