# Onsite Sewage Systems, Water Quality, Public Health, and the Chesapeake Bay

## EPA Partnership Webinar

## August 23, 2012

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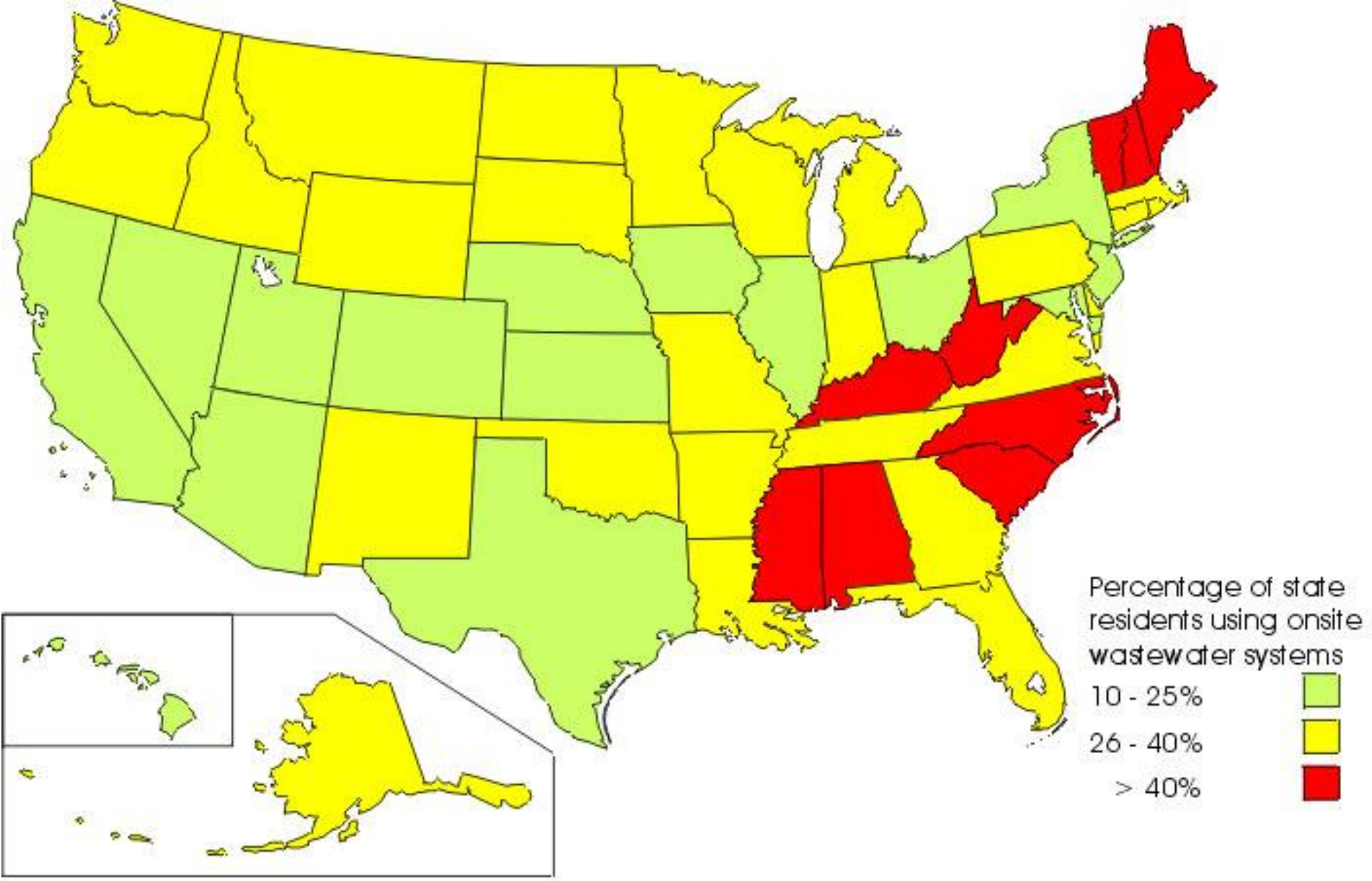
**Office of Environmental Health Services**
**Virginia Department of Health**

