

## Clearinghouse Rule 07-111

### ORDER OF THE STATE OF WISCONSIN NATURAL RESOURCES BOARD REPEALING, RENUMBERING, AMENDING AND CREATING RULES

The State of Wisconsin Natural Resources Board proposes an order to repeal NR 102.03(8) to (10), 102.04(4)(b), (e)1., (5) to (7) and ch. NR 209; to renumber NR 102.03(1) to (7) and 102.04(4)(e); to amend NR 102.01(2) and (3), 102.04(title), (1)(intro.), (2), (3)(intro.) and (4)(title), 102.05(3)(intro.), (b), (c), (e) and (f) and ch. NR 106 (title); and to create NR 102, subch. I (title), 102.03(intro.) and (1), 102.04(4)(e), (5) to (9), 102.05(3)(i), ch. NR 102, subch. II and ch. NR 106, subchs. V and VI relating to thermal standards for Wisconsin surface waters

WT-36-07

#### Summary Prepared by the Department of Natural Resources

**Statutory Authority and Explanation:** Sections 227.11(2), 281.15, 283.13, and 283.17, Stats., grant authority to the department to promulgate rules pertaining to water quality standards and associated water quality-based effluent limitation calculation procedures, as well as modification procedures thereof.

**Statutes Interpreted and Explanation:** Sections 281.15 and 283.13, Stats. have been interpreted as allowing the department the authority to establish appropriate thermal water quality standards and associated water quality-based effluent limitation calculation procedures for heated discharges to surface waters of the State. Section 283.17, Stats., has been interpreted as allowing the department the authority to establish thermal effluent limitation modification procedures.

**Related Statute or Rule:** The department is currently operating in a tenuous manner under existing requirements in ch. NR 102, Wis. Adm. Code, that took effect on 10/1/1973. The situation is tenuous because the Wisconsin Supreme Court declared significant portions of ch. NR 102 invalid (*Wisconsin Electric Power Company v. Wisconsin Natural Resources Board*, 90 Wis. 2d 656 (1979)), yet U.S. EPA requires thermal limits to be included in appropriate WPDES permits in order to be approved.

**Plain Language Rule Analysis:** In 1974 U.S. EPA approved Wisconsin's water quality standards (including thermal standards) as required in Public Law 92-500, the "Federal Water Pollution Control Act Amendments of 1972." Those standards became effective in 1975 following the normal rule-making process. Subsequently, the department was sued by several steam-electric power companies on the grounds that the application in permits of the temperature standards set forth in ch. NR 102, Wis. Adm. Code, were more stringent than federal requirements. Section 283.11(2), Stats., prohibits the department from establishing requirements more stringent than federal regulations unless the requirements are needed to meet water quality standards. The Wisconsin Supreme Court ruled that significant provisions of ch. NR 102 were equivalent to categorical-based effluent limitations for the steam-electric power discharge category and overturned the thermal requirements of ch. NR 102 for the steam-electric discharge category. However, other provisions in federal and state law allowed these facilities to demonstrate that power plant discharges were not adversely affecting aquatic life.

The effect of the Wisconsin Supreme Court ruling was to severely limit the department's ability to regulate the amount of heat discharged from power plants. Additionally, the decision has made regulation of all heated discharges to waters of the State confusing and difficult to conduct consistently.

In 1991 U.S. EPA requested that the department once again attempt to implement the thermal standards contained in ch. NR 102 to regulate the discharge of heat from two specific power plants. Due to the Wisconsin Supreme Court decision mentioned above, the department claimed it did not have the authority to issue a WPDES permit to the facilities to regulate heat. Citing 40 CFR 124.57, U.S. EPA proposed to issue the permits under the requirements of the federal National Pollution Discharge Elimination System (NPDES) program. In response to U.S. EPA's proposal, the department requested an opportunity to revise ch. NR 102 to adopt scientifically defensible thermal water quality standards and ch. NR 106 to develop procedures for establishing effluent limitations to meet the thermal water quality standards. An

advisory committee was formed in late 1994 to undertake this task. The committee members consisted of several department staff along with representatives of U.S. EPA - Region V, academia, municipal government, environmental advocacy, and industry, including representatives from steam-electric producers, pulp and paper manufacturers, and food producers. The result of this committee's work was to produce a draft rule that received Natural Resource Board approval for public hearing in August 1998. However, from the time following public hearings until May 2001 progress on finalizing the thermal rules revisions was inhibited by staffing changes associated with reorganization, retirement, and reassignment, as well as the need to address significant internal and external concerns related to the draft rule.

The Thermal Standards Revisions Advisory Committee was reestablished in the summer of 2001 and included representatives from all of the original stakeholder entities, as well as one representative each from aquaculture and Trout Unlimited. This advisory committee met 15 times between October 2001 and July 2004, and along with additional department staff, made significant contributions in the development of the proposed draft rule revisions. Following additional internal delays and time for Department staff to address remaining problems with the draft rules, the advisory committee was reestablished and met one last time in June 2007. Following this meeting the proposed draft rules before you were prepared. The current proposed draft includes numerous significant changes from the draft rule package that appeared before the Natural Resources Board in August 1998. Many of the changes were made in response to comments the department received during and following the public hearings in 1998. Several other changes were made in response to comments received more recently by U.S. EPA Region 5.

Adoption of the proposed water quality-based thermal rules will begin a new era of protecting fish and aquatic life from discharges of heat into waters of the state. A primary reason for this is that existing policy does not effectively consider the ability of the receiving water to assimilate heat, nor does it adequately account for the different biological needs of fish and aquatic life over the course of the varying seasons in a year or across different water body classifications. The proposed rules not only allow each receiving water to be evaluated for its own heat dissipating characteristics, but also account for the biological needs of aquatic life during different times of the year, which is addressed primarily through the application of both acute and sub-lethal monthly criteria. The inclusion of the sub-lethal criteria and the application of criteria on a monthly basis is a significant difference between the existing and proposed rules, but one that clearly makes the proposed rules much more water quality-based.

The revisions are to be made to chs. NR 102 and NR 106, and are summarized as follows:

Chapter NR 102 - Water Quality Standards for Wisconsin Surface Waters. The existing thermal standards are found in ss. NR 102.04, 102.05, and 102.07 - 102.09. The current proposal will amend several subsections of ss. NR 102.04 and 102.05, repeal ss. 102.07 - 102.09, and create a new Subchapter II entitled "Water Quality Standards for Temperature." Subchapter II identifies water quality criteria and default ambient temperatures for specific fish and aquatic life use communities, as well as other site-specific temperature-related standards.

Chapter NR 106 - Procedures for Calculating Water Quality Based Effluent Limitations for Toxic and Organoleptic Substances Discharged to Surface Waters. The title of this rule is proposed to be amended to "Procedures for Calculating Water Quality Based Effluent Limitations for Point Source Discharges to Surface Waters." There is no thermal section in the existing NR 106. The current proposal will create two new subchapters; Subchapter V entitled "Effluent Limitations for Temperature", and Subchapter VI entitled "Alternative Effluent Limitations for Temperature." Subchapter V specifies data requirements, variance procedures, methods for determining the necessity for and calculation of water quality-based effluent limitations, application of and compliance with the limitations in WPDES permits, and other related limitation and permitting issues. As a primary means of assuring the limitations are water quality-based, the proposed rule takes into account the ambient temperature and flow of a receiving water in the calculation of effluent limitations. The effluent limitation calculation incorporates a mass balance equation, making it equivalent to other codified limit calculation procedures. The mass balance approach enables the determination of the amount of heat that a receiving water can assimilate without adversely affecting fish and aquatic life. Supplemental limits, including those of 120° F to prevent incidental injury (scalding) to humans, 86° F to protect other limited aquatic life waterbodies, and those to be considered on a site-specific or case-by-case basis, are also proposed. Subchapter VI specifies procedures for determining alternative effluent limitations that may be established for point source

discharges with limitations calculated under Subchapter V that are demonstrated to be more stringent than necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is made. The Subchapter includes application, compliance schedule, and public notice procedures, among others. Subchapter VI replaces Chapter NR 209, which is proposed to be repealed.

The inclusion of the sub-lethal criteria and the application of criteria on a monthly basis does present the possibility that department staff may have an increase in workload during permit drafting due to an increased number of calculations. However, with the use of appropriate information technology and appropriate training this increase in workload should be relatively minor. Additionally, the rule has been crafted in such a way as to reduce workload where possible through the use of a general permit option. This option will replace the use of the existing general permit for regulation of discharges of heat, and will result in the need for new general permits to be drafted. However, it is not expected that the drafting of these new general permits will require a significant increase in workload.

**Federal Regulatory Analysis:** Basic federal requirements regarding water quality standards and permitting are found in various sections of the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.), which is commonly referred to as the Clean Water Act (CWA), as well as Parts 122, 123, 125, 130, and 131 of 40 CFR. Specific details regarding thermal discharges include section 316 of the CWA and section 130.2(o) 40 CFR. Additionally, the United States Environmental Protection Agency's (U.S. EPA's) current water quality criterion recommendations for temperature are those contained in "Quality Criteria for Water, 1986", which is commonly referred to as the Gold Book. U.S. EPA has provided specific water temperature guidance for U.S. EPA Region 10 (Pacific northwest) states and tribes that are specific to conditions in that region, and are aimed at protecting salmon and trout species. States in the region can adopt the standards in the guidance, or can develop and adopt alternative standards.

Most state thermal standards, including those adjacent to Wisconsin and discussed in the next section, predate the 1986 Gold Book. Thus most state thermal standards consist of requirements that differ from the current federal requirements. Although U.S. EPA could compel states to adopt thermal standards consistent with theirs by disapproving the existing state standards and forcing promulgation of federal standards, they have not done so to date.

**Comparison with Rules in Adjacent States:** Please see the "Wisconsin & Neighboring States' Thermal Standards Comparison Table" attached to this summary.

Illinois, Iowa, Michigan, and Minnesota each require the application of state-specific thermal standards. Although each of the states includes unique thermal standards language for its state, all of the states share in common at least 3 of the following 4 primary thermal standards components:

- Natural daily and seasonal temperature fluctuations shall be maintained.
- Includes a general maximum temperature rise at the edge of a mixing zone or temperature above existing natural ambient or listed maximum limit of 3.6 - 5.4° F in streams or rivers (2° F for cold water).
- Includes a general maximum temperature rise at the edge of a mixing zone or temperature above existing natural ambient or listed maximum limit of 3° F in inland lakes.
- Includes monthly maximum temperatures not to be exceeded (in tables).

Wisconsin's existing thermal standards include each of the 4 components listed above, however each of them were declared invalid by the Wisconsin Supreme Court (*Wisconsin Electric Power Company v. Wisconsin Natural Resources Board*, 90 Wis. 2d 656 (1979)). State courts in the adjacent states have not made similar rulings. In fact, all but a handful of states in the country currently incorporate some form of the above listed components in their state thermal standards. So, it is by necessity that the department must develop water quality standards that are significantly different in nature than those of adjacent states.

The likely result of promulgating and implementing the thermal water quality standards being proposed in comparison with adjacent states is that the proposed rules will be less restrictive, more restrictive, or approximately the same depending on each specific situation. The situational factors that play a significant role include water body type and classification, month, resident fish species and their spawning cycles, flow and ambient temperature of the water body, and various discharge facility process

parameters. One thing that is clear is that the proposed thermal standards and implementation rules will be, at the very least, among the very most state-specific and water quality-based in the country.

