



BUREAU OF WATER QUALITY  
PROGRAM GUIDANCE

Wastewater Policy and Management Team  
Water Resources Policy and Management Team

**Permitting the Use of Dyes  
In Wisconsin Surface Waters**

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*This document is intended solely as guidance and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.*

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Date

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## **Introduction**

Dyes are natural or synthetic substances used to change the color of something. This guidance document describes procedures for Department staff to follow when responding to requests for the discharge of dyes into surface waters. This document also describes communication procedures for staff, since dye use requests may come in directly to Water Quality staff or through other Department programs.

The Department may receive requests for the discharge of dyes into waters of the state for a variety of reasons. Users may request permission to discharge dye intermittently, at a low volume, and/or for a short-term. They may want to use a dye on frozen or unfrozen waters, over a longer period of time, or in a larger area. Regardless of the intended use, the Department is responsible for ensuring that discharges do not contain pollutants in concentrations that cause, have the reasonable potential to cause, or contribute to an excursion of applicable water quality standards.

Dyes should not be discharged into a surface water without prior approval from the Department. In most cases, a Wisconsin Pollutant Discharge Elimination System (WPDES) permit will be needed to cover the discharge.

In all situations, staff should use their best professional judgment to make sure that discharges of dye do not have the potential to cause environmental damage or cause deleterious impacts to surface waters. Dyes should not be discharged in amounts that will alter the natural color of the receiving water to such a degree as to negatively affect the designated uses (e.g. aquatic life, public health, wildlife, recreation) or violate narrative or numeric water quality standards.

This document supersedes previous guidance in Chapter 10 of the Aquatic Plant Management Handbook “Permitting the Use of Dyes in Public Waterways” (2018).

## **Applicable Regulations**

This document is intended to provide guidance on how to comply with Aquatic Plant Management (APM) and WPDES requirements as they relate to the discharge of dyes into surface waters of the state. The Department’s regulatory authority comes from the following statutes and administrative codes.

### **Wisconsin Statute**

- Wis. Stat. s. 23.24 gives the Department authority to implement efforts to protect and develop diverse and stable communities of native aquatic plants, regulate how aquatic plants are managed, and issue aquatic plant management permits.
- Wis. Stat. s. 29.601 (3), prohibits discharge of any waste material, or any acids or chemicals or waste or refuse arising from the manufacture of any article of commerce, or any other substance deleterious to game or fish life.
- Wis. Stat. s. 281.01(18), “Waters of the state” includes those portions of Lake Michigan and Lake Superior within the boundaries of this state, and all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, watercourses, drainage systems and other surface water or groundwater, natural or artificial, public or private, within this state or its jurisdiction.
- Wis. Stat. s. 281.15 gives the Department authority to set water quality standards and to protect the public interest, which includes the protection of public health and welfare, the present and prospective future use of waters for public and private water systems, the propagation of fish and aquatic life and wildlife, domestic and recreational

purposes, and agricultural, commercial, industrial and other legitimate uses. In all cases where the potential uses of water are in conflict, water quality standards shall be interpreted to protect the general public interest.

- Wis. Stat. s. 281.17 (2) authorizes the Department to supervise chemical treatment of waters for the suppression of nuisance-producing organisms.
- Wis. Stat. s. 283.01 (13) defines “pollutant” as any dredged spoil, solid waste, incinerator residue, sewage, garbage, refuse, oil, sewage sludge, munitions, chemical wastes, biological materials, radioactive substance, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water.
- Wis. Stat. s. 283.01 (14) defines “pollution” as man-made or man-induced alteration of the chemical, physical, biological or radiological integrity of water.
- Wis. Stat. s. 283.01 (20) defines “waters of the state” as including those portions of Lake Michigan and Lake Superior within the boundaries of the state, and all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, watercourses, drainage systems and other surface water or groundwater, natural or artificial, public or private, within the state or its jurisdiction, except those waters which are entirely confined and retained completely upon the property of a person.
- Wis. Stat. s. 283.11 requires the Department set effluent limitations and toxic effluent standards or prohibitions that comply with those in federal law.
- Wis. Stat. s. 283.31 grants the Department authority to administer WPDES permits. The discharge of any pollutant into any waters of the state by any person is unlawful unless such discharge or disposal is done under a permit issued by the Department under this section. It also requires that the terms and conditions of the permit comply with state water quality standards.
- Wis. Stat. s. 283.33 requires the Department to promulgate rules for the administration of storm water discharge permits.
- Wis. Stat. s.283.35 grants the Department authority to issue general permits applicable to a designated area of the state authorizing discharges from specified categories or classes of point sources located within that area
- Wis. Stat. s. 287.81, defines deposits or discharges of any solid waste in any waters of the state or on the ice of any waters of the state as littering.

