

# Illicit Discharge Detection and Elimination:

## Desktop Analysis of Illicit Discharge Potential (IDP)



# Desktop Assessment of Illicit Discharge Potential (IDP)

- ▶ Purpose:
  - Determine the potential severity for illicit discharges
  - Identify which subwatersheds or generating land use merit priority investigation
- ▶ Elements:
  - Delineate subwatersheds
  - Compile mapping and data
  - Compute discharge screening factors
  - Characterize IDP across subwatersheds
  - Generate maps to support field investigation

# 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

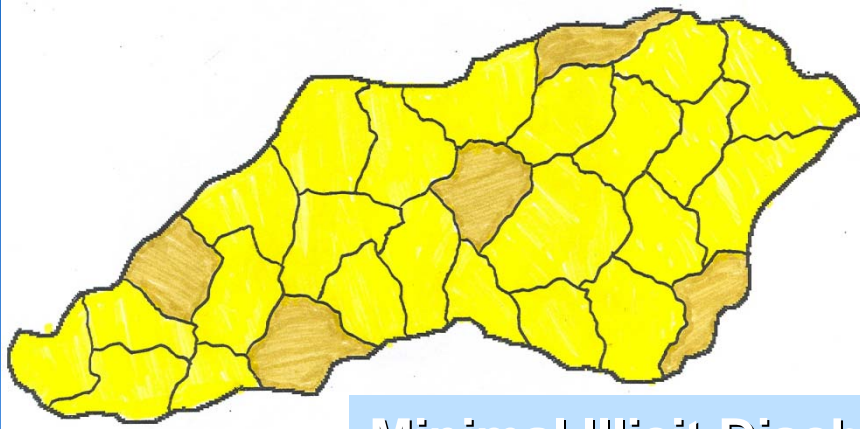
**Select the factors that apply most to your community**

# Prioritizing Subwatersheds Using IDP Screening Factors

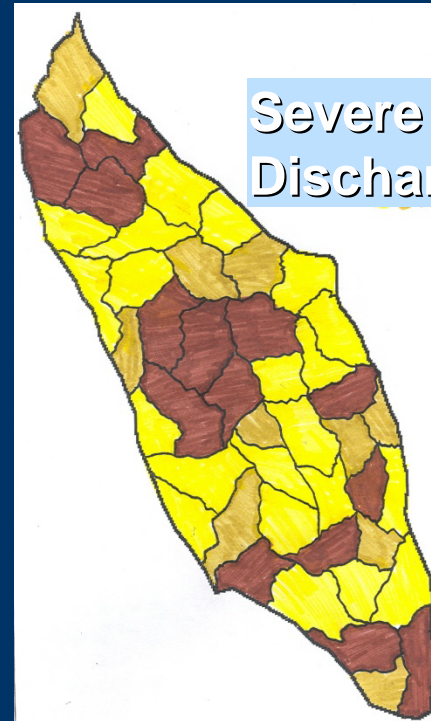
Subwatershed	Past discharge complaints	Poor dry weather WQ	Density of SW outfalls	Average age of dev.	Raw IDP score	Normalized IDP score
Subwatershed A	8 (2)	30% (2)	14 (2)	40 (2)	8	2
Subwatershed B	3 (1)	15% (1)	10 (2)	10 (1)	5	1.25
Subwatershed C	13 (3)	60% (3)	16 (2)	75 (3)	11	2.75
Subwatershed D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

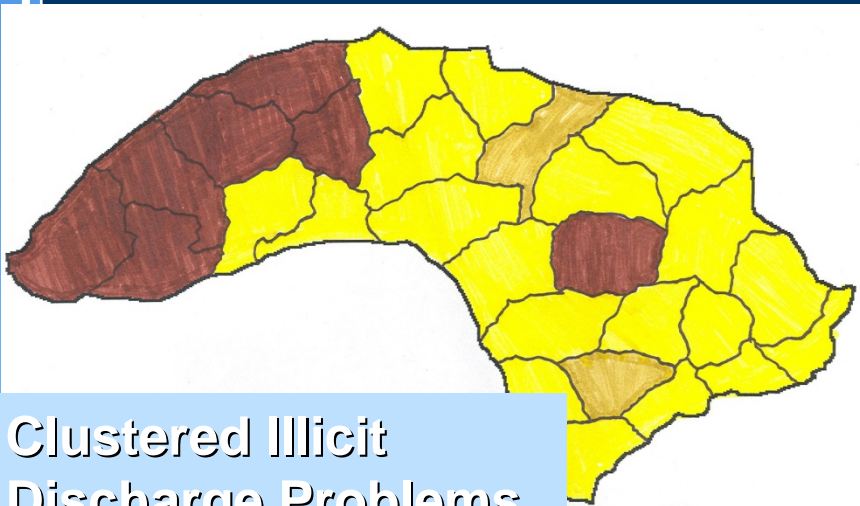
# Communities with...