## Wisconsin & Neighboring States' Thermal Standards Comparison Table

Component of Thermal Standard Language	States that Use the Language Component				
	WI*	IL	IA	MI	MN
No temperature changes that may adversely affect aquatic life.	X	X			≈
Natural daily & seasonal temperature fluctuations shall be maintained.	X	X		X	≈
Includes a general maximum temperature rise at the edge of a mixing zone or temperature above existing natural ambient or listed maximum limit of 3.6 - 5.4° F in streams or rivers (2° F for cold water).	X	X	X	X	X
Includes a general maximum temperature rise at the edge of a mixing zone or temperature above existing natural ambient or listed maximum limit of 3° F in inland lakes.	X	X	X	X	X
Includes a general maximum temperature rise at the edge of a mixing zone or temperature above existing natural ambient of 3° F in Great Lakes waters.	X		NA	X	
Shall not increase temperature of a thermocline or hypolimnion, or decrease the volume thereof.				X	
Shall not exceed monthly maximum temperatures more than 1% of the hours in a 12 month period.		X	X		
Includes monthly maximum temperatures not to be exceeded (in tables).	X	X	X	X	
Includes a maximum temperature not to be exceeded at any time.	X		X		X
Includes Mississippi River-specific criteria.	X		X	NA	
Maintain natural temperatures in wetlands.					X
Artificial cooling lake exemption available.		X			
Includes a rate of temperature change not to exceed 1.8° F per hour.			X		
Includes specific language for protecting salmonid migrations or natural trout reproduction.	X			X	
Monthly maximum temperatures may be exceeded for short periods when natural water temperatures exceed the default ambient.				X	
Temperatures measured within 1 meter of water surface.				X	
Monthly maximum temperatures are based on the P90 of natural water temperature + the increase allowed at the edge of a mixing zone.				X	
Includes secondary contact language (temperature shall not exceed 93° F more than 5% of the time or 100° F at anytime).		X			
Backfitting of alternative cooling facilities required if significant ecological damage is found from a Lake Michigan facility.		X	NA		NA

\* = These are Wisconsin's "existing", generally unenforceable thermal standards, and do not include comparison with any aspects of the proposed thermal rules revisions.

≈ = approximately the same

NA = not applicable

[Yellow Box] = thermal standards language very common to all of the states

## **Summary of the factual data and analytical methodologies:**

### General

The proposed thermal water quality criteria and ambient temperatures have been developed using an extensive amount of data, very likely the most extensive and state-specific dataset ever used to develop thermal standards in any state. The data came from 721 articles, reports, theses, dissertations, books, personal communications, and other types of publications, the vast majority of which were peer reviewed. The data comes from laboratory studies, field research and observation, and modeling, and the majority is based on fish. Only fresh water fish data was used to develop criteria for all but the limited aquatic life (LAL) category because it was determined that there was insufficient data from other aquatic organisms to develop criteria. Additionally, it was decided that criteria developed from fish data would likely be protective of the aquatic community as a whole (i.e. that fish were reasonable surrogates of all aquatic organisms). Since LAL waters do not contain fish, data from other organisms was used to develop the criterion for LAL waters not classified as wastewater effluent channels or wetlands.

All criteria are developed based on a combination of factors to make them as relevant and specific to Wisconsin waters as possible, which together make them water quality-based (rather than categorical). The factors used to develop the criteria that make them water quality-based include:

- criteria specific to each water body use or designation
- used only data from fish species known to exist in Wisconsin
- fish species data organized by specific water body use or designation
- criteria related to ambient water temperatures in Wisconsin water bodies
- ambient temperatures specific to each water body use or designation
- life history activities (gametogenesis, spawning, growth) considered for the months they are known to occur in Wisconsin

The development of the proposed thermal water quality criteria and ambient temperatures incorporated a variety of simple to more complex statistical methodologies. The simple analyses included calculating averages and geometric means. The development of acute criteria included regression analyses, analyses of covariance, and additional procedures that are consistent with analyses the department has used for developing criteria for toxic substances (as per ch. NR 105). Five factor polynomial regression analyses were used to develop the final sub-lethal criteria for each water body classification.

### Data for Developing Thermal Water Quality Criteria and Ambient Temperatures for All Waters Except Limited Aquatic Life Waters

Data from a total of 155 species was used to develop criteria for all waters except inland lakes, of which:

- 360 individual data point pairs from 38 species were used to develop acute criteria,
- 338 individual data points from 113 species were used to develop maximum spawning temperature criteria,
- 124 individual data points from 27 species were used to develop maximum no growth temperature criteria, and
- data from 9 species were used to develop maximum gametogenesis temperature criteria.

Data from a total of 60 species was used to develop criteria for inland lakes.

#### *For northern inland lakes:*

- 220 individual data point pairs from 21 species were used to develop acute criteria,
- 171 individual data points from 45 species were used to develop maximum spawning temperature criteria,
- 81 individual data points from 18 species were used to develop maximum no growth temperature criteria, and
- data from 6 species were used to develop maximum gametogenesis temperature criteria.

#### *For southern inland lakes:*

- 213 individual data point pairs from 21 species were used to develop acute criteria,

- 194 individual data points from 49 species were used to develop maximum spawning temperature criteria,
- 75 individual data points from 17 species were used to develop maximum no growth temperature criteria, and
- data from 6 species were used to develop maximum gametogenesis temperature criteria.

8848 monthly average ambient water temperatures from a total of 93 monitoring stations in Wisconsin were used to develop the proposed default monthly ambient temperatures for the different water body types.

- Data was collected by or reported to the U.S. Geological Survey, Wisconsin DNR, Green Bay Metropolitan Sewerage District, the UW Center of Limnology, and Wisconsin Power and Light.
- All temperatures were collected between 1988 and 2002, incorporating data from relatively cold, warm, and "normal" years in an effort to develop default ambient temperatures representative of Wisconsin's various water body types.
- 5398 monthly average ambient temperatures from 65 monitoring stations were used to develop the proposed default ambient temperatures for the 9 riverine water body classifications.
- 2440 monthly average ambient temperatures from 18 monitoring stations were used to develop the proposed default ambient temperatures for the 2 inland lake water body classifications.
- 1010 monthly average ambient temperatures from 10 monitoring stations were used to develop the proposed default ambient temperatures for the 6 Great Lakes water body classifications.

#### Data and Information for Finalizing a Water Quality Criterion for Limited Aquatic Life Waters Not Classified as Wastewater Effluent Channels or Wetlands

Data and information from 13 sources regarding turtles, frogs, toads, salamanders, mussels, snails, aquatic insects (stoneflies, mayflies, caddisflies), zooplankton, diatoms, green algae, and blue-green algae were considered in finalizing the limited aquatic life criterion of 86°F.

#### Effluent Limitation Calculation

The proposed effluent limitation calculations incorporate a mass balance equation, making it equivalent to other codified limit calculation procedures. The mass balance approach enables the determination of the amount of heat a receiving water can assimilate without adversely affecting fish and aquatic life. As a primary means of assuring the limitations are water quality-based, the proposed rule takes into account the ambient temperature and flow of a receiving water in the effluent limitation calculation.

**Effects on small business and the private sector:** The effects of the proposed rules on small business and the private sector are difficult to determine, but are likely to be very case specific. It is expected that effects will vary significantly from one business to another, and perhaps from one sector to another. The likely result of promulgating and implementing the thermal water quality standards being proposed is that the proposed rules will be less restrictive, more restrictive, or approximately the same in their effect on the private sector depending on the situation.

One effect that is expected to influence many dischargers of heat is that monitoring frequency of effluent temperature and effluent flow will increase. The purpose of the increased monitoring frequency is to capture data that defines the representative monthly effluent temperatures and effluent flows for a given facility. Past minimum monitoring for many facilities is not sufficient to determine representative monthly effluent temperatures. The proposed rules incorporate monthly standards, whereas past regulation of heated discharges was implemented annually or seasonally. Some dischargers are currently monitoring at or more frequently than the minimum requirements being proposed and thus won't be affected. However others have had very limited monitoring requirements to this point. For those permittees with insufficient data the increased monitoring frequency will last for a minimum of two years of the initial permit cycle, after which additional monitoring may not be required.

Other aspects of the proposed rules that may effect small business or the private sector revolve around the permitting of temperature in discharges. Some dischargers may have lower temperature limits in their permits than they currently do, while others may have higher temperature limits. Some may have essentially the same temperature limit. Some dischargers may have temperature limits in permits that

didn't have any limits before. Although less likely, there may be some dischargers who had temperature limits in permits previously, that will not in the future.

Throughout the rule development process effort was made to consider the many different types of discharges that could be affected (including the effects mentioned above) and to avoid permitting thermal discharges that are not adversely impacting aquatic environments. As such, all attempts have been made to assure the proposed rules are environmentally protective, but not unreasonable. Evidence of this effort are the many options available to dischargers and permittees built into NR 102 and NR 106 that give them opportunities to deviate from the default rule parameters if it is warranted. These options include site-specific ambient temperature and water quality criteria development, site-specific water quality-based effluent limitation calculations and modeling, numerous other considerations for permitting, data collection periods for those without sufficient data, provision for real-time monitoring and compliance, options to consider variability in discharge, options to address cold shock and rate of temperature change conditions, and special effluent limitation procedures for publicly owned treatment works (POTWs) and privately owned domestic sewage treatment works (PODSTWs).

Actual reporting requirements are expected to remain relatively unchanged with permittees reporting the necessary information via the Discharge Monitoring Report system or via the annual reporting requirements of a general permit, except that monitoring and compliance records will be reported for each month, rather than seasonally or annually. Some permittees will also be required to submit monitoring data with permit applications. Temperature limitations established in accordance with the proposed rules will be exempt from fees associated with ch. NR 101 (Wis. Adm. Code).

It is important in this discussion to remember the reason why the revised thermal rules are being proposed. Since the Wisconsin Supreme Court ruling made significant portions of the existing thermal rules invalid, a clearly water quality-based set of thermal rules has been needed. Many of the potential effects of the proposed rules are simply due to the fact that limited regulation of thermal discharges has been the only option for the past 32 years. Many dischargers will be used to this "historic" regulatory practice for discharges of heat, and thus will be affected by the proposed rule because it is something new. However, without the proposed rules, the effect to businesses and the department is very likely direct permitting of thermal discharges by U.S. EPA under the NPDES program, as was previously proposed by U.S. EPA. It was this proposal that led to the formation of the original advisory committee to develop rules to be implemented by the State.

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**Comments:** Comments should be submitted to Mike Wenzholz, Bureau of Watershed Management, 101 S. Webster St., PO Box 7921, Madison, WI 53707-7921 or [Michael.Wenzholz@wisconsin.gov](mailto:Michael.Wenzholz@wisconsin.gov).

The deadline for written comments is February 28, 2008. Written comments may also be submitted to the Department using the Wisconsin Administrative Rules Internet Web site at <http://adminrules.wisconsin.gov>

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SECTION 1. NR 102 subch. I (title) is created to read:

### **Subchapter I - General**

SECTION 2. NR 102.01(2) and (3) are amended to read:

**NR 102.01(2)** The long-range goal of Wisconsin water quality standards is to protect the use of water resources for all lawful purposes. Water quality standards shall protect the public interest, which includes the protection of public health and welfare and the present and prospective uses of all waters of the state for public and private water supplies, propagation of fish and other aquatic life and wild and domestic animals, domestic and recreational purposes, and agricultural, commercial, industrial, and other

legitimate uses. In all cases where the potential uses are in conflict, water quality standards shall protect the general public interest.

(3) Water quality standards serve as a basis for developing and implementing control strategies to achieve legislative policies and goals. Water quality standards are the basis for deriving water quality based effluent limitations and such limitations shall be determined to attain and maintain uses and criteria, unless more stringent effluent limitations are established to protect downstream waters. Water quality standards also serve as a basis for decisions in other regulatory, permitting or funding activities that impact water quality.

SECTION 3. NR 102.03 (intro.) is created to read:

NR 102.03 (intro.) The following definitions are applicable to terms used in this subchapter.

SECTION 4. NR 102.03(8) to (10) are repealed.

SECTION 5. NR 102.03(1) to (7) are renumbered NR 102.03(2) to (8).

SECTION 6. NR 102.03(1) is created to read:

**NR 102.03(1)** "Ambient temperature" for the purposes of this chapter means the typical existing temperature of a surface water outside the direct influence of any point source discharge, which may include daily and seasonal changes.

