Stormwater Hotspots and Pollution Prevention Practices
AGENDA

• Basics of Stormwater Hotspots
• Stormwater Design if Your Proposed Development Site is a Hotspot
• Pollution Prevention for Existing Stormwater Hotspots
• The Hotspot Site Investigation
• Stormwater Benchmarking Tool
• Test Your Hotspot Knowledge
What are Hotspots?

Commercial
Industrial
Institutional
Municipal and Transport-Related Operations

Produce higher levels of pollutants AND / OR
Present higher potential risk for spills, leaks, or illicit discharges
Regulatory Status of Stormwater Hotspots

Many industrial and municipal sites require industrial stormwater permits

More than 20,000 exist in the Chesapeake Bay Watershed

Many commercial, transport and institutional sites are hotspots but are not regulated
Commercial Hotspots

Commercial car washes
Vehicle maintenance and repair
Fast food restaurants
Nurseries/garden centers
Gas stations
Building material stores
Construction companies
Petroleum wholesalers
Industrial Hotspots

11 SIC code
“Heavy” Industries
Auto recyclers
Boat building & repair facilities
Recycling centers & scrap yards
Warehouses
Institutional Hotspots

- Cemeteries
- Corporate office parks
- Hospitals
- Colleges
- Private golf courses
Municipal Hotspots

Fleet storage/school bus depots
Landfills/solid waste facilities
Public works yards
Public schools
Maintenance depots
Public golf courses
Wastewater treatment plants
Transport-related Hotspots

- Airports
- Bus depots
- Ports
- Railroads and bulk shipping
- Highway maintenance facilities
- Trucking companies and distribution centers
- Rental car lots
Oddball Hotspots

Marinas
Hobby farms
Fairgrounds/racetracks
Restaurants
Common Hotspot Generating Areas

- Stormwater Infrastructure
- Turf and Landscaping
- Outdoor Materials
- Waste Management
- Physical Plant
- Vehicle Operations
- Unique Operations
Vehicle Operations

Unknown Leak From Repair of a Vehicle
Outdoor Material Storage

Covered

Uncovered
Outdoor Materials, cont.

Inadequately Labeled Storage Containers

Direct Connection to Storm Drains
Waste Management

Evidence of Dumpster Juice
Physical Plant

Downspout Discharge

Parking Lot Condition
Turf & Landscaping Areas
Stormwater Infrastructure
Stormwater Infrastructure, cont.

Gutter Accumulation Rating of 1

Gutter Accumulation Rating of 3

Gutter Accumulation Rating of 5
Assess Future Hotspot Status

- Localities should designate which types of new development have potential to become hotspots.

- If a site is designated as a hotspot, it influences how much runoff must be treated, whether it can be infiltrated or whether it must be treated by a sand filter.
Minimizing Future Hotspot Risk in Stormwater Design

- Risk-based strategy for stormwater infiltration
- Isolation of hotspot generating areas
- Reducing exposure to rainfall or runoff
Design tip: Isolate the hotspot generating areas and then treat their runoff separately in a sand filter.
Delaware or perimeter sand filters are an ideal choice to control hotspot runoff, since they:

- have high metal and hydrocarbon removal
- prevent movement into groundwater
- are easy to cleanout
- don’t consume surface area
Additional Tips to Design Away Hotspots

• Disconnect or divert any rooftop runoff that “runs on” to the Hotspot Generating Area (HGA). This also helps reduce the water quality storage volume needed for the treatment device.
• Minimize the size of the HGA by covering and secondary containment measures.
• Choose a sand filter or bioretention with an underdrain for HGA.
• Size them to capture the entire runoff volume from the locally required Water Quality storm event, and make sure to provide extensive pretreatment storage.
• If the sand filter is expected to bear loads, check to see if structural reinforcement is needed to withstand expected vehicle loads.
Risk-Based Management Strategies for Hotspots

- Depending on Hotspot Severity:
  1. Enhanced On-site Pollution Prevention Plans
  2. Treat at least 50% of WQv prior to Infiltration
  3. Prohibit Infiltration and Use Sand Filters Instead

