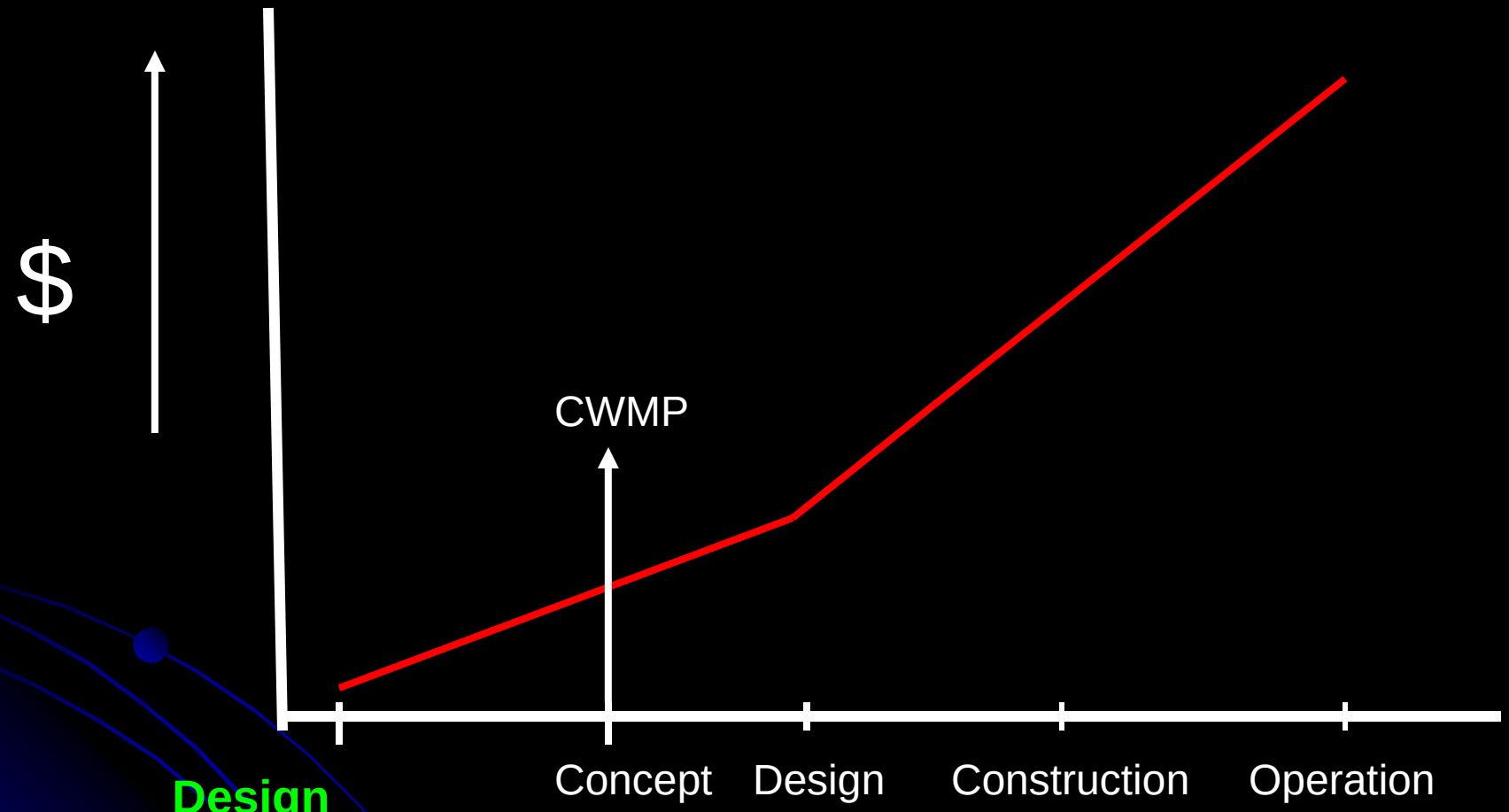
Summary / Risk Assessment

Presented to Orleans Board of Selectmen—July 1 2009

Cost --Risk of Errors



Design Requirements (TMDLs)

