

NJDOT Research Project 2007-11

“Water Quality Mitigation and Banking”

“... STREAMLINING SUSTAINABLE PROGRAM DELIVERY”

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The RBA Group**

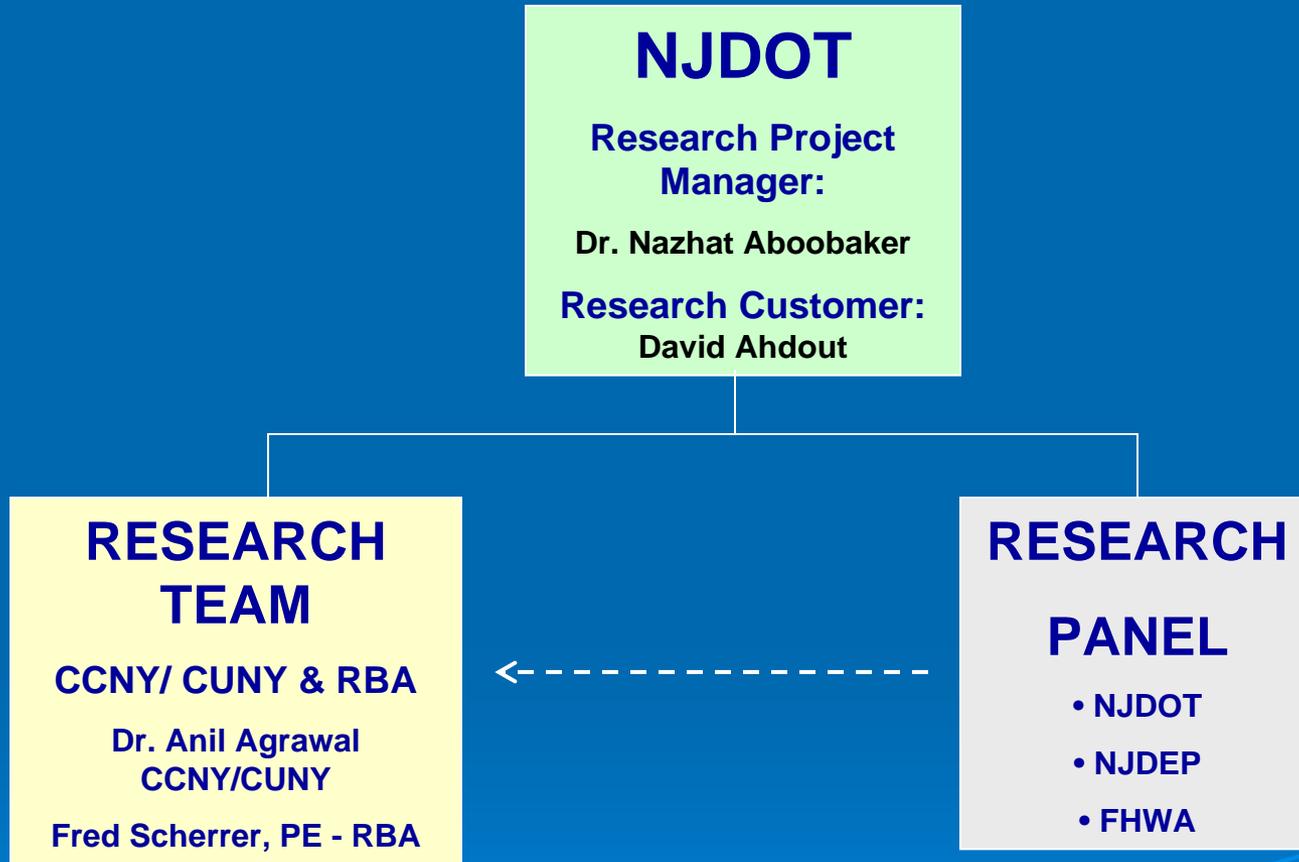
The background of the slide features several concentric, light blue circular ripples that resemble water droplets hitting a surface, scattered across the lower half of the page.

SUSTAINABLE TRANSPORTATION

Programmatic environmental solutions...

