Nonstormwater Discharge Pollution Loading from Two Mid-Atlantic Subwatersheds and Implications for Nutrient and Bacteria TMDLs

National Water Quality Monitoring Conference

Lori Lilly

Center for Watershed Protection

Watershed Ecologist/Planner

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Center for Watershed Protection

National non-profit 501(c)3, non-advocacy organization
Mission: to protect, restore, and enhance our streams, rivers, lakes, wetlands, and bays.

Provides technical assistance and tools to watershed groups, local, state, and federal governments
20 staff in MD, VA, & NY
www.cwp.org
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What is an Illicit Discharge?

A discharge to an MS4 that is not composed entirely of storm water except permitted discharges and fire fighting related discharges (40 CFR 122.26(b)(2))

Sources of Illicit Discharges (Reported in Phase I Communities)

- Illegal dumping practices (95%)
- Broken sanitary sewer line (81%)
- Cross-connections (71%)
- Connection of floor drains to storm sewer (62%)
- Sanitary sewer overflows (52%)
- Inflow / infiltration (48%)
- Straight pipe sewer discharge (38%)
- Failing septic systems (33%)
- Improper RV waste disposal (33%)
- Pump station failure (14%)

Discharge Flow Types

Pathogenic & toxic discharges
- Sanitary wastewater
- Commercial & Industrial discharges

Nuisance & aquatic life threatening discharges
- Landscaped irrigation runoff
- Construction site dewatering
- Automobile washing
- Laundry wastes

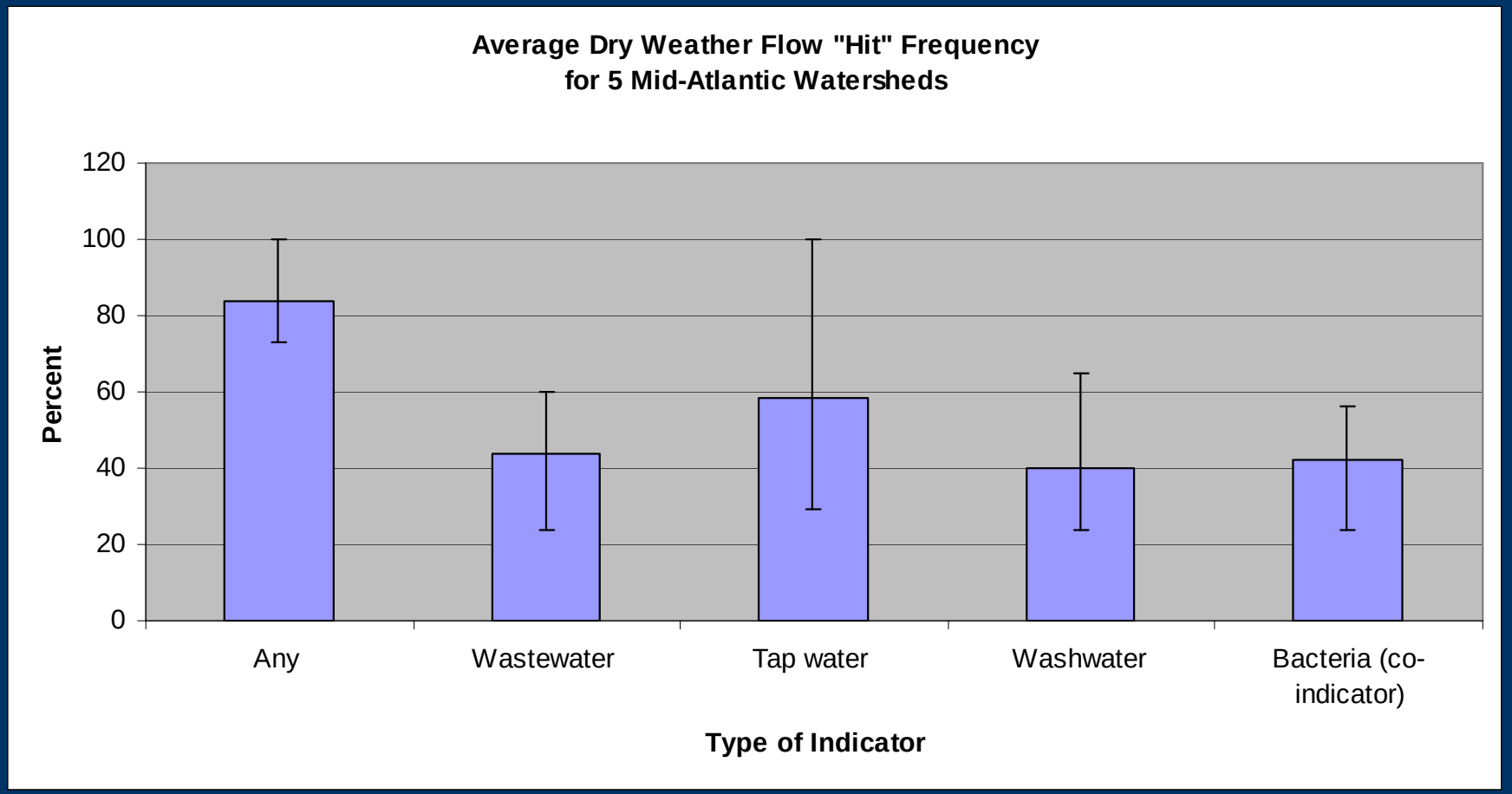
Unpolluted discharges
- Infiltrating groundwater
- Natural springs
- Domestic water line leaks

