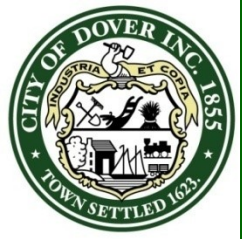




NPDES Great Bay Total Nitrogen General Permit

**Dover City Council Workshop
January 6, 2020**

**By: Gretchen Young, PE
Environmental Projects Manager
&
John B. Storer
Director of Community Services**



Clean Water Act regulates discharge from WWTP

Discharge Regulated for:

- **TSS**
- **BOD**
- **Metals**
- **Industrial Pre-Treatment**
- **PH**
- **Bacteria**
- **Nitrogen (newly regulated)**





Total Nitrogen Permit Timeline

2006

- Last WWTP Discharge Permit – no Nitrogen Requirement
- WWTP Discharge at 22.5 mg/L TN effluent

2012

- EPA releases draft of new permit (should be a 5-yr cycle)
- Total Nitrogen is now included

2015

- Dover invests to upgrade WWTP to 8 mg/L
- Dover runs at 5.1 mg/L in growing season

2018

- WWTP will be required to go to 3 mg/L (limit of technology)
- First look at an adaptive management approach to Nitrogen Reduction

2020

- Final Nitrogen General Permit released with adaptive management



Adaptive Management

Adaptive management is an approach to natural resource management that emphasizes learning through management where knowledge is incomplete, and when, despite inherent uncertainty, managers and policymakers must act.

(Allen, C. and A. Garmestani. Adaptive Management. Chapter 1, Craig R. Allen, Ahjond Garmestani (ed.), Adaptive Management of Social-Ecological Systems. Springer Netherlands, Dordrecht, Netherlands, , 01-10, (2015)