- ~ Sustainable**
- ~ Cost effective**
- ~ Streamlined**
- ~ Ideally suited for public works
program delivery**
- ~ Verifiable environmental compliance**

Project Team:



Background:

- **SWM requirements present implementation challenges**
 - ~ 1Ac. Disturbance/ 0.25Ac. Impervious
 - ~ Nature of capital program – widening, intersection improvements, bridges, safety improvements
- **SWM mitigation opportunities severely constrained**
 - ~ Right of Way availability & cost
 - ~ Utility, environmental, land improvements
 - ~ BMP / land use incompatibility
 - ~ Maintenance cost & liability
- **Many, small mitigation sites are less efficient**
 - ~ Soft cost, construction, maintenance
 - ~ Environmental benefits vs. strict compliance
 - ~ Wetland mitigation... lessons learned

STATEWIDE STORMWATER MANAGEMENT RULES (NJAC 7:8)

Three Basic Requirements for “Major Development”:

- **Groundwater Recharge**
 - ~ Maintain annual volume GW recharge per NJGRS or infiltrate increase in 2 year storm runoff volume.
- **Peak Runoff Rate Control**
 - ~ Post construction peak runoff rates for 2, 10, 100 yr storms shall be 50%, 75%, and 80% of pre - construction peak runoff rates.
- ➔ • **Water Quality Control**
 - ~ 80% TSS removal for new pavement.
 - ~ 50% TSS removal for reconstructed pavement.
 - ~ Each BMP method has assigned TSS removal rate (%).

WAIVERS FROM STRICT COMPLIANCE (NJAC 7:8-5.2(e))

Must meet following conditions for each project:

- 1. Demonstrate public need for project.**
- 2. Alternatives analysis demonstrates that all feasible “on site” mitigation has been addressed to the maximum extent practicable.**
- 3. Demonstrate that compliance requires condemnation of existing structures.**
- 4. Demonstrate NJDOT has no upstream land for additional mitigation not achievable on-site (considering land available through condemnation).**

RESEARCH OBJECTIVES:

- **Determine feasibility of stormwater mitigation banking... A prototype demonstration project.**
 - ~ **State owned roads**
 - ~ **Within specified watersheds**
 - ~ **Similar to wetland banking**
 - ~ **Design and construction is not in scope**
- **Develop “*programmatic compliance*” for obtaining hardship waivers from strict compliance.**
- **Provide environmental protection required by rules.**
- **Improve efficiency and effectiveness of stormwater mitigation design, implementation and maintenance.**

RESEARCH APPROACH

REGULATORY FEASIBILITY



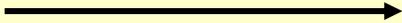
Task 1 - Literature Search & Regulatory Evaluation

Task 2 - Assemble Research Panel

Identify Any Fatal Flaw(s) & Obstacles

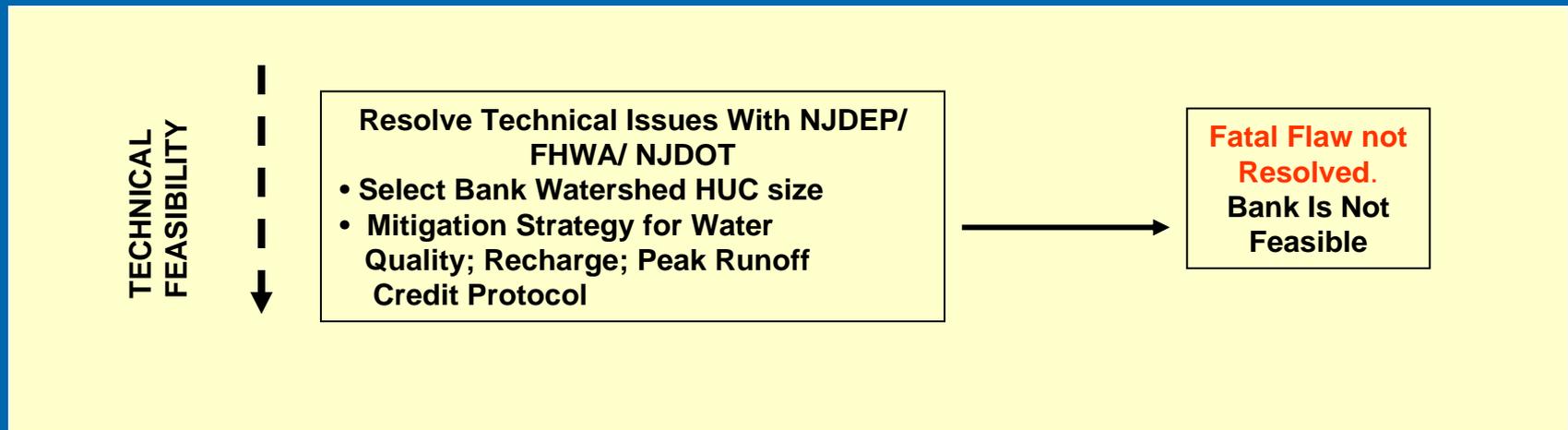
Resolve Fatal Flaws
NJDEP/ FHWA/ NJDOT

Process Agency Agreement



Fatal Flaw not Resolved.
Bank Is Not Feasible

RESEARCH APPROACH



Some Questions to Answer:

