

Illicit Discharge Detection and Elimination Program Implementation: Using What You Have

Presented at:
**Stepping Up Your Local
Stormwater Management
Program**
Tacoma, WA
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Presentation Developed By:

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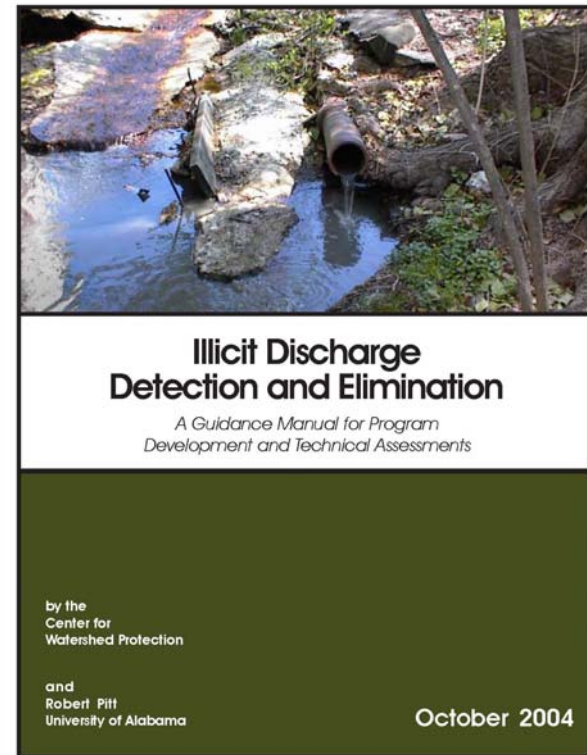
Presentation Overview

- 8 IDDE Program Components
- Program Component Costs
- Top 15 Tips
- Resources

IDDE Guidance Manual

8 Program Components

1. Audit Existing Resources & Programs
2. Establish Responsibility, Authority & Tracking
3. Complete a Desktop Assessment of Illicit Discharge Potential
4. Develop Program Goals & Implementation Strategies
5. Search for Illicit Discharge Problems in the Field
6. Isolate & Fix Individual Discharges
7. Prevent Illicit Discharges
8. Evaluate the Program



Audit Existing Resources & Programs

- Purpose:
 - Determine the most capable local agency to run program
 - Identify available staffing, resources and gaps
 - Understand local resources, expertise that can be applied

Audit Elements

- Infrastructure profile
- Legal authority
- Available mapping
- Field staff
- Access to lab services
- Education & outreach resources
- Discharge removal capability
- Program budget & financing

Potential Infrastructure Profile Questions:

How many miles of streams and storm drains exist in the MS4?

What is the area served by storm drains, sewers, and septic?

What is the general age and condition of the infrastructure?

Audit Existing Resources & Programs

- Desired Outcome:
 - Initial five year IDDE program development plan over the current permit cycle
- Budget Resources Required:
 - Less than one staff month for smaller communities
 - Up to three staff months for larger communities

Establish Responsibility & Authority

- Purpose:
 - Establish authority to regulate, respond to & enforce discharges
 - Identify & prohibit inappropriate connections through plumbing code updates
 - Develop reporting & tracking system

Illicit Discharge Ordinances

- Prohibit illicit discharges & illegal connections
- Provide for access & inspection
- Require & enforce elimination
- Address unique conditions or requirements

Fundamental units to track are individual outfalls...

- Geospatial coordinates
- Subwatershed & watershed address
- Contributing land use
- Diameter & physical characteristics
- Field assessment data
- Digital photos
- Follow-up monitoring at outfall or further up pipe
- Hotline complaints, along with response
- Status & disposition of enforcement actions
- Maintenance & inspection data

Desktop Assessment of Illicit Discharge Potential

- Purpose:
 - Determine the potential severity for illicit discharges
 - Identify which subwatersheds or generating land use merit priority investigation
- Elements:
 - Define drainage areas
 - Compile data
 - Screen drainage areas for IDP factors
 - Characterize IDP across subwatersheds



Screening Factors

- Past Discharge Complaints
- Poor Dry Weather Water Quality
- Density of Generating Sites
- Density of Industrial NPDES Permits
- Stormwater Outfall Density
- Age of Subwatershed Development
- Former Combined Sewers
- Older Industrial Operations
- Aging or Failing Sewers
- Density of Older Septic Systems
- Past Sewer Conversions