- **Nitrogen levels in Pleasant Bay Estuary**
  - Decreasing in Orleans Pleasant Bay
  - Decreasing in Meetinghouse Pond
  - Decreasing in Paw Wah Pond

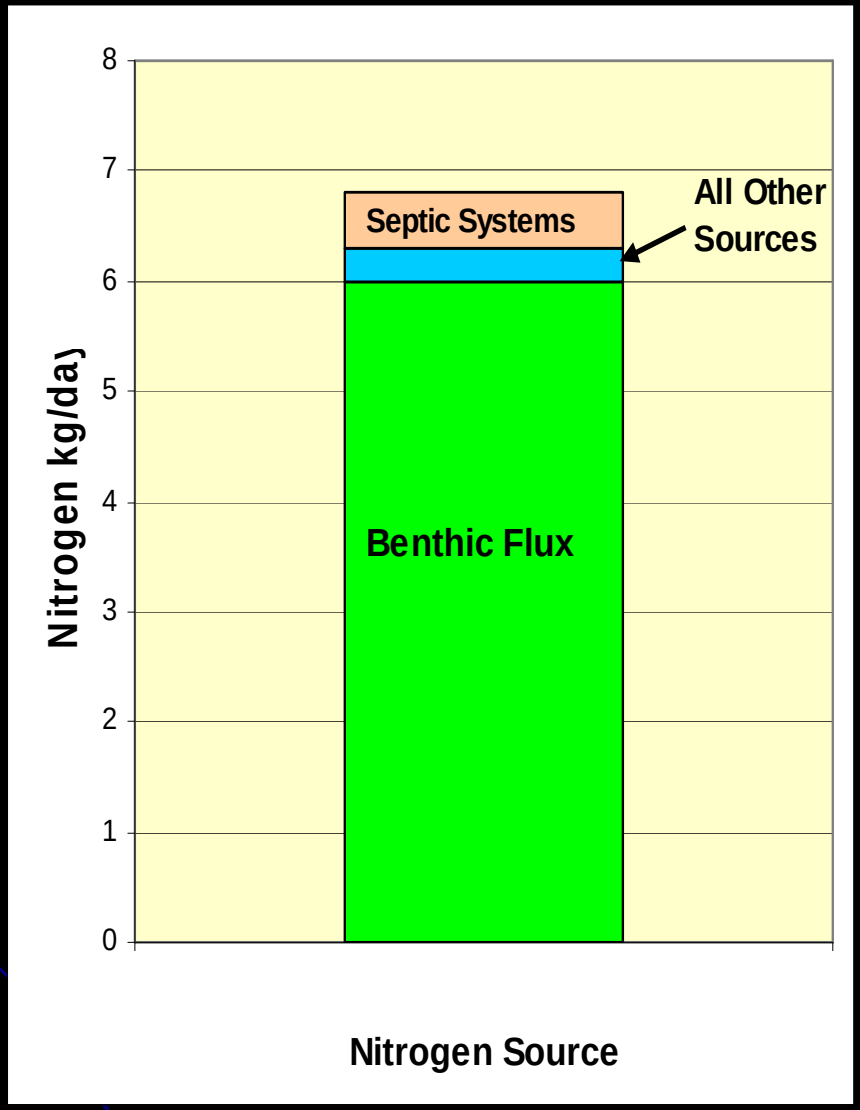
Approx. 80% of Orleans Pleasant Bay Estuary

Summary Risk Assessment

- Nitrogen Levels in Areys and Lonnies Pond increasing slowly
- We do not know why

