


Environmental Indicator Profile Sheet

	<p>Indicator Profile No. 21</p> <p>No. of Illicit Connections Identified/Corrected</p> <p>Category: Programmatic</p>	<p>Tools Used to Measure Indicator:</p> <ul style="list-style-type: none"> • Investigative monitoring using wet and dry weather sampling, visual observations, GIS, dye testing, smoke testing, etc.
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Description:
 This indicator involves the identification and correction of illegal and/or improper waste discharges into storm drainage systems and receiving waters. Dry weather flows potentially contribute substantial loadings to receiving waters. Jurisdictions have programs to identify, prioritize pollutants, and implement corrective actions to eliminate or minimize these non-stormwater entries.

Utility of Indicator to Assess Stormwater Impacts:

- Since illicit connections can contribute substantially to pollutant loadings, the number identified and corrected can have a direct and immediate effect on water quality.
- Can be used as a measure to assess the effectiveness of a municipality's overall stormwater program.
- Sampling can help define the frequency and severity of illegal discharges to the storm sewer system (i.e., non sanitary system).

Advantages of Method:

- Results are easily interpreted by politicians and administrative officials which help make programs sustainable and justify funding.
- Can be part of a citizen volunteer monitoring program.
- Helps many communities identify the locations and size of all storm and sanitary outfalls. Often many are "lost" over time due to poor record keeping.

Disadvantages of Method:

- The number of illicit connections identified is not necessarily representative of the total number of illicit connections in existence.
- Programs to identify, prioritize, and correct illicit connections can be very costly to operate and personnel training can be expensive.
- Does not measure the hydrological impact of storm flows in the pipe system.
- Site-specific monitoring may be required to characterize volume of flow and pollutant constituents of illicit connection.

Indicator Useful for Assessing:

- * Aquatic Integrity of:
 - Lakes
 - Streams
 - Estuaries
- * Land Use Impacts
- * Stormwater Mgmt Programs
- * Whole Watershed Quality
- * Industrial Sites
- * Municipal Programs

Key:

Very Useful

Mod. Useful

Not Useful

Indicator Advantages

- * Geographic Range
- * Baseline Control
- * Reliable
- * Accuracy
- * Low cost
- * Repeatable
- * All Watershed Scale
- * Familiar to Practitioners
- * Easy to use & Low training

Key

Very Advantageous

Mod. Advantageous

Not Advantageous

Cost

See Table 3.3E

Case Study: Minor, J.D., 1995**Finding Illicit Connections and Discharges with P²IL**

Torno, J.C. (ed.) 1995. Stormwater NPDES-related monitoring needs. Conference proceedings. American Society of Civil Engineers. Mt Crested Butte, CO. August 7-12, 1994

Finding illicit connections for the City of Scarborough, Ontario, Canada, located on the north shore of Lake Ontario, requires dedicated *Programs* and *Procedures*, executed with *Intuition* and *Luck* (P²IL). The City of Scarborough with a population of approximately 550,000, is about 85% developed. Sixteen per cent of the total area is within industrial districts. There are approximately 400 industrial/commercial/institutional (ICI) sites with stormwater discharges. The City has more than 800 storm drainage outfalls draining to three watercourses. Pollution prevention efforts occupy approximately 6000 manhours per year, equipment and lab costs are approximately \$50,000 (CDN) and start up costs were approx. \$200,000 CDN. The drainage system with outfalls has been mapped using GIS, waterways are monitored during wet and dry weather, and problem outfalls are identified with chemical, biological and visual techniques. Outfalls are further evaluated using flow meters, non-intrusive sensors, video cameras, dye testing, smoke testing, and pressure testing for the presence of illicit connections.

Method References:

- Identification of Illicit Connections: Pitt, R.; M. Lalor, D.D. Adrian, R. Field, D. Barbe, 1993. *Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems: A User's Guide.*, Alabama Univ. In Birmingham. Dept. of Civil Engineering. EPA-600-R-92-238.
- Discharge Characterization: Schmidt, S.D.; D.R. Spencer, 1986. Magnitude of Improper Waste Discharges in an Urban System. *In: Journal of the Water Pollution Control Federation*. Vol. 58, No. 7, July, 1986, pp. 744-748.