Select the factors that apply most to your community

Prioritizing Subwatersheds Using IDP Screening Factors

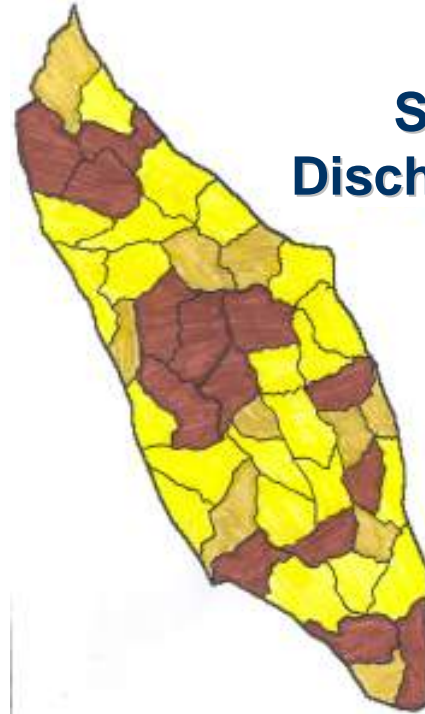
Subwatershed	Past discharge complaints	Poor dry weather WQ	Density of SW outfalls	Average age of dev.	Raw IDP score	Normalized IDP score
Subwatershed A	8 (2)	30% (2)	14 (2)	40 (2)	8	2
Subwatershed B	3 (1)	15% (1)	10 (2)	10 (1)	5	1.25
Subwatershed C	13 (3)	60% (3)	16 (2)	75 (3)	11	2.75
Subwatershed D	1 (1)	25% (1)	9 (1)	15 (2)	5	1.25
Subwatershed E	5 (1)	15% (1)	21 (3)	20 (1)	6	1.5

Basis for Assigning Scores...	1	2	3
Past discharge complaints/reports (total # logged)	< 5	5 - 10	> 10
Dry weather water quality (# times bacteria stds exceeded)	< 25%	25 - 50%	> 50%
Storm water outfall density (# outfalls / stream mile)	< 10	10 - 20	20
Average age of development (years)	< 25	25 - 50	> 50

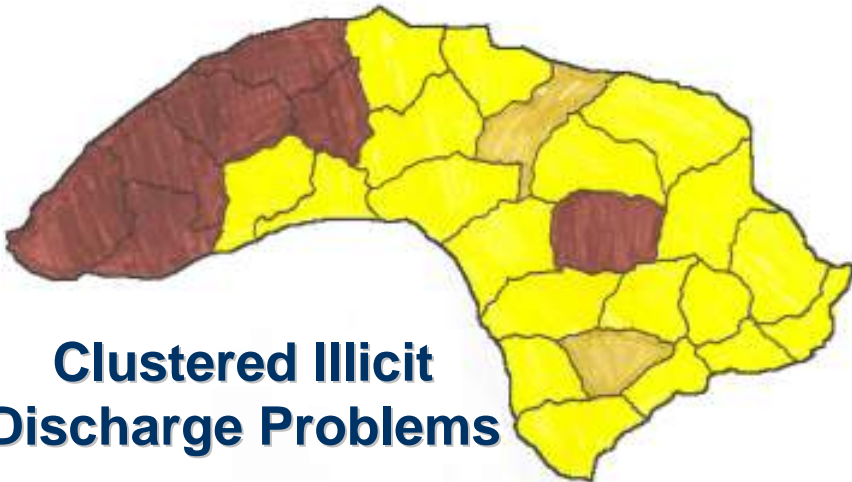
Communities with...