**Wisconsin Administrative Code**

- Section NR 102.04 (1) (d), Wis. Adm. Code, states that discharges and other activities shall be controlled so that all surface waters meet the following conditions at all times and under all flow and water level conditions:
  - (a) Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state,
  - (b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the state,
  - (c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state, and
  - (d) Substances in concentrations or combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.
- Section NR 102.04 (4) (d), Wis. Adm. Code, states that unauthorized concentrations of substances are not permitted that alone or in combination with other materials present are toxic to fish or other aquatic life. Surface waters shall meet the acute and chronic criteria as set forth in or developed pursuant to ss. NR 105.05 and 105.06, Wis. Adm. Code.
- Sections NR 105.05 and 105.06, Wis. Adm. Code, specify procedures for deriving secondary acute and chronic values, which are the concentrations in surface water that protect aquatic life from adverse short-term and long-term effects.

- Chapter NR 106, Wis. Adm. Code, contains procedures for calculating water quality based effluent limits for discharges to surface waters.
- Section NR 107.02, Wis. Adm. Code states that any person sponsoring or conducting chemical treatment for the management of aquatic plants or control of other aquatic organisms in waters of the state shall obtain an APM permit from the Department.
- Section NR 109.02, Wis. Adm. Code, states that a person sponsoring or conducting manual removal, burning or using mechanical means or aquatic plant inhibitors to control aquatic plants in navigable waters, or introducing non-native aquatic plants to waters of this state shall obtain an aquatic plant management permit from the Department.
- Chapter NR 205, Wis. Adm. Code, sets forth permit general conditions for all WPDES permits, procedures for establishing permit limits in WPDES permits, and procedures to be used for issuing general WPDES permits.
- Section NR 205.03 (28), Wis. Adm. Code defines pollutant as defined in s. 283.01 (13), Stats., means any dredged spoil, solid waste, incinerator residue, sewage, garbage, refuse, oil, sewage sludge, munitions, chemical wastes, biological materials, radioactive substance, heat, filter backwash, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water.
- Chapter NR 216, Wis. Adm. Code, establishes the criteria defining those storm water discharges needing WPDES permits to minimize the discharge of pollutants carried by storm water runoff from certain industrial facilities, construction sites and municipal separate storm sewer systems.
- Chapter 812.05(4), Wis. Adm. Code, states that only department approved groundwater tracers may be used for hydrogeologic studies and sets forth criteria for which approvals shall be based.

## **Prohibited Discharges**

The following describe situations where a dye discharge is typically not allowed.

**Applications to Entire or Major Portions of Waterbodies.** Applying dye to an entire or major portion of a surface water of the state will not be permitted in most cases, because the risk of significant adverse effects to aquatic habitat and the aquatic community, especially the native aquatic plant community, would be too high. As stated in ss. NR 107.01 and NR 109.01, Wis. Adm. Code, a balanced, diverse, and stable aquatic plant community is recognized to be a vital and necessary component of a healthy aquatic ecosystem. Chemical management and control of aquatic plants shall only be allowed in a manner consistent with sound ecosystem management, in consideration of cumulative impacts, and while minimizing the loss of ecological values in the body of water.

Furthermore, although some dyes may not be registered as a pesticide, they may still have pesticidal qualities that have the effect of controlling aquatic plants or other organisms, regardless of whether the intended use is for aesthetics or non-pesticide purposes. This is because dyes impart color and can act to inhibit aquatic plants and organisms and therefore fall under the regulatory purview of chs. NR 107 and 109, Wis. Adm. Code. Dye discharged to an entire or major portion of a lake or stream will limit light penetration which may inhibit photosynthesis in rooted and free floating plants and algae. These effects become more significant as the area covered by the dye becomes larger or the dye is maintained for a longer period of time. Prolonged use may suppress primary production and negatively affect food web interactions.

The use of dyes on an entire or major portion of a waterbody also poses the risk of inhibiting aquatic plants, either directly from the discharge itself, or from excess pollutant that travels beyond the treatment boundary or residual pollutant that remains after the treatment period. Dyes that are applied to a whole waterbody or large area have a significantly greater risk of remaining in the environment for longer periods and reaching sensitive areas of the

waterbody that it is discharged into or sensitive areas that are downstream or otherwise connected to them, and contaminating the water for aquatic plants and animals that live there. Even a little added color can block sunlight and prevent plant photosynthesis, which has the potential to disrupt an entire aquatic ecosystem.

In the rare circumstance that a whole or large portion of a waterbody application is to be allowed, an individual WPDES permit should be issued to cover the discharge. That permit must contain discharge limitations, monitoring and reporting or record keeping requirements, best management practices and other provisions to reduce, eliminate, or minimize the risk of pollutants impacting human health and violating water quality standards, as required by Wis. Stat. s. 283.31. The discharger must be able to demonstrate compliance with both acute and chronic WQS, including toxicity (limits based on secondary values), since the product would be expected to be present for  $\geq 96$  hours in those cases. The WPDES individual permitting process takes a minimum of three months from the point of complete application.

**Deleterious Substances.** Unauthorized use of aesthetic or non-pesticidal dye could be subject to penalties for damage to natural resources under Wis. Stat. s. 23.095 or for depositing substances deleterious to fish and game life under Wis. Stat. s. 29.601 (3), along with other local authorities.

