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	

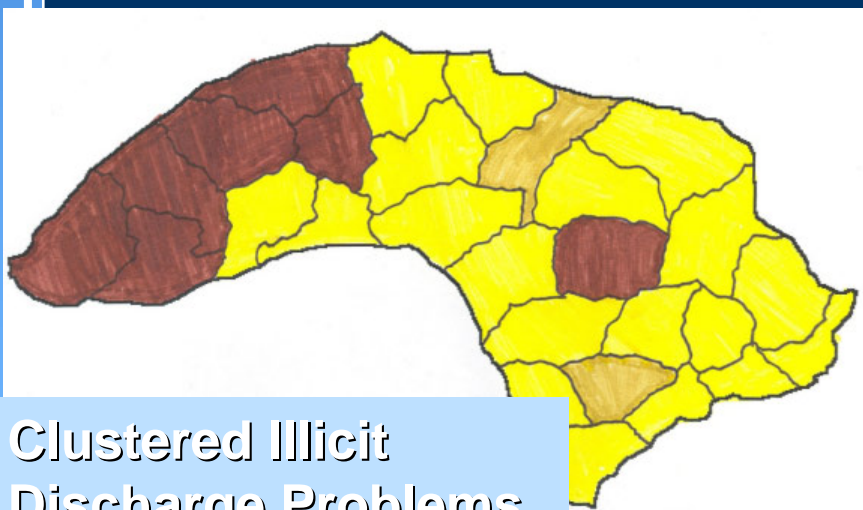# Communities with…
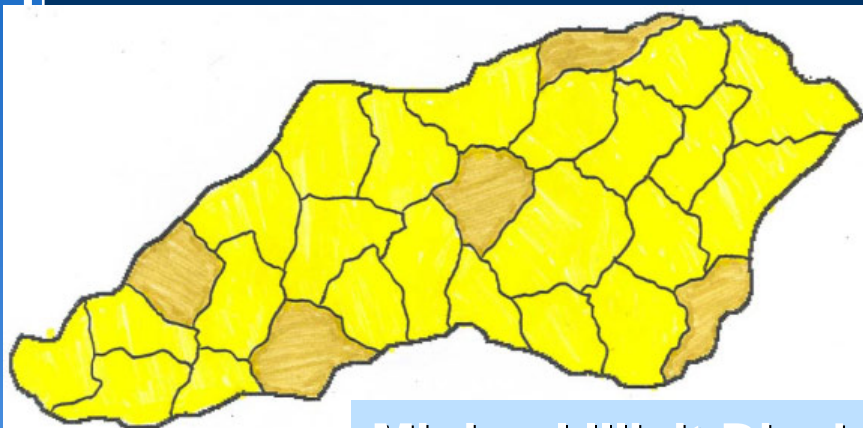
Minimal Illicit Discharge Problems
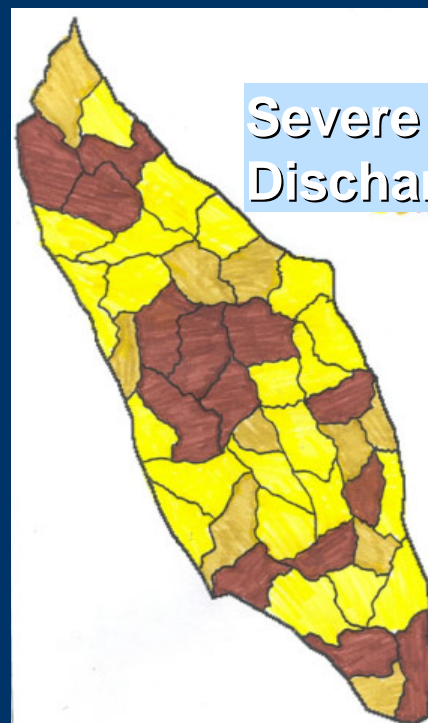
Severe Illicit Discharge Problems

