



MDE Maryland Department of the Environment

MD Coastal Bays TMDL: Update to MDCB STAC January 9, 2013

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Presentation Outline and Goal

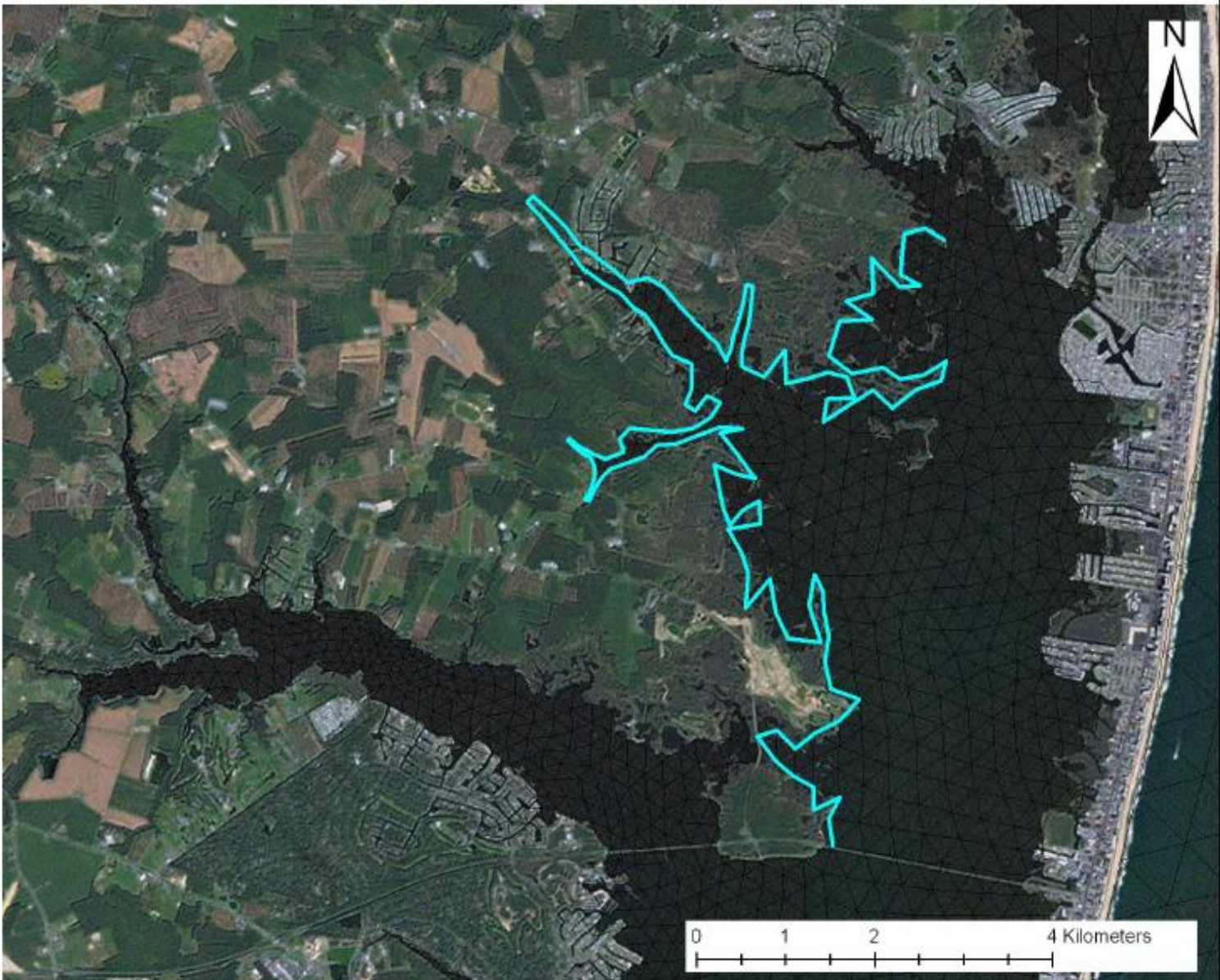
- Revisions/additions based on conference call on Dec. 14, 2012. Specific items:
 - Update on Shoreline Erosion (includes more area);
 - Update on Atmospheric Deposition;
 - Incorporation of diel DO fluctuation into daily average model output (Dr. Wang);
 - Questions/Discussion.
- Agreement on finalized path forward.