1. Watershed size (watershed management area, Hydrologic Unit Code... HUC-11 or HUC-14)?
2. Can / should bank include NJ Transit, county, municipal roads or facilities?
3. How will credit system be set-up (credit system for peak runoff control will be more complicated than credits for water quality and GW recharge)?
4. Can we “*shortcut*” to adapt other models (i.e. Maryland DOT)?

RESEARCH APPROACH

TECHNICAL WORK TO ESTABLISH BANK

Task 3 – Map DOT projects on Watersheds Map & Create Database for Mitigation Tracking

Select Watershed for Bank

Task 4 – Investigate Potential Mitigation Sites Along State Highways for Selected Watershed

Tasks 5 & 6 – Identify Mitigation Areas/ Stormwater Enhancements & Propose Bank Crediting Process & Tracking Program

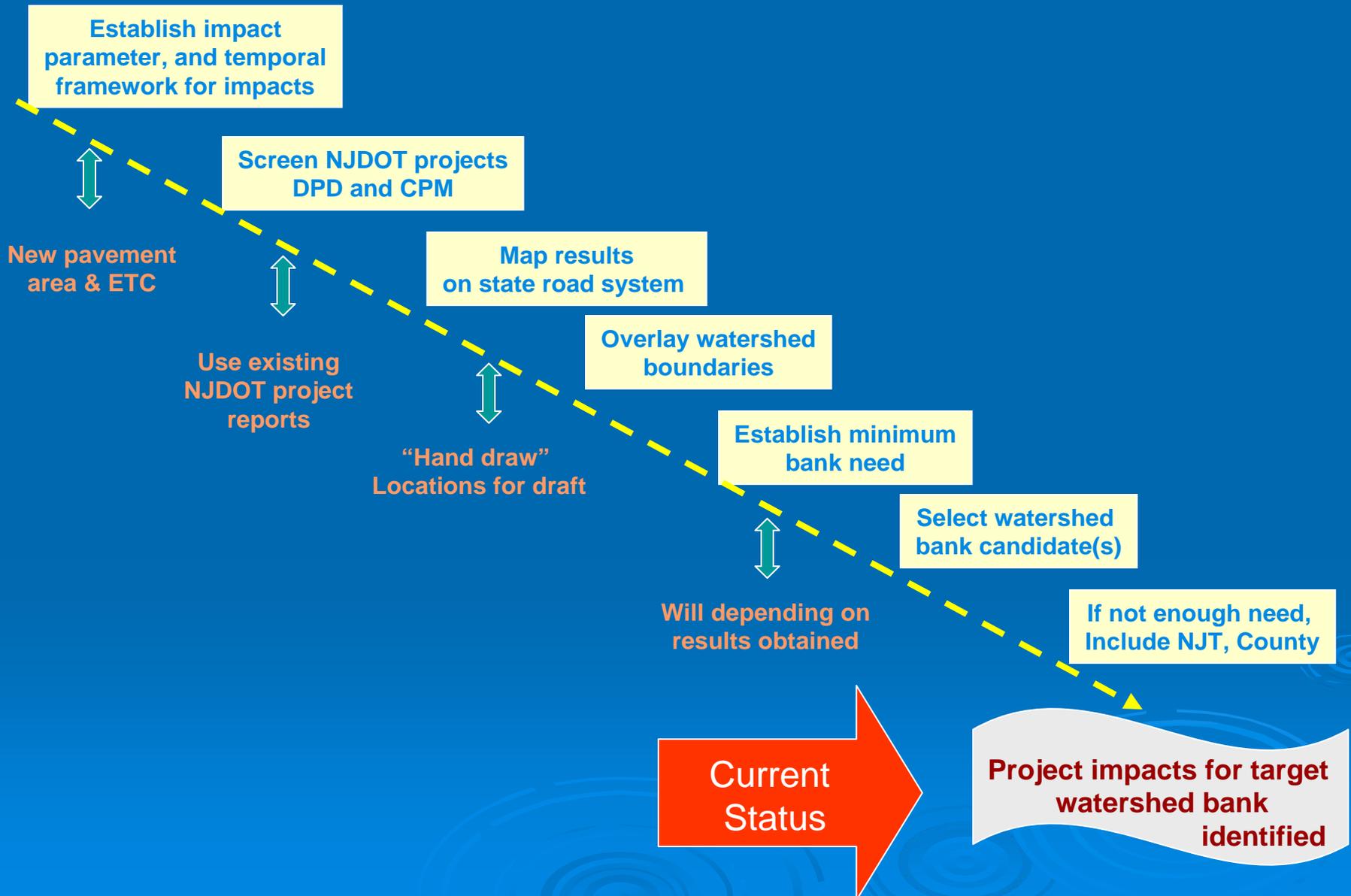
Task 7 – Select Bank Location / Recommend BMP Solution