Minimal Illicit Discharge Problems

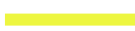




Severe Illicit Discharge Problems



Clustered Illicit Discharge Problems

Key:

-  Low IDP risk
-  Medium IDP risk
-  High IDP risk

Develop Program Goals & Strategies

- Purpose:
 - Define milestones to measure progress during 1st permit cycle
 - Make sure resources allocated to address real problems
 - Choose most appropriate & cost-effective methods to find discharges
- Desired Outcomes:
 - Program goals & measurable indicators for:
 - overall program administration
 - outfall assessment
 - finding & fixing illicit discharges
 - prevention of illicit discharges
 - Detailed yet flexible field investigation strategy

Audit	Authority	Desktop Assessment	Goals & Strategies	Search for Discharges	Isolate & Fix Discharges	Prevent Discharges	Tracking & Evaluation
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Measurable Goals Related to Outfall Assessment

Example Measurable Goals	Timeframe
Define & characterize drainage areas or sewer sheds	Year 1
Walk all stream miles	Begin Year 1, complete 1 st screening end permit cycle Repeat once per permit cycle
Develop digital map of all outfalls, land use, & other relevant infrastructure	Year 1 Continuously & regularly after that
Secure analytical laboratory services	Initiate in conjunction with field screening
Sample & trace source of % of flowing outfalls each year of permit cycle	Initiate during 1 st permit cycle Expand & enhance where problems are observed
Conduct regular in-stream assessments	
Conduct investigations at % of non-flowing outfalls with poor in-stream water quality to look for intermittent flows	
Integrate all collected stream data & citizen complaints into GIS system	Initiate during 1 st year Expand & enhance with time

Linking Implementation Strategies to Community-Wide IDP...

- Conduct field screening of outfalls in the context of broader watershed assessment & restoration initiatives
- Integrate program efforts into more comprehensive watershed assessment & restoration efforts
- Target & coordinate with watershed organizations to accomplish inventory & data collection efforts
- Establish hotline to report suspicious discharges



Refining Strategies to Address Unique Conditions... Aging Septic Infrastructure

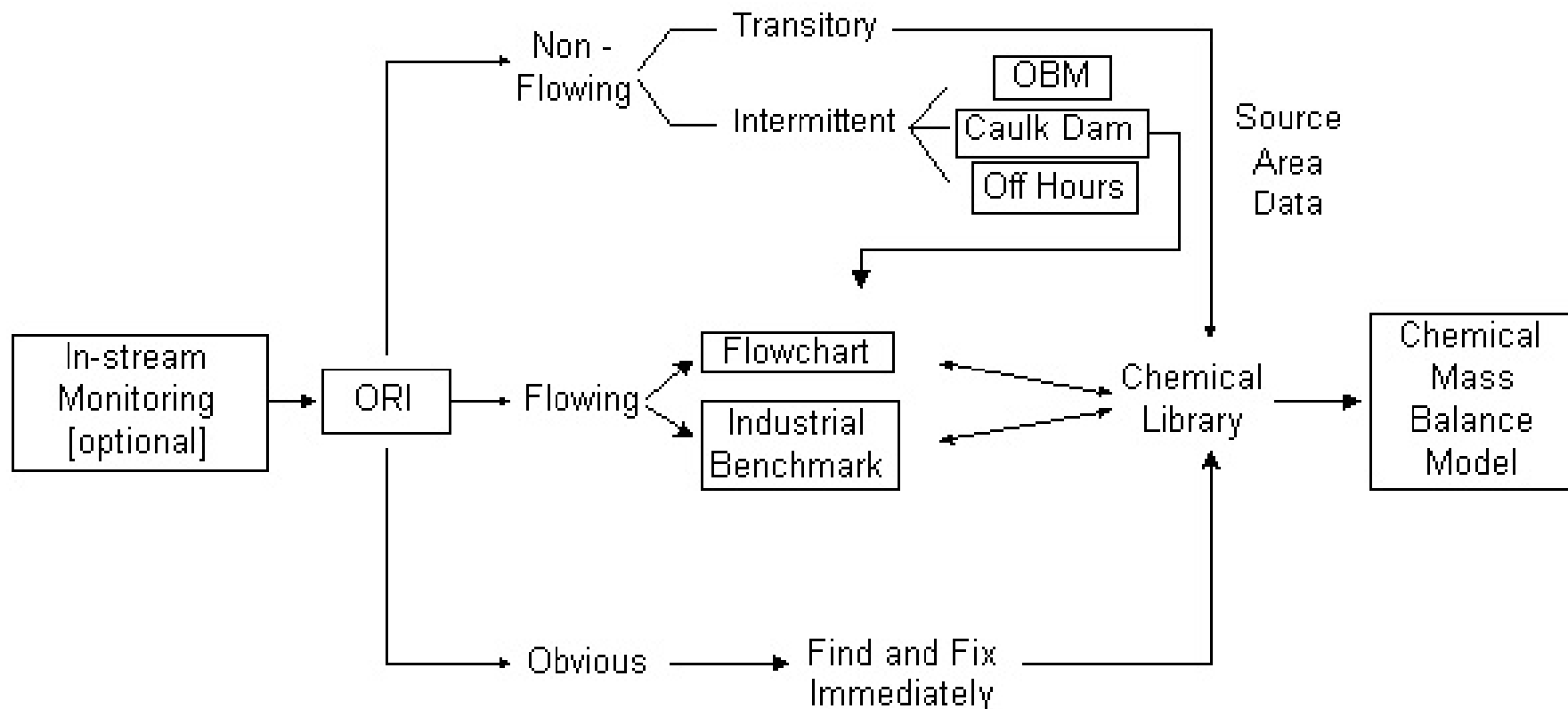
- Develop targeted education program for septic system maintenance
- Institute a point of sale inspection and verification process
- Develop cost share capabilities to assist property owners with upgrade of system