Incorporate Non-Point Source Reductions

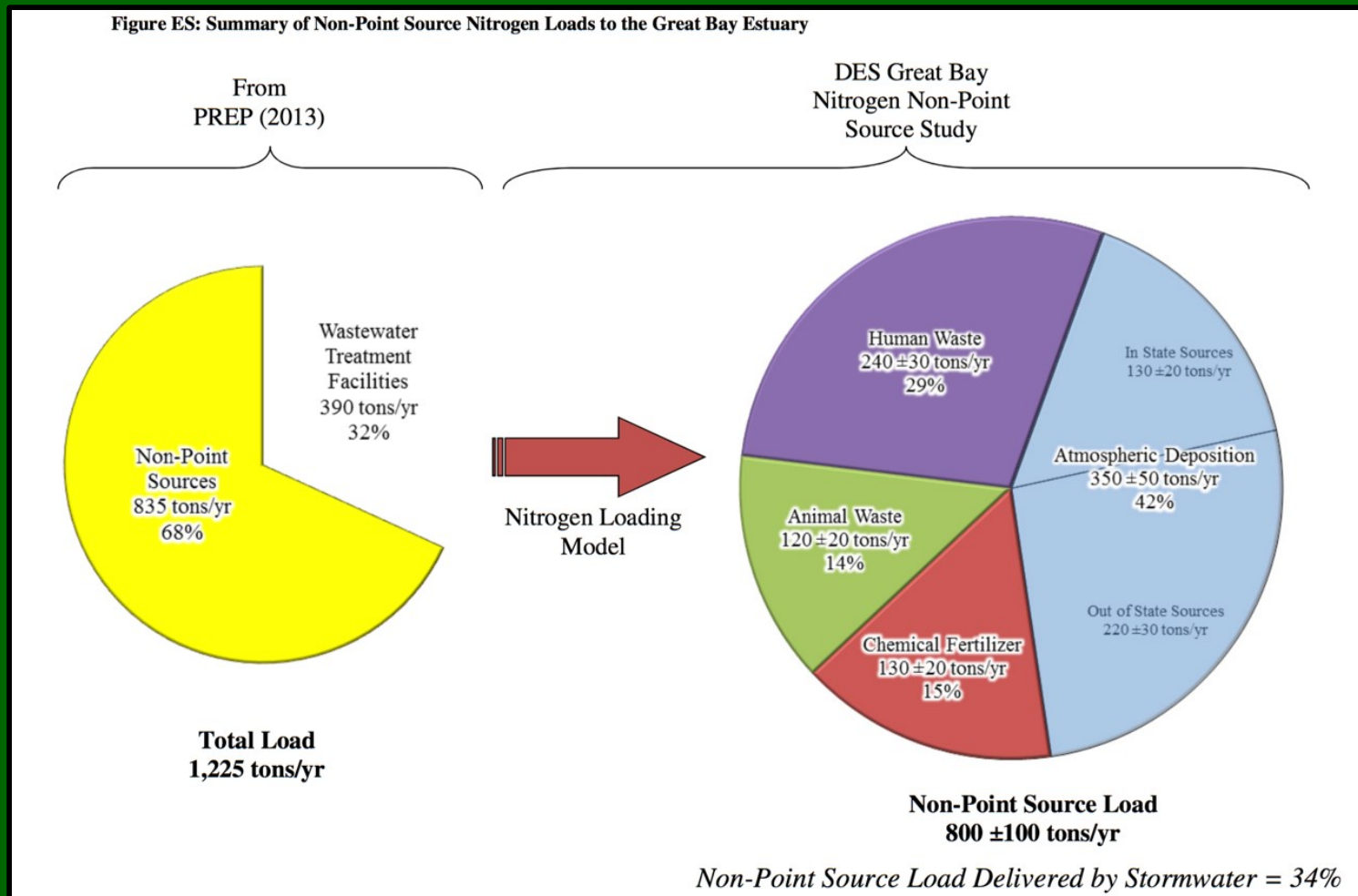


Figure from Great Bay Nitrogen Non-Point Source Study – June 16, 2014



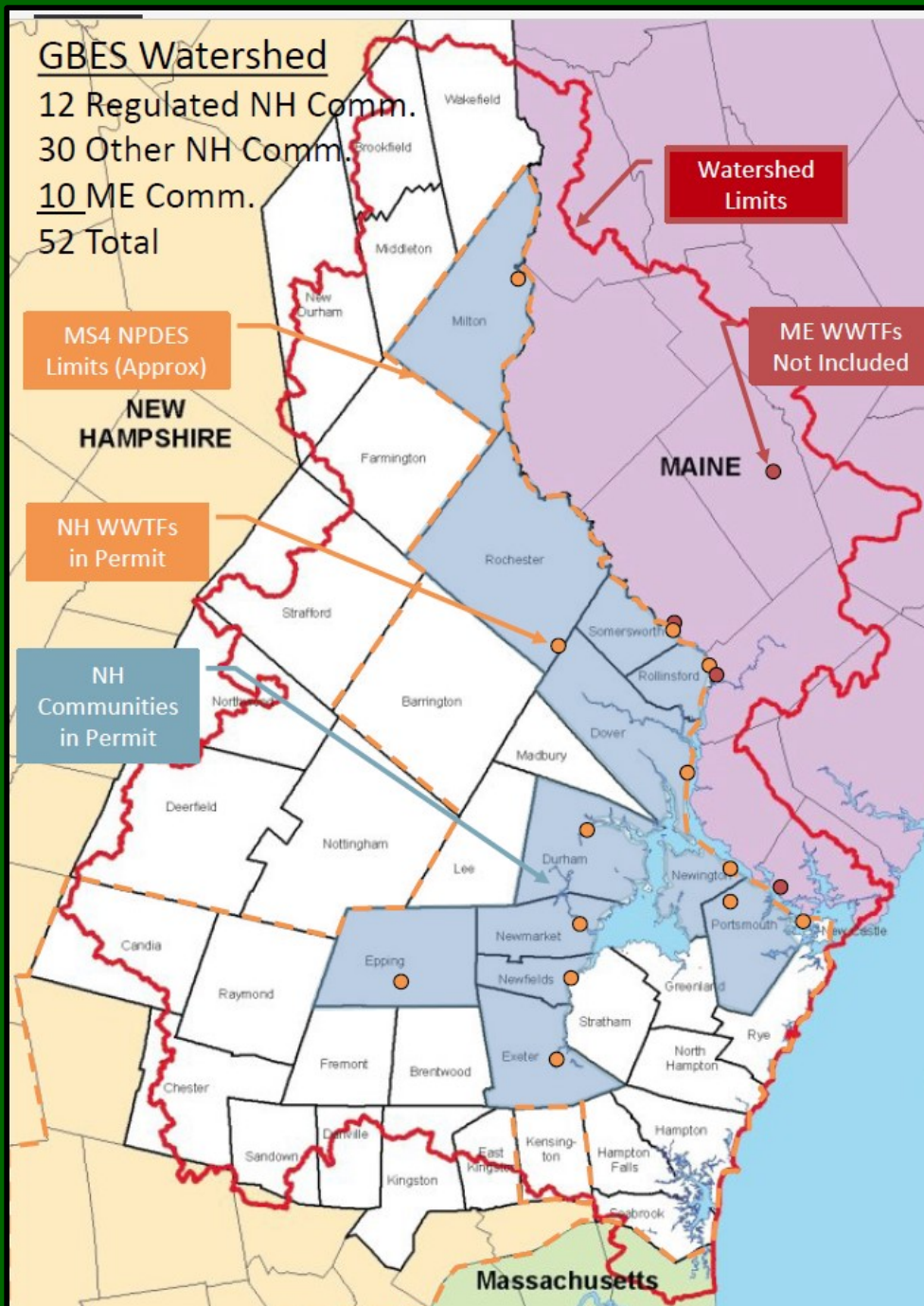
GBES Watershed

12 Regulated NH Comm.

30 Other NH Comm.

10 ME Comm.

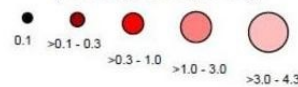
52 Total



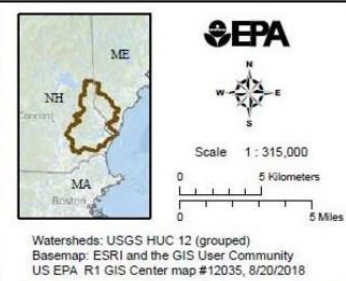


Wastewater Treatment Plants in the Piscataqua R. Watershed

2012-2016 Average Daily Flow
(million gallons per day)



■ Tidal Great Bay Estuary
— Non-Tidal Receiving Waters





Total Nitrogen Permit Overview

WWTP Discharge:

- Only addresses Nitrogen
- “Hold the Load”