**Developed shorelines.** NR 107.08 (3), Wis. Adm. Code, limits applications on lakes and impoundments to waters along developed shoreline including public parks except where approval is given by the Department for projects of public benefit. According to s. NR 107.05 (3), Wis. Adm. Code, the Department may deny issuance of an APM permit if the Department determines the discharge will:

- Place unreasonable restrictions on existing water uses; result in a hazard to humans, animals or other nontarget organisms;
- result in a significant adverse effect on the body of water;
- significantly injure fish, fish eggs, fish larvae, essential fish food organisms or wildlife, either directly or through habitat destruction; or
- the proposed chemical application is in locations identified by the Department as sensitive areas (aquatic vegetation identified by the Department as offering critical or unique fish and wildlife habitat or offering water quality or erosion control benefits to the body of water), unless the applicant can demonstrate to the satisfaction of the Department that treatments can be conducted in a manner that will not alter the ecological character or reduce the ecological value of the area.

**Discharges to Outstanding and Exceptional Resource Waters.** In most situations, new discharges to outstanding and exceptional resource waters as defined in ss. NR 102.10 and NR 102.11, Wis. Adm. Code, or discharges that may reach these waters, are not allowed. Section NR 207.03, Wis. Adm. Code, requires that pollutant discharges to outstanding resource waters not exceed background levels of the pollutant in the waterbody. The same standard applies to exceptional waters, unless the discharge is meant to prevent or correct an existing surface or groundwater contamination situation or a public health problem. The chemical background level in these high quality waters is typically expected to be non-detectable, but an applicator could supply background concentration sample results for any pollutant parameter that may be expected in the discharge. The surface water data viewer (<https://dnr.wi.gov/topic/surfacewater/swdv/>) can be used to identify outstanding and exceptional resource waters in the county where the discharge would occur.

**Discharges within Tribal Lands.** The Department is responsible for the issuance of all WPDES permits in Wisconsin, including permits applicable to Federal facilities, but excluding permits to Native American tribes or tribal organizations discharging from point sources located on Native American lands or reservations. (see Wisconsin's NPDES delegation agreement at: <https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=167886175>). In such instances, the Tribe or USEPA regulates the discharge and would issue a discharge permit. In the case of non-tribal landowners on

Tribal Lands, the Department retains jurisdiction to regulate discharges but will evaluate the exercise of that authority on a case-by-case basis. Discharge of dye that may reach Tribal Lands is subject to additional notifications to tribal organizations and consideration of any existing tribal water quality standards.

**Endangered Resources.** Discharges are not allowed that would cause harm to endangered or threatened species or their habitat, as specified in s. 29.604, Wis. Stats. and ch. NR 27, Wis. Adm. Code.

**Water Quality Standards.** The discharge must meet surface water quality standards contained in chs. NR 102, 103, 104, 105, 106 and 207, Wis. Adm. Code, and groundwater standards contained in ch. NR 140, Wis. Adm. Code. The surface water standards in ch. NR 102.04, Wis. Adm. Code specify that pollutant discharges be controlled to prevent interference with public rights from toxic substances, objectionable deposits, floating or submerged material, and materials producing color, odor, taste or unsightliness. A pollutant discharge that results in an exceedance of any applicable numeric or narrative Wisconsin water quality standard is prohibited.

**Wetland Discharges.** Discharges to a wetland where the Department has determined that the discharge of pollutants will not meet the wetland protection requirements of ch. NR 103, Wis. Adm. Code.

## **Permitting the Use of Dyes in Public Waterways**

A person that would like to discharge a dye into a surface water should contact the Department to determine if a permit is required under Wis. Stat. chapters 281 and/or 283 and whether the discharge of dye could have deleterious impacts to the surface water. Dyes should not be discharged into a surface water without a permit from the Department. The following discusses how to comply with chs. NR 107 and 109, Wis. Adm. Code, and WPDES requirements for the use of dyes in waters of the state. Note: if a waterbody is located entirely on private property and has no outlet to another surface water, then it is not considered a water of the state for WPDES purposes (Wis. Stat. s. 283.01(20)). If a discharge to this type of waterbody is pesticidal in nature, then an APM permit is necessary.

### **Aquatic Plant Management (APM) Permits**

Chapters NR 107 and NR 109, Wis. Adm. Code, require that a person taking actions that control aquatic plants or other aquatic organisms have a permit that allows them to do so. Only chemicals registered and labeled for intended use by the USEPA may be used for projects that are issued APM permits<sup>1</sup>. Some dyes may not be registered as a pesticide, but still have pesticidal qualities that have the effect of controlling aquatic plants or other organisms. For this reason, Department staff should first screen dyes for potential pesticidal attributes in all dye discharge requests.

Section NR 107.02, Wis. Adm. Code, states that anyone sponsoring or conducting chemical treatment for the management of aquatic plants or control of other aquatic organisms in waters of the state shall obtain a permit from the Department. Section NR 109.02, Wis. Adm. Code, states that anyone sponsoring or conducting manual removal, burning or using mechanical means or aquatic plant inhibitors to control aquatic plants in navigable waters, or introducing non-native aquatic plants to waters of the state shall obtain an aquatic plant management permit from the Department. Waters of the state include those portions of Lake Michigan and Lake Superior, and all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, watercourses, drainage systems and other ground or surface water, natural or artificial, public or private, within the state or its jurisdiction as specified in Wis. Stat. s. 281.01 (18).