Minimal Illicit Discharge Problems

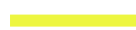




Severe Illicit Discharge Problems



Clustered Illicit Discharge Problems

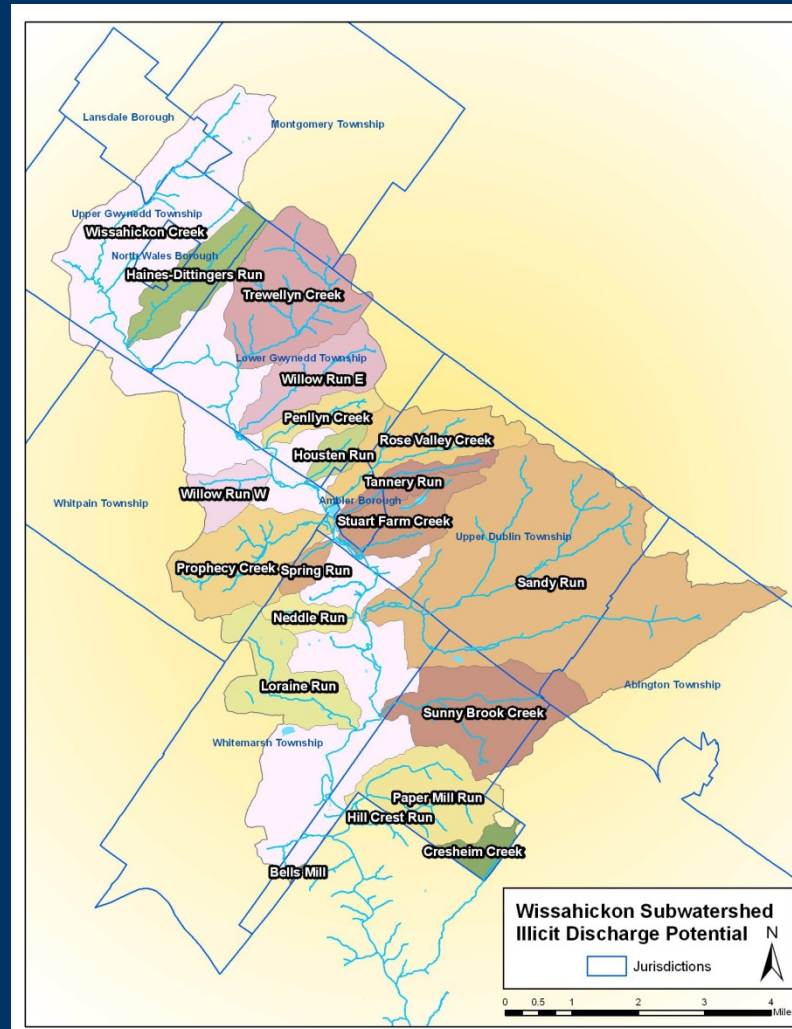
**Key:**

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

# Conditions Driving Program Setup

- ▶ Minimal problems
  - broader stream assessment program
- ▶ Clustered problems
  - confined subwatersheds, reaches, or specific industries where history of suspect discharges exist
- ▶ Severe problems
  - recognize that IDDE program will need significant commitment (staff, equipment, budget) for improvements to be realized

# Wissahickon IDP



# Wissahickon IDP – Subwatershed Screening Factors

- ▶ Outfalls per mile\*
- ▶ Flowing outfalls per mile\*
- ▶ Number of permitted dischargers
- ▶ Percent of subwatershed without stormwater controls
- ▶ Land use\*
- ▶ Thermal anomalies per mile (2 scenarios run – with and without thermal anomalies)\*