Task 8 – Final Report

Task 9 - Implement Training Plan



PROCESS TO IDENTIFY NEED



PROCESS TO IDENTIFY BANK



Note: Collaboration with watershed organization could "shortcut" bank site location process.

Key Project Results So Far



LITERATURE REVIEW

“The State of Water Quality Trading”, by Mark S. Kieser, Environmental Trading Network, *March 8, 2006.*

“A Stormwater Banking Alternative for Highway Projects”, Robert B. McCleary, P.E., Delaware Department of Transportation, Dover, Delaware.

“Water Quality Banking in Maryland”, Detailed Discussion with Division Chief, Highway Hydraulics Division, Maryland State Highway Administration.

MARYLAND BANKING

- **MOU between Maryland Department of the Environment and Maryland State Highway Administration.**
- **Water quality treatment required for all projects... banking provides flexibility.**
- **Water quality only – not peak flow impacts.**
- **Credit used mostly for minor pavement projects. All new projects must provide BMPs to the extent possible.**
- **Maryland Department of Environment requires MSHA to own the water quality BMP facility.**
- **Water Quality Debit - treat 1.20 acres for 1 acre impact.**

MARYLAND BANKING

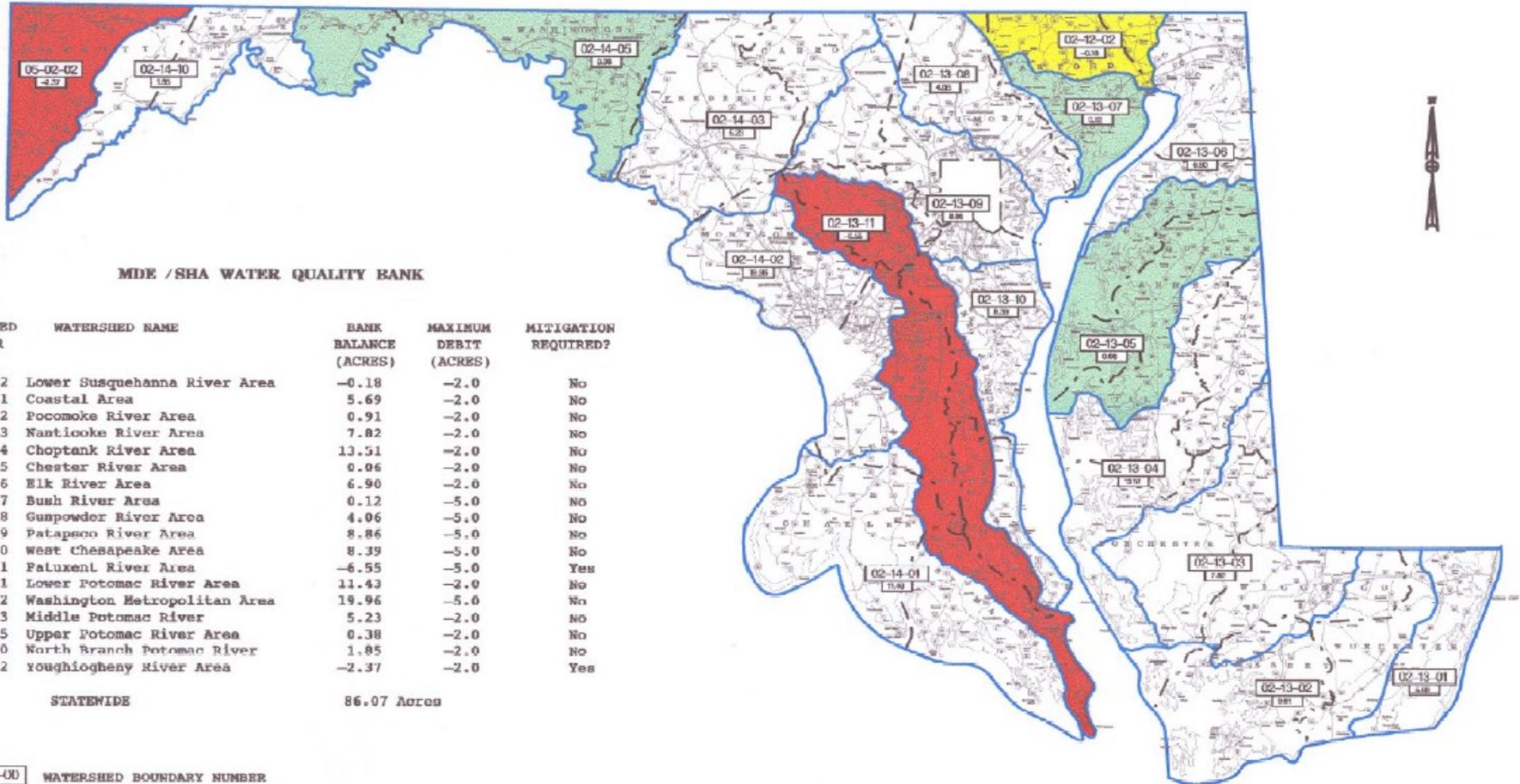
- Deferral for 5 acres of new pavement in metropolitan area and 2 acres in rural areas.
- Credit for wetland mitigation sites receiving pavement runoff
- Ability to extend the use of banking to other state agencies
- Ability to overdraw the bank and credit back in two years, with the condition to find mitigation site within one year.