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<sup>1</sup> The Department may consider an application for a field evaluation use permit under s. NR 107.10, Wis. Adm. Code, for chemical products that are not labeled for aquatic nuisance control if the applicant has obtained an experimental use permit from USEPA or Wis. DATCP per 40 CFR 172 and s. ATCP 29.71. A Special Local Needs registration by the Wis. DATCP per s. ATCP 29.72 or Section 18 emergency exemption granted by USEPA per 40 CFR 166.

## Wisconsin Pollutant Discharge Elimination System (WPDES) Permits

Wis. Stat. s. 283.31 provides the Department authority to administer WPDES permits. The discharge of any pollutant into any waters of the state by any person is unlawful unless such discharge or disposal is done under a permit issued by the Department under Wis. Stat. chapter 283. When the Department issues APM permits under chs. NR 107 or 109, Wis. Adm. Code, WPDES permits are also required<sup>2</sup> for activities that result in: (1) a biological pollutant discharge, (2) an excess chemical pollutant discharge into waters of the state located beyond the treatment area boundary, and/or (3) a chemical pollutant residue that remains in waters of the state after completion of the pesticide treatment period. An excess or residual chemical pollutant from a pest control treatment project could include, but not be limited to: (1) a pesticide active or inert ingredient, (2) a pesticide degradation by-product, (3) a chemical applied to enhance pesticide effectiveness, and/or (4) a non-pesticide chemical applied to control a problem species.

WPDES permit coverage or other authorizations may also be required for any discharge that could introduce toxic substances, objectionable deposits, floating or submerged material, or materials producing color, odor, taste, or unsightliness that pose a reasonable potential to exceed surface water quality standards found in chs. NR 102, NR 104, NR 105, NR 207, and NR 217, Wis. Adm. Code, or groundwater standards found in ch. NR 140 Wis. Adm. Code. Unpermitted discharges of dyes (at deleterious levels) may be subject to citations pursuant to Wis. Stat. s. 29.601 or discharge without a chapter 283 permit.

### Wastewater Permits

Dyes used at wastewater treatment plants or other facilities with individual permits or those collection systems permitted under the Satellite Sewage Collection System general permit do not require additional permit coverage, since any dye discharge would be regulated under the existing WPDES permit for that facility. For example, a municipality or wastewater treatment facility may wish to investigate their collection system for infiltration and inflow (I/I) or an industry may wish to check their piping for unknown sanitary/production wastewater cross connections. In situations like this and others where a facility's discharge is already covered by an individual WPDES permit, the permittee should alert the Wastewater compliance staff assigned to their facility to let them know of their intended actions. For information related to tracer dye use, see "Investigative or Dye Tracer Studies" on page 10.

### Storm Water Permits

Similar to the Wastewater permits discussed above, dyes used by permitted storm water dischargers would not require additional permit coverage since any dye discharge would be regulated under the existing WPDES permit. WPDES permits are issued to regulate storm water discharges to waters of the state from certain industrial facilities, construction sites and municipal separate storm sewer systems (MS4s). Storm water WPDES permits do not serve as authorization to apply or discharge dye to a surface water, but dyes are occasionally used by municipalities and industries to detect illicit discharges, sanitary sewer and storm sewer cross-connections, and sources of non-storm water discharges. For these purposes, properly performed dye testing can be a useful investigatory tool to detect and eliminate pollutants that are potentially lowering water quality. Consequently, in accordance with the recommendations of this guidance, in certain situations the Department may encourage or request dye testing for specific water quality improvement purposes.

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<sup>2</sup> A Federal 6th Circuit Court of Appeals ruling on January 7, 2009 *National Cotton Council, et al. v. the U.S. Environmental Protection Agency* ([https://www3.epa.gov/npdes/pubs/pesticide\\_6thcircuit.pdf](https://www3.epa.gov/npdes/pubs/pesticide_6thcircuit.pdf)) stated that in addition to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Clean Water Act permits are also required for pest control activities that produce any of these results.



## Applying for Permits

The Department should be notified of a proposed dye discharge at least 120 days in advance in order to allow time for staff to review materials and information related to the discharge and to issue a WPDES permit if one is needed, or grant general permit coverage, if applicable. This 120 day notification is not necessary for investigative or tracer dye uses (see discussion below). Discharges that have the reasonable potential to cause or contribute to an exceedance of surface water quality standards (chs. NR 102, NR 104, NR 105, NR 207, and NR 217, Wis. Adm. Code) or groundwater quality standards (ch. NR 140, Wis. Adm. Code) normally require the increased oversight, monitoring and effluent limitations established in site-specific individual WPDES permits. Issuance of an individual WPDES permit typically takes a minimum of three months from the date a complete application is received. Permit decisions are subject to public notice and participation procedures as well as opportunities for challenge at the time of permit issuance, reissuance or modification under chapter 283, Wis. Stats. The WPDES general permit for Aquatic Plant, Algae, and Bacteria (WPDES Permit No. WI-0064556) may be applicable to pesticidal dye discharges. (See <https://dnr.wi.gov/topic/Wastewater/AquaticPesticides.html>.) Other general permits may also be applicable to dye coverage. The general permit program coordinator should be contacted to determine whether general permit coverage may be granted for a specific dye application.