SECTION 7. NR 102.04 (title) is amended to read:

**NR 102.04 Categories of standards surface water uses and criteria.**

SECTION 8. NR 102.04(1)(intro.) is amended to read:

**NR 102.04(1)** GENERAL. (intro.) To preserve and enhance the quality of waters, ~~standards~~ surface water uses and criteria are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all surface waters including the mixing zone ~~and the effluent channel~~ meet the following conditions at all times and under all flow and water level conditions:

SECTION 9. NR 102.04(2) is amended to read:

**NR 102.04(2)(title)** ~~REVISED STANDARDS USES AND CRITERIA. It should be recognized that these standards~~ The following uses and criteria will be revised as new information or advancing technology indicate that revisions are in the public interest. Water used for hydropower and commercial shipping depends mainly on quantity, depth and elevation; consequently, no specific quality ~~standards~~ criteria for these uses have been prepared.

SECTION 10. NR 102.04(3)(intro.) is amended to read:

**NR 102.04(3)** FISH AND OTHER AQUATIC LIFE USES. ~~The department shall classify all~~ All surface waters ~~into shall belong to~~ one of the fish and other aquatic life subcategories described in this subsection. Only those use subcategories identified in pars. (a) to (c) shall be considered suitable for the protection and propagation of a balanced fish and other aquatic life community as provided in the federal water pollution control act amendments of 1972, P.L. 92-500; 33 USC 1251 et seq.

SECTION 11. NR 102.04(4) (title) is amended to read:

**NR 102.04(4)(title)** ~~STANDARDS~~ CRITERIA FOR FISH AND OTHER AQUATIC LIFE.

SECTION 12. NR 102.04(4)(b) is repealed.

SECTION 13. NR 102.04(4)(e) is renumbered to NR 102.04(4)(b) and amended to read:

NR 102.04(4)(b)(title) ~~Temperature and dissolved~~ Dissolved oxygen for cold waters. Streams Water bodies classified as trout waters by the department of natural resources (Wisconsin Trout Streams, publication 6-3600 (80)) or as great lakes or cold water communities may not be altered from natural background ~~temperature and or ambient~~ dissolved oxygen levels to such an extent that trout populations are adversely affected-, and include the following:

SECTION 14. NR 102.04(4)(e)1. is repealed.

SECTION 15. NR 102.04(4)(e)2. and 3. are renumbered to NR 102.04(4)(b)1. and 2.

SECTION 16. NR 102.04(4)(e) is created to read:

NR 102.04(4)(e) *Temperature*. Water quality criteria for temperature shall be determined and applied pursuant to subch. II.

SECTION 17. NR 102.04(5) to (7) are repealed.

SECTION 18. NR 102.04(5) to (9) are created to read:

**NR 102.04(5) RECREATIONAL USE.** (a) *General*. All surface waters shall be suitable for supporting recreational use and shall meet the criteria specified in sub. (6). A sanitary survey or evaluation or both to assure protection from fecal contamination is the chief criterion for determining the suitability of a water for recreational use.

(b) *Exceptions*. Whenever the department determines, in accordance with the procedures specified in s. NR 210.06, that wastewater disinfection is not required to protect recreational uses, the criteria specified in par. (a) and in chs. NR 103 and 104 do not apply.

**(6) CRITERIA FOR RECREATIONAL USE.** As bacteriological guidelines, the membrane filter fecal coliform count may not exceed 200 per 100 ml as a geometric mean on not less than 5 samples per month, nor exceed 400 per 100 ml in more than 10% of all samples during any month.

**(7) PUBLIC HEALTH AND WELFARE USE.** (a) All surface waters shall be suitable for supporting public health and welfare.

(b) Whenever the department determines a discharge of heated effluent is not exposed or situated in a manner that may pose a realistic potential for scalding of humans, the criterion specified in sub. (8)(c) does not apply.

**(8) CRITERIA FOR PUBLIC HEALTH AND WELFARE USE.** (a) *General*. The criteria developed pursuant to ss. NR 105.08 and 105.09 shall be met regardless of whether the surface water is used for public drinking water supply or the applicable fish and aquatic life subcategory.

(b) *Taste and odor criteria*. All surface waters providing public drinking water supplies or classified as cold water or warm water sport fish communities as described in sub. (3) shall meet the taste and odor criteria specified or developed pursuant to s. NR 102.14.

(c) *Temperature criteria*. In order to protect humans from being scalded, the water temperature of a discharge may not exceed 120°F unless the conditions of sub. (7)(b) are met or unless it is specifically authorized under provisions in subch. V or VI of ch. NR 106.

**(9) WILDLIFE USE AND CRITERIA.** (a) *Use*. All surface waters shall be suitable for supporting wildlife.

(b) *Criteria.* The criteria specified in or developed pursuant to s. NR 105.07 shall be met.

SECTION 19. NR 102.05(3) (intro.) is amended to read:

**NR 102.05(3) MIXING ZONES.** (intro.) Water quality standards shall be met at every point outside of a mixing zone. The size of the mixing zone ~~cannot be uniformly prescribed, but~~ shall be based on such factors as effluent quality and quantity, available dilution, temperature, current, type of outfall, channel configuration and restrictions to fish movement. For toxic and organoleptic substances with water quality criteria or secondary values specified in or developed pursuant to chs. NR 102 and 105, allowable dilution shall be determined as specified in ch. NR 106 in addition to the requirements specified in this subsection. As a guide to the delineation of a mixing zone, the following shall be taken into consideration:

SECTION 20. NR 102.05(3)(b), (c), (e), and (f) are amended to read:

NR 102.05(3) (b) Providing passageways ~~in rivers~~ for fish and other mobile aquatic organisms.

(c) Where possible, mixing zones being no larger than 25% of the cross-sectional area or volume of flow of ~~the stream~~ a flowing water body and not extending more than 50% of the width.

(e) Mixing zones not exceeding 10% of ~~a~~ an inland lake's total surface area.

(f) Mixing zones not ~~interfering with~~ adversely impacting spawning or nursery areas, migratory routes, nor mouths of tributary streams.

SECTION 21. NR 102.05(3)(i) is created to read:

NR 102.05(3)(i) Final acute and sub-lethal water quality criteria for temperature specified in or developed pursuant to ss. NR 102.24 to 102.26 not being exceeded at any point outside the mixing zone.

SECTION 22. NR 102.05(4) is repealed.

SECTION 23. NR 102.07 to NR 102.09 are repealed.

SECTION 24. Chapter NR 102 subch. II is created to read:

### **Subchapter II - Water Quality Standards For Temperature**

**NR 102.20 Purpose.** The purpose of this subchapter is to establish water quality standards for temperature pursuant to s. 281.15(1), Stats. Water quality standards for temperature shall protect fish and other aquatic life from mortality, immobilization, loss of equilibrium, impaired growth, adverse reproductive effects, and other sub-lethal effects.

**NR 102.21 Applicability.** The provisions of this subchapter are applicable to surface waters of Wisconsin.

**NR 102.22 Definitions.** The following definitions are applicable to terms used in this subchapter.

(1) "Acute effects" means any effect resulting in death or immobilization.

(2) "Ambient temperature" for the purposes of this subchapter means the typical existing temperature of a surface water outside the direct influence of any point source discharge, which may include daily and seasonal changes.

(3) "cfs" means cubic feet per second, usually pertaining to stream or effluent flow. 1 cfs = 0.64584 mgd.

(4) "Cold shock" means exposure of aquatic organisms to a rapid decrease in temperature and a sustained exposure to low temperature that induces abnormal behavioral or physiological performance and often leads to death.

(5) "Daily maximum temperature" means the highest allowed daily water temperature, outside an allowed mixing zone.

(6) "Great Lakes" means the open Wisconsin waters of Lake Superior, Lake Michigan, Green Bay and Chequamegon Bay, as well as adjoining open waters that exhibit characteristics of Lake Superior, Lake Michigan, Green Bay or Chequamegon Bay, or in other ways are determined by the department to be equivalent to these waters for purposes of regulating discharges of heat to them.

(7) "Maximum weekly average temperature" means the highest allowed arithmetic mean of all daily maximum temperatures recorded in a calendar week (Sunday – Saturday), outside an allowed mixing zone.

(8) "mgd" means million gallons per day, usually pertaining to stream or effluent flow.

(9) "Sub-lethal effects" means effects resulting in inadequate gonad development, gamete production and viability, spawning or growth.

**NR 102.23 Categories of standards applicable to temperature. (1) PUBLIC HEALTH AND WELFARE.** The department may establish water quality standards for temperature to protect public health and welfare uses, as defined in s. NR 102.04(7) and (8).

(2) FISH AND OTHER AQUATIC LIFE USES. The department may establish water quality standards for temperature for the protection of fish and other aquatic life uses defined in s. NR 102.04(3). For exclusive purpose of the application of water quality standards for temperature, the warm water sport fish and warm water forage fish communities, as defined in s. NR 102.04 (3)(b) and (c), are treated together as warm water communities.

(3) LIMITED FORAGE FISH COMMUNITIES. The department may establish water quality standards for temperature for the protection of limited forage fish communities. The definition of this subcategory is contained in s. NR 102.04(3)(d).

(4) LIMITED AQUATIC LIFE COMMUNITIES. The department may establish water quality standards for temperature for the protection of limited aquatic life communities. The definition of this subcategory is contained in s. NR 102.04(3)(e).

(5) GREAT LAKES COMMUNITIES. The department may establish water quality standards for temperature for the protection of Great Lakes communities. This use exists only for the regulation of discharges of heat. The definition of this subcategory is contained in ss. NR 102.22(6) and 102.25(5).

**NR 102.24 General water quality criteria for temperature. (1)** There may be no temperature changes that may adversely affect aquatic life.

(2) Natural daily and seasonal temperature fluctuations shall be maintained.

(3) TEMPERATURE FOR LIMITED AQUATIC LIFE COMMUNITIES. (a) The limited aquatic life community may be applied to any hydrologic classification, as defined in s. NR 104.02(1), except that it shall be applied to all surface waters classified as diffused surface waters, wetlands and wastewater effluent channels, as defined in s. NR 104.02(3)(b)1. All conditions of ch. NR 103 shall be met.

(b) The temperature at any point in waters classified as limited aquatic life, except for those specifically classified as wastewater effluent channels or wetlands regulated under ch. NR 103, may not exceed 86°F. Additionally, all conditions of ch. NR 103 shall be met.

(c) The temperature at any point in limited aquatic life waters classified as wastewater effluent channels may not exceed 120°F.

**Note:** The department recognizes there are legitimate concerns that not all wetlands and ephemeral streams are the biological equivalents of other limited aquatic life waters, and is in the process of re-evaluating the wetland and ephemeral stream classifications to determine if and when full fish and aquatic life conditions should be applied.

**NR 102.25 Default ambient temperatures and water quality criteria for the protection of fish and other aquatic life. (1) GENERAL.** In the absence of site-specific ambient temperature data or water quality criteria as defined in ss. NR 102.26 and 102.27, respectively, the applicable ambient temperatures, sub-lethal water quality criteria, and acute water quality criteria shall be as specified in subs. (2) to (5). In all cases, all of the following conditions apply:

(a) The ambient temperature, sub-lethal water quality criterion, and acute water quality criterion specified for any calendar month shall be applied simultaneously to establish the protection needed for each identified fish and other aquatic life use.

(b) Sub-lethal water quality criteria are to be applied as maximum weekly average temperatures.

(c) Acute water quality criteria are to be applied as daily maximum temperatures.

(d) Water quality criteria for temperature shall be applied in accordance with the mixing zone provisions of s. NR 102.05(3).

**(2) NON-SPECIFIC WATERS.** Unless default ambient temperatures and water quality criteria are specified in subs. (3) to (5), the values listed in Table 2 shall be the applicable ambient temperatures, sub-lethal and acute water quality criteria for the protection of fish and other aquatic life.