Search for Illicit Discharge Problems in the Field

- Purpose:
 - Conduct rapid field screening to identify & track suspected outfalls & stream segments
 - Conduct investigatory sampling & analysis to establish flow types & likely sources
- Desired Outcome:
 - Locations & characterizations of all outfalls
 - Strategy for future chemical analysis
 - Local “fingerprint” library

IDDE Monitoring Framework



□ Denotes a monitoring method

Isolate & Fix Individual Discharges

- Purpose:
 - Use a variety of tools & techniques to narrow down the source of illicit discharges & correct the problem
 - Establish an appropriate & effective enforcement program to ensure repair
- Elements:
 - Using land use to isolate the source
 - Tracking the discharge through the storm drain
 - Hotline reporting

Discharge Complaint Hotline

- Leads to early detection & correction
- Encourages active public stewardship
- Can “piggyback” on other call response needs
- Identifies suspected facilities for further investigation & education
- Increases municipal accountability
- Good tool to pick up intermittent and transitory discharges
- Time & money to provide 24/7 service
- Marketing the hotline number
- Establishing inter- & intra-departmental response process

Quick Drainage Area Investigation



Source: R. Frymire

Finding and Fixing

- Move up the pipe
- Use smoke or dye testing once narrowed
- Use enforcement or repair



Techniques to Locate the Discharge

Source: www.darrscleaning.com



Source: NEIWPPC, 2003



Source: www.darrscleaning.com



Source: www.darrscleaning.com

Source: www.darrscleaning.com

Fixing Illicit Discharges

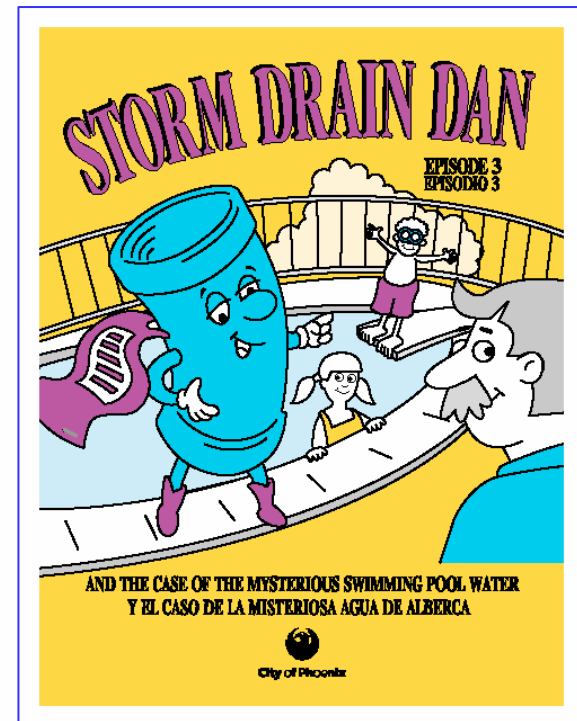
- Who is responsible?
- What methods will be used to repair?
- How long will the repair take?
- How will removal be confirmed?