Sewage Discharges

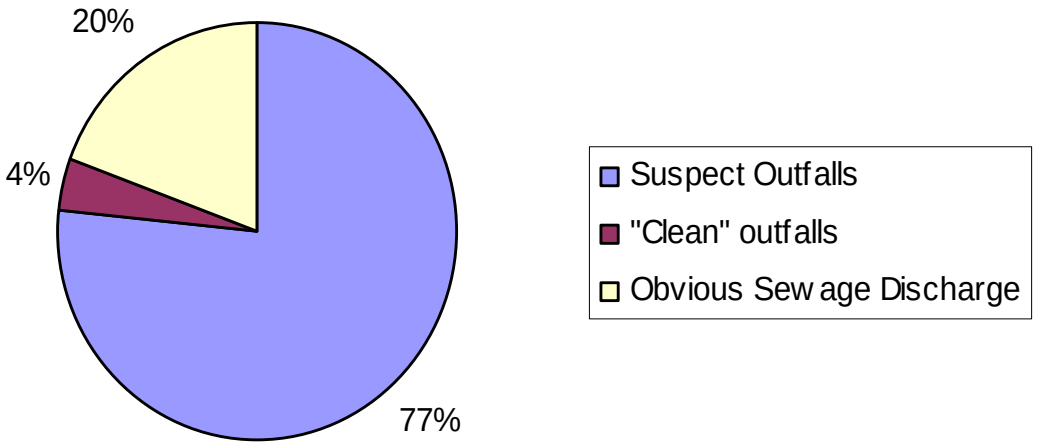
- In urban areas, these may be a bigger problem than previously realized
- Baltimore has spent millions on wet weather repairs to address SSOs – the repairs have had little effect on dry weather water quality (CWP 2011)
- Kaushel et al (2011) found that sewage was the predominant source of nitrogen load during baseflow, even after repairs to the wastewater system were complete

Findings from recent studies

27-40% of outfalls have dry weather flow



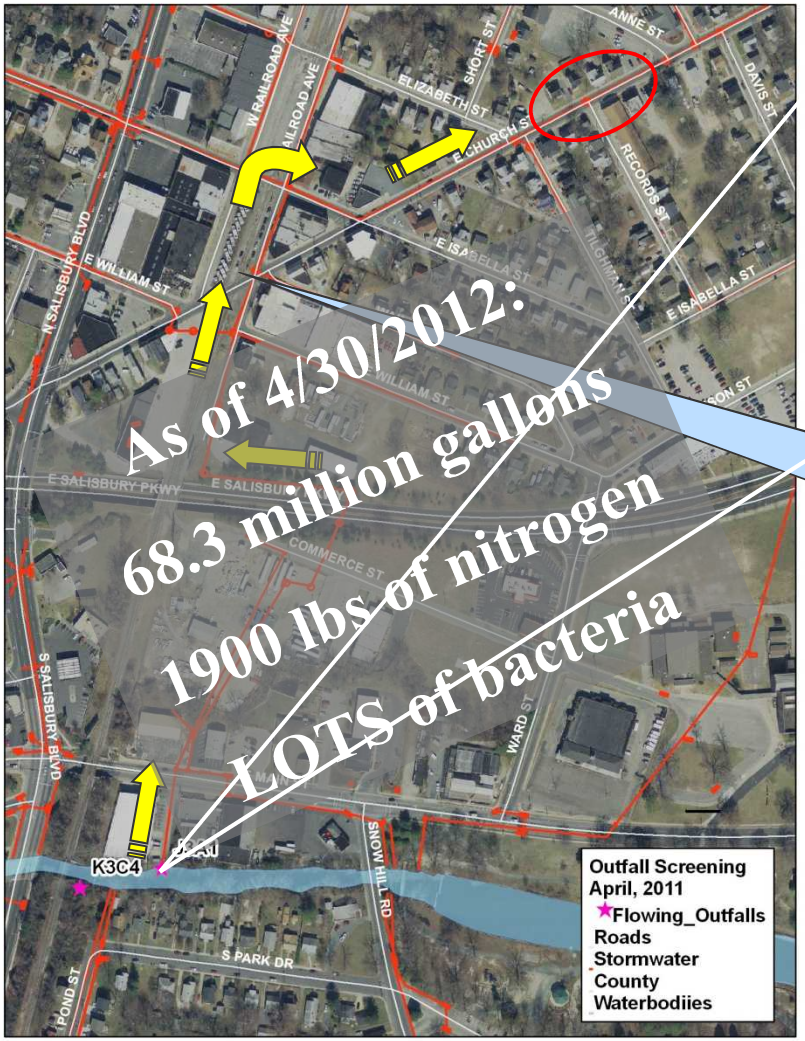
Percentage of Total E.coli in Sligo Creek Outfalls



Pollutant accounting

- Local TMDLs – nutrients and bacteria
- Chesapeake Bay TMDL (largest TMDL ever - 6 states and the District)
- MS4 permits
- Consent decrees
- Safe Drinking Water Act
- CWA Antidegradation Policy