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
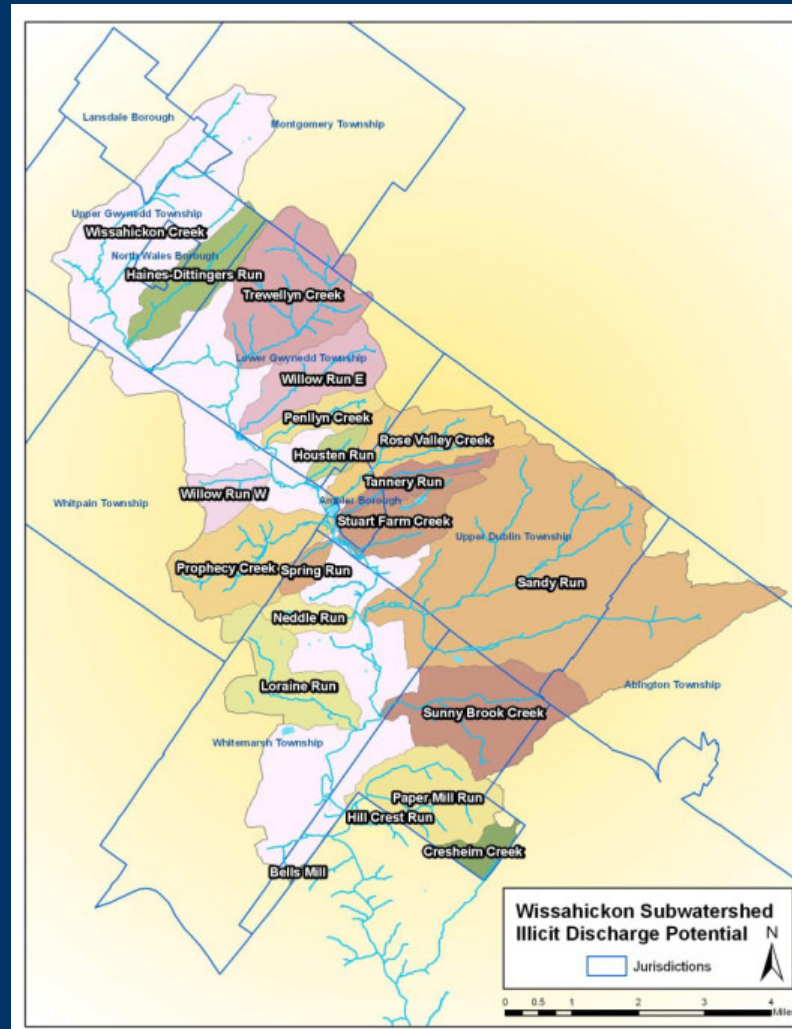
Wissahickon IDP – Subwatershed Screening Factors

▸ 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

Wissahickon Subwatershed
Illicit Discharge Potential

Jurisdictions
Wiss_Watershed
Development_WO_SW
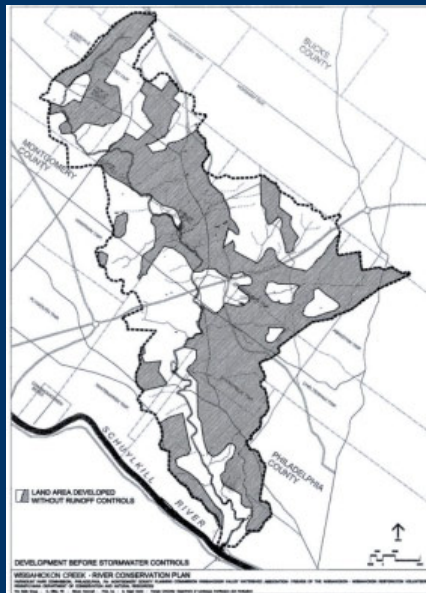
Source: Wissahickon River Conservation Plan (2000)
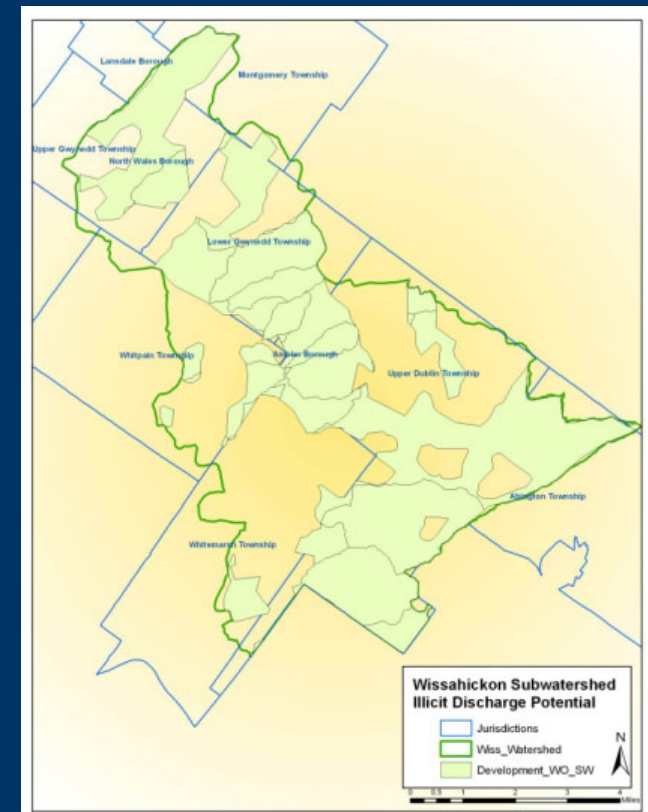
Metric Breakdown