- Construction cost of retrofit projects ~ \$12,000 per acre treated.
- Framework for credit swapping between two drainage areas.
- Has about 86 acres “balance of credit” in the bank.

MARYLAND BANKING

- Pending projects database
- Tracking database
- Site search database - a database of sites with state right of way for entire watersheds
- Tracking done for watersheds using GIS Mapping.

MARYLAND WATER QUALITY GIS TRACKING

MDE /SHA WATER QUALITY BANK STATUS



MDE /SHA WATER QUALITY BANK

WATERSHED NUMBER	WATERSHED NAME	BANK BALANCE (ACRES)	MAXIMUM DEBIT (ACRES)	MITIGATION REQUIRED?
02-12-02	Lower Susquehanna River Area	-0.18	-2.0	No
02-13-01	Coastal Area	5.69	-2.0	No
02-13-02	Pocomoke River Area	0.91	-2.0	No
02-13-03	Nanticoke River Area	7.82	-2.0	No
02-13-04	Choptank River Area	13.51	-2.0	No
02-13-05	Chester River Area	0.06	-2.0	No
02-13-06	Elk River Area	6.90	-2.0	No
02-13-07	Bush River Area	0.12	-5.0	No
02-13-08	Gunpowder River Area	4.06	-5.0	No
02-13-09	Patapsco River Area	8.86	-5.0	No
02-13-10	West Chesapeake Area	8.39	-5.0	No
02-13-11	Faluxent River Area	-6.55	-5.0	Yes
02-14-01	Lower Potomac River Area	11.43	-2.0	No
02-14-02	Washington Metropolitan Area	19.96	-5.0	No
02-14-03	Middle Potomac River	5.23	-2.0	No
02-14-05	Upper Potomac River Area	0.38	-2.0	No
02-14-10	North Branch Potomac River	1.85	-2.0	No
05-02-02	Youghiogheny River Area	-2.37	-2.0	Yes

STATEWIDE 86.07 Acres

- 00-00-00 WATERSHED BOUNDARY NUMBER
- 0.00 BANK BALANCE
- BALANCE EXCEEDING MAXIMUM DEBIT
- BALANCE AT OR BELOW ZERO ACRES
- BALANCE BETWEEN 0 AND 0.5 ACRES
- WATERSHED BOUNDARY