Approximately 20% of Orleans Pleasant Bay Estuary

Areys Pond Nitrogen Sources



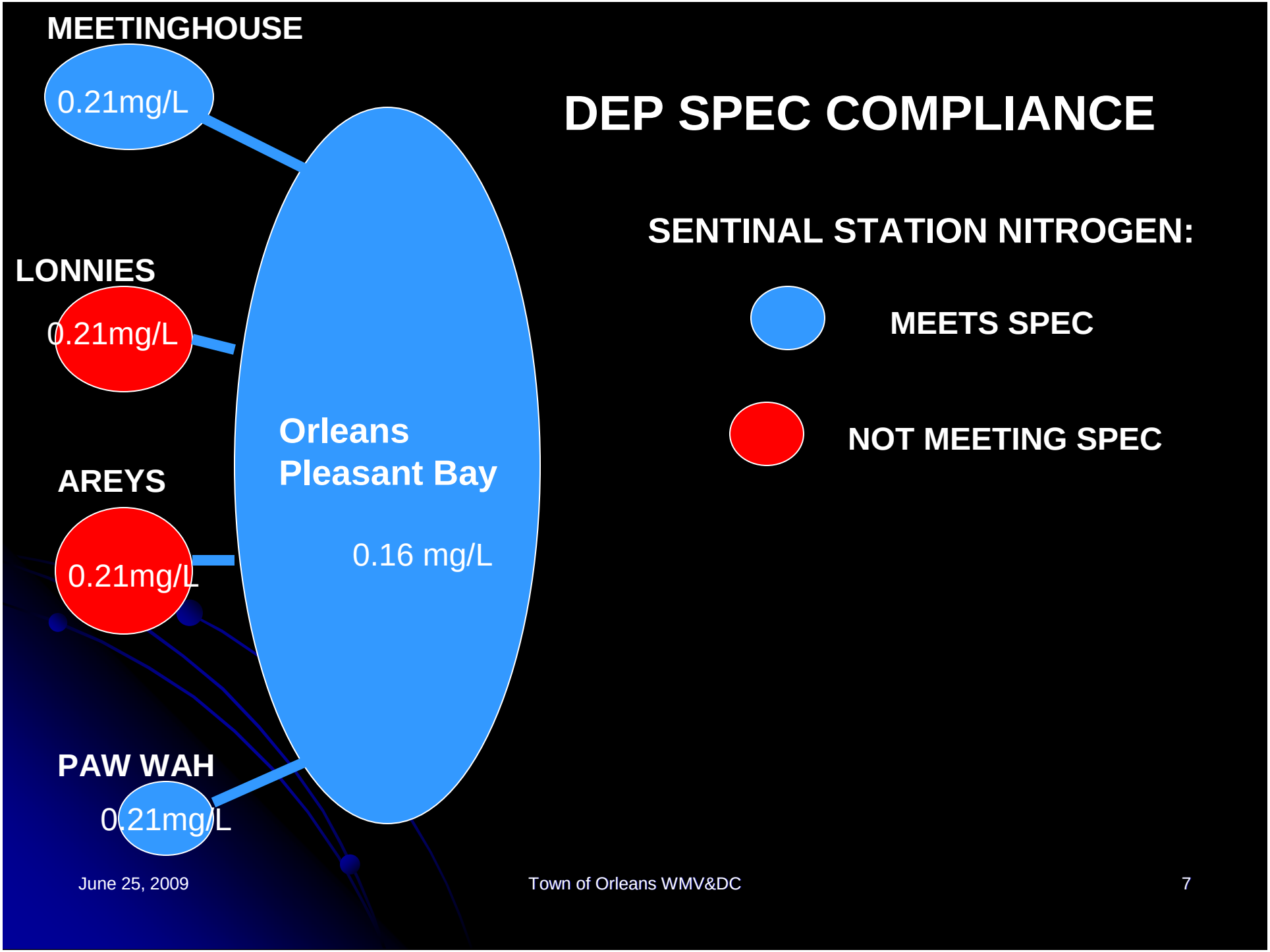
Summary Risk Assessment

- Nitrogen Levels in Areys and Lonnies Pond increasing slowly
- We do not know why:

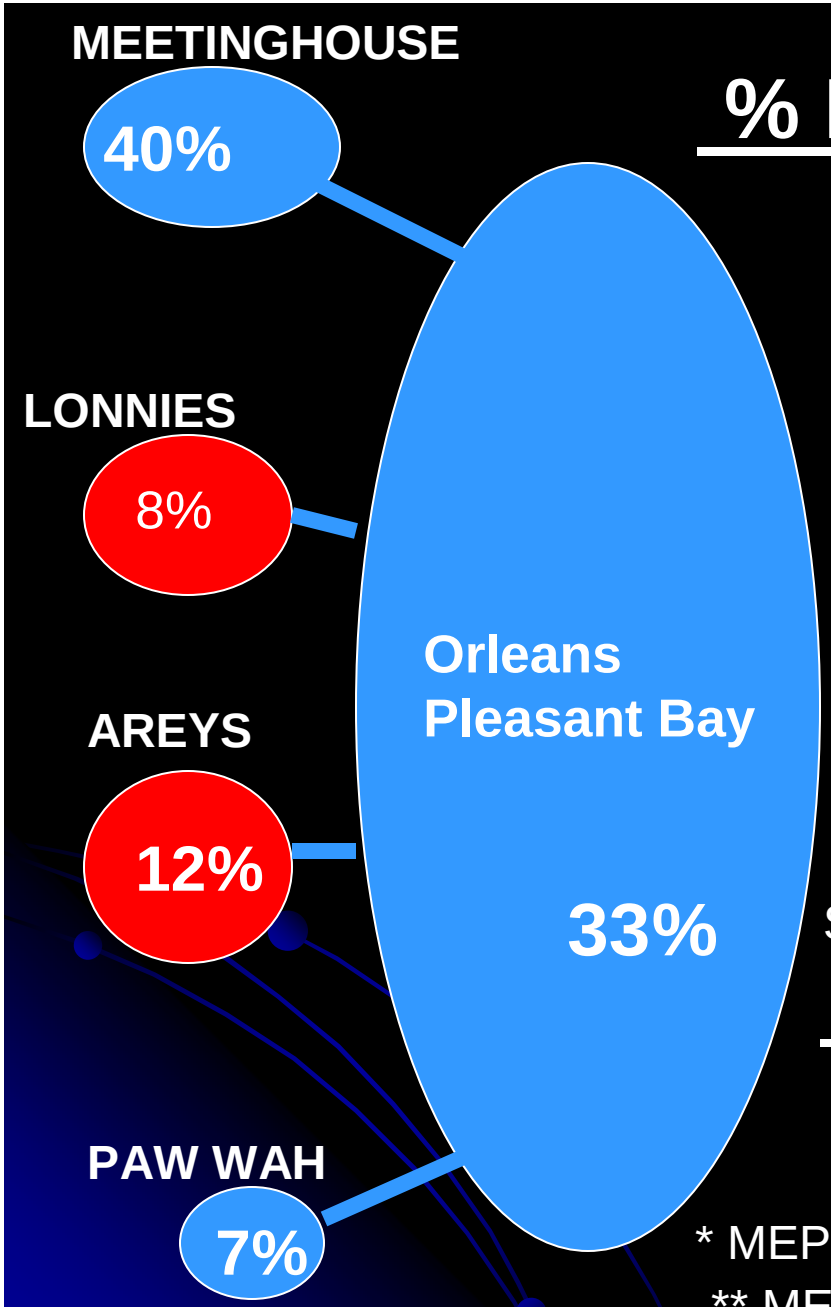
Risk: Sewering may not address the problem

(20% of total cost)

DEP SPEC COMPLIANCE



% Distribution of N Removal (Sewering)