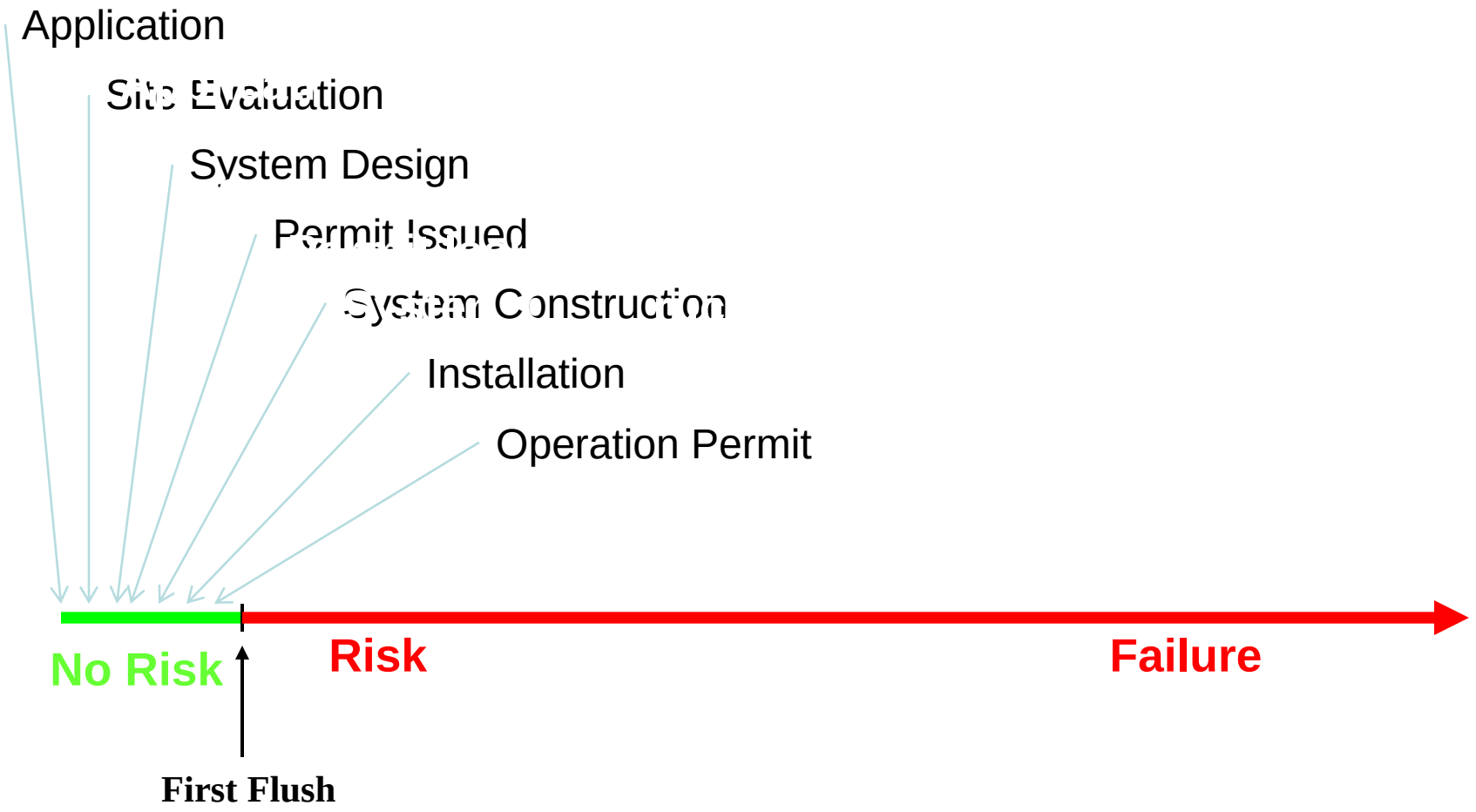
VDH VIRGINIA DEPARTMENT OF HEALTH
*Protecting You and Your Environment*




Source: U.S. Census Bureau. 1990

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

# VDH's Role


Application
Site Evaluation
System Design
Permit Issued
System Construction
Installation
Operation Permit
No Risk
Risk
Failure
First Flush