Initial Total Nitrogen Load estimate: 5 lb/day



April 19, 2011

Petroleum smell

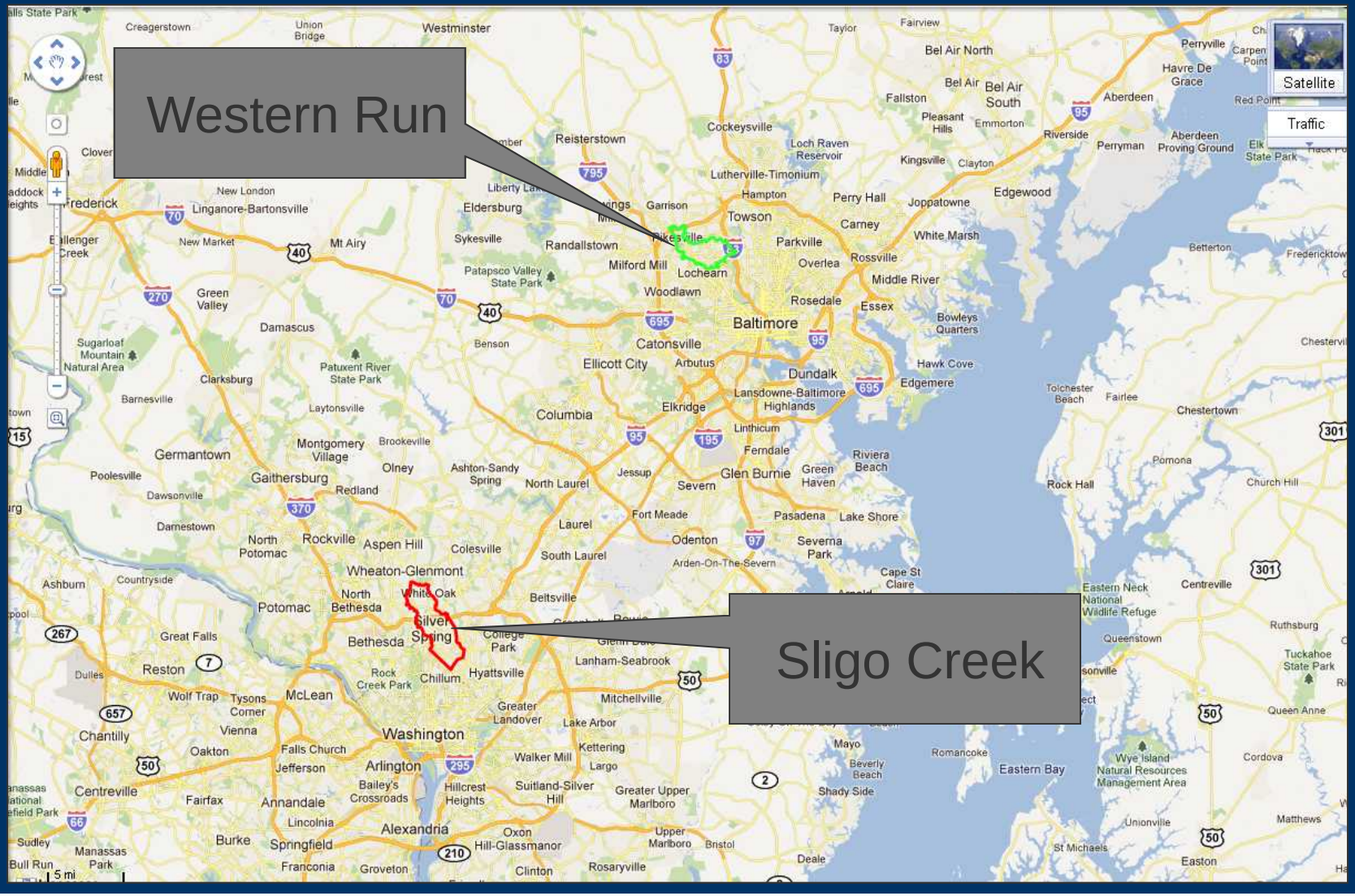
Ammonia: 0.27 mg/l

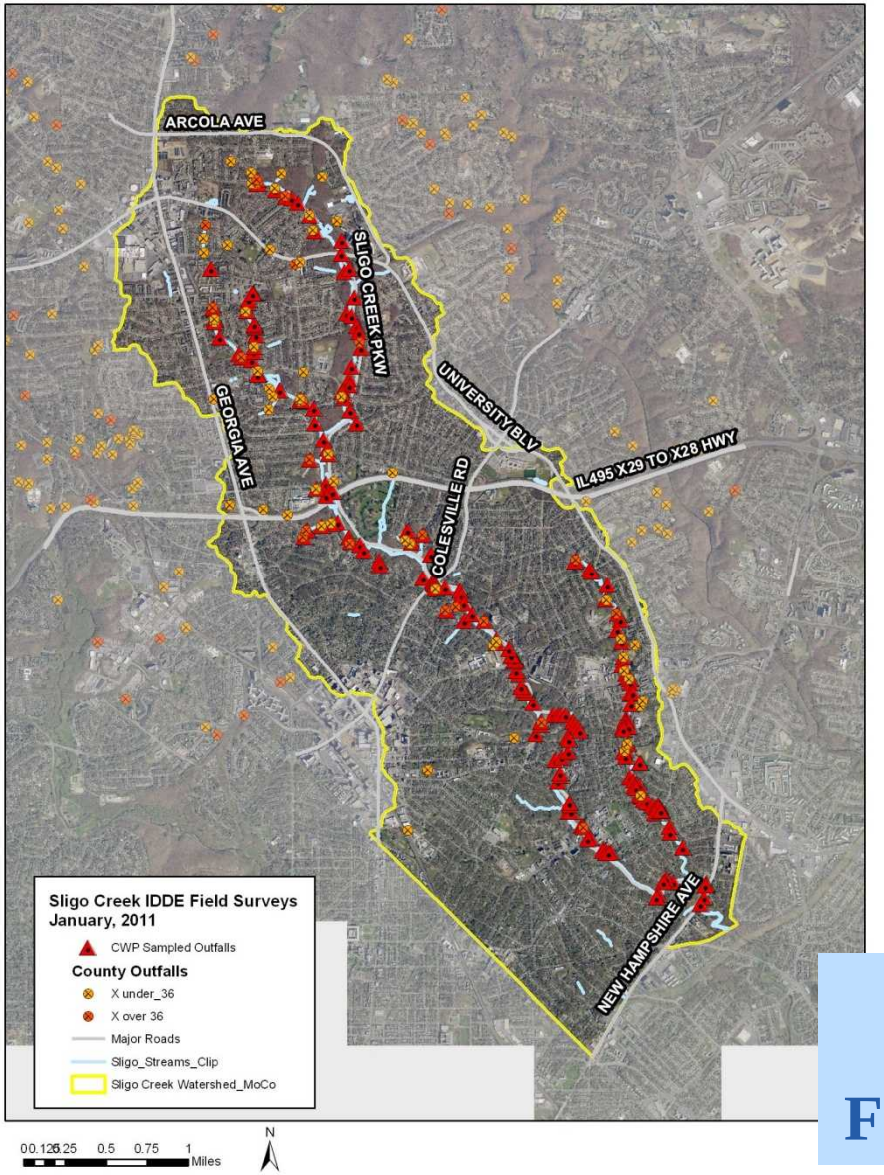
E. coli: 13,200 CFU/100 ml

- **Obvious – should be fixed ASAP**
- **Old combined sewer; some sewer separation was overlooked**
- **300K to fix**