 - 167 lb/day (8mg/l @ current flow)
 - Rolling Seasonal Average
- Frequent Monitoring
- May increase in future if WWTP treats areas currently on septic



MLE Process with Invent Mixers and Aquarius Technologies Aeration System



Four new Aerzen Channel and Septage Blowers and Two new Carter Plunger Pumps



Total Nitrogen Permit Overview

WWTP Discharge:

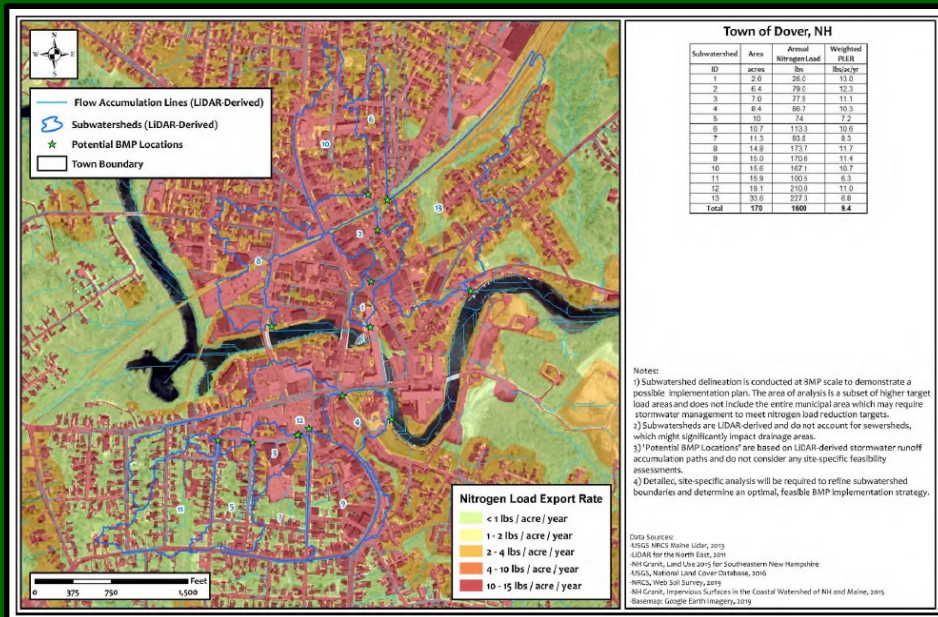
- Reduce I/I to offset increases due to new development
(±\$300,000/yr)
- Continue to improve operations at the WWTP
- Add another process train and clarifier to accommodate increased flow from continued development
(±\$13,000,000 – in 5-10 years??)