NJDOT, FHWA, NJDEP COORDINATION

- Continued coordination is key to project success
- Use HUC – 11 watershed for banking
- No regulatory fatal flaws were identified
- NJDEP agreed to provide information on water quality improvement initiatives for selected watershed
- Stormwater peak flow control is a challenge for banking
- Pilot banking process will be documented in an interagency MOU
- Results of pilot banking project will be evaluated for potential Statewide application

IDENTIFIED POTENTIAL WATERSHED

- Reviewed hundreds of projects from DPD and CPM
- Mapped projects which may create impervious impacts statewide on GIS with HUC -11 boundary overlays
- Selected top six impacted watersheds
- Obtained estimates of impervious surfaces in selected six watersheds and mapped results
- Selected watershed with most future projects and high impact
- Hackensack Watershed selected for evaluation of future banking – Approx. 23 acres; at least 5 future projects

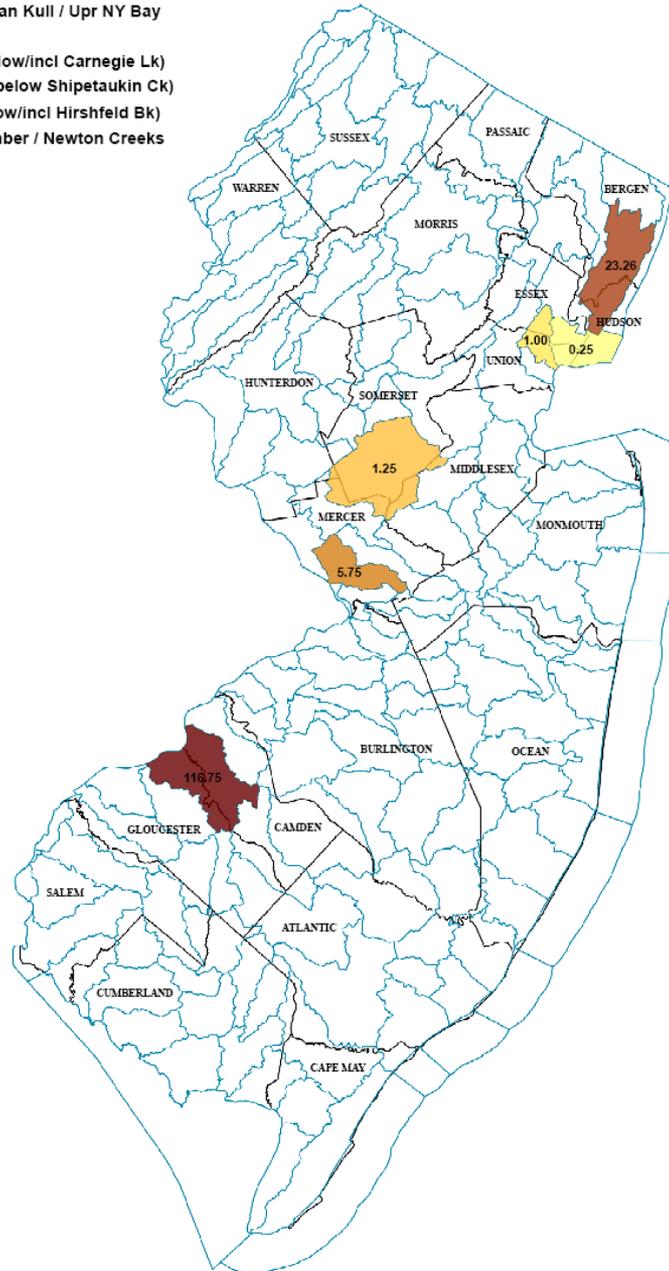
NEW JERSEY DEPARTMENT OF TRANSPORTATION

Division of Project Planning and Development's
Active Concept Development
and Feasibility Assessment
PRS Projects
&
CPM Projects



MAXIMUM IMPERVIOUS IMPACT (Acres)