Two flows – both very contaminated – one continuous sewage, the other intermittent industrial

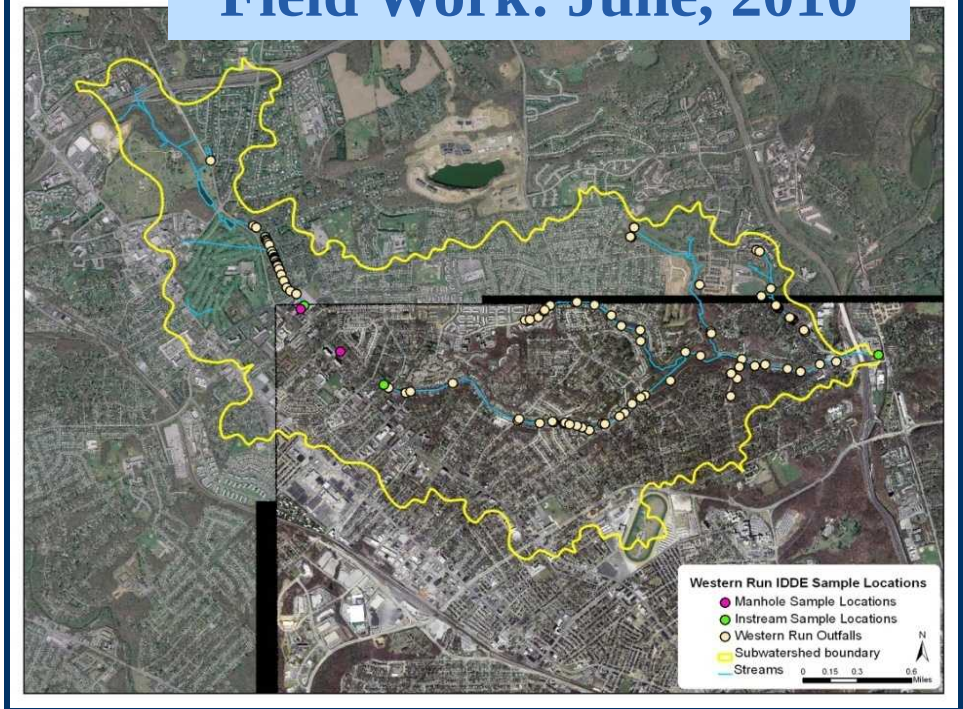
Recent Watershed Studies





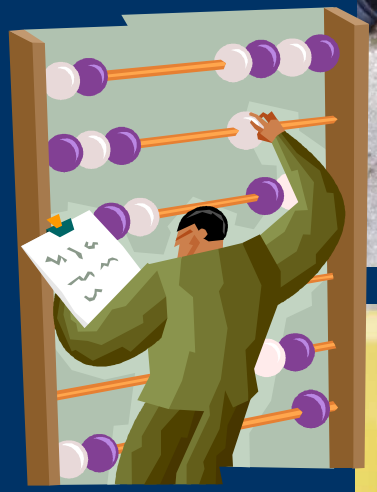
Western Run (5.4 sq mi)

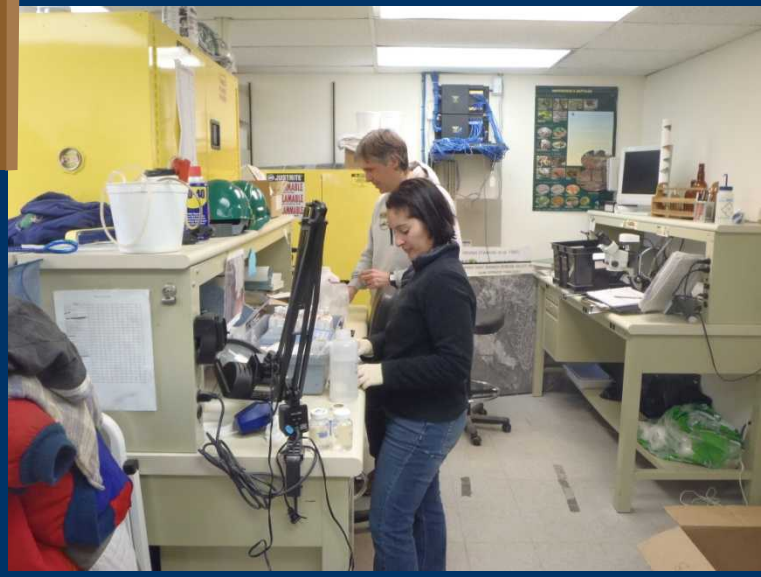
Field Work: June, 2010



Sligo Creek (9.6 sq mi)