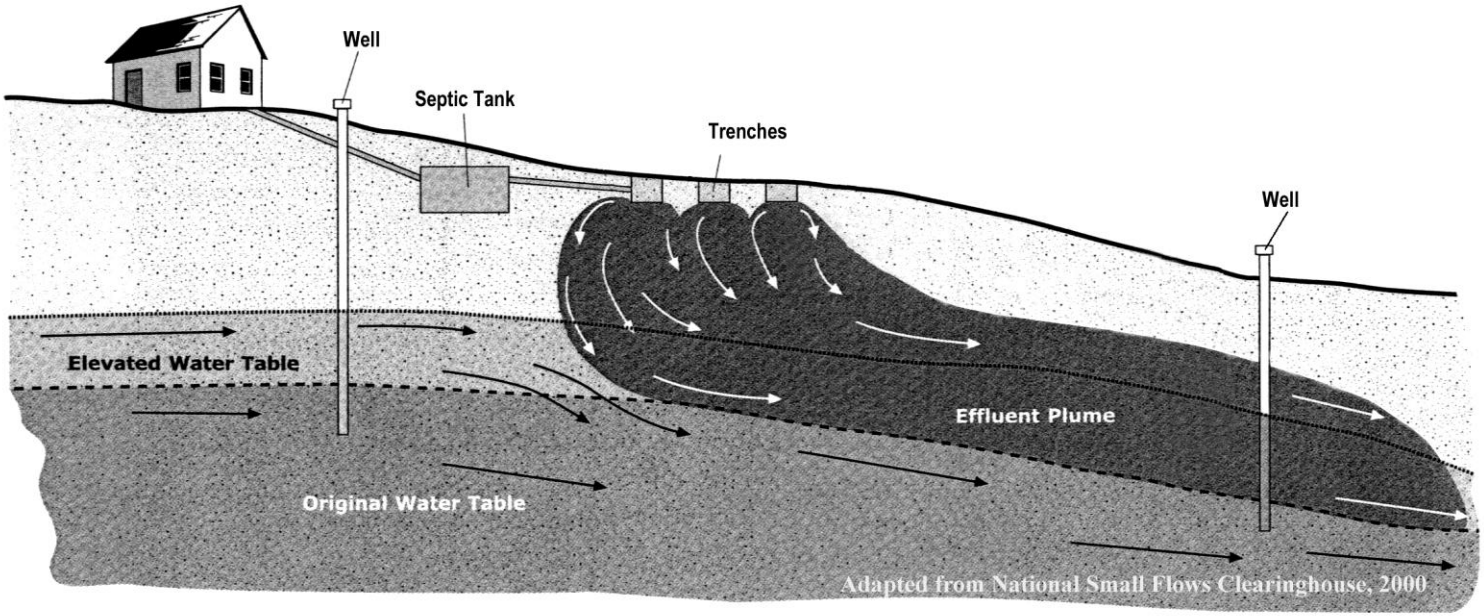
# EPA Response to Congress 1997

- Adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas. Small communities' wastewater needs are currently 10 percent of total wastewater demands. Decentralized systems serve approximately 25 percent of the U.S. population, and approximately 37 percent of new development.