\*Data from Philadelphia Water Department & national GIS data sources

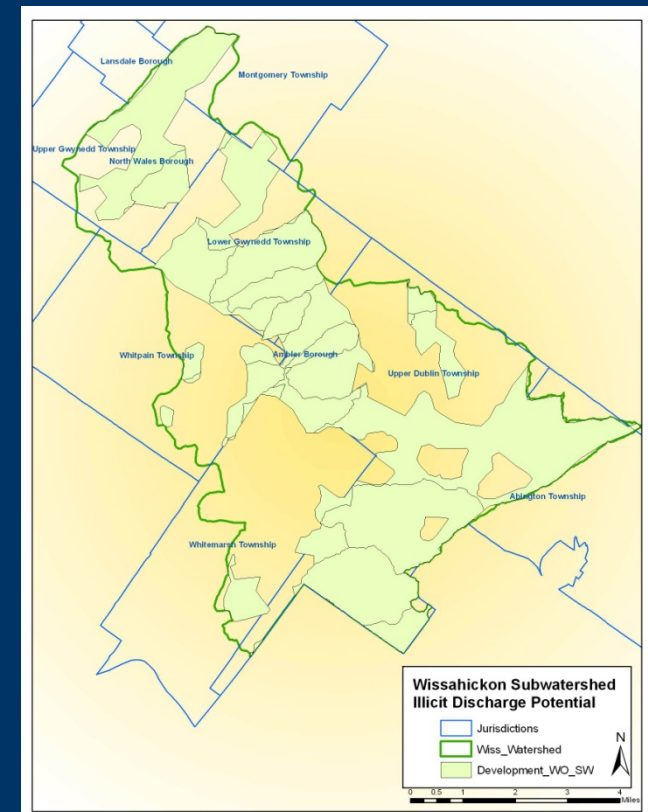
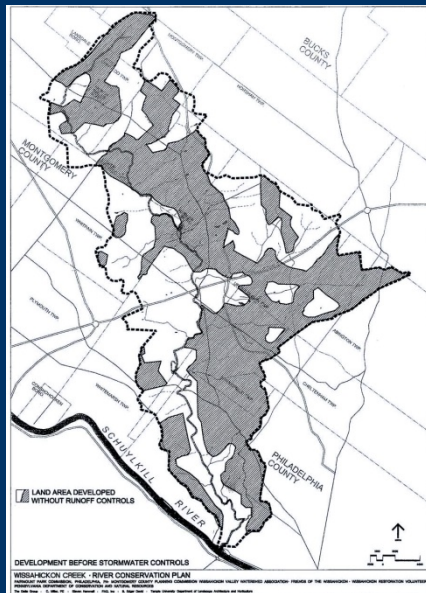


# Metric Breakdown

- ▶ Outfalls per mile – clip streams and outfalls each to subwatershed boundaries for ratio
- ▶ Flowing outfalls per mile – same as above; obtained from attribute field of PWD's field verification of thermal imagery data that indicated flow was present
- ▶ No. of permitted dischargers – from EPA's Enforcement and Compliance History (ECHO)

# Metric Breakdown

- ▶ Percent of subwatershed developed prior to stormwater regulations – surrogate for age of development
- ▶ Map was digitized into GIS



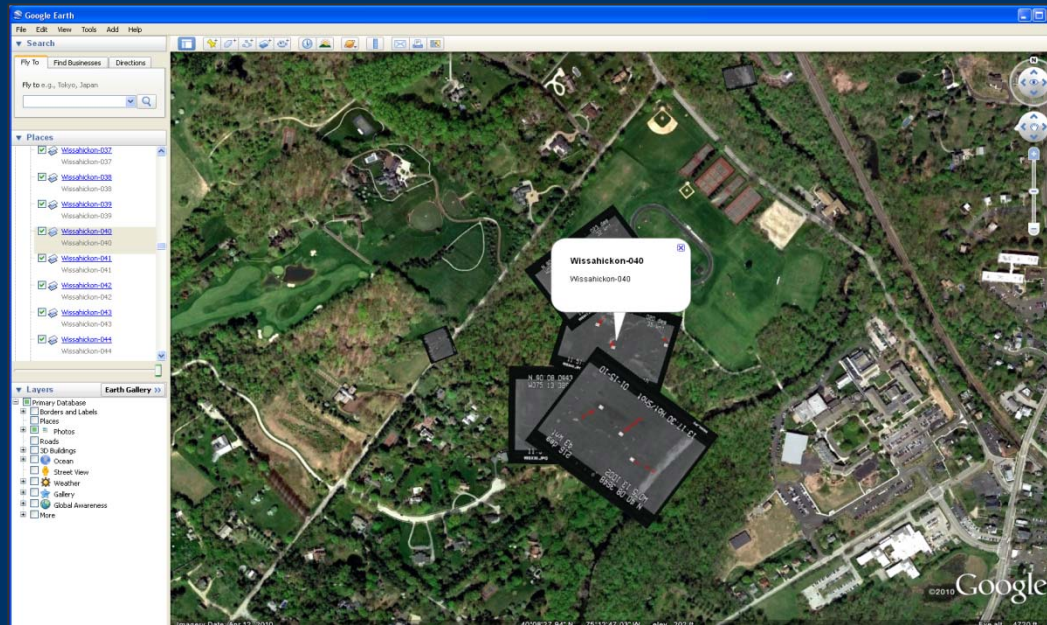
Source: Wissahickon River Conservation Plan (2000)