**Table 2**

Default Ambient Temperatures and Water Quality Criteria for Temperature for Non-Specific Waters  
(All values are expressed as degrees Fahrenheit)

Month	Cold <sup>4</sup>			Warm - Large <sup>5</sup>			Warm - Small <sup>6</sup>			LFF <sup>7</sup>		
	Ta <sup>1</sup>	SL <sub>2</sub>	A <sup>3</sup>	Ta	SL	A	Ta	SL	A	Ta	SL	A
<b>JAN</b>	35	47	68	33	49	76	33	49	76	37	54	78
<b>FEB</b>	36	47	68	33	50	76	34	50	76	39	54	79
<b>MAR</b>	39	51	69	36	52	76	38	52	77	43	57	80
<b>APR</b>	47	57	70	46	55	79	48	55	79	50	63	81
<b>MAY</b>	56	63	72	60	65	82	58	65	82	59	70	84
<b>JUN</b>	62	67	72	71	75	85	66	76	84	64	77	85
<b>JUL</b>	64	67	73	75	80	86	69	81	85	69	81	86
<b>AUG</b>	63	65	73	74	79	86	67	81	84	68	79	86
<b>SEP</b>	57	60	72	65	72	84	60	73	82	63	73	85
<b>OCT</b>	49	53	70	52	61	80	50	61	80	55	63	83
<b>NOV</b>	41	48	69	39	50	77	40	49	77	46	54	80
<b>DEC</b>	37	47	69	33	49	76	35	49	76	40	54	79

<sup>1</sup> Ta = ambient temperature

<sup>2</sup> SL = sub-lethal criteria

- <sup>3</sup> A = acute criteria
- <sup>4</sup> Cold = waters with a fish and aquatic life use designation of "cold"
- <sup>5</sup> Warm - Large = waters with a fish and aquatic life use designation of "warm" and unidirectional 7Q10 flows  $\geq$  200 cfs (129 mgd)
- <sup>6</sup> Warm - Small = waters with a fish and aquatic life use designation of "warm" and unidirectional 7Q10 flows  $<$  200 cfs (129 mgd)
- <sup>7</sup> LFF = waters with a fish and aquatic life use designation of "limited forage fish"

**(3) SPECIFIC LARGE RIVERS.** The values listed in Table 3 shall be the applicable ambient temperatures, sub-lethal and acute water quality criteria for the protection of fish and other aquatic life for the identified water segments.

**Table 3**

Default Ambient Temperatures and Water Quality Criteria for Temperature for Specific Large Rivers  
(All values are expressed as degrees Fahrenheit)

Month	Mississippi River <sup>4</sup>			Rock River <sup>5</sup>			Upper Wisconsin River <sup>6</sup>			Lower Wisconsin River <sup>7</sup>			Lower Fox River <sup>8</sup>		
	Ta <sup>1</sup>	SL <sub>2</sub>	A <sup>3</sup>	Ta	SL	A	Ta	SL	A	Ta	SL	A	Ta	SL	A
JAN	32	49	75	33	49	76	33	49	76	32	49	75	35	49	76
FEB	33	50	76	35	50	76	33	50	76	32	50	75	35	50	76
MAR	36	52	76	38	52	77	35	52	76	37	52	77	38	52	77
APR	47	55	79	49	55	79	44	55	78	48	55	79	50	55	80
MAY	60	65	82	64	65	84	60	65	82	61	65	83	62	65	83
JUN	72	75	85	71	75	85	70	75	85	71	75	85	73	76	85
JUL	76	80	86	74	79	86	75	80	86	75	80	86	77	81	87
AUG	76	79	86	73	79	85	73	79	85	74	79	86	76	80	86
SEP	67	73	84	66	72	84	65	72	84	67	72	84	68	73	85
OCT	54	61	81	54	61	81	51	61	80	53	61	80	53	61	80
NOV	40	50	77	40	50	77	39	50	77	40	50	77	42	50	78
DEC	33	49	76	34	49	76	33	49	76	33	49	76	35	49	76

- <sup>1</sup> Ta = ambient temperature
- <sup>2</sup> SL = sub-lethal criteria
- <sup>3</sup> A = acute criteria
- <sup>4</sup> Mississippi River = applies to any portion of Wisconsin's Mississippi River reach
- <sup>5</sup> Rock River = applies to waters downstream of Lake Koshkonong
- <sup>6</sup> Upper Wisconsin River = applies to waters upstream of Petenwell Dam
- <sup>7</sup> Lower Wisconsin River = applies to waters downstream of Petenwell Dam to the confluence with the Mississippi River
- <sup>8</sup> Lower Fox River = applies to waters downstream of the Lake Winnebago outlet

**(4) INLAND LAKES.** The values listed in Table 4 shall be the applicable ambient temperatures, sub-lethal and acute water quality criteria for the protection of fish and other aquatic life for inland lakes.

**Table 4**

Default Ambient Temperatures and Water Quality Criteria for Temperature for Inland Lakes  
(All values are expressed as degrees Fahrenheit)

Month	Northern <sup>4</sup>			Southern <sup>5</sup>		
	Ta <sup>1</sup>	SL <sub>2</sub>	A <sup>3</sup>	Ta	SL	A
JAN	35	49	76	35	49	77
FEB	34	52	76	39	52	78
MAR	35	55	76	41	55	78
APR	41	60	78	49	60	80
MAY	55	67	81	58	68	82
JUN	67	75	85	70	75	86
JUL	72	79	86	77	80	87
AUG	71	79	86	76	80	87
SEP	63	72	84	67	73	85
OCT	52	61	80	54	61	81
NOV	43	50	78	42	50	78
DEC	35	49	76	35	49	77

<sup>1</sup> Ta = ambient temperature

<sup>2</sup> SL = sub-lethal criteria

<sup>3</sup> A = acute criteria

<sup>4</sup> Northern = applicable for those lakes north of state highway 10

<sup>5</sup> Southern = applicable for those lakes south of state highway 10

(5) GREAT LAKES WATERS. The values listed in Table 5 shall be the applicable ambient temperatures, sub-lethal and acute water quality criteria for the protection of fish and other aquatic life for Great Lakes waters identified in s. NR 102.22(6).

**Table 5**

Default Ambient Temperatures and Water Quality Criteria for Temperature for Great Lakes Waters of Wisconsin  
(All values are expressed as degrees Fahrenheit)

Month	Green Bay						Lake Michigan						Lake Superior <sup>8</sup>			Chequamegon Bay <sup>9</sup>		
	Southern <sup>4</sup>			Northern <sup>5</sup>			Northern <sup>6</sup>			Southern <sup>7</sup>			Ta	SL	A	Ta	SL	A
	Ta <sub>1</sub>	SL <sub>2</sub>	A <sup>3</sup>	Ta	SL	A	Ta	SL	A	Ta	SL	A	Ta	SL	A	Ta	SL	A
JAN	35	49	75	35	43	69	34	43	69	35	43	69	35	41	69	35	41	69
FEB	35	52	75	35	47	69	33	47	69	34	46	69	34	46	69	35	46	69
MAR	41	54	77	36	52	70	35	52	69	37	52	70	34	51	69	35	51	69
APR	47	58	79	40	57	71	39	58	70	43	59	70	35	57	69	38	57	69
MAY	56	64	81	48	63	72	44	64	71	48	65	72	41	63	70	50	63	72
JUN	66	70	83	57	68	75	48	69	72	54	70	73	49	69	72	59	69	74
JUL	70	75	83	62	71	77	53	71	73	59	71	74	55	72	73	62	72	75
AUG	70	75	83	64	71	78	56	69	73	63	70	76	57	71	73	64	71	76
SEP	65	70	83	61	66	77	53	64	73	60	64	74	57	64	73	60	66	74
OCT	54	60	80	54	58	74	48	55	72	53	57	73	50	55	72	49	57	72
NOV	39	49	76	44	49	71	42	47	70	45	49	71	43	45	70	39	48	70
DEC	37	46	75	37	44	70	36	44	69	38	44	70	38	42	69	35	43	69

<sup>1</sup> Ta = ambient temperature

<sup>2</sup> SL = sub-lethal criteria

<sup>3</sup> A = acute criteria

<sup>4</sup> Southern Green Bay = waters south of the Brown County line to the Fox River mouth

<sup>5</sup> Northern Green Bay = waters north of the Brown County line to the northernmost point on Washington Island

<sup>6</sup> Northern Lake Michigan = waters north of the Milwaukee River mouth (downtown Milwaukee)

<sup>7</sup> Southern Lake Michigan = waters south of the Milwaukee River mouth (downtown Milwaukee)

<sup>8</sup> Lake Superior = waters in Lake Superior except those in Chequamegon Bay

<sup>9</sup> Chequamegon Bay = waters within the region enclosed by Chequamegon Point and a straight line west to the mainland

**NR 102.26 Site-specific ambient temperatures. (1) DEVELOPMENT OF SITE-SPECIFIC AMBIENT TEMPERATURES.** The following steps shall be followed when developing site-specific ambient temperatures:

(a) Show that the data used to derive the default ambient temperatures do not apply to the specific water segment or body in question.

(b) Collect site-specific water temperature data using a continuous recorder or similar device that takes measurements at least hourly. Alternatively, continuously measured water temperature data for the given site that has been collected at any time since October 1987, may be gathered and used. Data may be acceptable even if a relatively small amount of data is missing, i.e.  $\leq 10$  missing days per month in the months of December, January, and February or  $\leq 5$  missing days per month in the months of March through November. Collect or gather the most site-specific water temperature data possible between October 1987 and present in order to develop site-specific ambient temperatures that best represent ambient temperatures of the site. A minimum of 2 years of data shall be collected. However, by using as much data as possible between October 1987 and present it is more likely relatively hot years, cold years, and normal years will be represented and considered in the final values.

(c) Calculate daily average temperatures from the data from par. (b) and then calculate monthly average temperatures from the daily average temperatures for each individual month that data has been collected for; or alternatively calculate monthly average temperatures directly from the data from par. (b) for each individual month that data has been collected for.

(d) Organize all individual monthly averages by month. Determine the monthly site-specific ambient temperatures by calculating the geometric mean of all monthly averages for each given month.

(e) Alternative methods for developing site-specific ambient temperatures may be used as long as they are as representative of ambient temperatures as those in pars. (a) to (d). The department will make final approval of alternative methods.

**(2) USE OF SITE-SPECIFIC AMBIENT TEMPERATURES TO ESTABLISH ACUTE CRITERIA.** Once site-specific ambient temperatures have been approved in accordance with sub. (1), the acute water quality criteria listed in Table 6 will be applicable for the protection of fish and other aquatic life.

**(3) USE OF SITE-SPECIFIC AMBIENT TEMPERATURES TO ESTABLISH SUB-LETHAL CRITERIA.** Once site-specific ambient temperatures have been approved in accordance with sub. (1), the sub-lethal water quality criteria applicable for the protection of fish and other aquatic life shall be calculated as follows:

(a) Use Table 7 to determine the appropriate sub-lethal criteria for a given fish and other aquatic life use.

(b) Compare the sub-lethal criteria from par. (a) with the equivalent site-specific monthly ambient temperatures from sub. NR 102.26(1) and the acute criteria determined through sub. NR 102.26(2).

(c) Modify the sub-lethal criteria as follows:

1. If a sub-lethal criterion is less than the site-specific ambient temperature for a given month, increase the sub-lethal criterion to be equal with the site-specific ambient temperature.

2. If a sub-lethal criterion is greater than an acute criterion for a given month, as determined through sub. NR 102.26(2), decrease the sub-lethal criterion to be equal with the acute criterion.

(d) Perform a fifth order polynomial regression of the 12 monthly sub-lethal criteria resulting from pars. (b) and (c). Using the resulting equation of the regression, calculate the final sub-lethal criteria for each month. This is done by replacing the "x" variables in the equation with a numeric representation for each month, such that for January "x" = 1, for February "x" = 2, ... and for December "x" = 12.

(e) The final sub-lethal criteria from par. (d) shall be used in combination with the site-specific ambient temperatures developed in s. NR 102.26(1) and the acute criteria determined through s. NR 102.26(2).