In addition to a WPDES permit, a ch. NR 107, Wis. Adm. Code, Chemical Aquatic Plant Control Permit (hereafter “APM permit”) is required for most discharges of dye into the waters of the state regardless of whether the intended use is for aesthetics or non-pesticide purposes. This is because dyes impart color and may act to manage, inhibit or control aquatic plants and organisms and therefore fall under the regulatory purview of chs. NR 107, Wis. Adm. Code. Dye in a lake or stream will limit light penetration which may inhibit photosynthesis in rooted and free floating plants and algae. These effects become more significant as the area covered by the dye becomes larger or is maintained for a longer period of time. Prolonged use may suppress primary production and negatively affect food web interactions and therefore requires more in-depth evaluation.

Applications for the use of dyes should be routed through Central Intake using the Chemical Aquatic Plant Control Application (Form 3200-004) to determine if an APM Permit is required. (See <https://dnr.wisconsin.gov/permits/water>.) Questions about the use of dyes should be routed to Regional APM program staff for initial permit review as this may impact permitting requirements of the WPDES program. The Regional APM Coordinator should forward the notification to the WPDES General Permit Coordinator for WPDES review once APM permitting decisions have been completed unless APM permitting is anticipated to be complex and require cross-program coordination.

**Internal Routing of Notification.** Requests for the use of dye may come to the Department via a variety of staff. The cross-program nature of these requests requires coordination of decision making between APM and WPDES programs. After the APM Coordinator or WPDES General Permit Coordinator is notified of a proposed dye application, the coordinator should route notification materials to all appropriate staff shown below and send a copy of final decisions to the DNR Spills Hotline e-mail at [DNRLEHotline@wisconsin.gov](mailto:DNRLEHotline@wisconsin.gov).

### Education or Research

- Streams: Streams Biologist, Fisheries Biologist, Conservation Warden
- Lakes: Lakes Biologist, Fisheries Biologist, Conservation Warden

### Stormwater applications

- Streams: Streams Biologist, Stormwater Specialist or Engineer, Conservation Warden
- Lakes: Lakes Biologist, Stormwater Specialist or Engineer, Conservation Warden

Wastewater applications

- Streams: Streams Biologist, WPDES General Permit Coordinator, Conservation Warden
- Lakes: Lakes Biologist, WPDES General Permit Coordinator, Conservation Warden

Dam safety or infrastructure integrity

- Streams: Streams Biologist, Dam Safety/Floodplain Engineer, Conservation Warden
- Lakes: Lakes Biologist, Dam Safety/Floodplain Engineer, Conservation Warden

## **Information Submittal for Dye Applications**

Dye applications should be reviewed by Department staff using best professional judgment to ensure that discharges will not contain pollutants in concentrations that cause, have the reasonable potential to cause, or contribute to an excursion above applicable water quality standards. Dyes should not be discharged in amounts that will alter the natural color of the receiving water to such degree as to violate narrative or numeric water quality standards or negatively impact designated uses. In order for Department staff to perform a review of a proposed dye discharge, the following information is needed for each dye that is proposed for use and for each potential discharge location:

1. Project scope summary.
2. Name and contact information of applicator.
3. Name of product(s) and associated Safety Data Sheet (SDS).
4. A completed Additive Review Request Worksheet (Form 3400-213) from the [Water Quality Review Procedures for Additives](#).
5. Photograph of product label.
6. Location and proposed date(s) of dye application.
7. Estimated quantity and duration of dye application. Include information regarding expected product breakdown and movement within waterway, if applicable.
8. Map of proposed application area.
9. Method of dye application.
10. Expected color and opacity of dye.

## **WPDES Permit Processing**

Wis. Stat. s. 283.31 requires a WPDES permit be issued for the discharge of any pollutant through a point source into any waters of the state, including surface waters and groundwater. WPDES permits contain requirements that include discharge limitations, monitoring and reporting or record keeping requirements, best management practices (BMP) and other provisions to reduce, eliminate, or minimize the risk of pollutants impacting human health and water quality. Discharge of a pollutant without an individual WPDES permit or coverage under a general permit is in violation of Wis. Stat. s. 283.31. Unpermitted discharges of dye could also be subject to a citation for deleterious substances under Wis. Stat. s. 29.601 (3).

The WPDES General Permit Coordinator should review all requests for dye use to determine if WPDES coverage is required, according to the steps described below and in the flowchart that follows:

1. If an APM permit was issued for dye applications, WPDES coverage is required and may be authorized under the general permit for Aquatic Plant, Algae, and Bacteria (WPDES Permit No. WI-0064556; see

<https://dnr.wi.gov/topic/Wastewater/AquaticPesticides.html>), because it has been determined that the discharge has pesticidal qualities that have the effect of controlling aquatic plants or other organisms.

