

# Wisconsin's Thermal Water Quality Standards

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**Highlights of rule features that may  
affect your operation?**



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# Presentation Overview

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- **History of Thermal Standards**
- **Overview of NR 102 – Water Quality Standards**
- **Overview of NR 106 – Point Source Limits**
- **Rule Flexibility**
- **Implementation Highlights**

# History

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Year	Action
1973	Standards originally adopted
1979	Wisconsin Supreme Court ruling invalidated standards
1991	U.S. EPA objected to two WPDES permits
1994	Wisconsin initiated efforts to revise standards
2008	Public Hearings
2010	Revisions adopted

# NR 102

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- **Water Quality Criteria**
- **Fish & Aquatic Life**
  - **Protection of Fish Species**
  - **Acute: Lethality**
  - **Sub-Lethal: Spawning, Juvenile Growth & Gametogenesis**
- **Public Health & Welfare**
  - **120°F – Prevention of Human Scalding**

# NR 102 (Continued)

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- **Ambient Temperature**
  - **Default Values**
  - **Small vs. Large Rivers (7-Q10 < > 200 cfs)**
  - **North vs. South Inland Lakes (State Hwy. 10)**
  - **Green Bay**
  - **Great Lakes**
- **Site-Specific Ambient Temperature Values**
- **Site-Specific Criteria**

# NR 102 (Continued)

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## Example Criteria Table

Warmwater – Large Stream			
Month	Ambient	Sub-Lethal	Acute
Jan	33	49	76
Mar	36	52	76
May	60	65	82
Jul	75	80	86
Sep	65	72	84
Nov	39	50	77

# NR 106

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- **Subchapter V**
  - **Applicability**
  - **Data needs**
  - **Limits calculation procedures**
  - **Reasonable potential determination**
  - **Special POTW provisions**
  - **General Permits**
- **Subchapter VI – Alternative Effluent Limits**

# NR 106 - Applicability

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- **Point Source discharges with heat load**
  - **WPDES – Industrial**
  - **WPDES – Municipal POTW**
- **Stormwater**
  - **No more stringent than federal regulations**
  - **No current federal regulations in place**
  - **Case-by-case if adverse impacts**

# NR 106 – Data Needs

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- **Stream Flow ( $Q_s$ )**
  - Annual 7-Q10
  - Monthly or Seasonal (if available)
- **Effluent Flow ( $Q_e$ )**
  - Municipal – Annual Design Flow
  - Industrial – Annual Average Flow
  - Seasonal or Other – Case-by-case
- **Effluent Temperature**
  - Daily Maximum – Highest instantaneous value
  - Weekly Average – Mean of daily maximum values

# NR 106 – Limit Calculations: Rivers

## Flow Ratio Screening

Warm Water & Limited Forage	Effluent Limitations	Cold Water
$Q_s:Q_e \geq 20:1$	120°F	$Q_s:Q_e \geq 30:1$
$20:1 > Q_s:Q_e > 2:1$	More stringent: 120°F or Sub-lethal	$30:1 > Q_s:Q_e > 2.5:1$
$Q_s:Q_e \leq 2:1$	Sub-lethal & Acute Limits	$Q_s:Q_e \leq 2.5:1$

# NR 106 – Limits Calculation

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- **Flowing waters**
  - **Mass balance equation**
  - **Criteria from NR 102**
  - **Ambient Temp. = Default or site-specific**
  - **Dilution = 25% of 7-Q10 flow or approved alternative**
- **Lakes**
  - **Mass balance equation**
  - **Criteria from NR 102**
  - **Ambient Temp. = Default or site-specific**
  - **Dilution = Calculated via formula**

# NR 106 – Reasonable Potential (Industrial)

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- **Dependent on  $Q_s:Q_e$  ratio**
- **Daily maximum limit in permit if:**
  - Maximum effluent temperature > calculated acute limitation**
- **Weekly average limit in permit if:**
  - Weekly average effluent temperature > calculated sub-lethal limitation**
- **120°F limit in permit unless demonstration made that no potential for human contact exists**

# NR 106 – Reasonable Potential (Municipal POTW)

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- **Dependent on  $Q_s:Q_e$  ratio**
- **Daily maximum limit in permit if:**
  - Maximum effluent temperature > calculated acute limitation**
- **Weekly average limit in permit if:**
  - Weekly average effluent temperature > calculated sub-lethal limitation**
- **No weekly average limit if request for dissipative cooling made with permit application & sufficient information available to show no sub-lethal risk**

# NR 106 – Dissipative Cooling Option (Municipal POTW Requirements)

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- **Permittee must submit the following data:**
  - Physical description of outfall structure
  - Description of other heat sources to receiving water
  - Min/Max weekly effluent temperature for past 2 years
- **Permittee must submit the following data, **if available:****
  - Biological data of receiving water
  - Physical attributes of receiving water that encourage rapid mixing or dissipation of heat
  - Min/Max weekly stream temperature for past 2 years

# NR 106 – Dissipative Cooling Option (WDNR Requirements)

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- **WDNR must evaluate other data available, including:**
  - Physical characteristics of receiving water
  - Occurrence of other heat loads
  - Effluent temperature variability
  - Difference between ambient and effluent temperature
  - Receiving water use attainment status
  - Presence of threatened or endangered species
- **WDNR must include specific request for comment in public notice of proposed permit if dissipative cooling is recognized**

# NR 106 – Dissipative Cooling Option

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- **Municipal POTW may request a **continuance** if:**
  - Request is made with renewal application
  - POTW certifies no substantive changes in operation or loadings from previous decision
  - POTW provides new information for facility or stream that supports previous decision
- **WDNR must include specific request for comment in public notice if continuance is approved**
- **WDNR must include sub-lethal limitations in permit if continuance is not approved**

# Flexibility

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- **NR 102**
  - Site-specific ambient temperature values
  - **Site-specific water quality criteria**
  
- **NR 106**
  - Annual, seasonal, or monthly limits
  - Alternative mixing zones
  - Limits derived from water quality models
  - Compliance schedules
  - **Variances – 283.15 , Stats. (3-yr duration)**
  - **Alternative Effluent Limits – Subchapter VI [Equivalent of federal 316(a)] (Up to 10-yr duration)**

**Yellow Highlight = Federal approval required**

# Implementation Highlights

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- **WDNR will address permits upon expiration (i.e., no intent to modify permits)**
- **If *representative effluent temperature data are unavailable*, permits will include:**
  - **Calculated limits**
  - **Monitoring requirement (1-2 yrs.)**
  - **Compliance Schedule**
  - **Provision to drop limits if monitoring data indicate limitations are unnecessary**

## Implementation Highlights (Continued)

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- **Effluent temperature monitoring recommended**
  - **Representative daily maximum (*known or expected*) measured as least once per week during normal operating conditions**
- **WDNR will provide user friendly spreadsheets for preliminary limits calculation – Release TBD**
- **Training opportunities in Summer 2010 - TBD**

# Questions & Concerns



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