MEETS SPEC 80%

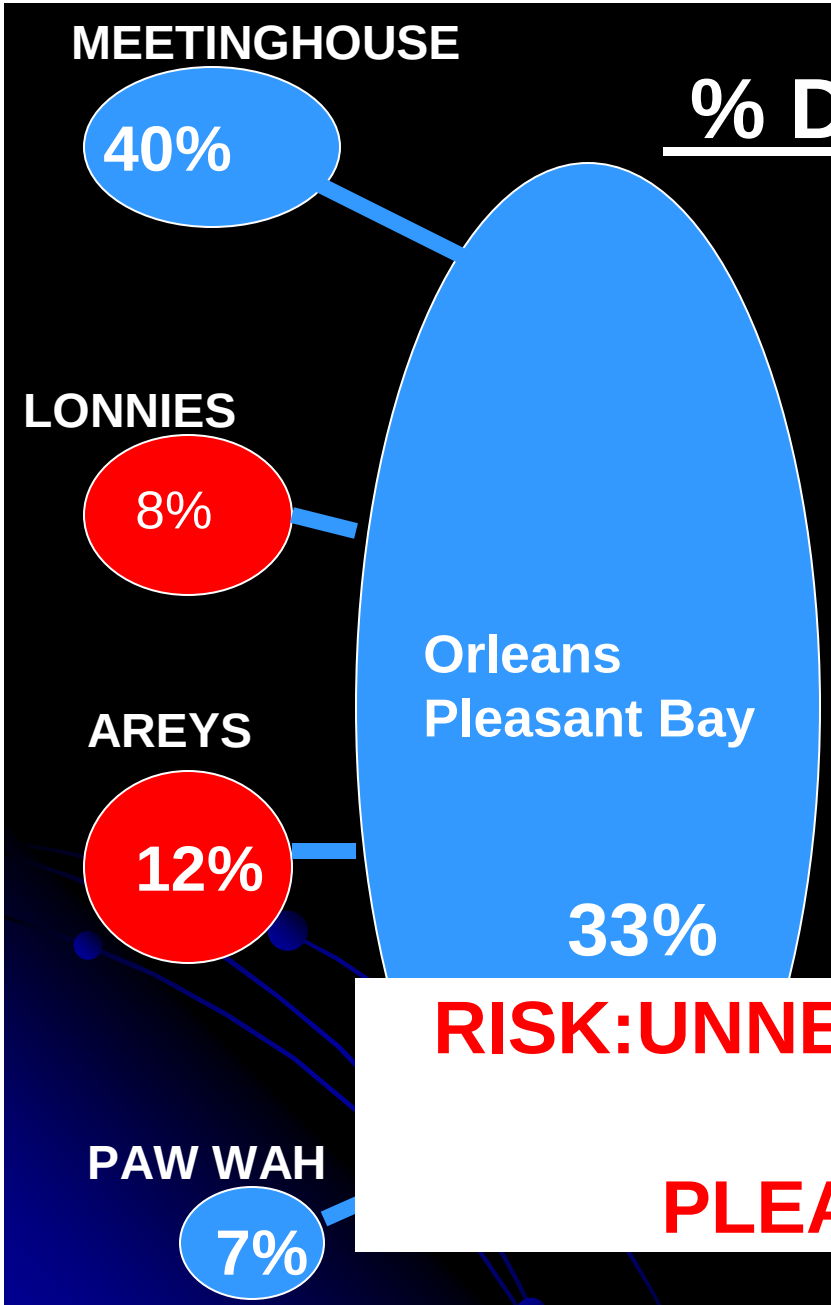
NOT MEETING SPEC 20%

$$\frac{\text{Septic Load Kg/d* Each Segment} \times \text{\% N reduction Req'd** to meet threshold}}{\text{Total septic load*}}$$

* MEP Report Table ES1

** MEP Report Table ES2

% Distribution of Sewering



MEETS SPEC 82%

NOT MEETING SPEC 18%

RISK:UNNECESSARILY SEWERING OF (Approx. 80%) PLEASANT BAY ESTUARY

SMAST LINKED MODEL RISK

- Many Large Nitrogen Input Biases
- Switch to N_{BIO}
- No access to model and data
- Lack of transparency
- Outputs do not match the measured data