- These rules also apply to other practices where infiltration may be expected after little or no treatment (e.g., dry ED ponds, grass swales, filter strips)
<table>
<thead>
<tr>
<th>Industrial and Municipal Stormwater Hotspots</th>
<th>SWPP Required?</th>
<th>Restricted Infiltration</th>
<th>No Infiltration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities w/NPDES Industrial permits</td>
<td>Yes</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Public works yard</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Ports, shipyards and repair facilities</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Railroads/ equipment storage</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Auto and metal recyclers/scrap yards</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Petroleum storage facilities</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Highway maintenance facilities</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Wastewater, solid waste facilities</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Industrial machinery and equipment</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Trucks and trailers</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Airfields and aircraft maintenance areas</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Fleet storage areas</td>
<td>Yes</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Commercial Stormwater Hotspot Operation</td>
<td>SWPP Required?</td>
<td>Restricted Infiltration</td>
<td>No Infiltration</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>----------------</td>
<td>------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Parking lots (40 or more parking spaces)</td>
<td>No</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Gas stations</td>
<td>No</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Highways (2500 ADT)</td>
<td>No</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Retail/wholesale vehicle/ equipment dealers</td>
<td>No</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Convenience stores/fast food restaurants</td>
<td>No</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Vehicle maintenance facilities</td>
<td>No</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Nurseries and garden centers</td>
<td>No</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Golf courses</td>
<td>No</td>
<td>●</td>
<td></td>
</tr>
</tbody>
</table>
How to Determine if an Existing Site is a Stormwater Hospot
The Hotspot Site Investigation

- Creates inventory of stormwater hotspots
- Rates severity of each hotspot
- Suggests appropriate follow-up actions, including referral for immediate enforcement
- Examines feasibility of on-site stormwater retrofits
Hotspot Site Investigation
# HSI: Initial Hotspot Status

<table>
<thead>
<tr>
<th>H. INITIAL HOTSPOT STATUS - INDEX RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Not a hotspot (fewer than 5 circles and no boxes checked)</td>
</tr>
<tr>
<td>☐ Confirmed hotspot (10 to 15 circles and/or 1 box checked)</td>
</tr>
</tbody>
</table>

**Follow-up Action:**
- Refer for immediate enforcement
- Suggest follow-up on-site inspection
- Test for illicit discharge
- Include in future education effort
- Check to see if hotspot is an NPDES non-filer
- Onsite non-residential retrofit
- Pervious area restoration; complete PAA sheet and record
  - Unique Site ID here: ____________
- Schedule a review of storm water pollution prevention plan

**Notes:**
- [Not a hotspot]
- [Potential hotspot]
- [Confirmed hotspot]
- [Severe hotspot]
What is Stormwater Pollution Prevention?

- Alteration of everyday operations and practices to reduce the amount and types of pollutants entering the storm drain system
Benefits of Pollution Prevention

- Extremely cost effective at avoiding the creation of pollutants
- Most good housekeeping techniques are easily implemented
- Minimizes health risks to residents and workers
- Reduces future liability and avoids costly clean up in the future
Choose the Mix of Source Control Practices

15 different hotspot pollution prevention practices profiled in USRM 8
The Stormwater Benchmarking Tool
Objectives of the Benchmarking Tool

- Takes only a few hours to complete
- Identifies correctable stormwater problems
- Increases staff awareness about stormwater, watersheds and community stewardship
- Done outside the building and is kinda fun
- Leads to action not just paperwork
- Create a quantitative scorecard of overall site performance
The Benchmarks

22 Benchmarks assessed inside and outside the building and the stream the site discharges to

Specific tasks or activities performed to earn individual benchmark points

100 points maximum for the site as a whole

Recommended minimum score is 95 points
1. Define Your Watershed Address

**Activity:** Use the internet to determine the stream to which the facility ultimately drains to, as well as the larger watershed in which it resides

**Benchmarks:**
- Google Earth to find location of the facility in relation to nearest stream and watershed
- Do a web search to identify local or regional watershed groups
- Contact them to learn more about key water quality and habitat issues
2. Derive a Stormwater Profile for Your Site

**Activity:** Analyze site layout to estimate key land cover variables to compute stormwater runoff volume and pollutant loads generated by your facility.