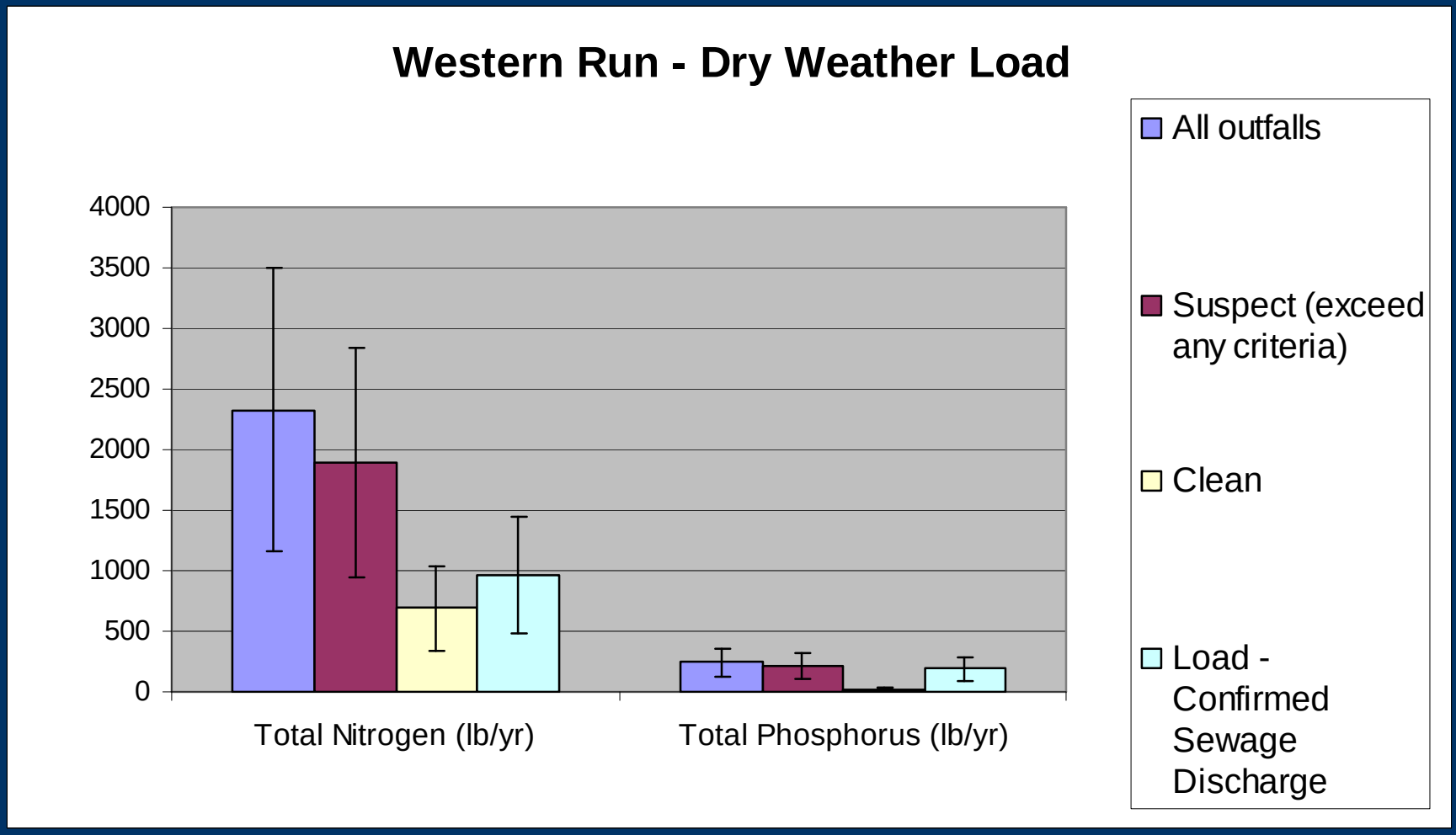
Field work: January, 2011



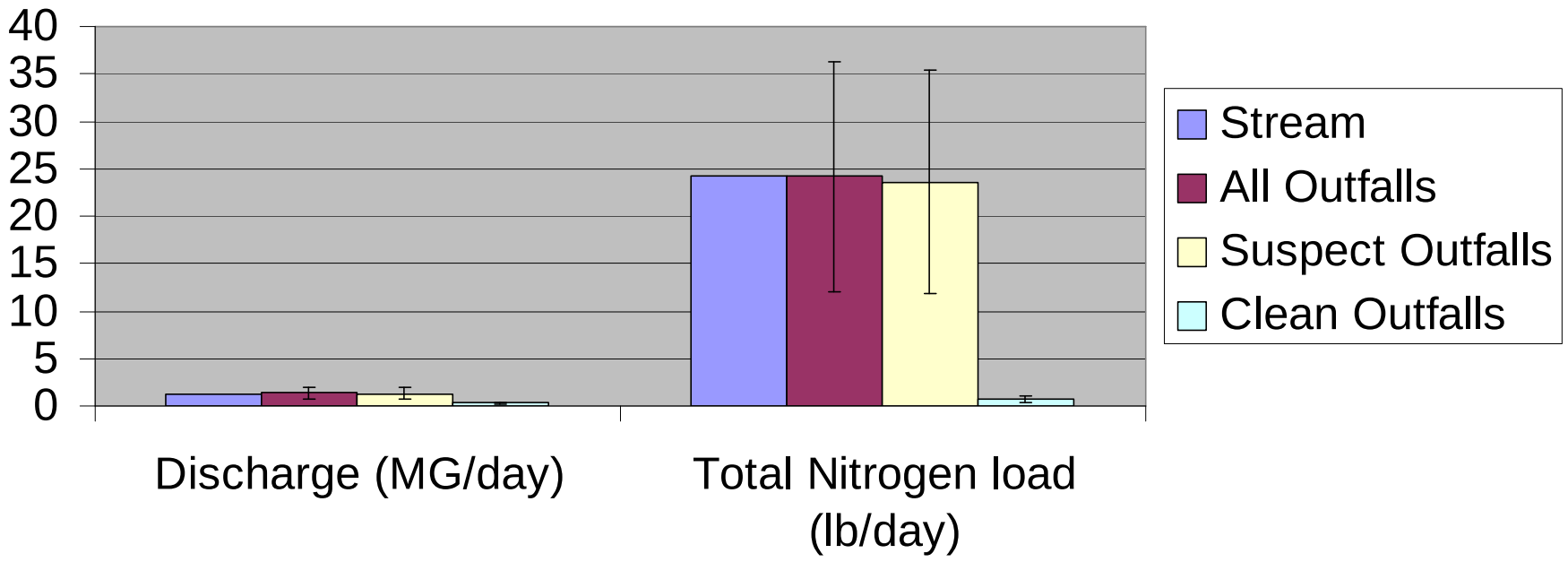


Outfall Reconnaissance Inventory (ORI) Quantitative Assessment

	Parameters Analyzed
In the field	Ammonia
Sample 1	Fluoride
	Anionic Surfactants
	Potassium
Sample 2	Total Nitrogen