SMAST LINKED MODEL RISK

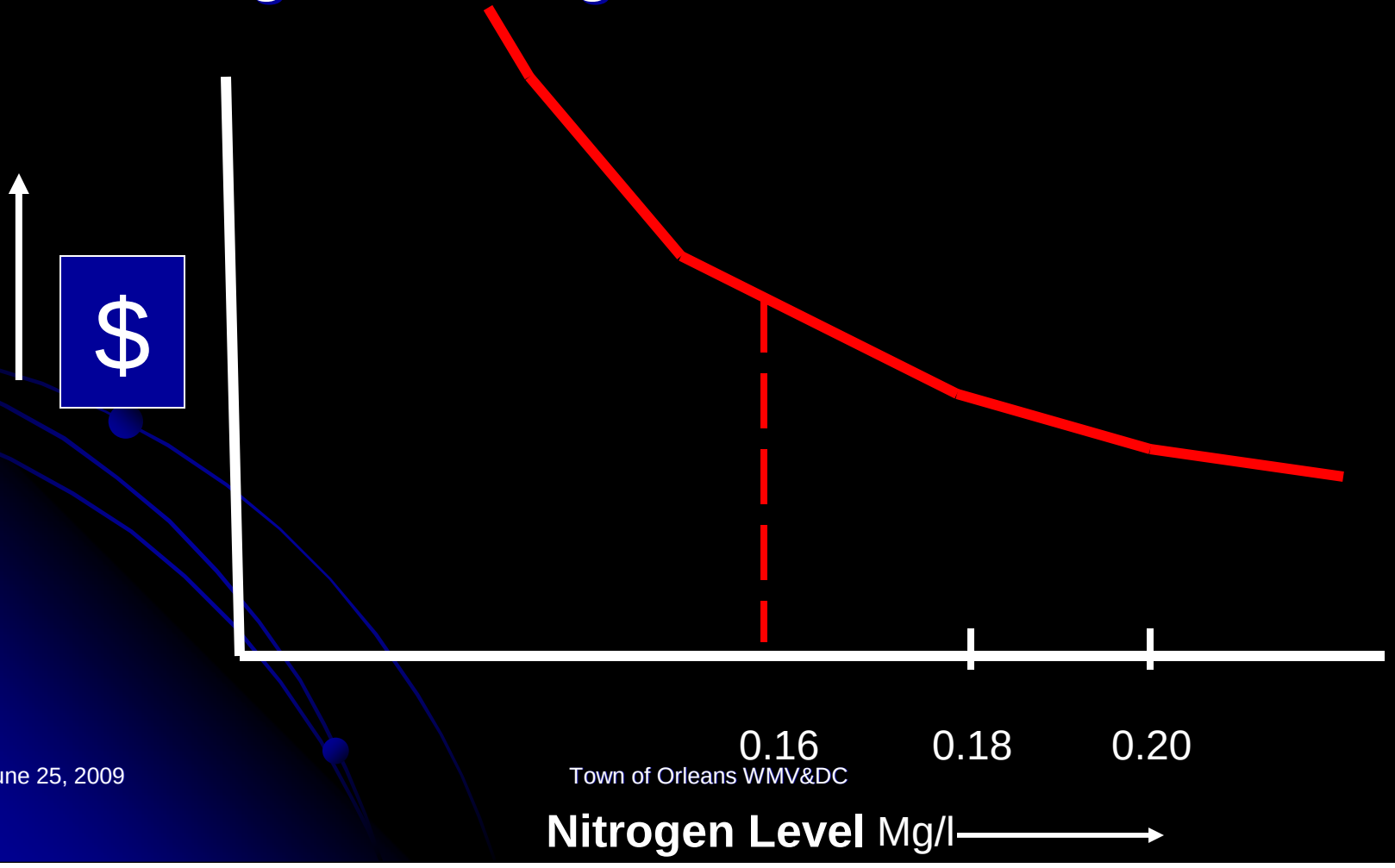
- Many Large Input Errors
- Switch to N_{BIO}
- No access to model and data
- Lack of transparency
- Outputs do not match the measured data