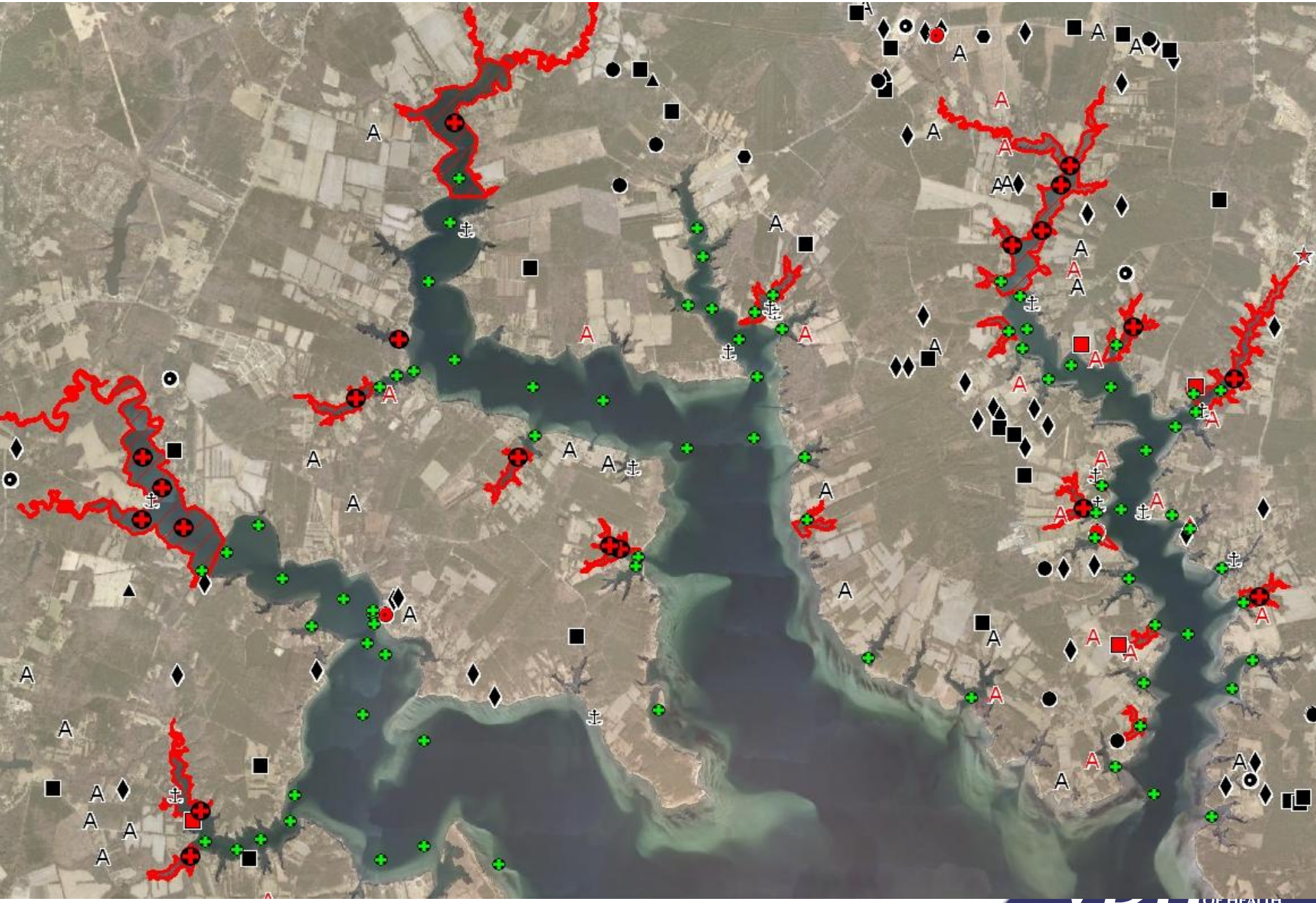
# Goals of Sewage Treatment Processes

- Treatment to reduce harmful elements
- Distribution of water (effluent) back into the environment
- All onsite sewage systems return treated effluent to ground water through the soil