▸ 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
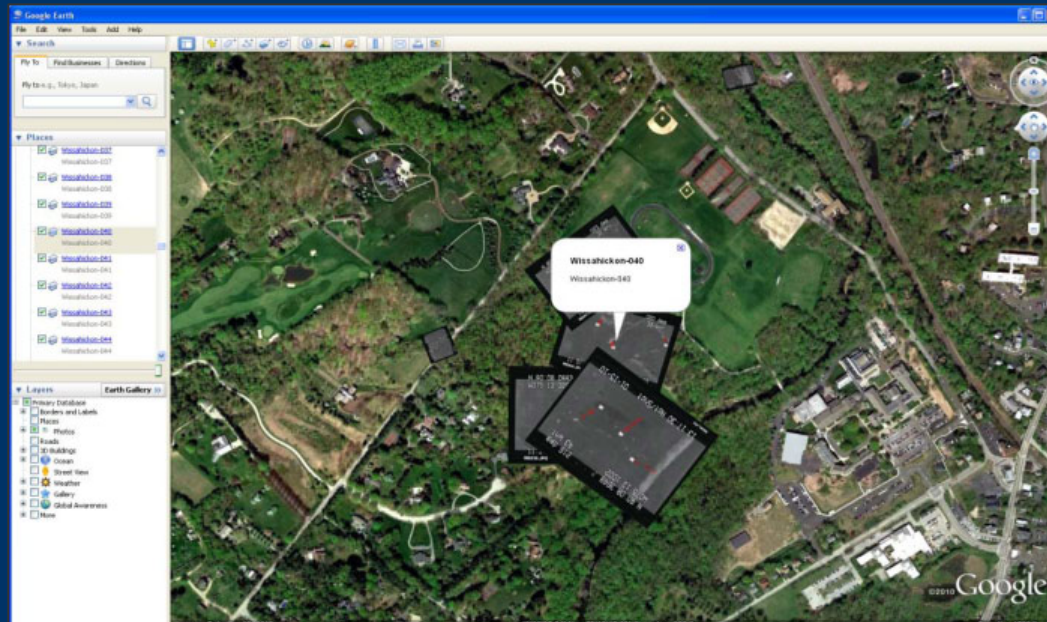
Metric ranking for IDP

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)
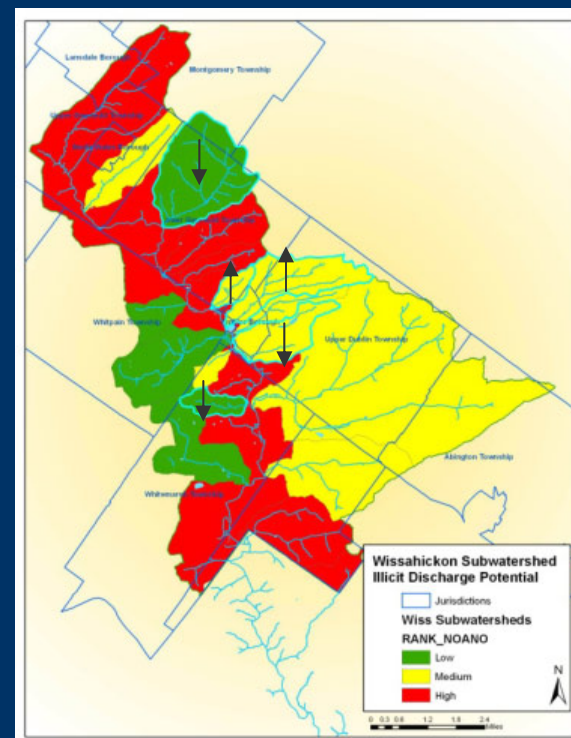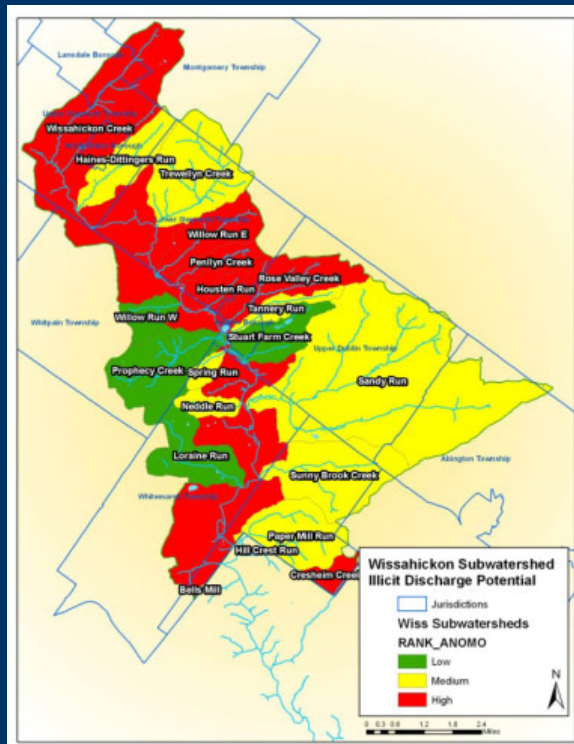
Other information to add into analysis...

▸ 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