# Metric Breakdown

- ▶ Land Use – broken down as percent of subwatershed institutional/industrial/commercial and percent of subwatershed residential
- ▶ Thermal anomalies per mile – same as outfall

# Thermal anomalies

- ▶ Use of infrared video camera from the air to record images of heat radiating from the Earth; uses differential temperature between ground and stream surfaces (which remain relatively constant) and warmer areas to locate possible pollution sources

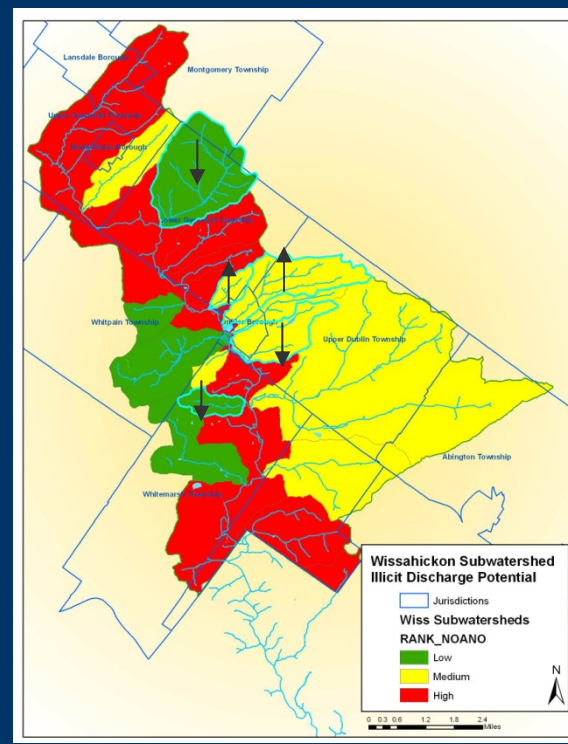
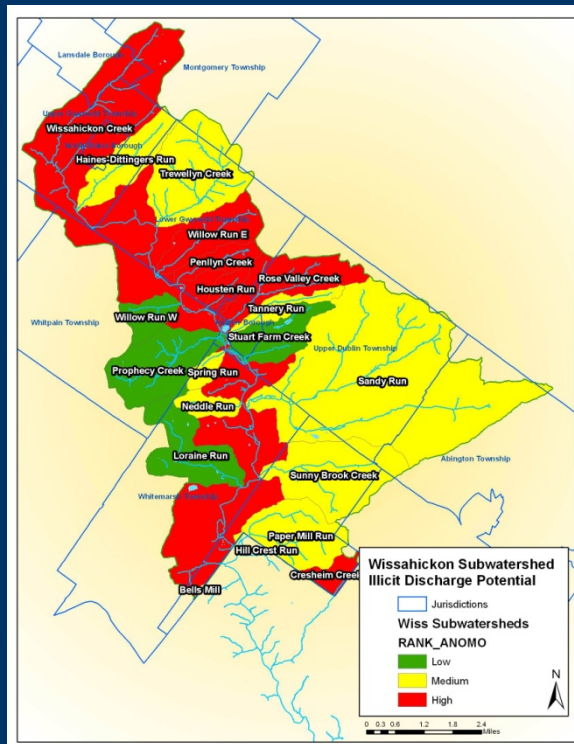


# Metric ranking for IDP

Metric	Low (1)	Medium (2)	High (3)
Outfalls per mile	<10	10-20	>20
No of permitted dischargers	<1	1-3	>4
Flowing outfalls per mile	<1	2-3	>3
% of subshed developed w/o SWM	<50%	50-75%	>75%
Thermal anomalies per mile	<1	2-3	>3
% of subshed w/ commercial land use	<10%	10-20	>20
% of subshed w/ residential land use	<30%	30-45%	>45%

# Results

- ▶ Results of individual ranks are summed and normalized (divided by total number of ranking factors)



# Other information to add into analysis...

- ▶ Water quality monitoring data – esp. dry weather data for nutrients and bacteria
- ▶ Aging or failing sewers
- ▶ Past discharge complaints
- ▶ Other pertinent locally collected data (e.g. field verified outfall data)

# Q/A