# Conventional System: Drainfield



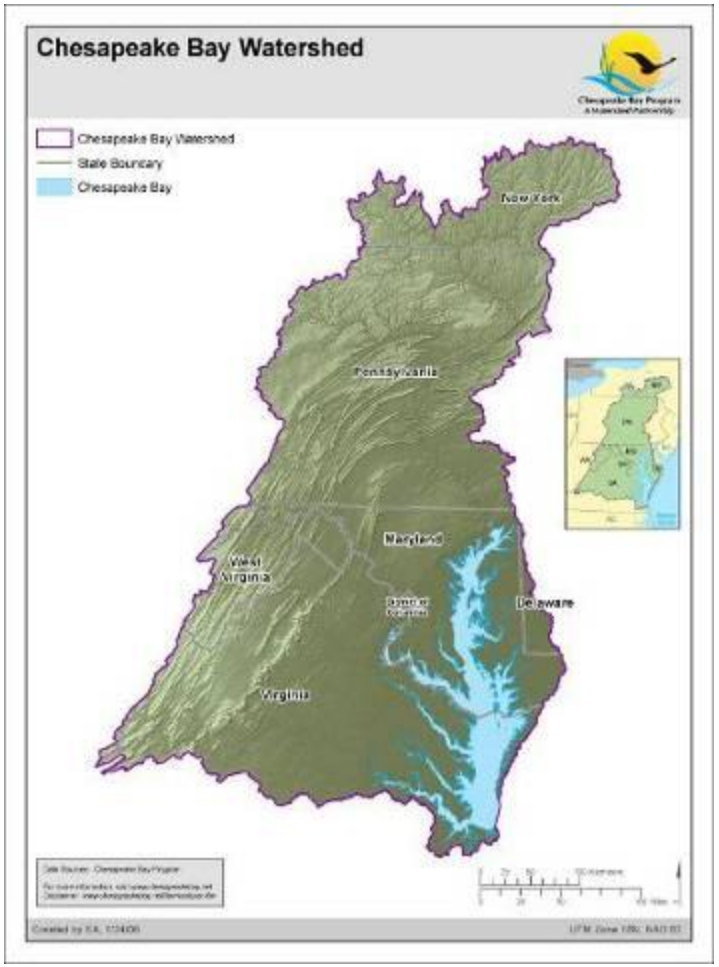
# Conventional Onsite System




VIRGINIA DEPARTMENT OF HEALTH
and Your Environment

# The Chesapeake Bay TMDL

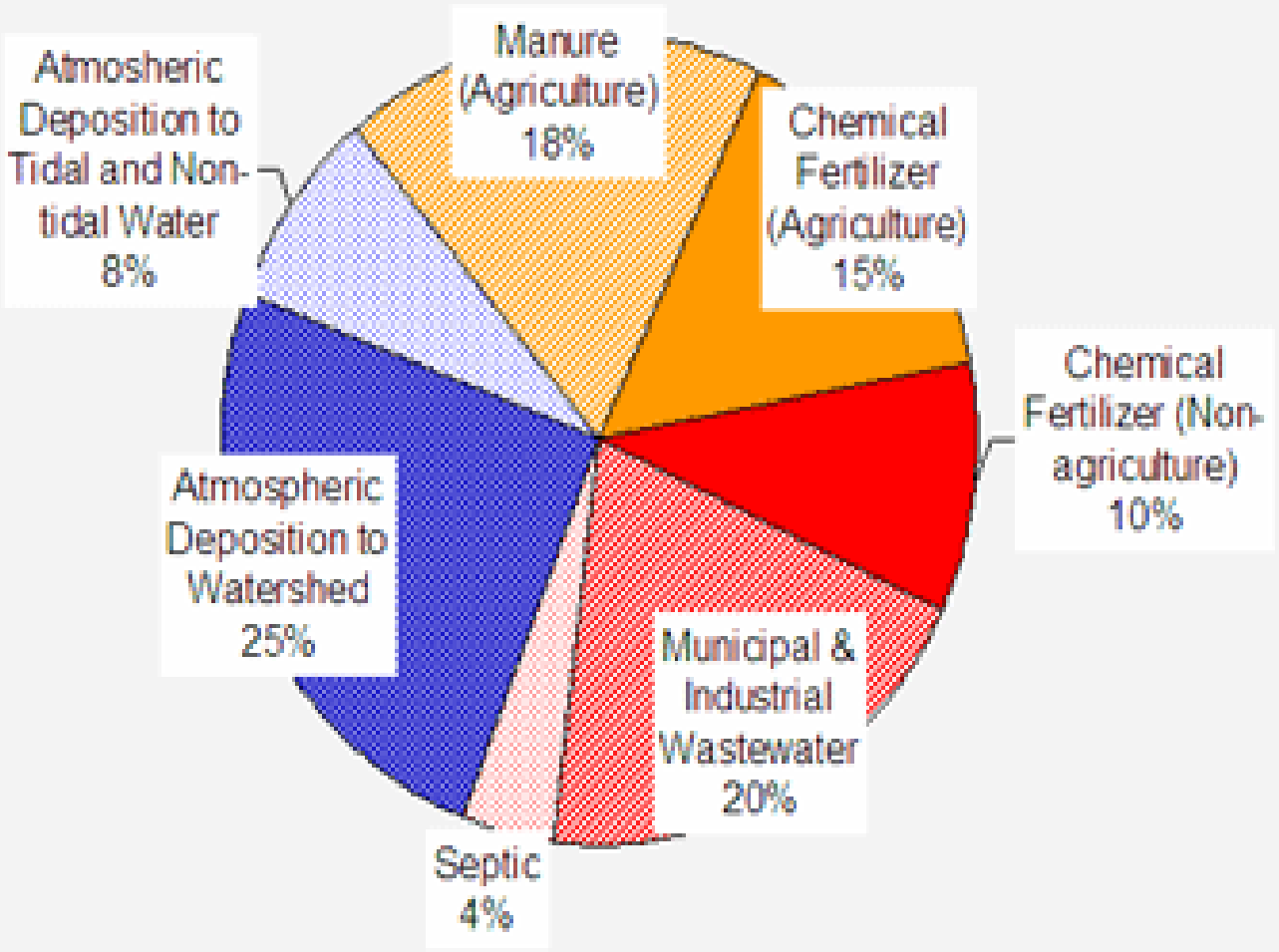
- EPA sets pollution diet to meet states' Bay clean water standards
- Caps on nitrogen, phosphorus and sediment loads for all 6 Bay watershed states and DC
- States set load caps for point and non-point sources
- Target: 2025



## Sources of Nitrogen Loads to the Bay 2004

**Primary Sources of Atmospheric Deposition:**

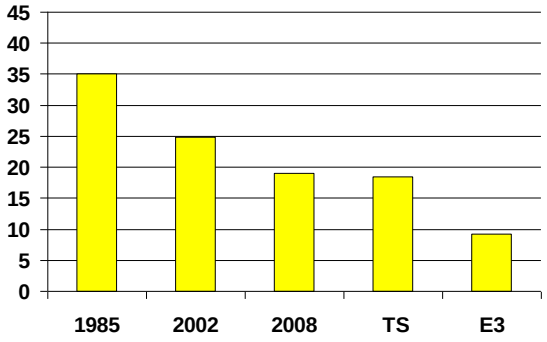
- Vehicles and other mobile sources
- Electric utilities, industry and other stationary sources
- Livestock and fertilized soil emissions
- Lightning and forest soils



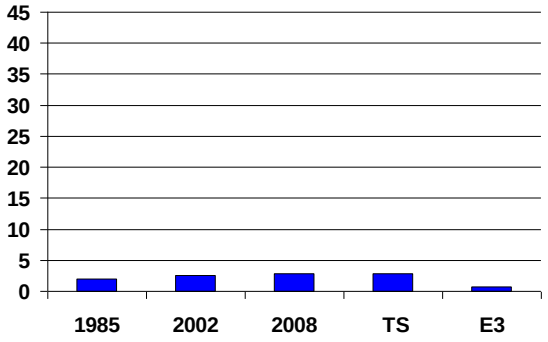

Source: Chesapeake Bay Program Phase 4.3 Watershed Model.
Note: Does not include loads from tidal shoreline erosion.

