Stormwater Management

Environmental Concerns

Stormwater runoff is precipitation that is not absorbed by the ground. Rather, it washes over the surface of the land picking up pollutants as it travels. Stormwater runoff may collect soil particles, petroleum products, excess fertilizer, residues from industrial activities, litter, and pet waste. If left unchecked, these pollutants are carried with the runoff into surface waters where they impact water quality.

The volume of stormwater runoff increases as natural forests and fields are replaced with hard surfaces such as buildings, parking lots, driveways, and roads. Without plants to disrupt the flow, stormwater moves across the land more quickly than under predevelopment conditions. This greater, faster flow of stormwater can severely degrade receiving water bodies by accelerating erosion that leads to flooding, destruction of plant and animal life, and loss of habitat. Pollutants carried by stormwater impair water quality by increasing levels of nitrogen, phosphorous, suspended solids, biological oxygen demand, and chemical oxygen demand. Temperatures and levels of toxic metals and hydrocarbons tend to increase, dissolved oxygen decreases, and the acidity-alkalinity of the water typically changes. The result is that near shore areas are less able to support wildlife such as juvenile fish and crabs. Also, using the water for human recreation becomes less desirable.

Pertinent Laws and Regulations

The control of pollutants that may be carried by stormwater runoff from vessel maintenance areas is addressed in the Vessel Maintenance and Repair chapter. Please refer to the Laws and Regulations section for more information about the General Permit.

Best Management Practices to Control Stormwater Runoff

A comprehensive guide to stormwater runoff control best management practices is available at njstormwater.org. This guide, "NJ Stormwater Best Management Practices Manual" contains helpful current information regarding low impact development, landscaping recommendations, and details of structural stormwater management measures.

Practice Low Impact Development.

Low impact development promotes the concept of designing with nature. The goal of low impact development is to build on a site without altering the existing hydrologic cycle. The approach takes advantage of a site's natural features, including vegetation, to minimize the need to build expensive stormwater control devices. Rather than responding to the rainfall-runoff process with structural controls, low impact development techniques interact with the process, controlling stormwater runoff and pollutants closer to the source and providing site design measures that can significantly reduce the overall impact of land development on stormwater runoff.

___✓ (5) Protect areas that provide water quality benefits and areas particularly susceptible to erosion and sediment loss.

___✓ (1) Protect natural drainage features and vegetation.

___✓ (5) Minimize land disturbance including clearing and grading.

___✓ (5) Capture and treat stormwater on site.

___✓ (5) Direct the runoff from your parking lot to a bioretention area rather than toward a storm drain. A "rain garden" is an example of a bioretention area. It is an area planted with native vegetation and sited such that it collects stormwater. Water, nutrients, and pollutants are taken up by soil and plants within 24 to 48 hours after a storm. Rain gardens are also attractive areas that can provide shade and wildlife habitat, act as wind breaks, and muffle noise.

Visit the Clean Marina Program website at njcleanmarina.org for additional information about low impact development and rain gardens.

☐ **(21) Total Points for BMP** ☐ **Total N/A Points**

Cultivate Vegetated Areas.

Healthy soil and vegetation capture, treat, and slowly release stormwater. The water is cleaned through a combination of microbial action in the soil, vegetative uptake, evaporation, and transpiration.

___✓ (5) Plant environmentally sensitive landscapes at the edge of parking lots and within islands in parking lots. Refer to Appendix IV for information about the Rutgers Master Gardner Program.

___✓ (5) Plant vegetated buffers between your upland property and the water's edge.

___✓ (1) Provide low maintenance landscaping that contributes to retention and employs native vegetation and minimizes the use of lawns, fertilizers, and pesticides.

___✓ (1) Position downspouts so that they drain to vegetated areas rather than to concrete or asphalt.

___✓ (5) Provide vegetated open-channel conveyance systems that discharge into and through stable vegetated areas.

☐ **(17) Total Points for BMP** ☐ **Total N/A Points**

Minimize Impervious Areas.

The less impervious area on site, the less runoff you will have to manage.

___✓ (5) Pave only when absolutely necessary.

___✓ (1) Break up or interrupt the flow of runoff over impervious surfaces. All runoff from the unconnected impervious area must be sheet flow directed to downstream pervious areas.

___✓ (1) Minimize the length of new roadway required to serve new or expanding marinas.

___✓ (5)* Employ alternatives to asphalt for parking lots and vessel storage areas, e.g., dirt, gravel, seashells, engineered porous pavement. In selecting the type of pervious paving materials, consideration must be given to anticipated character and intensity of use.