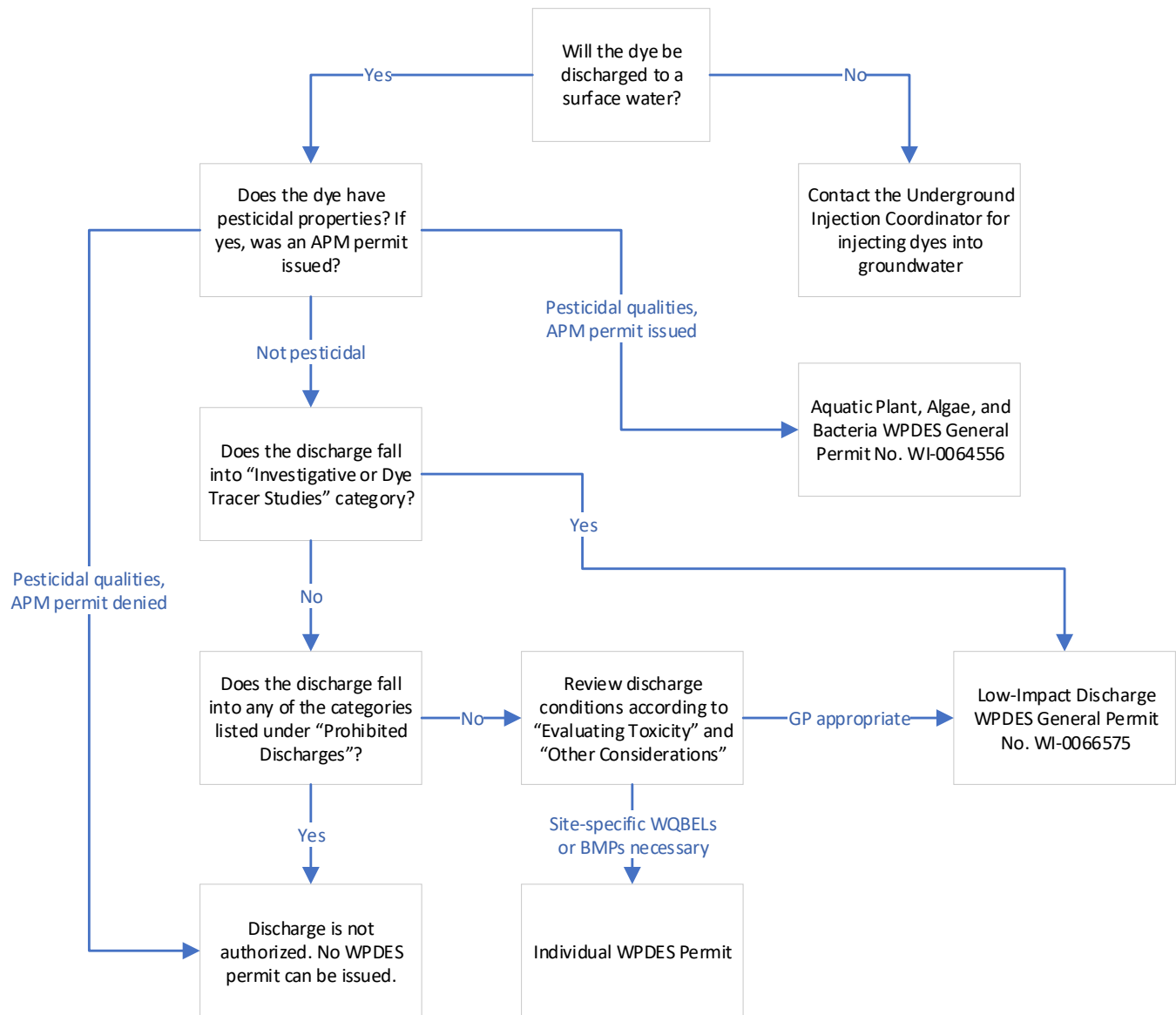
2. If an APM permit is required but was denied, the discharge is not authorized by the Department. WPDES review is not needed because the project cannot move forward without an APM permit.
3. If an APM permit is not required because it has been determined that the discharge does not have pesticidal qualities, the General Permit Coordinator should conduct a review using the process steps described below and shown in the flowchart, while considering the guidance in “Evaluating Toxicity” and “Other Considerations” sections of this document. Staff will need to determine whether an individual permit is necessary or if a general permit may be applicable.
  - a. Assess if the discharge has reasonable potential to exceed surface water quality standards (chs. NR 102, NR 104, NR 105, NR 207, and NR 217, Wis. Adm. Code) or groundwater quality standards (ch. NR 140, Wis. Adm. Code).
  - b. Perform an additive review for each product (see ‘Evaluating Toxicity’ section).
  - c. Coordinate with regional staff, tribal liaison, assessment of local conditions, and make final decision in consultation with regional Water Quality Bureau management.

In situations where site-specific water quality based effluent limits (WQBELs), BMPs, or other conditions are necessary to protect water quality standards, an individual WPDES permit may be necessary. The general permit for Low-Impact Discharges (WPDES Permit No. WI-0066575) may be appropriate if the discharge has been determined to present no or minimal impact to water quality. (See <https://dnr.wi.gov/topic/wastewater/generalpermits.html>.) Decisions should be well documented and saved in the [Additives Folder](#) under the chemical manufacturer and product name, so that others can tell why decisions were made.