Total Nitrogen Permit Overview

Adaptive Management Framework:

- Monitor Ambient Water Quality
- Track TN Additions and Reductions
- Create a Source Reduction Plan
- Determine Load Based threshold

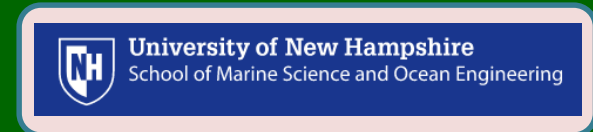
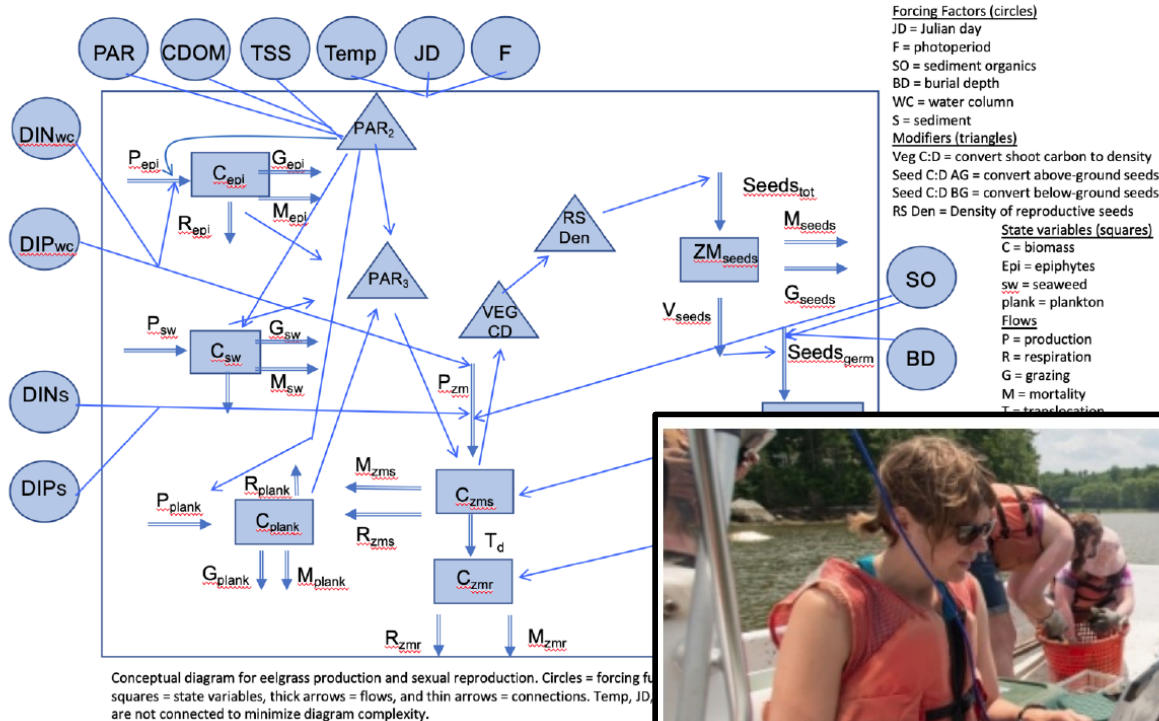




Monitor Ambient Water Quality & Determine Load Based Threshold

Piscataqua Region Monitoring Collaborative (PRMC) & Research and Monitoring Plan (RAMP)

Figure 3. Detailed conceptual model of eelgrass ecosystem (adapted from Jarvis et al. 2014).