___✓ (5)* Use a non-toxic, organic soil binder derived from the Plantago plant family. When this binder is combined with crushed aggregate (e.g., gravel, shells) and soil, it creates a somewhat permeable surface that will resist erosion. For the cost of asphalt or less, it is a resilient material that will not crack during winter freeze/thaw cycles, can be repaired by adding more material and tilling the surface, and can be dug up with a shovel to plant trees and shrubs.

☐ **(17) Total Points for BMP** ☐ **Total N/A Points**

Employ Preventative Source Controls

The most effective way to address water quality concerns is by preventing pollutants from coming into contact with stormwater runoff.

___✓ (1) Install litter fences to prevent litter from blowing off the property.

___✓ (5) Provide for regular trash collection as part of the your maintenance plan.

___✓ (1) Regularly sweep impervious areas and manually collect litter.

___✓ (5) Install storm drain inlets that are designed specifically to prevent the discharge of large trash and debris from entering the drainage system.

___✓ (5) Employ berms, curbing, and/or secondary containment to keep pollutants from coming in contact with stormwater.

☐ **(17) Total Points for BMP** ☐ **Total N/A Points**

Use Structural Controls as Necessary.

Because of space limitations or other constraints, it may be necessary to adopt more traditional practices such as pond systems, wetland systems, infiltration systems, and filter systems.

- Stormwater pond systems capture and slowly release storm flows. Ponds may be permanent (retention ponds) or may hold water only temporarily (detention ponds). A Dry Extended Detention pond is an example of a stormwater pond system. Dry Extended Detention Ponds hold runoff for up to 24 hours after a storm. Water is slowly released through a fixed opening. The pond is normally dry between storms. This type of structure is effective for sites that are 10 acres or more.
- Stormwater wetland systems are designed to replicate the ability of natural wetlands to cleanse and absorb storm flows. A Pocket Wetland is created by excavating to the high water table elevation. Pocket wetlands can serve drainage areas of 5 to 10 acres.
- Infiltration systems are designed to take advantage of soil's natural infiltration capacities and pollutant removal characteristics. A Dry Well is an infiltration system designed to treat roof top runoff. Water is collected in downspouts and directed into a filter composed of crushed stone and fabric. Rain gardens and porous pavement are other examples of infiltration systems.
- Filter systems "strain" runoff to remove pollutants. Conventional Sand Filter Systems are constructed of layers of sand grading from the coarsest on top to the finest below. The sand overlies either a gravel bed (for infiltration) or perforated underdrains (for discharge of treated water). Oil/grit separators are another form of filter system. Water from parking lots and other areas likely to have hydrocarbons should be directed through oil/grit separators (or oil absorbent fabric) before discharging to any other management structure.

Develop schedules for the maintenance of all stormwater management structures and conduct maintenance in accordance with the schedules. Contact NJDEP's Division of Watershed Management (Appendix I) for information about grant funding to local governments for the installation of stormwater management structures in existing developed areas.

Control Sediment from Construction Sites.

___ ⚖ Use devices such as hay bales, silt fences, storm drain filters, sediment traps, and earth dikes to prevent sediments from leaving construction areas.

Stencil Storm Drains.

___ ✓ (5) Stencil storm drains with the words "Don't Dump" and "Drains to River" (if appropriate). Stencils and instructions are available from Clean Ocean Action (Appendix 1) and The Ocean Conservancy (Appendix 1). Be sure to get permission from the municipality that maintains storm drains in your community. Generally, it is the Department of Public Works.

☐ **(5) Total Points for BMP** ☐ **Total N/A Points**

Basic Industrial Stormwater Permit Required

___ ⚖ If your facility conducts boat repair, painting, or maintenance (including washing), the marina must obtain a Basic Industrial Stormwater General Permit (NJ0088315) from NJDEP. The permit covers stormwater discharges from areas involved in boat maintenance (rehabilitation, mechanical repairs, painting, and fueling) and cleaning operations. The General Permit requires that you prepare a Stormwater Pollution Prevention Plan (SPPP), and submit the SPPP Preparation Certification to NJDEP within six months of the facility's permit authorization date.

Stormwater Pollution Prevention Plan Preparation

- The plan must identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges associated with industrial activity at the marina. Additionally, the plan must describe and ensure practices to reduce pollutants in stormwater discharges from industrial activities at the facility. Refer to Box 5 for a general outline.
- For guidance in developing a stormwater pollution prevention plan, contact NJDEP for a copy of the Stormwater Pollution Prevention Plan Guidance at 609-633-7021. Other resources include: *Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices* and an EPA published summary document on the same subject. Both are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, telephone (703) 487-4600.