**Table 6**  
 Acute Criteria Across All Ambient Temperatures  
 (All values are expressed as degrees Fahrenheit)

Inland Waters						Great Lakes Waters					
1 Ta	2 Cold	3 Warm	4 LFF	5 N Lake	6 S Lake	7 SGB	8 NGB	9 NLKMI	10 SLKMI	11 LKSUP	12 CB
32	68	75	77	75	76	74	69	69	69	68	68
33	68	76	77	76	76	74	69	69	69	69	69
34	68	76	77	76	76	75	69	69	69	69	69
35	68	76	77	76	77	75	69	69	69	69	69
36	68	76	78	76	77	75	70	69	69	69	69
37	69	77	78	77	77	75	70	70	70	69	69
38	69	77	78	77	77	76	70	70	70	69	69
39	69	77	79	77	78	76	71	70	70	70	70
40	69	77	79	77	78	76	71	70	70	70	70
41	69	78	79	78	78	77	71	70	70	70	70
42	69	78	79	78	78	77	71	70	70	70	70
43	69	78	80	78	78	77	71	70	70	70	70
44	70	78	80	78	79	78	71	71	71	71	71
45	70	79	80	79	79	78	71	71	71	71	71
46	70	79	80	79	79	78	72	72	72	71	71
47	70	79	81	79	80	79	72	72	72	71	71
48	70	79	81	79	80	79	72	72	72	72	72
49	70	79	81	80	80	79	73	72	72	72	72
50	70	80	81	80	80	79	73	73	73	72	72
51	71	80	82	80	81	80	73	73	73	72	72
52	71	80	82	80	81	80	73	73	73	72	72
53	71	80	82	81	81	80	74	73	73	72	72
54	71	81	82	81	81	80	74	73	73	73	73
55	71	81	83	81	82	81	74	73	73	73	73
56	72	81	83	81	82	81	75	73	73	73	73
57	72	82	83	82	82	81	75	73	73	73	73
58	72	82	83	82	82	81	75	74	74	73	73
59	72	82	84	83	83	81	76	74	74	74	74
60	72	82	84	83	83	82	76	74	74	74	74
61	72	83	84	83	83	82	77	75	75	74	74
62	72	83	84	83	84	82	77	75	75	75	75
63	73	83	85	84	84	82	78	76	76	75	75
64	73	84	85	84	85	82	78	77	77	76	76
65	73	84	85	84	85	83	78	77	77	76	76
66	73	84	85	85	85	83	79	78	78	77	77
67	74	84	86	85	85	83	79	78	78	77	77
68	74	85	86	85	85	83	80	79	79	78	78
69	74	85	86	85	86	83	80	79	79	78	78
70	74	85	86	86	86	83	81	80	80	79	79
71	74	85	87	86	86	84	81	81	81	79	79
72	75	85	87	86	86	84	82	81	81	80	80
73	75	85	87	86	86	84	82	82	82	80	80
74	75	86	87	86	87	84	82	82	82	81	81
75	75	86	88	87	87	85	83	83	83	81	81
76		86	88	87	87	85	83	83	83	82	82
77		87	88	87	87	85	84	84	84	83	83
78		87	88	87	88	86	84	84	84	83	83
79		87	89	88	88	86	84	84	84	83	83
80		87	89	88	88	86	84	84	84	83	83
81		88	89	88	88	86	84	84	84	83	83
82		88	89	88	89	87	84	84	84	84	84
83		88	90	89	89	87	84	84	84	84	84
84		88	90	89	89	88	85	85	85	84	84
85		89	90	89	89	88	85	85	85		
86		89	90	89	90	89					
87		89	91	90	90	89					
88		90	91	90	90	89					
89		90	91	90	91	89					
90		91	91	91	91						
91		91	92	91	92						
92			92		92						

- <sup>1</sup> Ta = ambient temperature
- <sup>2</sup> Cold = waters with a fish and other aquatic life use designation of "cold"
- <sup>3</sup> Warm = waters with a fish and other aquatic life use designation of "warm"
- <sup>4</sup> LFF = waters with a designation of "limited forage fish"
- <sup>5</sup> N Lake = applicable for those lakes north of State Highway 10
- <sup>6</sup> S Lake = applicable for those lakes south of State Highway 10
- <sup>7</sup> SGB = Green Bay waters south of the Brown County line to the Fox River mouth
- <sup>8</sup> NGB = Green Bay waters north of the Brown County line to the northernmost point on Washington Island
- <sup>9</sup> NLKMI = Lake Michigan waters north of the Milwaukee River mouth (downtown Milwaukee)
- <sup>10</sup> SLKMI = Lake Michigan waters south of the Milwaukee River mouth (downtown Milwaukee)
- <sup>11</sup> LKSUP = waters in Lake Superior except those in Chequamegon Bay
- <sup>12</sup> CB = Chequamegon Bay waters within the region enclosed by Chequamegon Point and a straight line west to the mainland

**Table 7**

Raw Monthly Sub-Lethal Criteria for Use In Determining Final Sub-Lethal Criteria with Site-Specific Ambient Temperatures  
(All values are expressed as degrees Fahrenheit)

Month	C	W-L	W-S	LFF	NIL	SIL	MR	RR	UWR
January	47	50	50	54	50	50	50	50	50
February	45	50	50	54	50	50	50	50	50
March	53	54	54	54	54	54	54	54	54
April	59	65	65	64	63	64	65	65	65
May	59	70	70	75	70	70	70	70	70
June	67	72	72	75	72	72	72	72	72
July	68	74	74	75	75	74	74	74	74
August	68	78	78	77	77	77	78	78	78
September	52	87	87	92	87	87	87	87	87
October	52	54	54	54	54	54	54	54	54
November	50	50	50	54	50	50	50	50	50
December	46	50	50	54	50	50	50	50	50
Month	LWR	LFR	SGB	NGB	SLM	NLM	LS	CB	
January	50	50	50	44	44	44	42	42	
February	50	50	50	43	43	43	43	43	
March	54	54	54	54	52	54	52	52	
April	65	65	60	59	61	60	58	58	
May	70	70	66	64	67	65	65	65	
June	72	72	70	67	68	67	67	67	
July	74	74	70	68	68	68	69	69	
August	78	78	71	67	67	67	69	69	
September	87	87	83	79	79	79	79	79	
October	54	54	50	50	50	50	45	54	
November	50	50	47	47	47	47	44	46	
December	50	50	47	45	45	45	43	44	

C = Cold = waters with a fish and other aquatic life use designation of "cold"  
W-L = Warm -Large = waters with a fish and other aquatic life use designation of "warm" and unidirectional 7Q10 flows  $\geq$  200 cfs (129 mgd)

W-S = Warm - Small = waters with a fish and other aquatic life use designation of "warm" and unidirectional 7Q10 flows < 200 cfs (129 mgd)

LFF = waters with a designation of "limited forage fish"

NIL = Northern Inland Lakes = applicable for those lakes north of state highway 10

SIL = Southern Inland Lakes = applicable for those lakes south of state highway 10

MR = Mississippi River = applies to any portion of Wisconsin's Mississippi River reach

RR = Rock River = applies to waters downstream of Lake Koshkonong

UWR = Upper Wisconsin River = applies to waters upstream of Petenwell Dam

LWR = Lower Wisconsin River = applies to waters downstream of Petenwell Dam to the confluence with the Mississippi River

LFR = Lower Fox River = applies to waters downstream of the Lake Winnebago outlet

SGB = Green Bay waters south of the Brown County line to the Fox River mouth

NGB = Green Bay waters north of the Brown County line to the northernmost point on Washington Island

SLM = Lake Michigan waters south of the Milwaukee River mouth (downtown Milwaukee)

NLM = Lake Michigan waters north of the Milwaukee River mouth (downtown Milwaukee)

LS = Lake Superior = waters in Lake Superior except those in Chequamegon Bay

CB = Chequamegon Bay = waters within the region enclosed by Chequamegon Point and a straight line west to the mainland

**NR 102.27 Site-specific water quality criteria. (1) GENERAL.** A water quality criterion contained within this subchapter may be modified for a particular surface water segment or body. A water quality criterion may be modified if specific information is provided that shows data used to derive the water quality criterion do not apply to the specific water segment or body and if additional information is provided to derive site-specific water quality criteria. Site-specific water quality criteria are intended to be applicable to a specific surface water segment. The development of site-specific water quality criteria shall consider the guidance provided in Chapter 3.7 of the Water Quality Standards Handbook, Second Edition, U.S. EPA, 8/15/1994, in addition to being consistent with the guidelines provided in sub. (2). Any water quality criterion modified for site-specific conditions shall be promulgated and included in sub. (3) before it can be applied on a site-specific basis.

**(2) SITE-SPECIFIC WATER QUALITY CRITERIA DEVELOPMENT.** (a) The department may promulgate site-specific water quality criteria for temperature when it determines that the data used to derive the default water quality criteria published in this subchapter do not apply to the specific water segment or body in question. In making that determination the same approach used to develop the water quality criteria in s. NR 102.25 may be used to develop site-specific water quality criteria by recalculating the water quality criteria based upon the actual species that are associated with the specific site.

(b) Alternative methods for developing site-specific water quality criteria may be used if it is determined that those alternative methods will protect against sub-lethal and acute impacts in the fish and other aquatic life community of a specific site.

(c) A water quality criterion developed via alternative methods shall be reviewed by the department and shall be promulgated in sub. (3) before it can be applied on a site-specific basis.

**(3) PROMULGATED SITE-SPECIFIC WATER QUALITY CRITERIA.** Site-specific water quality criteria for temperature that have been promulgated are listed below:

**NR 102.28 Cold shock standard.** Water temperatures of discharges shall be controlled in such a manner as to protect fish and other aquatic life uses from the deleterious effects of cold shock as defined in s. NR 102.22(4).

**NR 102.29 Rate of temperature change standard.** Temperature of a water of the state or a discharge to a water of the state may not be artificially raised or lowered at such a rate that it causes detrimental health or reproductive effects to fish or other aquatic life of the water of the state.

**NR 102.30 Variances to water quality standards for temperature.** The provisions of s. 283.15, Stats., are applicable to the water quality standards in this subchapter.

SECTION 25. NR 106 (title) is amended to read:

## CHAPTER NR 106

### PROCEDURES FOR CALCULATING WATER QUALITY BASED EFFLUENT LIMITATIONS FOR ~~TOXIC AND ORGANOLEPTIC SUBSTANCES DISCHARGED~~ POINT SOURCE DISCHARGES TO SURFACE WATERS

SECTION 26. Chapter NR 106, subch. V is created to read:

#### Subchapter V – Effluent Limitations for Temperature

**NR 106.50 Purpose.** The purpose of this subchapter is to specify how the department will calculate water quality-based effluent limitations for temperature under s. 283.13(5), Stats., and to specify how the department will determine when the limitations will be included in Wisconsin pollution discharge elimination system (WPDES) permits. Water quality-based effluent limitations for temperature are necessary to assure attainment and maintenance of surface water quality standards established in accordance with s. 281.15(1), Stats., and set forth in subch. II of ch. NR 102.

**NR 106.51 Applicability.** The provisions of this subchapter are applicable to point sources that discharge cooling water, non-contact cooling water, or other wastewater to surface waters of the state and that contain an associated heat load or that are elevated in temperature relative to the ambient receiving water.

**NR 106.52 Definitions.** The following definitions are applicable to terms used in this subchapter.

(1) "Ambient temperature" for the purposes of this subchapter means the typical existing temperature of a surface water outside the direct influence of any point source discharge, which may include daily and seasonal changes.

(2) "Biologically based design flow" means a receiving water design flow to protect fish and aquatic life for which both the duration and exposure is expressed in days and the allowable frequency of excursion is expressed in years. An example of a biologically based design flow is a 4-day, 3-year design flow which corresponds to the lowest 4-day average flow that will limit excursions from any water quality criteria to not more than once in 3-years.

(3) "cfs" means cubic feet per second, usually pertaining to stream or effluent flow.

(4) "Cold shock" means exposure of aquatic organisms to a rapid decrease in temperature and a sustained exposure to low temperature that induces abnormal behavioral or physiological performance and often leads to death.

(5) "Daily maximum effluent temperature" means the highest temperature measured in a calendar day.

(6) "Daily maximum effluent temperature limitation" means the maximum allowable daily effluent temperature.