# Virginia Nitrogen Loads By Source Sectors [million lbs/yr]

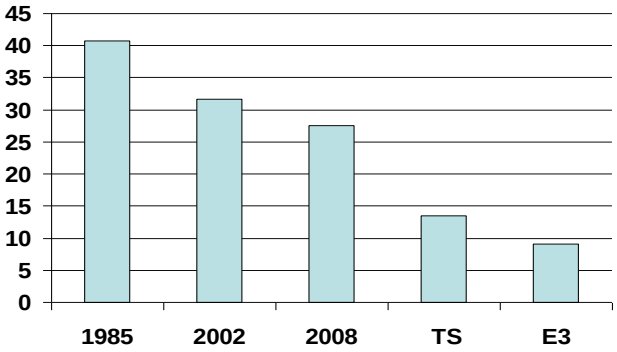
## Wastewater



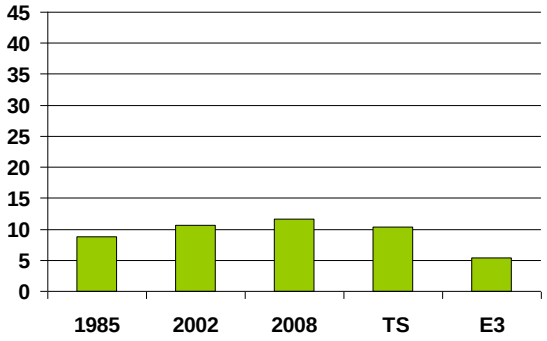

## Septic



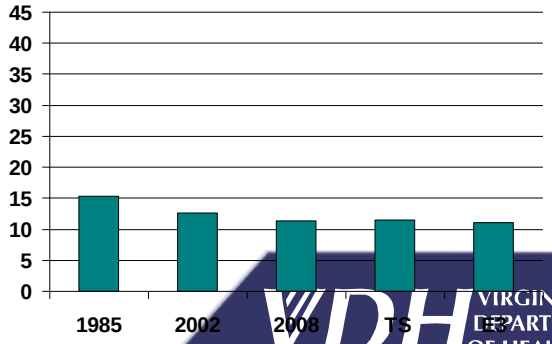

## Agriculture




## Urban Runoff




## Forest



# Chesapeake Bay Significance: Onsite Sewage Systems

- EPA estimates 540,000 systems
- 2.9 Million pounds of N per year
- 4% of the total current N load
- EPA estimates 40% of N from every system reaches a stream
- The current WIP reduces onsite systems to 2.405 Million pounds
- This is a CAP

# Federal Consequences
## Dec. 29, 2009 EPA Letter

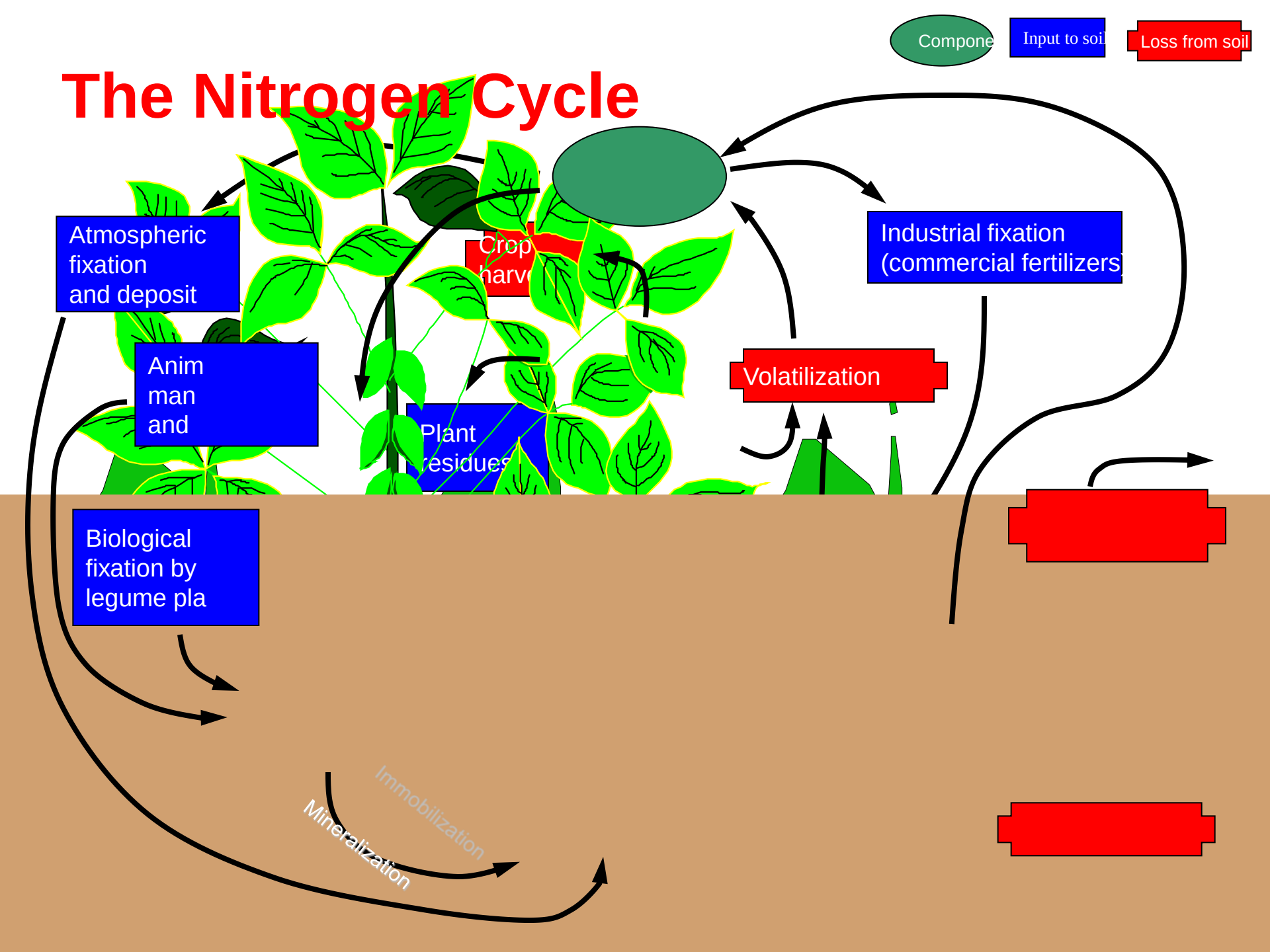
- Directed at states not achieving expectations
- Includes:

1. Expand NPDES coverage to currently unregulated sources
2. Object to state-issued NPDES permits and increase program oversight
3. Require net improvement offsets
4. Establish finer scale wasteload and load allocations in the Bay TMDL
5. Require additional reductions of loadings from point sources (e.g., wastewater, stormwater, CAFOs)
6. Increase and target federal enforcement and compliance assurance in the watershed
7. Condition or redirect EPA grants
8. Federal promulgation of local nutrient water quality standards

# N in Wastewater

- N is a component of amino acids and urea
- N in wastewater comes from
  - Bodily wastes
  - Discarded food material
  - Cleaning agents

Forms:  Organic N and ammonia-N


Compone
Input to soil
Loss from soil
The Nitrogen Cycle
Atmospheric fixation and deposit
Crop harv
Industrial fixation (commercial fertilizers)
Anim man and
Volatilization
Plant residues
Biological fixation by legume pla
Immobilization
Mineralization

# *Biological N Removal*

*Two Step Biological Process Required*

Step 1 - Nitrification

Step 2 - Denitrification

# Watershed Implementation Plan (WIP) Elements: Onsite Sewage

- Reduce rate of growth through regulatory actions; propose offsets through Nutrient Credit Exchange
- Alternative Onsite Sewage System Regulations:
  - 50% reduction for all small AOSS
  - 3mg/l TN at project boundary for large AOSS
- Seek legislation to require all new and replacement systems to reduce N

# WIP Elements Cont…

- Seek legislation to promote community systems
- Seek legislation to require pump-outs where currently not required
- Seek legislation for tax credits
- Encourage use of Betterment Loans and explore other financial incentives or relief

# Purpose of AOSS Regulations

- Protect the quality of public health, surface water, and ground water in the Commonwealth.
- Establish a program for regulating the operation and maintenance of alternative onsite sewage systems (AOSS).
- Establish performance requirements and horizontal setbacks for AOSS necessary to protect public health and the environment.
- Guide VDH in the permitting process for AOSS designs.
- Inform owners, designers, and operators of their responsibilities in regards to the design, operation and maintenance of AOSS.

# Owner Responsibilities

- Have the AOSS operated and maintained by an operator.
- Have operator visit AOSS at the frequency set by the regulations (minimum of annually for small AOSS).
- Have operator collect required samples.
- Keep a copy of log provided by operator.
- Keep a copy of the Operation and Maintenance manual.
- Follow the Operation and Maintenance manual.
- Comply local ordinances adopted pursuant to the Chesapeake Pay Preservation Act and the Chesapeake Bay Preservation Area Designation and Management Regulations.

# Operator Responsibilities

- Reporting of all required site visits and reportable incidents to LHD though new online reporting website.
- Operator to keep record log of the following (at a minimum):
  - Testing and sampling results
  - Reportable incidents
  - Corrective actions/repairs made
  - Recommendations for repair
  - Pump outs
  - Date reports given to owner

# Sampling and Monitoring

- Scheduled sampling regime for all AOSS with applications received on or after effective date of regulations.
- Small AOSS
  - Initial grab sample (180 days)
  - Generally approved systems once every five years
  - Non-generally approved systems four samples first two years, annually thereafter
- Large AOSS
  - Sampling and monitoring dependant upon scale of system (GPD)

# Performance Requirements

- Hydraulic loading rates and organic strength (Table 1).
- Minimum effluent requirements (STE, TL-2, TL-3, TL-3 with disinfection) for vertical separation to limiting features (water table, restriction, etc.)
- Ground water protection by setting concentration limits for all AOSS, and additional requirements for direct dispersal to ground water.
- Additional nutrient requirements for AOSS in the Chesapeake Bay Watershed (effective 2013).
- Sets horizontal setback requirements and performance requirements for AOSS designed under 32.1-163.6