- For existing boatyards, the plan must be completed within six months of obtaining coverage under this permit. The facility must be in compliance with the terms of the plan within 18 months of receiving coverage.
- For new facilities, the plan must be completed and implemented prior to submitting a Request For Authorization for coverage under the general permit.
- Upon request, the plan must be submitted to NJDEP. The permittee may then be notified that the plan does not meet one or more of the minimum requirements. In such an event, the permittee must amend the plan and submit a written certification to NJDEP that the requested changes have been made.
- The permittee shall amend the plan whenever there is a change in design or operation that will have a significant effect on the potential for pollutants to be discharged to state waters. The plan shall also be amended if it proves ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with industrial activity.

Box 4. Contents of a Stormwater Pollution Prevention Plan

1. Pollution prevention team members
2. Description of other existing environmental management plans (e.g., spill prevention plan)
3. Inventory of source materials processed or stored (e.g., waste oil, fuel, wash water)
4. Inventory of non-stormwater discharges (e.g., process wastewater, domestic sewage)
5. Site map identifying buildings, drainage patterns, waste storage areas, etc.
6. Narrative of existing conditions and controls to minimize exposure to stormwater
7. BMP selection and plan design for:
   - A. Washing areas
   - B. Blasting, sanding and painting areas
   - C. Material storage areas
   - D. Engine maintenance and repair areas
   - E. Material handling areas
   - F. General yard areas
8. Revised site map that identifies and locates selected BMPs
9. Implementation schedule for BMPs and employee training
10. Maintenance Schedule for repairs and improvements
11. Inspection Schedule to ensure proper operation and effectiveness of BMP
12. Annual inspection and annual report that describes facility compliance
13. General Requirements (record keeping and certifications)
14. Administration (important contact information to assist you in preparing a SPPP)

Chapter Total: ____ (77)

Chapter Total N/A Points: ____

Best Management Practices for Protecting Sensitive Areas

Minimize Impervious Areas.

___✓ (5) Keep paved areas to an absolute minimum, e.g., designated work areas and roadways for heavy equipment only.

☐ **(5) Total Points for BMP** ☐ **Total N/A Points**

Practice Water-wise Landscaping.

Save on water bills, reduce your maintenance activities, and protect water quality by minimizing your water use.

___✓ (5) Water plants only when necessary. Indicators include wilting shrubs and grass that lies flat and showsfootprints. Water in the cooler early morning or early evening to avoid stressing plants and to minimize water evaporation.

___✓ (5) Select plants suited to the existing conditions (i.e., soil, moisture, and sunlight) so that they will require little care in terms of water, fertilizer, and pesticides. Refer to Appendix IV for a representative list of beneficial plants.

___✓ (1) Water deeply and infrequently rather than lightly and often. Deep watering promotes stronger root systems that enable plants to draw on subsurface water during hot spells and droughts.

___✓ (5) Employ equipment that delivers water prudently. Sprinklers work well for lawns. Soaker hoses or drip irrigation systems deliver water directly to the roots of shrubs, flowers, and vegetables with minimal loss to evaporation.

___✓ (1) Place mulch (wood chips, bark, dry grass clippings, nut shells, etc.) to a depth of 3-4” around plants to keep water in the soil, prevent weeds, and reduce the quantity of sediment picked up by stormwater. Planting groundcovers at the base of trees serves the same function.

___✓ (1) Cluster plants with similar water requirements. This practice will ease your maintenance burden, conserve water, and benefit the plants.

___✓ (5) Replace lawn areas with wildflowers, groundcover, shrubs, and trees.

___✓ (5) Recycle “gray water.” Gray water is water used once for dishwashing or in a washing machine, but is not overly contaminated. It can be filtered and used to water landscaped areas. However, regulations vary, so be sure to check local ordinances for permit requirements and written approval before pursuing this option.

___✓ (1) Direct downspouts into covered containers. Use the collected water on your landscaped areas.

☐ **(29) Total Points for BMP** ☐ **Total N/A Points**

Adopt Integrated Pest Management Practices.

Because of your proximity to the water, it is important to avoid the use of potentially hazardous lawn and garden chemicals whenever possible. Instead, deter unwanted plants or animals with integrated pest management practices. Integrated Pest Management, or "IPM" employs preventive, cultural, biological, and chemical methods to control pests while minimizing impacts to non-target species, wildlife, and water quality.

___✓ (1) Select disease and insect resistant plants that will out-compete common weeds, and that can thrive on your property. Refer to the Master Gardner list of native plants (Appendix IV) and take into consideration sun exposure, slope, drainage, shade, wind, volume of foot traffic, soil type, temperature variations, and other environmental factors. (For sources of native plants visit the Native Plant Society of New Jersey at www.npsnj.org.)