**Benchmarks:**
- Estimate total site area, impervious cover and runoff coefficient
- Compute the annual stormwater runoff volume produced at your site, and compare it to your annual production (in cases, shipping containers, etc)
- Compute the annual phosphorus, zinc, and oil/grease loads produced by your facility
Stormwater Profile for Plant

- Site Area = 24.1 acres
- Estimated % Impervious = 92%
- Average Annual Runoff = 50 inches
- Total Phosphorus = 56 lbs/yr
- Sediment = 8.7 tons/year
- Total Nitrogen = 452 lbs/yr
- Oil and Grease = 865 lbs/yr = 104 gallons/yr
- Zinc = 43 lbs/year
3. Enhance Employee Training

**Activity:** Involve employees to increase their stormwater pollution prevention IQ

**Benchmarks:**
- Include them in the benchmark assessment
- Customize stormwater training
- Include personal stewardship at home
4. Upgrade Your Stormwater Plan

**Activity:** Check to make sure that you have an approved Stormwater Pollution Prevention Plan (SWPPP) for your site, and develop annual work plan to improve the total benchmark score

**Benchmarks:**

- Find and review your last pollution prevention plan.
- Update it to reflect findings from benchmarking assessment
- Designate lead individual at facility to track it
- Prominently post current score
5. Understand the Plumbing at Your Site

Plant Evolution: Not Always Sure Where Stormwater Goes
Activity: This involves a careful analysis of the site plan followed by a walk through to find out exactly how and where stormwater flows across the site... followed by marking of all storm drains on the site.
6. Retrofit Roof Runoff

**Activity:** Inspect the rooftop to determine roof materials and conditions and potential to disconnect or treat roof downspouts

**Benchmarks**
- Assess Rooftop Materials
- Check for Downspout Disconnects
- Look for Rooftop Retrofit
- Retain Design Consultant
7. Investigate Loading/Unloading Areas

**Activity:** Investigate the interaction of pollutants, practices and storm drains at the building interface (truck and rail)

**Benchmarks**
- Sweeping versus wash-downs
- Covering loading docks
- Redesign drainage
8. Prevent Parking Lot Pollution

**Activity:** Evaluate the condition, drainage and maintenance of the parking lot to reduce runoff and reduce pollutants.

**Benchmarks**
- Stabilize un-paved lots
- Walk lots monthly to find and fix leaks
- Weekly trash and litter pickup
- Monthly sweeping of the lot
- Special care with seal-coating and power-washing
9. Prevent Spills at Fueling Areas

**Activity:** Inspect Pollution Prevention Practices at all Fueling Areas at the Site

**Benchmarks**
- Cover Fueling Islands
- Dry Spill Response Kits
- Redesign Flows to Prevent Storm Drain Entry
10. Seasonal Operations/Outdoor Wash-Water

Activity: Assess seasonal operations at the site with the potential to produce polluted runoff or wash-water out of the storm drain system

Benchmark:
- Review winter snow removal and salting and salt storage
- Off-site truck washing
- Block storm drains when doing outdoor washing/hosing
11. Vehicle Repairs and Fluids

**Activity:** Investigate where vehicles are repaired/maintained to make sure fluids and other pollutants do not reach storm drain system

**Benchmarks:**
- No outdoor truck repairs
- Check indoor shop drains
- Proper fluid disposal/recycling practices
12. Evaluate Spill Control and Response

**Activity:** Walk the site to find areas of greatest spill risk, and critically evaluate how to improve plant spill capability

**Benchmarks:**
- Provide spill kits at high risk areas of site
- Update emergency contact numbers
- Create an unannounced “fake” spill
13. Prevent Runoff From Outdoor Storage

**Activity:** Walk the site to look for materials stored outside on a temporary or permanent basis that could come into contact with rainfall.

**Benchmarks:**
- Place materials on pallets
- Temporary cover
- Secondary containment and berms
- No streak or stain lines on way to storm drain
14. Exterior Dumpster Management

Activity: Walk the site to look for dumpster/compactor juice and spillage

Benchmarks:
- Dumpster covered, have lids and are water tight
- Schedule pickups with solid waste contractors frequently
- Disconnect dumpsters from storm drain
14. Exterior Dumpster Management
15. Turf Management and Conversion

Activity: Inspect the open and landscaped areas of the site and look for opportunities to stormwater treatment or convert turf to trees