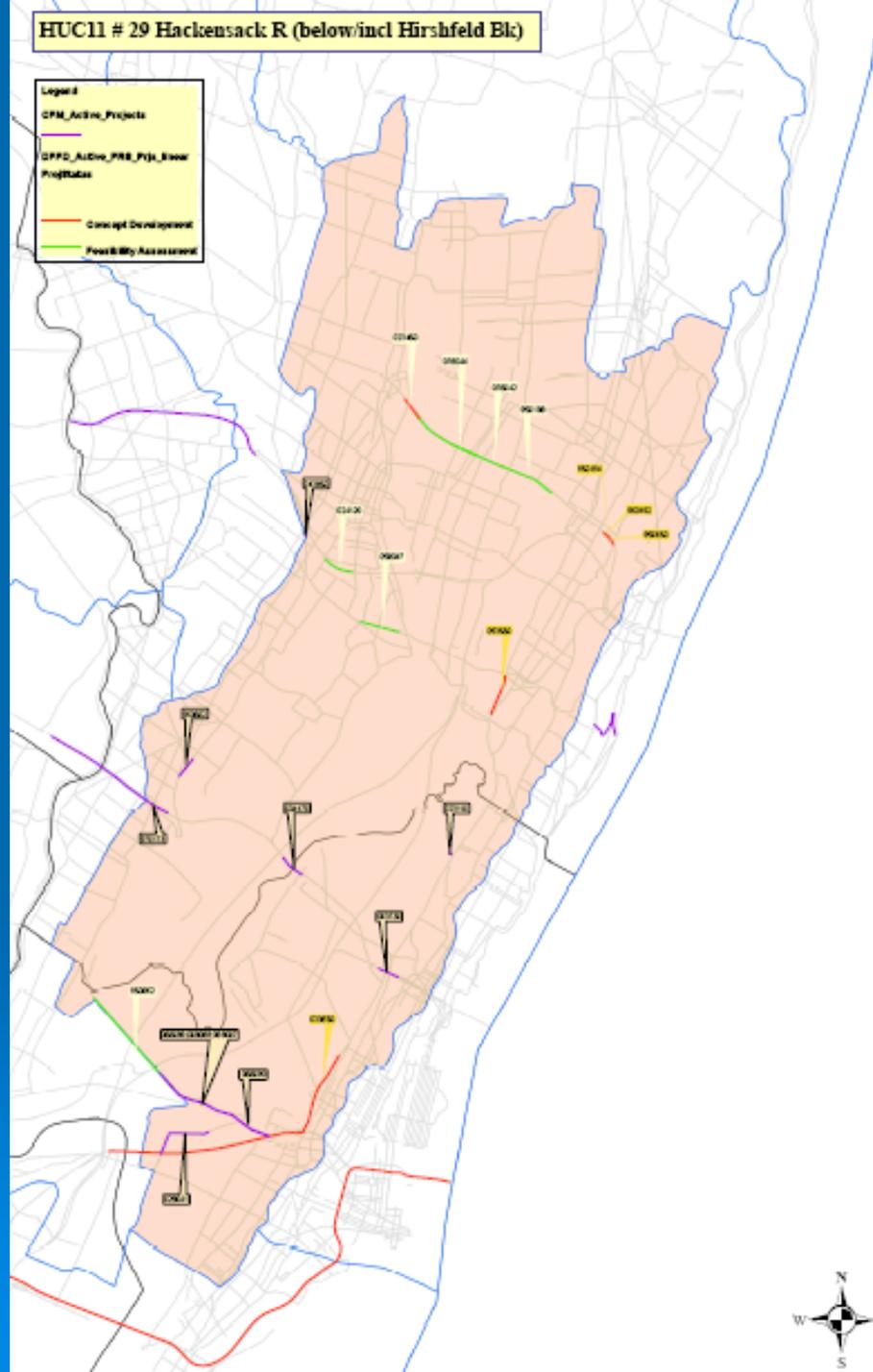
- Newark Bay / Kill Van Kull / Upr NY Bay
- Elizabeth River
- Millstone River (below/incl Carnegie Lk)
- Assunpink Creek (below Shipetaukin Ck)
- Hackensack R (below/incl Hirshfeld Bk)
- Woodbury / Big Timber / Newton Creeks
- HUC 11 Boundary



HUC11 # 29 Hackensack R (below/incl Hirshfeld Blc)

Legend

- CPM_Active_Projects
- CPFD_Active_PRR_Pijs_Review_Program
- Concept_Development
- Feasibility_Assessment



REMAINING WORK...

Research is approximately 40% complete

TECHNICAL WORK TO ESTABLISH BANK

Task 4 – Investigate Potential Mitigation Sites Along State Highways for Selected Watershed

Tasks 5 & 6 – Identify Mitigation Areas/ Stormwater Enhancements & Propose Bank Crediting Process & Tracking Program

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THANK YOU...

...QUESTIONS?