___✓ (1) For rodent problems, correct the sanitation situation or other factors that attract rodents and employ non-chemical controls. Only when absolutely necessary, use chemical bait in bait boxes that meet accepted criteria of "tamper resistant" to children and non-targeted animals.

___✓ (1) Mow lawn areas properly to suppress weeds. Mow varieties of grass that grow better in cooler weather to no less than 2.5 inches in height. Mow grasses that grow better in warm weather to no less than 1.5 inches.

___✓ (1) Pull weeds by hand to reduce reliance on herbicides.

___✓ (1) Boost your own tolerance for weeds and other pests. If it is not harming anything, leave it alone.

___✓ (1) Foster natural predators such as spiders, praying mantis, dragonflies, lacewings, soldier beetles, birds, bats, frogs, lizards, and certain snakes and toads.

___✓ (1) Use natural agents such as milky spore disease for grubs and Japanese beetles, *Bacillus thuringiensis* (BT) to control mosquito and small moth larvae, and sabadilla for chinch bugs.

___✓ (5) Exhaust all other options before using pesticides. Use organic alternatives to chemical pesticides. Also, rather than broadcasting pesticides, apply them directly to problem areas.

___✓ (5) Treat only serious or threatening intolerable pest infestations.

___✓ (5) Purchase the least toxic chemical in the smallest practical quantity

___✓ (5) Do not use pesticides outdoors just before a rainfall or on a windy day.

___✓ (1) Apply insecticides during the evening when honeybees and other beneficial insects are less active.

___✓ (5) Do not apply pesticides near water, e.g., shore, wells, streams, ponds, bird baths, swimming pools, etc.

For additional information and resources regarding the principles and practices of IPM, contact NJDEP's Bureau of Pesticide Compliance (See Appendix I).

☐ **(33) Total Points for BMP** ☐ **Total N/A Points**

Best Management Practices for Creating Habitat Areas

Maintain and/or Develop Vegetated Areas.

Vegetation filters and slows the flow of surface water runoff, stabilizes shorelines, and provides wildlife habitat, flood protection, and visual diversity.

___✓ (5) Maintain or create vegetated buffers (grassy or wooded) between all impervious areas (e.g., parking lots and boat storage areas) and the water.

___✓ (5) Plant vegetated areas with "beneficial" plants; those plants that require minimal care in terms of trimming, watering, and applications of fertilizer and pesticides. Native, or indigenous, plants require little care because they are adapted to the local climate and soil types. Also, many horticultural varieties and imported plants may be considered beneficial if they have few maintenance requirements and if they do not displace naturally occurring vegetation (that is, if they are not invasive). Refer to Appendix IV.

___✓ (1) Select perennial plants instead of annuals. Perennial plants need to be planted only once, tend to shade out most weeds, and few require supplemental water or maintenance.

__✓ (1) Choose plants that bear flowers, fruit, nuts, and seeds to attract birds, small mammals, and other wildlife.

___✓ (5) Do not plant and remove existing non-native invasive plants. (Visit the NJDEP website for a list of non-native invasive plants that should be avoided in New Jersey)

___✓ (1) Maintain proper soil pH and fertility levels. Fertility describes the presence of nutrients and minerals in the soil. Acidity and alkalinity levels are indicated by pH. These two measures together tell you which plants your soil can support. Soil pH may be adjusted by adding lime (base) or gypsum (acid). Add organic matter such as compost, leaf mold, manure, grass clippings, bark, or peat moss to improve fertility.

___✓ (1) Submit a soil sample to the Rutgers Cooperative Extension Service annually to determine fertility, pH, and application rates for soil amendments. For additional information visit the Rutgers website at www.rce.rutgers.edu/ag or call 732-431-7260 for Monmouth County or 732-349-1246 for Ocean County offices.

___✓ (1) Foster beneficial organisms. For example, earthworms move through the soil feeding on microorganisms. In the process, they aerate the soil, improving the flow of water and air to plant roots.

___✓ (5) Compost leaves, branches, grass trimmings, and other organic matter. Use the mature compost to nourish your soil. Alternatively, chip branches and leaves and use as mulch to discourage weeds and to conserve moisture. More complete information on composting is available from the Rutgers Cooperative Extension Service. Visit their website at www.rce.rutgers.edu or call 732-431-7260.

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☐ **(17) Total Points for BMP** ☐ **Total N/A Points** **Chapter Total:**

Chapter Total N/A Points:
____ (219) ____