(7) "Instantaneous maximum effluent temperature limitation" means the maximum allowable effluent temperature determined from any temperature measurement such as the value of a grab sample or at any time during continuous monitoring over a given period of regulation, e.g. a month.

(8) "mgd" means million gallons per day, usually pertaining to stream or effluent flow.

(9) "New facility" means any new point source facility or new point source discharge that commences operation after the effective date of this subchapter ... [revisor insert date].

(10) "Water quality standards" means applicable water quality standards set forth in chs. NR 102 to 104, or any federally promulgated water quality standards applicable to surface waters of the state.

(11) "Weekly average effluent temperature" means the arithmetic mean of all daily maximum effluent temperature values recorded in a calendar week, Sunday to Saturday.

(12) "Weekly average effluent temperature limitation" means the maximum allowable weekly average temperature determined as the arithmetic mean of all daily maximum effluent temperature values recorded in a calendar week, Sunday to Saturday.

(13) "WPDES" or "WPDES permit" means Wisconsin pollutant discharge elimination system permit issued under ch. 283, Stats.

(14) "WQBEL" means water quality-based effluent limitation.

**NR 106.53 Parameters used to establish water quality-based effluent limitations for temperature.** (1) RECEIVING WATER FLOW RATE ( $Q_s$ ). The value of  $Q_s$  used to determine effluent limitations for discharges to flowing waters shall be as follows:

(a)  $Q_s$  shall equal  $\frac{1}{4}$  of the average minimum 7-day flow which occurs once in 10 years ( $\frac{1}{4}$  7-day  $Q_{10}$ ) or, if sufficient information is available to calculate a biologically based receiving water design flow,  $\frac{1}{4}$  of the flow which prevents an excursion from the applicable water quality criteria using a duration of 4 days and a frequency of less than once every 3 years ( $\frac{1}{4}$  4-day, 3-year biological flow).

(b)  $Q_s$  may be reduced from those values calculated in par. (a) wherever natural receiving water flow is significantly altered by flow regulation or other types of water diversion structures.

(c) The discharger shall be allowed to demonstrate, through appropriate and reasonable methods that an adequate zone of free passage exists in the cross-section of the receiving water or that dilution is accomplished rapidly such that the extent of the mixing zone is minimized. In complex situations, the department may require that the demonstration under this paragraph include water quality modeling or field dispersion studies.

(d) Based upon the results of a demonstration submitted under par. (c),  $Q_s$  may be modified from that specified in par. (a) or (b). A modified  $Q_s$  shall be determined on a case-by-case basis and shall be approved in writing by the department. In no case may  $Q_s$  exceed the larger of the 7-day  $Q_{10}$  or the 4-day, 3-year biologically based design flow.

(e) In no case may the value of  $Q_s$  exceed that of par. (a) if the department determines that the discharge has a potential to jeopardize the continued existence of any endangered or threatened species listed under ch. NR 27 and conforming to section 7 of the federal Endangered Species Act, 16 USC 1536.

(2) EFFLUENT FLOW RATE ( $Q_e$ ). The value of  $Q_e$  used to determine effluent temperature limitation shall be as follows:

(a)  $Q_e$  shall be the highest daily maximum effluent flow rate, expressed as mgd, that has occurred for each individual month of the year and represents normal operating conditions.

(b)  $Q_e$  shall be determined on a case-by-case basis for seasonal discharges, discharges proportional to stream flow, or other unusual discharge situations.

**NR 106.54 Representative effluent temperature data.** (1) The representative daily maximum effluent temperature is the highest effluent temperature known or expected to occur on any day under normal operating conditions at the time of permit issuance. Representative daily maximum effluent temperature shall be measured at a frequency of not less than once per week whenever a discharge occurs.

(2) The representative weekly average effluent temperature is the highest weekly average effluent temperature known or expected to occur under normal operating conditions at the time of permit issuance.

(3) The department may require a permittee to collect additional data if the department determines that the requirements of subs. (1) and (2) do not provide adequate data to document the operational variability of a discharge.

(4) A permittee may request, at the time of application for a WPDES permit, calculation of effluent temperature limitations to be included in a permit based on real-time data. Any permittee that makes a request shall provide effluent flow, effluent temperature, receiving water flow, and receiving water temperature at a frequency no less than one result per hour that is representative of normal operating conditions, including variability.

**NR 106.55 Determination of water quality-based effluent limitations for temperature in WPDES permits.** (1) GENERAL. The department shall determine water quality-based effluent limitations for temperature to attain and maintain water quality standards and criteria specified in or determined according to procedures in ch. NR 102.

(2) LIMITATIONS FOR WATERS DESIGNATED AS LIMITED AQUATIC LIFE. The daily maximum effluent temperature limitation shall be 86°F for discharges to surface waters classified as limited aquatic life according to s. NR 104.02(3)(b)1. and as defined in sub. NR 104.02(1), except for those classified as wastewater effluent channels or those regulated as wetlands under ch. NR 103.

(3) LIMITATIONS FOR WATERS DESIGNATED AS WASTEWATER EFFLUENT CHANNELS. The daily maximum effluent temperature limitation shall be 120°F for discharges to surface waters classified as limited aquatic life wastewater effluent channels according to s. NR 104.02(3)(b)1. and as defined in s. NR 104.02(1)(d).

(4) LIMITATIONS FOR WETLANDS. Effluent temperature limitations shall be established for wetlands on a case-by-case basis to meet the water quality standards provided in ch. NR 103.

(5) LIMITATIONS FOR DISCHARGES TO STORM SEWERS. (a) A permittee may request, at time of permit application, an effluent limitation greater than 120°F if the discharge is to a storm sewer or other storm water conveyance channel and the permittee can demonstrate to the satisfaction of the department that the heated effluent is not discharged in a manner that will cause a potential for scalding of humans. An effluent temperature limitation greater than 120°F shall be determined according to the following equation:

$$T_{tp} = 120 + (HLV \times (L/100))$$

Where:  $T_{tp}$  = Effluent temperature limitation in degrees Fahrenheit  
 $HLV$  = 0.25 – an assumed heat loss value of 0.25 unless an alternative value is determined to be representative of site-specific conditions.  
 $L$  = Length (in feet) of the wastewater effluent channel between the effluent discharge location and a selected downstream location

(b) An alternative heat loss value (HLV) may be used in the equation. Alternative value shall be representative of seasonal influences on heat loss and be based on a comparison of effluent temperature at the location of discharge to the wastewater effluent channel and the temperature at the selected downstream location.

(c) The department may consider available site-specific information to determine an alternative to that determined under pars. (a) and (b).

**(6) LIMITATIONS FOR RECEIVING WATERS WITH UNIDIRECTIONAL FLOW NOT DESIGNATED AS LIMITED AQUATIC LIFE.** Except as provided in subs. (2), (3) and (5), the department shall establish water quality-based effluent limitations to ensure that effluent is not discharged at elevated temperatures that may adversely affect humans or aquatic life at or near the point of discharge for discharges to surface waters with unidirectional flow.

(a) Effluent temperature limitations determined under this subsection shall meet the water quality-based effluent limitation calculated in accordance with par. (b) or the water community-specific daily maximum temperature provided in par. (c), whichever is lower, except for short-term excursions for zebra mussel control, as approved by the department and authorized in a permit on a case-by-case basis.

(b) The methods described in this paragraph apply to both acute and sub-lethal effluent temperature limitations. Water quality-based effluent limitations to meet the requirements of this subsection shall be determined using the following procedures:

$$WQBEL = [((WQC - T_a)(Q_s + (1 - f)Q_e)) / Q_e] + T_a$$

Where:

WQBEL = Water quality-based effluent limitation (in degrees Fahrenheit),

WQC = Water quality criteria (in degrees Fahrenheit) as defined in ss. NR 102.25 to 102.27

T<sub>a</sub> = Ambient temperature (in degrees Fahrenheit) as determined in ss. NR 102.25 to 102.27

Q<sub>s</sub> = Receiving water flow rate equal to ¼ 7-Q<sub>10</sub> as specified in s. NR 106.53(1)(a) unless an alternative receiving water flow rate has been determined in accordance with ss. NR 106.53(1)(b) to (e).

f = Fraction of the effluent flow that is withdrawn from the receiving water, where “f” ranges from 0 to 1 and is unitless.

Q<sub>e</sub> = Effluent flow rate in mgd as specified in s. NR 106.53(2).

(c) The effluent temperature limitations determined under this subsection may not exceed the following water community-specific daily maximum temperatures:

1. 75°F when discharged to a water designated as cold water, as defined in s. NR 102.04(3)(a).
2. 91°F when discharged to a water designated as warm water, as defined in s. NR 102.25(2) and (3).
3. 92°F when discharged to a water designated as limited forage fish, as defined in s. NR 102.23(3).

(d) A limitation based on the water community-specific daily maximum temperature provided in par. (c) does not apply when the Q<sub>s</sub>:Q<sub>e</sub> ratio is equal to or greater than 100:1. In this case the effluent temperature limitation is based on the water quality-based effluent limitation calculated in accordance with par. (b). However, the effluent temperature limitation may not exceed 120°F at any time unless the permittee demonstrates to the satisfaction of the department that the heated effluent is not discharged in a manner that will cause a potential for scalding of humans.

**(7) LIMITATIONS FOR INLAND LAKES, IMPOUNDMENTS, AND GREAT LAKES WATERS.** The department shall establish water quality-based effluent limitations to ensure that the effluent is not discharged at elevated temperatures that may adversely affect humans or aquatic life at or near the point of discharge for discharges to surface waters that are inland lakes, impoundments, or Great Lakes waters that do not exhibit unidirectional flow.

(a) Effluent temperature limitations determined under this subsection shall meet the water quality-based effluent limitation calculated in accordance with par. (b) or the water community-specific daily maximum temperature provided in par. (c), whichever is lower, except for short-term excursions for zebra mussel control, as approved by the department and authorized in a permit on a case-by-case basis.

(b) The methods described in this paragraph apply to both acute and sub-lethal effluent temperature limitations. Water quality-based effluent limitations to meet the requirements of this subsection shall be determined using the following procedures:

$$WQBEL = [(WQC - T_a)/(e^{-a})] + T_a$$

Where:

WQBEL = Water quality-based effluent limitation (in degrees Fahrenheit),

WQC = Water quality criteria (in degrees Fahrenheit) as defined in ss. NR 102.25 to 102.27

T<sub>a</sub> = Ambient temperature (in degrees Fahrenheit) as determined in ss. NR 102.25 to 102.27

e<sup>-a</sup> = An empirical factor; the exponent "a" is calculated as follows:

$$a = [(A)(54.7 + B(150))] / [(8,360,000)(Q_e)]$$

Where:

A = Area of mixing zone in square feet, as follows:

Maximum Area Allowed (square feet)	=	Water Body
31,416	=	inland lake or impoundment off-shore discharge
15,708	=	inland lake or impoundment shore discharge
15,708	=	Great Lakes harbor discharge
3,141,593	=	Great Lakes off-shore discharge
3,125,000	=	Great Lakes shore discharge

Additionally, a department approved site-specific mixing zone based on a mixing zone study may be substituted for the mixing zone sizes specified in this subsection.

The maximum area of the mixing zone is subject to all applicable portions of s. NR 102.05(3).

B = A coefficient which is a function of T<sub>a</sub>, as follows:

T <sub>a</sub>	=	B
≤ 59.9	=	0.405
60-69.9	=	0.555

70-79.9	0.667
≥ 80	0.990

$Q_e$  = Effluent flow rate in mgd as specified in s. NR 106.53(2).

(c) The effluent temperature limitations determined under this subsection may not exceed the following water community-specific daily maximum temperatures:

1. 91°F when discharged to a water designated as a northern inland lake, as defined in s. NR 102.25(4).
2. 92°F when discharged to a water designated as a southern inland lake, as defined in s. NR 102.25(4).
3. 89°F when discharged to a water designated as southern Green Bay, as defined in s. NR 102.23(5).
4. 85°F when discharged to a water designated as northern Green Bay, as defined in s. NR 102.23(5).
5. 85°F when discharged to a water designated as Lake Michigan, as defined in s. NR 102.23(5).
6. 84°F when discharged to a water designated as Lake Superior or Chequamegon Bay, as defined in s. NR 102.23(5).