Monitor Ambient Water Quality & Determine Load Based Threshold

Support PRMC & RAMP work:

- **Lead by Piscataqua Regional Estuary Partnership (PREP)**
- **Assistance from NHDES, UNH, CLF, and other organizations**
- **Involves stakeholders from the regulated communities**
- **Requires funding, potentially from multiple sources
(±\$100,000/yr)**
- **Intermunicipal agreement**
- **Engage outside water quality experts (±\$50,000/yr)**



Track TN Additions and Reductions

Pollutant Tracking and Accounting Program (PTAP)

NPS tracking database

Dover Municipal Report

Land Use Conversion Table

Soils		Existing Conditions			Future Conditions			Report of Origin
Hydrologic Group	Acres	Land Use Type	Acres	Impervious and/or Paved Surfaces Acres	Land Use Type	Acres	Impervious and/or Paved Surfaces Acres	
C/D	5.77	Residential	5.77	0.06	Commercial/Institutional	5.77	1.06	Broadview Urgent Care Animal Hospital
A	0.45	Residential	0.45	0.17	Residential	0.45	0.25	Hanson Court Apartments
A	1.65	Residential	1.65	1.19	Residential	1.65	0.98	Roberts Road Reconstruction, Dover NH
A	2.04	Residential	2.04	0.76	Residential	2.04	0.75	Locust Street Inn & Locust Common
B	0.61	Residential	0.61	0.06	Residential	0.61	0.35	
C	0.47	Residential	0.47	0.00	Residential	0.47	0.22	





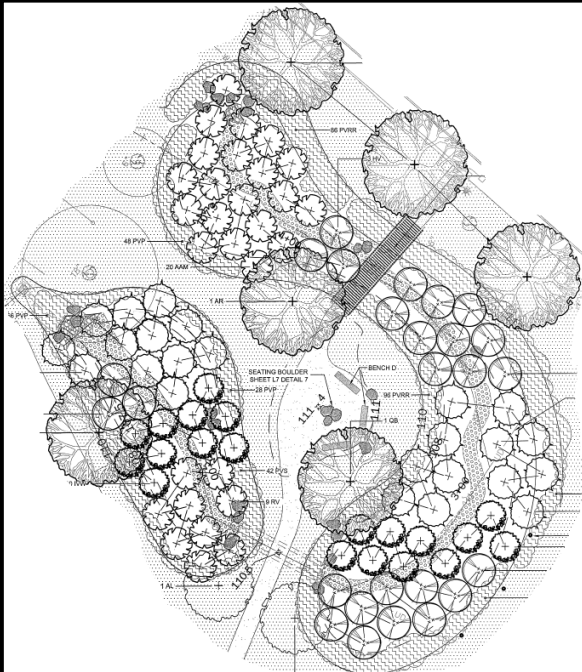
Track TN Additions and Reductions

Support PTAP:

- Actively participate in developing tracking and accounting criteria
- Find long-term funding & home for program ($\pm$ \$5,000/yr)
- Require all development/redevelopment projects to input information into program
- Track city initiatives



Non-Point Source Reductions



Dover plans first-in-NH environmental project

Jeff McMenemy Fosters Daily Democrat
Published 4:53 p.m. ET Oct. 20, 2020





Non-Point Source Reductions

Potential Future Efforts:

- Enhanced Leaf Collection ($\pm$ \$200,000 investment + \$60,000/yr)
- Fertilizer Bans
- Additional Nitrogen focused BMP installs ($\pm$ \$200,000/yr)
- Increase maintenance of BMP's (\$20,000/yr)
- Extend sewer lines to remove aging septic systems (\$180,000/yr)
- “Trading Credits” throughout the watershed (\$50,000/yr)
- Continue to hold development/redevelopment projects to high standards



Non-Point Source Reductions

Land Control Limitations:

- **Dover Land area approx. 27.5 sq miles**
- **25.1 sq miles actually land**
- **2.3 sq miles are water features**
- **2.1 sq miles (8.4%) is City owned/controlled**
- **1.0 sq mile State of NH or DOT (4.0%)**
- **22.0 sq miles privately owned (87.6%)**



Option to not accept new permit

Remain covered under existing WWTP only discharge:

- Upgrade plant to limit of technology (3 mg/l)
 - ±\$24 million at the WWTP
 - 2 more treatment trains, another clarifier, more storage, carbon feed, tertiary filter, etc.
 - Increased operation budget
- Lose “secondary” benefits of NPS improvements
- No ability to “trade credits” or make improvements throughout the watershed
- No long-term water quality monitoring to determine efficacy



Permit Timeline

Nov. '20

- Final Permit Issued

Feb. '21

- Effective date of permit

April '21

- Notice of Intent deadline

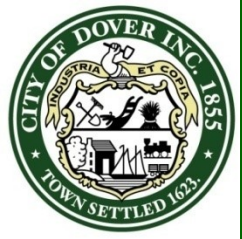
July '21

- Adaptive management plan due



Total Nitrogen Permit Budget Implications

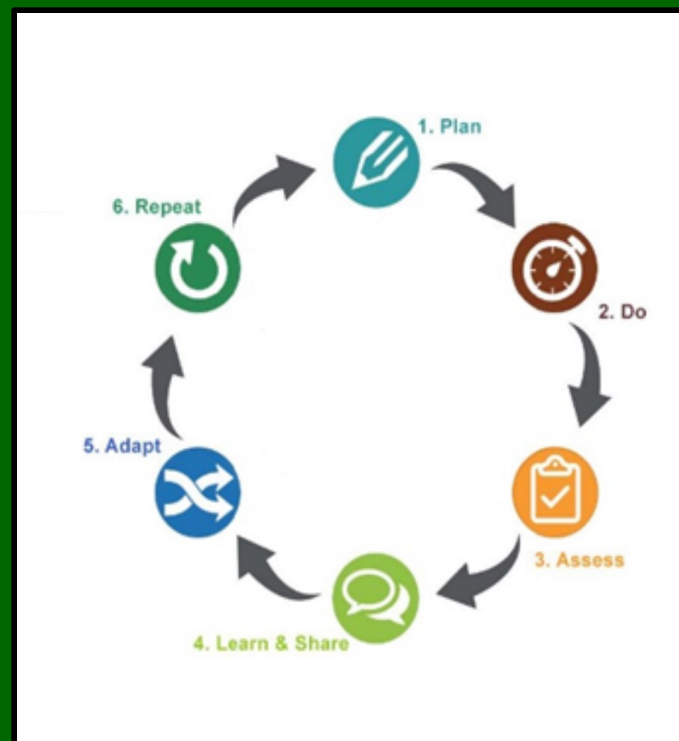
		2021	2022	2023	2024	2025	2026
Current Budget	Technical Services - Collaborative Monitoring and assessing work	\$ 150,000	\$ 150,000	\$ 150,000	\$ 200,000	\$ 200,000	\$ 200,000
	CS Professional Staff Time	\$ 250,000	\$ 250,000	\$ 250,000	\$ 300,000	\$ 300,000	\$ 300,000
	Sewer CIP I/I	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000
	NPS in other CIP projects	\$ 200,000	\$ 200,000	\$ 200,000	\$ 250,000	\$ 250,000	\$ 250,000
	CB spoils facility	\$ 3,500,000					
	SUBTOTAL	\$ 4,400,000	\$ 900,000	\$ 900,000	\$ 1,050,000	\$ 1,050,000	\$ 1,050,000
Permit Impact	"Hold the load" evaluations and monitoring		\$ 150,000	\$ 150,000	\$ 200,000	\$ 200,000	\$ 200,000
	Sewer expansion/ Septic Removal		\$ 180,000	\$ 180,000	\$ 230,000	\$ 230,000	\$ 230,000
	NPS specific improvements		\$ 500,000	\$ 500,000	\$ 500,000	\$ 500,000	\$ 500,000
	SUBTOTAL	\$ -	\$ 830,000	\$ 830,000	\$ 930,000	\$ 930,000	\$ 930,000
TOTAL		\$4,400,000	\$1,730,000	\$1,730,000	\$1,980,000	\$1,980,000	\$1,980,000



Review and Reassess in 5 years

Adaptive Management:

- Demonstrate improvements in the GB
- Learn from what is successful and what needs to be improved
- Implement source reduction plan
- Potentially modify monitoring program





Questions??

**By: Gretchen Young, PE
Environmental Projects Manager
&
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