# Direct Dispersal to Ground Water

- Less than 6” of vertical separation
- IS allowed as long as site not wetlands
- Effluent and ground water quality consistent with DEQ ground water rules (9 VAC 25-280)
- Board of Health performance requirements not in conflict with existing state law
- Allows for development in many areas not developable prior to 2008 legislation (HB1166)

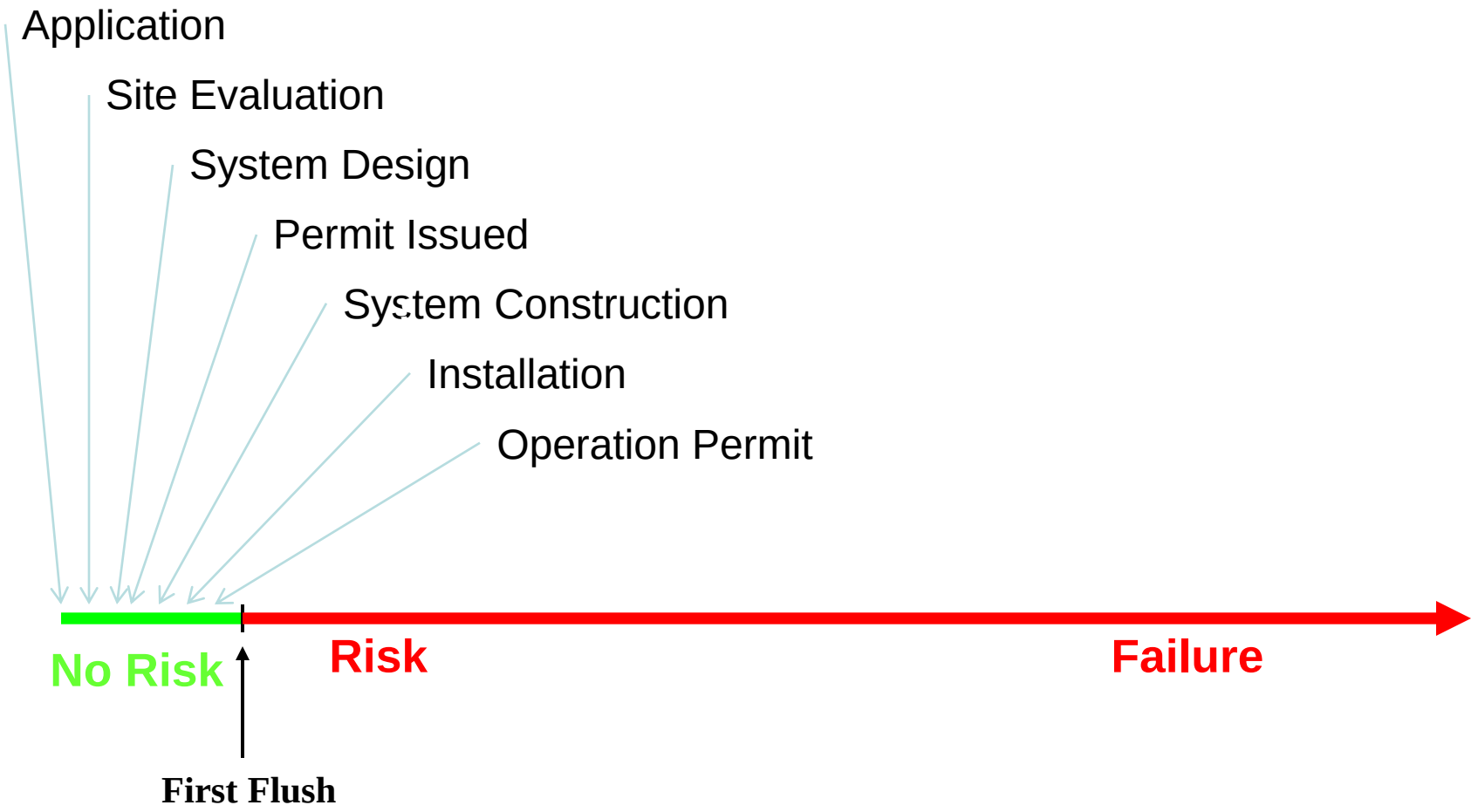
# Wetlands

- Definition of “Surface Waters”
- Discharge requires NPDES/VPDES permit
- DEQ primacy
- Board of Health has no jurisdiction
- VDH will not delineate wetlands

# Health and Environmental Concerns

- Human pathogens and potential for disease transmission (waterborne)
- Nitrogen (nitrate)
- Other concerns
  - PCP's
  - Endocrine disrupters
- Nuisances

# VDH's Role


Application
Site Evaluation
System Design
Permit Issued
System Construction
Installation
Operation Permit
No Risk
Risk
Failure
First Flush


# Thank you!