**(8) LIMITATIONS FOR DISCHARGES WITH FLUCTUATING OR VARIABLE EFFLUENT FLOW RATES.** A permittee may request flow-related effluent temperature limitations for discharge flows that fluctuate or vary on a frequent basis. Flow-related effluent temperature limitations shall be determined as follows:

- (a) At the time of permit application, the permittee shall submit representative minimum and maximum effluent flow data for the interval of variability for which effluent flow-related limitations are requested, e.g., month, season, etc.
- (b) Effluent temperature limitations shall be determined following the procedures of sub. (6) or (7), as appropriate using both the minimum and maximum effluent flow rates submitted in par. (a).
- (c) Effluent temperature limitations determined in accordance with par. (b) shall be expressed in a permit as a function of effluent flow.
- (d) Permits that contain flow-related effluent temperature limitations shall require daily monitoring of effluent temperature during times of discharge.

**(9) LIMITATIONS TO PROTECT DOWNSTREAM WATERS.** The department may calculate more stringent effluent temperature limitations than those determined under this section whenever more stringent limitations are necessary to attain or maintain water quality standards in downstream or other adjacent waters.

**NR 106.56 Establishment of water quality-based effluent limitations for temperature in WPDES permits. (1) GENERAL.** The department shall use the methods in this section to determine the need to establish water quality-based effluent temperature limitations in a permit.

**(2) REASONABLE POTENTIAL TO EXCEED AN ACUTE EFFLUENT LIMITATION.** An acute water quality-based effluent limitation for temperature shall be established in a WPDES permit for each month in which the representative daily maximum effluent temperature for that month exceeds the acute water quality-based effluent limitation determined in s. NR 106.55(5), (6) or (7). The representative effluent maximum temperature used in this subsection shall be the greater of the following:

(a) The highest recorded representative daily maximum effluent temperature as measured or determined according to s. NR 106.54(1).

(b) The projected 99<sup>th</sup> percentile of all representative daily maximum effluent temperatures as measured or determined according to s. NR 106.54(1).

**(3) REASONABLE POTENTIAL TO EXCEED A SUB-LETHAL EFFLUENT LIMITATION.** A sub-lethal water quality-based effluent limitation for temperature shall be established in a WPDES permit for each month in which the representative weekly average effluent temperature for that month exceeds the sub-lethal water quality-based effluent limitation determined in s. NR 106.55(5), (6) or (7). The representative weekly average effluent temperature used in this subsection shall be the greater of the following:

(a) The highest weekly average effluent temperature for the month as measured or determined according to s. NR 106.54(2).

(b) The projected 99<sup>th</sup> percentile of all representative weekly average effluent temperatures for the month as measured or determined according to NR 106.54(2).

**(4) REASONABLE POTENTIAL TO EXCEED A LIMITED AQUATIC LIFE EFFLUENT LIMITATION.** A daily maximum effluent temperature limitation of 86°F shall be established in a WPDES permit for each month in which the representative daily maximum effluent temperature exceeds 86°F for discharges to limited aquatic life waters not classified as a wastewater effluent channel according to s. NR 104.02(1) and (3)(b)1. or as a wetland regulated under ch. NR 103.

**(5) REASONABLE POTENTIAL TO EXCEED A WASTEWATER EFFLUENT CHANNEL EFFLUENT LIMITATION.** A daily maximum effluent temperature limitation of 120°F shall be established in a WPDES permit for each month in which the representative daily maximum effluent temperature exceeds 120°F for discharges to a wastewater effluent channel. An alternative effluent temperature limitation greater than 120°F equal to the temperature determined according to the procedure in s. NR 106.55(5) may be established in a WPDES permit for each month in which the representative daily maximum effluent temperature exceeds the calculated alternative limitation.

**(6) REASONABLE POTENTIAL TO EXCEED LIMITATIONS FOR THE PROTECTION OF PUBLIC HEALTH AND WELFARE.** A daily maximum effluent temperature limitation of 120°F shall be established in a WPDES permit for each month in which the representative daily maximum effluent temperature exceeds 120°F, unless the permittee demonstrates to the satisfaction of the department that the heated effluent is not discharged in a manner that will cause a potential for scalding of humans.

**(7) LIMITATIONS TO PROTECT DOWNSTREAM WATERS.** Whenever the department determines that more stringent effluent temperature limitations are necessary to attain or maintain water quality standards in downstream or other adjacent waters and the representative daily maximum or weekly average effluent temperatures exceed the limitations, then more stringent effluent temperature limitations shall be established in a WPDES permit.

**(8) LIMITATIONS TO PROTECT FOR COLD SHOCK.** The department shall determine on a case-by-case basis if any additional conditions are necessary in a WPDES permit to protect against cold shock, as defined in s. NR 106.52(4), and in accordance with the cold shock standard specified in s. NR 102.28. Provisions under this subsection shall be in addition to the water quality-based effluent temperature limitations determined under this section.

**(9) LIMITATIONS TO PROTECT FOR RATE OF TEMPERATURE CHANGE.** The department shall determine on a case-by-case basis if any conditions are necessary in a WPDES permit to protect against detrimental health or reproductive effects to fish and aquatic life caused by excessive rates of temperature change in a water of the state or as a result of a discharge to a water of the state to meet the

rate of temperature change standard specified in s. NR 102.29. Provisions under this subsection shall be in addition to the water quality-based effluent temperature limitations determined under this section.

**(10) REPRESENTATIVE DATA UNAVAILABLE.** Whenever, after the effective date of this rule ... [revisor insert date], the department issues or reissues a permit to a discharger for which representative data as described in s. NR 106.54 is not available, the following requirements shall be included in the issued or reissued permit:

(a) Unless the department determines on a case-by-case basis that a more stringent effluent temperature limitation is necessary for the protection and propagation of aquatic life, the daily maximum effluent temperature limitation shall be:

1. 75°F when discharged to a water designated as cold water, as defined in s. NR 102.04(3)(a).
2. 91°F when discharged to a water designated as warm water, as defined in s. NR 102.25(2) and (3).
3. 92°F when discharged to a water designated as limited forage fish, as defined in s. NR 102.23(3).
4. 91°F when discharged to a water designated as a northern inland lake, as defined in s. NR 102.25(4).
5. 92°F when discharged to a water designated as a southern inland lake, as defined in s. NR 102.25(4).
6. 89°F when discharged to a water designated as southern Green Bay, as defined in s. NR 102.23(5).
7. 85°F when discharged to a water designated as northern Green Bay, as defined in s. NR 102.23(5).
8. 85°F when discharged to a water designated as Lake Michigan, as defined in s. NR 102.23(5).
9. 84°F when discharged to a water designated as Lake Superior or Chequamegon Bay, as defined in s. NR 102.23(5).
10. 86°F when discharged to a water designated as limited aquatic life, not classified as a wastewater effluent channel, as defined in s. NR 102.23(4), 104.02(1) and (3)(b)1., and 104.02(1), or a wetland regulated under ch. NR 103.
11. 120°F when discharged to a water designated as limited aquatic life - wastewater effluent channel, as defined in ss. NR 102.23(4) and 104.02(1)(d).

(b) Monitoring to obtain representative effluent temperature as described in s. NR 106.54 shall be required for a period of not greater than 2 years.

(c) Water quality-based effluent temperature limitations determined under applicable methods described in s. NR 106.55 and as determined necessary under any applicable provision of this section. Compliance with the limitations shall be attained prior to the expiration date of the permit.

(d) If, after 2 years of data collection, it is determined that an effluent temperature limitation is not necessary under any applicable provision of this section, the water quality-based effluent temperature limitations in the permit may not be effective. A condition shall be included in the permit that invalidates any effluent temperature limitations and the compliance schedule in the permit. Continued monitoring of effluent temperature may be required.

**(11) MONITORING.** The department shall establish on a case-by-case basis the monitoring and reporting frequency in a WPDES permit.

**(12) LIMITATIONS IN PERMITS.** Effluent temperature limitations of 86°F, 120°F or greater than 120°F determined necessary under s. (4), (5) or (6) shall be expressed in permits as the maximum temperature at any time. Acute effluent temperature limitations determined necessary under this section shall be expressed in permits as daily maximum effluent temperature limitations. Sub-lethal effluent temperature limitations determined necessary under this section shall be expressed in permits as weekly average effluent temperature limitations. In all cases, monitoring data collected for purposes of reporting and determining compliance shall be representative data as described in s. NR 106.54.

**NR 106.57 Effluent limitations for multiple thermal discharges.** Whenever the department determines that more than one thermal discharge may be adversely affecting the water quality of the same receiving water, the provisions of both this subchapter and s. NR 106.11 shall be used to calculate the combined allowable heat load from the discharges necessary to meet the water quality criteria for temperature as specified in ch. NR 102. The resultant allowable thermal load shall be divided among the various discharges using an allocation method based on site-specific considerations. Whenever the department makes a determination under this subsection, the department shall specify the reasonable potential basis for any effluent temperature limitation and shall notify all permittees who may be affecting the water quality of the same receiving water of the determination and any limitations developed under this section. Any modifications to WPDES permits to account for multiple discharges shall include an opportunity for public comment pursuant to ch. 283, Stats.

**NR 106.58 Effluent limitations based on water quality models.** At the time of permit application, a permittee may submit the results of a calibrated and verified water quality model developed or adapted for a particular water body in support of an effluent temperature limitation based on a water quality model and in lieu of the procedures in subs. NR 106.55(5), (6) and (7). Simplified modeling approaches as outlined in "Water Quality Assessment" (EPA-600/6-82-004) or dynamic methods may be utilized in developing water quality-based effluent limitations such that applicable water quality standards specified in ch. NR 102 are maintained. Data used to execute the model shall be representative of the long-term characteristics of the receiving water and shall be collected in a manner consistent with requirements of ch. NR 219. Effluent limitations based on water quality models approved under this section are not modifications to the water quality criteria specified in ch. NR 102 and will be approved on a case-by-case basis.

**NR 106.59 Effluent limitations for temperature for existing POTWs and PODSTWs. (1) GENERAL.** This subsection applies to publicly owned treatment works (POTWs) discharges or privately owned domestic sewage treatment works (PODSTWs) discharges subject to ch. NR 210 that existed prior to the effective date of this rule ... [revisor insert date] and that discharge to surface waters.

**(2) FINDINGS.** The department finds that application of the thermal water quality criteria to all publicly owned treatment works and privately owned domestic sewage treatment works would result in all of the following:

(a) End-of-pipe wastewater cooling technology for reduction on heat is prohibitively expensive.

(b) Except for thermal discharges for which effluent temperature limitations are required pursuant to sub. (4)(b), use of equipment needed to cool wastewater effluent to meet applicable effluent temperature limitations would result in significant adverse environmental impacts when compared to the impacts caused by non-cooled domestic sewage discharges.

(c) Attaining the applicable water quality standards specified in ch. NR 102 would cause substantial and widespread adverse social and economic impacts in the applicable service area.

**(3) REVIEW.** The findings of sub. (2) shall be reviewed by the department every 3 years.

**(4) LIMITATIONS.** (a) Except as provided in par. (b), the department shall reissue permits for publicly owned treatment works and privately owned domestic sewage treatment works without effluent temperature limitations if a permittee has submitted an application for a variance under sub. (5) and the department approves the variance.

(b) The department shall establish effluent temperature limitations for publicly owned treatment works and privately owned domestic sewage treatment works whenever one or more of the following conditions are met:

1. The representative daily maximum effluent temperature of the effluent is greater than 120°F.
2. The department determines that the effect of the heated effluent from an existing wastewater treatment outfall, a relocated outfall, or an additional outfall from an existing permittee has a substantial demonstrated adverse effect on the protection and propagation of aquatic life in and on the receiving water.