Benchmarks:
- Evaluate all turf and landscaping for potential for:
  - Reduced Mowing
  - Soil Restoration
  - Reforestation
  - Filter Strips
  - Rain Gardens
- 1 point for each 3% turf converted
Activity: Do a quick retrofit reconnaissance investigation to identify possible locations to treat runoff from all or part of the parking lot, and retain an engineering consultant to assess the feasibility and cost of building them.
Activity: Modify landscaping contracts to reduce inputs of fertilizer, pesticides and water

Benchmark
- Reduce fertilizer & pesticides
- Avoid herbicides on fence lines
- Shift to stormwater as source of irrigation water
- Use native species in landscaping
18. Check for Dry Weather Flows in Drain

**Activity:** Follow the storm drain system until it outfalls to a ditch or stream and look for evidence of illicit discharges or dry weather flow.

**Benchmarks:**
- Look for dry weather flow
- Do outfall investigation
- Trace the source and fix it
19. Regularly Maintain Stormwater Infrastructure

Activity: Check all storm drain inlets, sumps and stormwater best management practices (if present) for excessive sediment accumulation.

Benchmarks

• Perform semi-annual maintenance inspection of your stormwater infrastructure
• Clean out storm drain inlets annually
• Perform recommended maintenance on any stormwater treatment practices
20. Natural Area Conservation

**Activity:** Assess the condition and habitat needs of any forests, wetlands, buffers or conservation areas present at the site and to improve their ecological function and diversity

**Benchmarks:**

- Resource inventory and mapping
- Implement conservation and restoration practices
21. Become a Local Watershed Partner

**Activity:** Meet with a local or regional watershed group to find ways to strengthen their efforts through volunteer work, product donations, board service or other measures

**Benchmarks:**

Meet at least once with the local or regional watershed group

Provide tangible evidence of support to the group in first year
22. Stream Walk and Cleanup

**Activity:** Walk the closest thousand feet of stream to the bottling facility with safe access to identify need for stream cleanup or adoption

**Benchmarks:**

- Take employees on a stream walk at the nearest accessible stream segment
- Help plan a stream cleanup or adoption for that segment with the local watershed organization
<table>
<thead>
<tr>
<th>Score</th>
<th>Rating</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>95 to 100</td>
<td>Excellent</td>
<td>Congratulations... Your activities and practices make you an industry leader in stormwater compliance... you go way beyond the minimum and deserve recognition in your community</td>
</tr>
<tr>
<td>85 to 94</td>
<td>Good</td>
<td>Great Start... You run a good clean operation and only have a handful of areas for improvement to meet the goal</td>
</tr>
<tr>
<td>75 to 84</td>
<td>Fair</td>
<td>Needs Work... Although you are doing a lot of things right, there are many areas where you can do more</td>
</tr>
<tr>
<td>65 to 74</td>
<td>Poor</td>
<td>Not so Good. Your site is probably a hotspot for stormwater pollution... and your team needs to get cracking to get the work done to meet the standard.</td>
</tr>
<tr>
<td>35 to 64</td>
<td>Very Poor</td>
<td>Shame on You: Your site is probably a severe hotspot and you are almost certainly noncompliant with your stormwater permit. The team and plant manager need a real action plan</td>
</tr>
<tr>
<td>Less than 35</td>
<td>Unacceptable</td>
<td>Shred the Evidence (just kidding): Your site is truly bad and you are exposing your company to regulatory risks, fines and citizen suits! Improving your score should be an immediate facility wide priority</td>
</tr>
</tbody>
</table>
CASE STUDY... WHAT WOULD YOU DO HERE???
CASE STUDY... WHAT WOULD YOU DO HERE???

- Vehicles are maintained and repaired
- Vehicles are stored/ repaired outside
- Evidence of spills/ leakage from vehicles
- Materials stored outside on paved surface
- Storage area directly connected to storm drain
- Evidence of staining / discoloration around storage area
- Outdoor storage area lacks cover
- Liquid materials stored without secondary containment
- Hazardous materials present
- Dumpster has no cover, is leaking, and located near storm drain inlet
- No stormwater treatment practice is present
What Would You Do Here?
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What Would You Do Here?
Pollution Prevention Programs

Resources

In This Folder
- Pollution Prevention Internet Resources
- Excerpts from USRM 8: Pollution Source Control Practices
- Hotspot Site Investigation Field Sheets

Available from CWP:
- USRM 8: Pollution Source Control Practices