Prevent Illicit Discharges

- Purpose:
 - Identify location & regulatory status of generating sites
 - Screen for bad actors
 - Target appropriate education & enforcement efforts
- Desired Outcome:
 - Education programs that target the most common intermittent and transitory discharges
 - Three sectors: neighborhoods, generating sites, and municipal housekeeping

IDDE Education Target Audiences

- Resident Education
 - Storm drain stenciling, outfall signage, hotline promotion, school presentations
- Commercial and Industrial Hotspots
- Public Employees
 - Field crew & inspector cross-training



Source: City of Phoenix, AZ

Program Tracking & Evaluation

- Purpose:
 - Revise the program to prevent or eliminate the most serious illicit discharges in the most cost-effective manner in response to monitoring and hotline information gathered in the first few years of the permit cycle.

Program Tracking Systems

- Updated mapping to reflect locations of illicit discharges and problems
- Water quality results associated with specific outfall and in-stream sampling
- Frequency of hotline use
- Number of “hits” or confirmed illicit discharges
- Program costs by line item
- Number of corrections and associated cost

IDDE Program Costs

IDDE Program Component		Start Up Cost	Annual Cost
1: Audit	Perform Audit	\$3K - \$9K	--
	Initial Program Plan	\$1K - \$3K	--
2: Authority	Adopt Ordinance	\$1K - \$17K	--
	Tracking System	\$2K - \$15K	\$2K
3: Desktop Assessment	Desktop Analysis	\$1K - \$4K	--
	Field Mapping	\$500 - \$1K	--
4: Goals & Strategies	Develop Goals	\$1K - \$3K	--
	Field Monitoring Strategy	\$1K - \$3K	--
5: Search for Discharges	ORI	--	\$5.7K - \$12.8K
	Establish Hotline	\$1.3K - \$7.7K	\$1.5K - \$11.4K
	Sample Analysis	\$500 - \$15.5K	\$9K - \$21.2K
	Outfall Map	--	\$500 - \$1K
6: Isolate & Fix Discharges	Isolate	--	\$2K - \$5.2K
	Fix	--	\$10K - \$30K
7: Prevent Discharges	Education	\$1K - \$8.1K	\$1.3K - \$13.9K
	Enforcement	--	\$1K - \$14K
8: Tracking & Evaluation	Program Administration	\$10K - \$15K	\$10K - \$15K
TOTAL		\$23,300 - \$101,300	\$43,000 - \$126,500

Top 15 Tips for Effective IDDE Programs

1. Go after continuous sewage discharges first
2. Put together an interdisciplinary and interagency IDDE development team
3. Educate everybody about illicit discharges
4. Understand your infrastructure
5. Walk all of your streams in the first permit cycle

Top 15 Tips

6. Use GPS to create your outfall map
7. Don't develop a monitoring plan until you understand your discharges
8. Utilize a simple outfall tracking system to organize your data
9. Outsource some functions to local watershed groups
10. Utilize a hotline as an education and detection tool

Top 15 Tips

11. Cross-train all local inspectors
12. Target your precious storm water education dollars
13. Stress public health and safety benefits of sewage-free streams
14. Calibrate your program resources to the magnitude of your problem
15. Think of discharge prevention as a tool of watershed restoration

Additional Resources

All these documents can be accessed from www.cwp.org

- *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments* (CWP and Robert Pitt, 2004)
- ORI Field Sheet & Database
- Illicit Discharge Hotline Incident Tracking Sheet
- Chemical Mass Balance Model (CMBM) Setup & Input File
- *Inappropriate Discharge Detection and Elimination: What Phase I Communities Are Doing to Address the Problem* (Zielinski and Brown, 2003)

Additional Resources

- *Illicit Discharge Detection And Elimination Manual* (NEIWPPC, 2003)
 - www.neiwppcc.org/iddmanual.pdf
- *A Guidance Manual for Identifying and Eliminating Illicit Connections to Municipal Separate Storm Sewer Systems* (Galveston County Health District, 2002)
 - www.gchd.org/pages/pollution/GuideManual.pdf
- The Rouge River Project Illicit Discharge Elimination Program
 - www.rougeriver.com/techtopy/illicit/index.html