If an individual permit is deemed necessary for the discharge, it should include permit conditions placing limitations on dye use. Individual permits should also require that the permittee:

1. Maintain records of dye use including the product name, manufacturer, and daily maximum amount used.
2. Perform visual monitoring during and after the dye discharge.
3. Check for adverse incidents, such as death or distress of aquatic organisms or plants, disruption of wildlife habitat, risk to recreational activities, risk to human health, etc.
4. Report any unusual or adverse conditions to the Department.

WPDES Permitting Decisions



**Investigative or Dye Tracer Studies.** If activities are not already covered by an individual WPDES permit, the general permit for Low-Impact Discharges (WPDES Permit No. WI-0066575) may be applicable for discharges of dye in small quantities and for short periods that are done for technical or scientific purposes, such as when used as a tracer by a governmental agency or educational institution for investigating public safety and health issues. This may include checking the structural integrity of dams, identifying illicit discharges or cross connections in sanitary or storm sewers, mixing zone mapping, or other similar studies. The Low-Impact GP is appropriate for most dye tracer studies because the dye discharged is expected to be very low in volume and short-term in nature, and thus is not expected to have the reasonable potential to cause or contribute to an exceedance of surface water quality or groundwater quality standards. Because a general permit can be used to cover these discharges, the 120 day notification discussed above is not necessary for investigative or tracer dye uses. Investigations where dye is injected into the subsurface may require approval under s. NR 812.05(4), Wis. Adm. Code. In these cases, the facility or municipality should contact the Department’s Underground Injection Coordinator in the Drinking & Groundwater Program.

Dischargers considering a dye tracer study should ensure that:

- The discharge falls within the description of a tracer or research-related test
- The discharge doesn't contain any hazardous substances
- The concentration and volume of substances in the discharge are limited to the amount strictly necessary to achieve the objectives of the activity
- The extent of the dye plume(s) should be minimized to maximum extent practicable

**Department Notification prior to tracer dye activities.** When a governmental agency or educational institution applies dyes, the Department should be notified at least 7 calendar days prior to introduction to waters of the state.

Department staff should send a copy of the notification via e-mail to the DNR Spills Hotline at [DNREHotline@wisconsin.gov](mailto:DNREHotline@wisconsin.gov), if the permittee has not already done so.

## **Evaluating Toxicity**

Sections NR 102.04 (1) (d) and NR 102.04 (4) (d), Wis. Adm. Code, prohibit the discharge of substances in concentrations or combinations which are toxic to human, animal, plant or fish and aquatic life. All proposed dye discharges should be evaluated to assess the potential for toxicity. It is important to note that while some dyes are vegetable-based and believed to be safe for human consumption (i.e., food grade dye), this does not necessarily mean that they will not cause harm to wildlife, fish, or other aquatic life.

Furthermore, products that have undergone USEPA registration have had acute aquatic life toxicity data evaluated only for the product's active ingredient. The USEPA registration process does not consider the toxicity of the whole product and does not evaluate the potential for impacts due to chronic toxicity. USEPA registration does not replace the additive review evaluation described below except when the product is registered as an aquatic pesticide and the proposed use is in accordance with label instructions.

### **Additive Reviews**

The [Water Quality Review Procedures for Additives \(https://dnr.wisconsin.gov/topic/wastewater/additives.html\)](https://dnr.wisconsin.gov/topic/wastewater/additives.html) describes the steps that should be followed in order to assess the potential for toxicity from dye products. That guidance document describes the procedures that staff use to calculate secondary acute and chronic values for additive products according to ss. NR 105.05 and 105.06, Wis. Adm. Code, which are the concentrations in surface water that protect aquatic life from adverse short-term and long-term effects. Using that guidance, staff should calculate the applicable acute and chronic secondary values for the dye product.

The magnitude, duration, and frequency of the discharge are all important when considering the potential for environmental impact due to toxicity. Users may request permission to discharge dye intermittently, at a low volume, and/or for a short-term, or they may want to use dye over a longer period of time and a wider area. A very toxic product could cause less environmental damage if there is a lot of receiving water dilution available, compared to a less toxic product that is discharged where there is very little available dilution. If small amounts are used only once or for a very short time, the potential for impacts due to toxicity are likely to be lower than if higher amounts are discharged or if smaller amounts are discharged continuously.

Once secondary values have been calculated, staff should compare those values to information related to the quantity and duration of the dye application in order to decide if the discharge has the potential to cause environmental harm. First, determine the length of time that the product would be expected to be present in the receiving water. In most cases, if the product and/or its degradates are expected to be present (even if it can't be seen) in the receiving water for

1 hour or more in any 24 hour period, acute toxicity should be evaluated; if more than 96 hours in any 7 day (168 hour) period, chronic toxicity should also be evaluated.

When evaluating the potential for impacts due to acute toxicity, the acute secondary value is compared to the concentration to be added to the receiving water (no dilution or mixing in the receiving water is assumed). If that concentration exceeds the acute secondary value, the discharge should not be allowed since the potential for impacts due to acute toxicity are high. If based on this evaluation, the discharge would not cause an exceedance of the secondary value but would cause an exceedance of one fifth of the secondary value, this indicates a moderate level of concern with the potential for dye toxicity and an acute WQBEL should be included in the permit.