RISK: INABILITY TO TEST SEWERING SCENARIOS

May affect the design phase cost by 5%

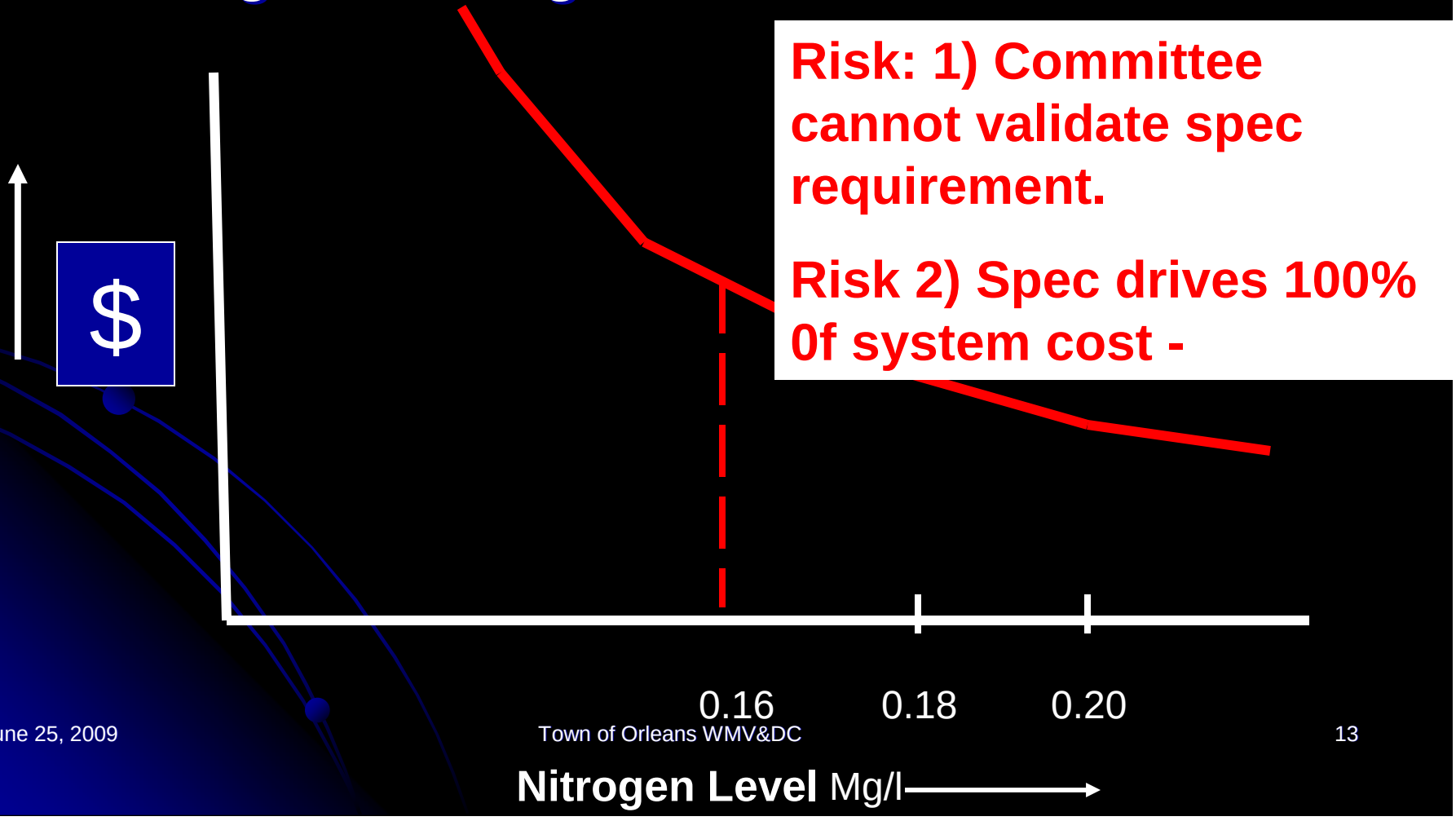
System Design Spec Risk

- No validation of key system spec.
- 0.16mg/L for eelgrass health



System Design Spec Risk

- Key system spec.
- 0.16mg/L for eelgrass health



Risk: 1) Committee cannot validate spec requirement.

Risk 2) Spec drives 100% 0f system cost -

Pleasant Bay Alliance Symposium June 18, 2009—The Breach

- "Breach not closing –not going away" Ted Keon -- Chatham Coastal Resources Dept.

- "Breach will remain open and drift slowly South for the next 80 years" Dr Graham Giese
  Provincetown Center Coastal Studies

- Seas likely to rise from 2-5 feet in next 90 years due to global warming and rising global sea level
  Rob Thieler USGS

Summary—Pleasant Bay

- **Orleans needs a reliable model**
- Risk assessment follow up required
- Pleasant Bay measured data in conflict with SMAST Pleasant Bay Report
- Breach is expected to continue to improve water quality—restore eelgrass / infauna