	Total Phosphorus
Sample 3	E. coli and Total coliform

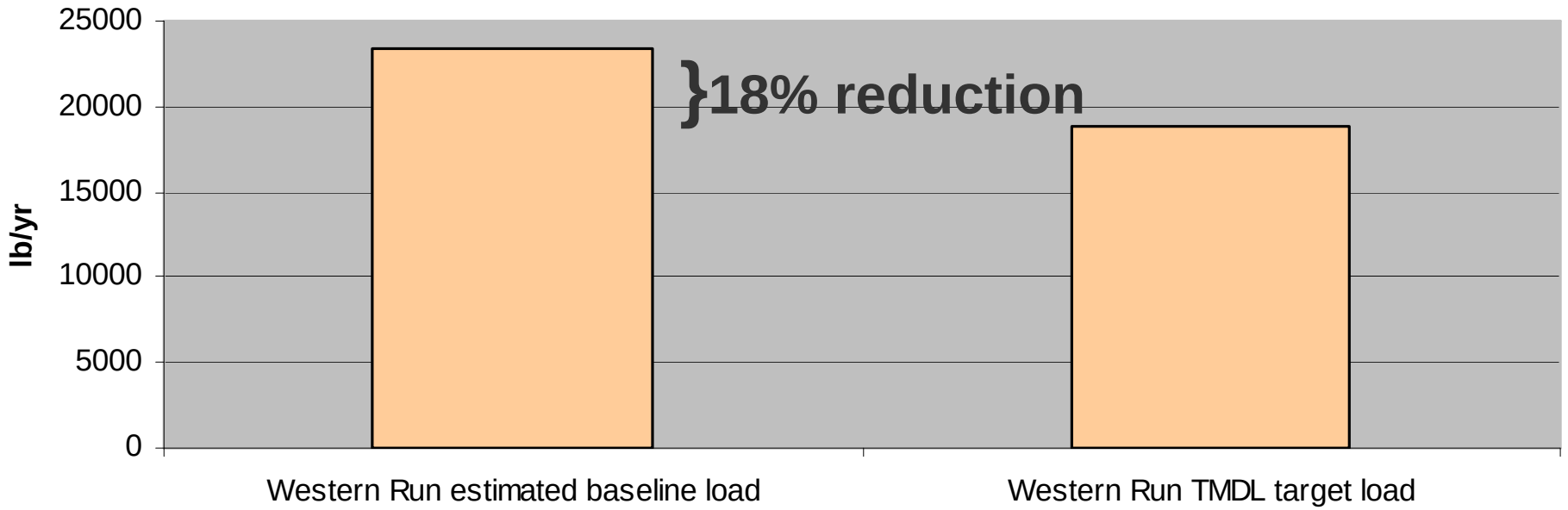

Western Run - Dry Weather Load
4000
3500
3000
2500
2000
1500
1000
500
0
Total Nitrogen (lb/yr)
Total Phosphorus (lb/yr)
All outfalls
Suspect (exceed any criteria)
Clean
Load - Confirmed Sewage Discharge