If chronic toxicity is a concern because of the amount of time the product will remain in the receiving water, staff should first determine the dilution available in the receiving water. To evaluate if the dye poses a chronic toxicity concern:

- For discrete discharges (i.e. from a pipe) – Using the calculated chronic secondary value and the equations in s. NR 106.06(4)(b), Wis. Adm. Code, Department staff should calculate an applicable discharge limit. If the discharge concentration exceeds the calculated limit, the discharge should not be allowed since the potential for impacts due to chronic toxicity are high. If based on this evaluation, the discharge would not cause an exceedance of the calculated limit but would cause an exceedance of one fifth of the limit, this indicates a moderate level of concern with the potential for dye toxicity and a chronic WQBEL should be included in the permit.
- For dye applications directly to a waterbody – An effort should be made to determine the maximum expected dye concentration that will occur in the waterbody over the 96 hour or longer period of concern for chronic toxicity. The assumptions for this evaluation should mirror those in the equations in s. NR 106.06(4)(b), Wis. Adm. Code, where appropriate. For example, 25% of the low flow of the receiving stream may be considered for dilution. If the expected concentration after taking into account available dilution in the receiving water exceeds the calculated secondary criteria, the discharge should not be allowed since the potential for impacts due to chronic toxicity are high.

Section NR 106.06 (4) (c), Wis. Adm. Code covers receiving water design flow ( $Q_s$ ). The value of  $Q_s$  to be used in calculating the effluent limitation for discharges to flowing waters shall be determined as follows:

1. The Department shall make reasonable efforts to determine the area of the zone of passage and the dilution characteristics of discharges.
2. The Department may require that the discharger provide information on the discharge mixing and dilution characteristics of discharges.

## **Other Considerations**

Section NR 102.04 (1) (d), Wis. Adm. Code, states that discharges and other activities shall be controlled so that all surface waters meet the following conditions at all times and under all flow and water level conditions. The following cannot be present in such amounts as to interfere with public rights in waters of the state:

- Substances that will cause objectionable deposits on the shore or in the bed of a body of water.
- Floating or submerged debris, oil, scum or other material.
- Materials producing color, odor, taste or unsightliness.

- Substances in concentrations or combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.

In addition to this narrative criterion, from s. NR 102.04, Wis. Adm. Code, and criteria for toxic substances in ch. NR 105, Wis. Adm. Code, staff should also ensure that dye discharges will not result in the exceedance of other surface water quality standards specified in chs. NR 102, NR 104, NR 207, and NR 217 Wis. Adm. Code, or groundwater standards in ch. NR 140 Wis. Adm. Code. This determination may necessitate requesting additional information or analytical data related to the product's active and inactive ingredients or specific water quality parameters of concern in the receiving water. For example, if a dye is thought to have the potential to significantly impact pH, dissolved oxygen, BOD, conductivity, total suspended solids, phosphorus, or other pollutant levels in the receiving water, product testing for these or related parameters should be requested so that they can be evaluated prior to product approval.

The following are some examples of water quality standards that must be met in surface waters:

- **pH:** The pH shall be within the range of 6.0 to 9.0, with no change greater than 0.5 standard units outside the estimated natural seasonal maximum and minimum, as required by s. NR 102.04 (4) (c), Wis. Adm. Code.
- **Dissolved Oxygen:** The DO content may not be < 5.0 mg/L at any time, as per s. NR 102.04 (4) (a), Wis. Adm. Code. (In trout streams not < 6.0 mg/L, or not < 7.0 mg/L during spawning, s. NR 102.04 (4) (a), Wis. Adm. Code.)
- **Taste and odor.** Surface waters providing public drinking water supplies or classified as cold water or warm water sport fish (s. NR 102.04 (3), Wis. Adm. Code) shall meet taste and odor criteria pursuant to s. NR 102.14, Wis. Adm. Code.
- **Phosphorus:** The discharge shall not have reasonable potential to cause or contribute to an exceedance of water quality standards for total phosphorus as specified in s. NR 102.06, Wis. Adm. Code.
- **Ammonia:** The discharge shall not have reasonable potential to cause or contribute to an exceedance of water quality standards for ammonia in ch. NR 105, Wis. Adm. Code.
- **Discharge Rate/Application Method:** The discharge flow rate and/or application method used should be controlled to prevent sediment or turbidity from entering the receiving water. This is in order to control activities so that conditions for objectionable deposits, floating or submerged material, and unsightliness are met at all times and under all flow and water level conditions pursuant to s. NR 102.04 (1), Wis. Adm. Code.

Additionally, the discharge of hazardous substances are not allowed as specified in ch. NR 706, Wis. Adm. Code, and discharges cannot cause harm to endangered or threatened species or their habitat, as specified in s. 29.604, Wis. Stats. and ch. NR 27, Wis. Adm. Code. Additional penalties may apply for damage to natural resources under s. 23.095 or the discharge of deleterious substances as specified in s. 29.601 where a chemical is introduced without a WPDES permit.