**(5) APPLICATION FOR A VARIANCE.** A permittee subject to this section may, when filing a permit application, submit an application for a variance to the thermal standard. In the application for a variance, the permittee shall certify that the effluent temperature of its discharges to surface waters is substantially similar to the effluent temperature of other POTW or PODSTW discharges providing similar treatment technology, and shall also certify that the findings of sub. (2)(a), (b) and (c) apply to its POTW or PODSTW.

**(6) MONITORING.** The department may require a publicly owned treatment work or privately owned domestic sewage treatment work subject to the provisions of this section to monitor effluent temperature.

**NR 106.60 Effluent limitations for discharges from new facilities.** Except as provided in subch. VI, new sources constructed and issued a WPDES permit after the effective date of this rule ... [revisor insert date] shall be designed to meet applicable water quality-based effluent temperature limitations, as determined in this subchapter, on the effective date of the WPDES permit.

**NR 106.61 General permit. (1)** The department may issue a general permit containing effluent temperature limitations and monitoring requirements described in sub. (2) and grant coverage under the permit to any point source that discharges solely non-contact cooling water directly to surface water or to a storm sewer, or that discharges to the land surface, provided all of the following conditions are met:

- (a) The effluent flow rate ( $Q_e$ ) is less than 50,000 gallons per day.
- (b) The surface water to which the discharge occurs is not a wetland.
- (c) The representative daily maximum effluent temperature of the discharge does not exceed:
  1. 75°F when discharged to a water designated as cold water, as defined in s. NR 102.04(3)(a).
  2. 91°F when discharged to a water designated as warm water, as defined in s. NR 102.25(2) and (3).
  3. 92°F when discharged to a water designated as limited forage fish, as defined in s. NR 102.23(3).
  4. 91°F when discharged to a water designated as a northern inland lake, as defined in s. NR 102.25(4).

5. 92°F when discharged to a water designated as a southern inland lake, as defined in s. NR 102.25(4).
6. 89°F when discharged to a water designated as southern Green Bay, as defined in s. NR 102.23(5).
7. 85°F when discharged to a water designated as northern Green Bay, as defined in s. NR 102.23(5).
8. 85°F when discharged to a water designated as Lake Michigan, as defined in s. NR 102.23(5).
9. 84°F when discharged to a water designated as Lake Superior or Chequamegon Bay, as defined in s. NR 102.23(5).
10. 86°F when discharged to a water designated as limited aquatic life, not classified as a wastewater effluent channel, as defined in ss. NR 102.23(4), 104.02(1) and (3)(b)1., or a wetland regulated under ch. NR 103.

11. 120°F when discharged to a water designated as limited aquatic life - wastewater effluent channel, as defined in ss. NR 102.23(4) and 104.02(1)(d).

- (d) The  $Q_s: Q_e$  ratio is greater than 5:1 when the discharge is directly into a flowing surface water.
- (e) The receiving waterbody is not an outstanding resource water or an exceptional resource water, as specified in ss. NR 102.10 and 102.11, respectively.
- (f) The discharge does not contain a water treatment additive applied by the permittee, unless the water treatment additive is not a biocide and is approved by the department.
- (g) The discharge does not contain process wastewaters or pollutants in quantities that cause harm to animal, plant or aquatic life.
- (h) The discharge does not cause a safety hazard due to unsafe ice conditions in winter.

**(2)** A general permit issued under this section shall require the permittee to collect representative daily maximum effluent temperatures not less than once per month. Unless specified otherwise, the permittee will not be required to submit effluent temperature data collected under the monitoring provisions of the general permit issued under this section. Any effluent temperature data collected shall be retained by the permittee for the duration of the permit or 3 years after this information is collected, whichever is longer and shall be provided to the department upon request. The department, when granting coverage under a general permit issued under this section, may on a case-by-case basis require the permittee to periodically submit effluent temperature data to the department.

**(3)** A permittee granted coverage under the general permit authorized under this section shall be required to verify conformance with the conditions in sub. (1) whenever the permit is reissued or coverage granted.

**NR 106.62 Compliance schedules.** Whenever the department issues a permit with effluent temperature limitations established using the procedures in this subchapter, the permit may contain a compliance schedule to attain the limitations not more than 3 years from the date of permit issuance if either of the following conditions is met:

- (1)** The permittee does not apply for an alternative effluent limitation under the provisions of subch. VI.

(2) The permittee applies for an alternative effluent limitation under the provisions of subchapter VI and, after reviewing the data and information provided with the application, the department determines that sufficient information to establish an alternative thermal effluent limitation is not available.

SECTION 27. Subchapter VI is created to read:

### **Subchapter VI – Alternative Effluent Limitations For Temperature**

**NR 106.70 Purpose.** The purpose of this subchapter is to establish procedures for the determination of alternative thermal effluent limitations as authorized under s. 283.17, Stats. The department may establish alternative thermal effluent limitations under s. NR 106.74 if the owner or operator of a point source demonstrates to the department that a proposed effluent limitation established under subch. V is more stringent than necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is made.

**NR 106.71 Definitions.** The following definitions are applicable to terms used in this subchapter. Definitions of other terms and meanings of abbreviations are set forth in ch. NR 205.

(1) “Alternative thermal effluent limitations” means effluent temperature limitations for the control of the thermal component of a discharge which are less restrictive than limitations calculated using the procedures specified in subch. V.

(2) “Balanced, indigenous community” or “balanced, indigenous population” means a biotic community typically characterized by diversity, the capacity to sustain itself through cyclic seasonal changes, presence of necessary food chain species, and non–domination of pollution tolerant species. A community may include historically non–native species introduced in connection with a program of wildlife management and species whose presence or abundance results from substantial, irreversible environmental modifications. Normally, however, such a community will not include species whose presence or abundance is attributable to the introduction of pollutants that will be eliminated by compliance by all sources with effluent limitations and standards effective by July 1, 1983, including modifications thereof in accordance with the provisions of this chapter.

(3) “Existing discharge,” as used in this subchapter, means a discharge that has been issued a permit before the effective date of this subchapter ... [revisor insert date].

(4) “New discharge,” as used in this subchapter, means a discharge that commences on or after the effective date of this subchapter ... [revisor insert date]

(5) “Relevant evidence” means new or historical biological data, physical monitoring data, and engineering or diffusion models.

(6) “Representative, important species” means species which are representative, in terms of their biological needs, of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water receiving a thermal discharge.

(7) “Water quality standards” means applicable water quality standards set forth in chs. NR 102 to 104, or any federally promulgated water quality standards applicable to surface waters of the state.

**NR 106.72 Application for alternative effluent limitations for temperature.** The owner or operator of any point source subject to effluent temperature limitations determined under subch. V may submit an application to the department for alternative thermal effluent limitations when the owner or operator submits an application for issuance or reissuance of a WPDES permit or at any time following issuance of a permit, subject to the permit modification provisions of s. 283.53, Stats. Prior to submitting the application and prior to undertaking any study or investigation to support a demonstration for alternative thermal effluent limitations, the owner or operator shall obtain approval from the department of

a list of representative important species for the water into which the discharge is made subject to the provisions of s. NR 106.73. The list of representative important species shall be established in consideration of the species used to derive the water quality criteria in subchapter II of ch. NR 102 for the waterbody into the which the discharge is made or proposed.

**(1) NEW DISCHARGE.** An applicant may submit an application for an alternative thermal effluent limitation for a new discharge. The application shall include a demonstration that the effluent temperature limitations calculated according to the procedures specified in subch. V are more stringent than necessary. The application shall also contain all of the following:

- (a) A description of the alternative thermal effluent limitation requested.
- (b) A description of the methodology the applicant used to support the demonstration.
- (c) Biological, hydrological and meteorological data, physical monitoring data, engineering or diffusion models, laboratory studies, and other relevant information.
- (d) The data and results of studies, experiments and other information that support the demonstration that the identified representative, important species will be protected, and that will assure the protection and propagation of a balanced, indigenous community of shellfish, fish and aquatic life in an on the body of the water into which the discharge will be made.

**(2) EXISTING DISCHARGE.** An existing permittee may submit an application for an alternative thermal effluent limitation for an existing discharge. The application shall include a demonstration that the effluent temperature limitations calculated according to the procedures specified in subch. V are more stringent than necessary. The permittee may request an alternative thermal effluent limitation under either par. (a) or (b).

(a) A permittee may demonstrate that no appreciable harm has resulted from the normal component of the discharge, (taking into account the interaction of the thermal component with other pollutants and the additive effect of other thermal sources, to a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge has been made.

(b) A permittee may demonstrate that, despite the occurrence of previous appreciable harm, an alternative thermal effluent limitation will assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge has been made.

(c) In the application under this section, the permittee shall provide all of the following:

- 1. A description of the alternative thermal effluent limitation requested.
- 2. A description of the methodology the applicant used to support the demonstration.
- 3. Biological, hydrological and meteorological data, physical monitoring data, engineering or diffusion models, laboratory studies, and other relevant information.
- 4. The data and results of studies, experiments and other information that support the demonstration that the identified representative, important species will be protected, and that will assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and aquatic life in and on the water to which the discharge has been made.

**NR 106.73 Identification of representative, important species.** Any applicant for an alternative thermal effluent limitation shall submit to the department a proposed list of representative important species prior to submitting an application and undertaking a demonstration under s. NR 106.72. The list shall take into account applicable water quality standards. The department may approve the

proposed list of representative important species or may establish a list of species other than those proposed by the applicant, as the department deems appropriate.

**NR 106.74 Determination of alternative effluent limitations for temperature.** (1) **NEW DISCHARGES.** Alternative thermal effluent limitations may be established by the department for a new discharge if the permittee demonstrates that the discharge, considering the cumulative impact of the thermal discharge together with all other significant impacts on the species affected will assure the protection and propagation of representative, important species and will, in turn, assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and aquatic life in and on the body of receiving water.

(2) **EXISTING DISCHARGES.** Alternative thermal effluent limitations may be established by the department for an existing discharge if the permittee has demonstrated either of the following:

(a) No appreciable harm has resulted from the thermal component of the discharge, taking into account the interaction of the component with other pollutants and the additive effect of other thermal discharges, to the representative, important species and a balanced, indigenous community of shellfish, fish, and wildlife in and on the body of water receiving the discharge.

(b) That despite the occurrence of previous appreciable harm, an alternative thermal effluent limitation will assure the protection and propagation of the representative, important species and a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into receiving the discharge.

(3) **APPRECIABLE HARM.** In determining whether appreciable harm has occurred the department shall consider any relevant biological, engineering, or other data demonstrating that thermal effluent limitations calculated using the procedures specified in subch. V are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community.

**NR 106.75 Public notice.** The public notice of intent to issue, reissue, or modify a permit shall contain all of the following whenever the department is establishing alternative thermal effluent limitations under this subchapter or a compliance schedule under s. NR 106.62:

(1) The thermal effluent limitations that are calculated using the procedures specified in subch. V.

(2) The proposed alternative thermal effluent limitations.

(3) A statement that the applicant has submitted a demonstration in support of a request for alternative thermal effluent limitations and that the department is proposing to establish the alternative thermal effluent limitations or, in the event that there is insufficient information to support alternative thermal effluent limitations, that the department is proposing to include a compliance schedule in the permit.

(4) A statement that all data submitted by the applicant, and a summary thereof, are available at the office of the department for public inspection during office hours.

(5) A statement that any interested person may comment upon the applicant's proposed alternative thermal effluent limitations.

**NR 106.76 Review of alternative effluent limitations for temperature.** Whenever a permittee has been granted an alternative thermal effluent limitation under this chapter, the procedures of s. 283.15, Stats., are not applicable.

SECTION 28. Chapter NR 209 is repealed.

SECTION 29. EFFECTIVE DATE. The rule shall take effect the first day of the month following publication in the Wisconsin administrative register as provided in s. 227.22(2)(intro.), Stats.

SECTION 30. BOARD ADOPTION. The rule was approved and adopted by the State of Wisconsin Natural Resources Board on \_\_\_\_\_.

Dated at Madison, Wisconsin \_\_\_\_\_

STATE OF WISCONSIN  
DEPARTMENT OF NATURAL RESOURCES

By \_\_\_\_\_  
Matthew J. Frank, Secretary

(SEAL)