Sligo Creek
Nitrogen Load Summary



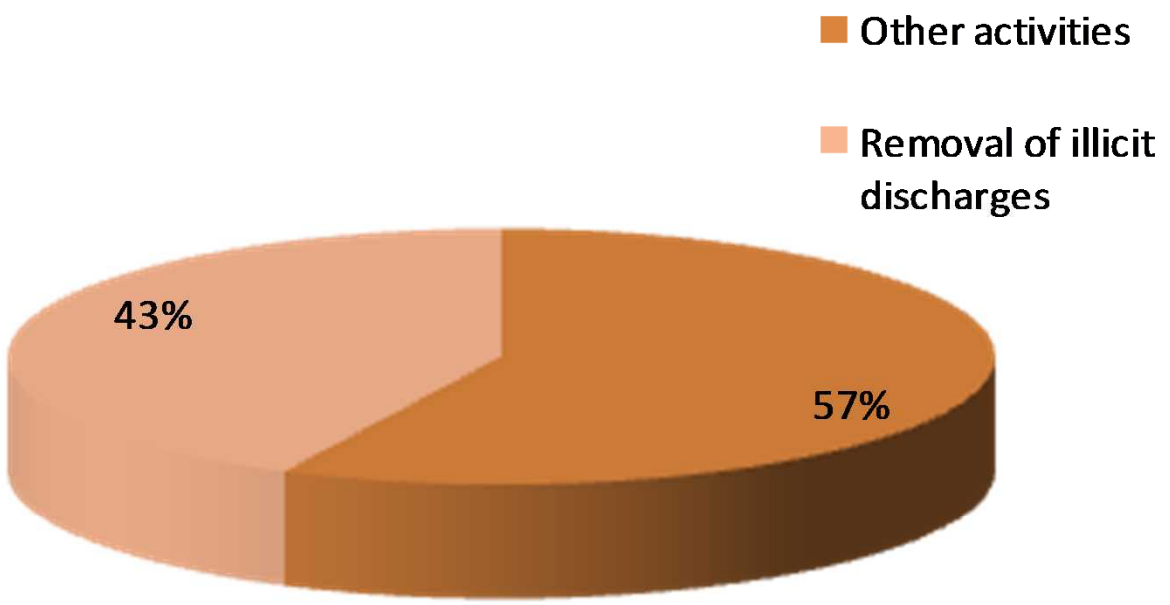
IDDE, meet TMDL

Nitrogen TMDL Load Reduction Estimates for Western Run



*Based on load assumptions derived from CWP, 2008 and Phase I Watershed Implementation Plan estimates for the Chesapeake Bay TMDL.

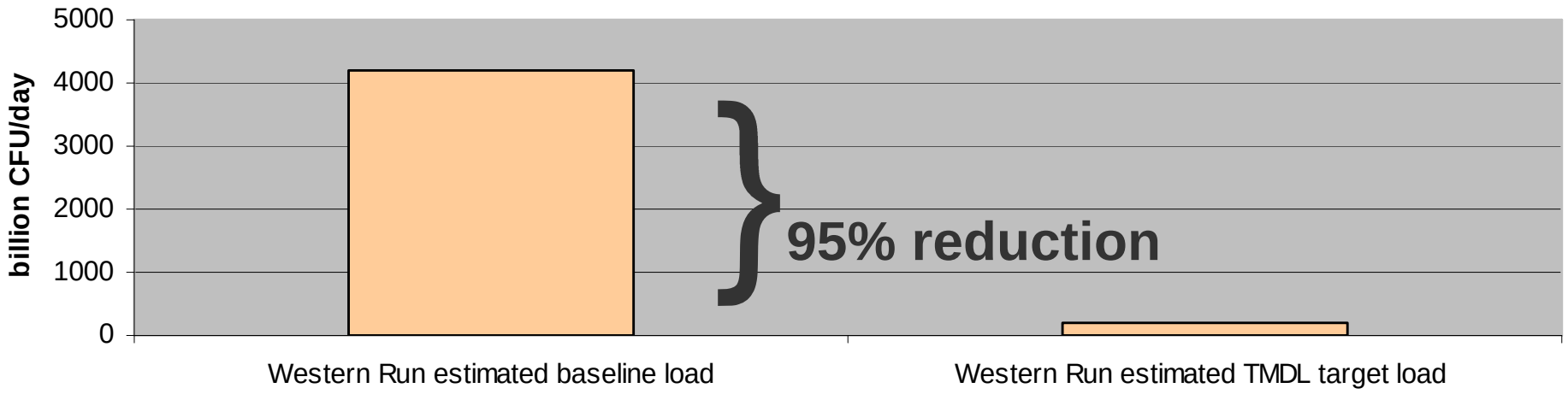
Estimated percent of required total nitrogen reduction that can be met through removal of illicit discharges in Western Run



Sligo Creek required 79% reduction and 17% could met be through illicit discharge elimination

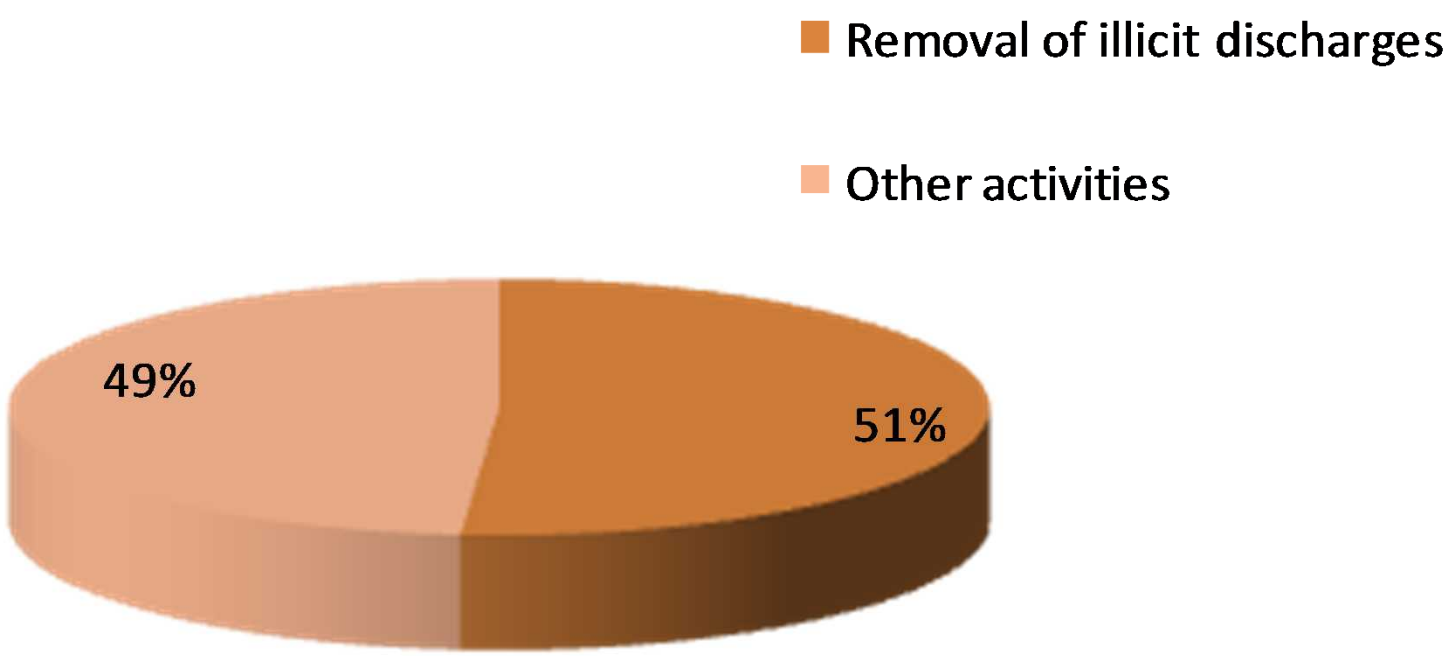
*Illicit discharge load estimates based on single grab sample

Bacteria TMDL Load Reduction Estimates for Western Run



*Based on load assumptions derived from MDE, 2006.

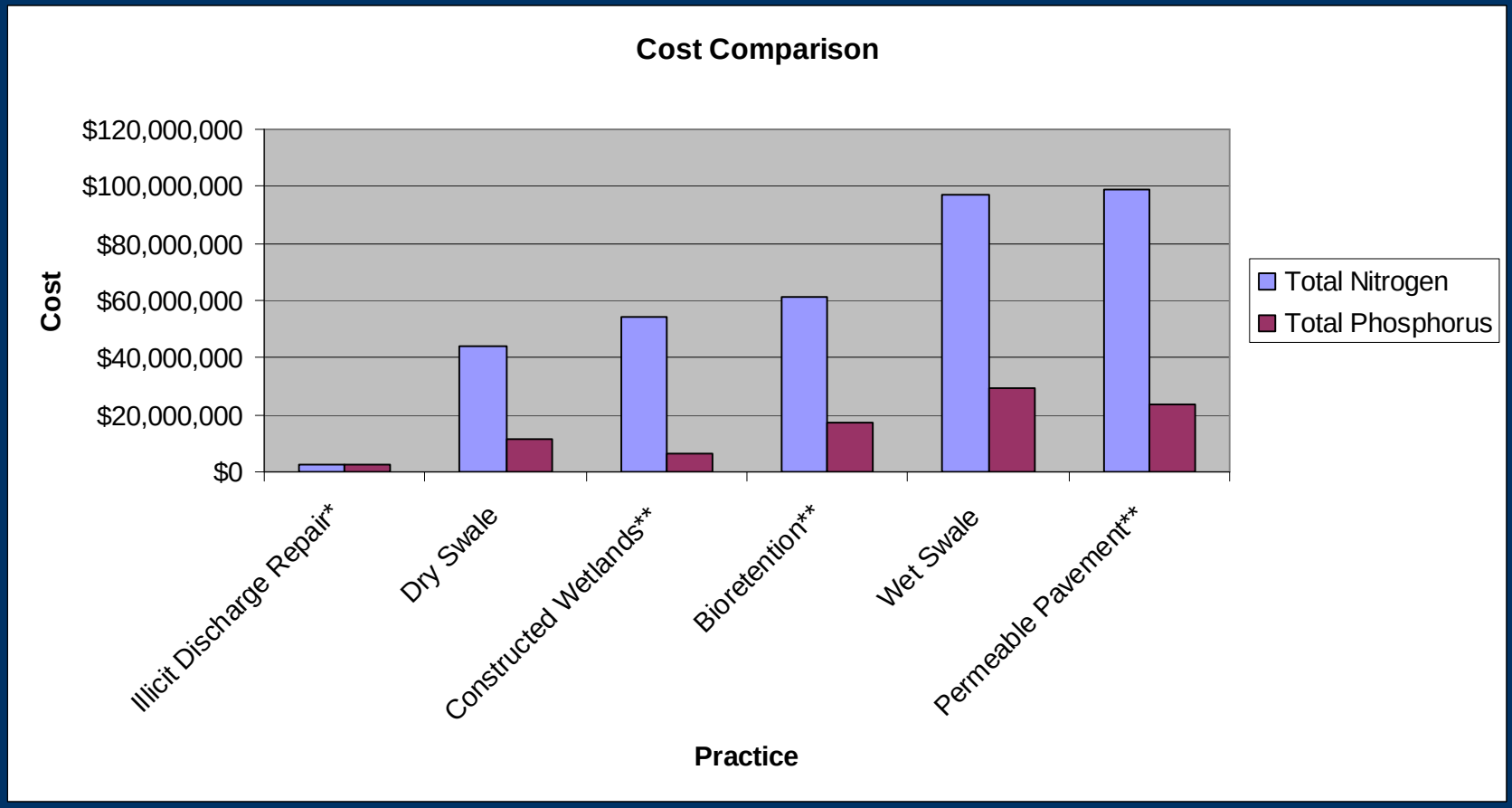
Estimated percent of required bacteria reduction that can be met through removal of illicit discharges in Western Run*



Sligo Creek required 93% reduction and 21% could be met through illicit discharge elimination

*Illicit discharge load estimates based on single grab sample

Illicit discharge elimination is a cost effective approach to nutrient management



*Assumes 50K per repair for 47 repairs

**Assumes 100% of the water quality volume provided by treating 1" of rainfall

Take Home Points

- IDDE can play a significant role in helping to meet TMDL requirements
- IDDE is a cost effective strategy to meet pollution load reduction targets
- Finding and removing illicit discharges can require significant coordination and persistence but can result in significant water quality improvement

Q/A