GIS Lengths for Shoreline Erosion: Assawoman Bay in MD

The area shown at right is designated as the area in the model from which shoreline erosion for the "Assawoman Bay" is calculated; its length is:

34,524.70 m
(113,270.01 ft)

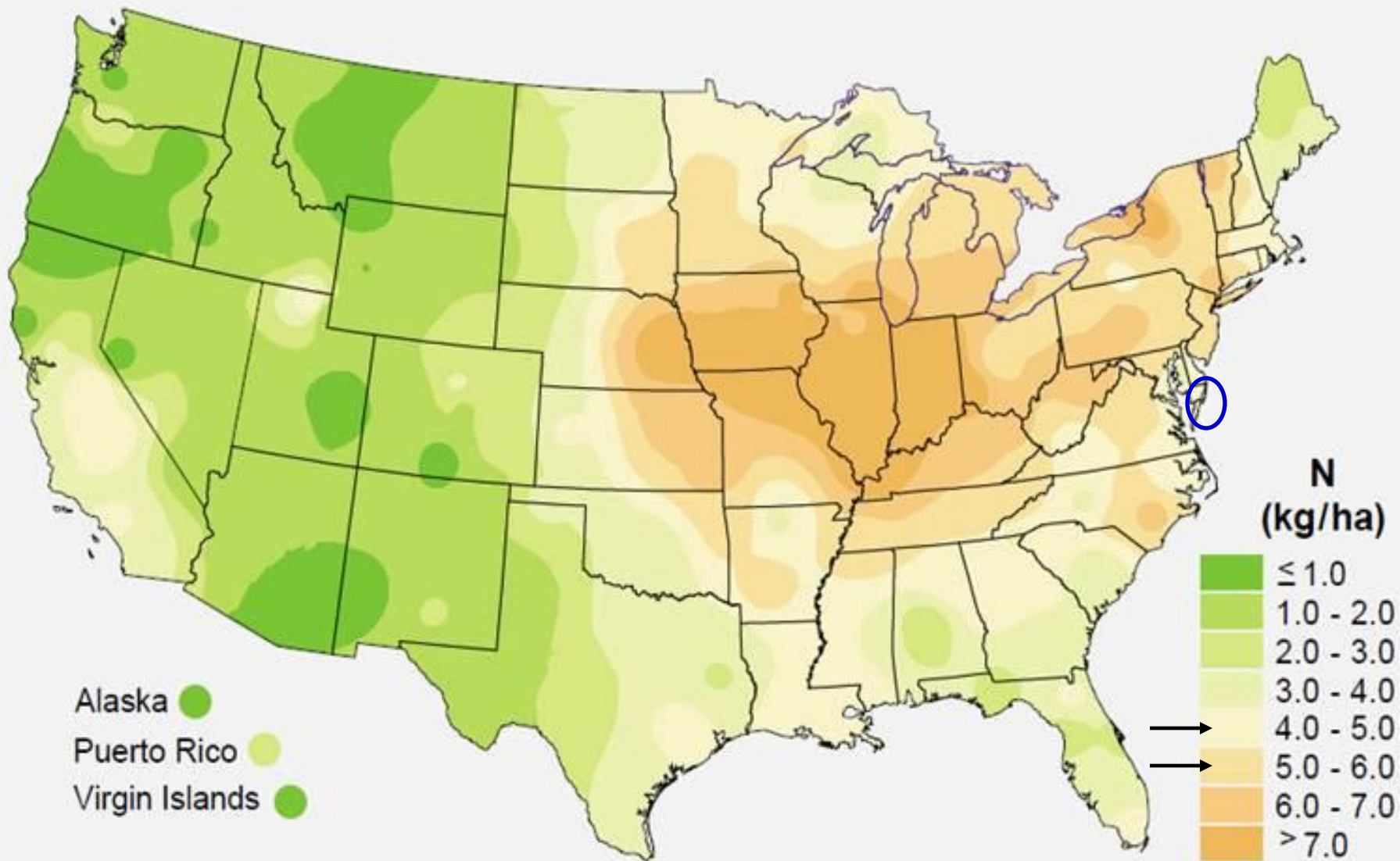


Total Nitrogen from Individual Basin	Erosion Rate lb/ft/yr	Shoreline Length (Model) ft	TN Erosion Load lb/yr
Assawoman Bay in MD	0.0964	113,270.01	10,924.19
Isle of Wight Bay (not including St. Martin River)	0.1189	64,331.15	7,650.78
St. Martin River	0.0820	150,106.02	12,310.62
Sinepuxent Bay	0.0839	107,994.33	9,062.32
Newport Bay	0.1023	60,790.22	6,221.57
Chincoteague Bay	0.1829	796,386.30	145,659.05
Total Coastal Bays		1,292,878.04	191,828.54
Total Phosphorus from Individual Basin	Erosion Rate lb/ft/yr	Shoreline Length (Model) ft	TP Erosion Load lb/yr
Assawoman Bay in MD	0.0089	113,270.01	1,003.42
Isle of Wight Bay (not including St. Martin River)	0.0132	64,331.15	849.33
St. Martin River	0.0088	150,106.02	1,319.91
Sinepuxent Bay	0.0136	107,994.33	1,473.32
Newport Bay	0.0137	60,790.22	830.55
Chincoteague Bay	0.0252	796,386.30	20,068.93
Total Coastal Bays		1,292,878.04	25,545.47

Atmospheric Deposition:

- Currently use Chesapeake Bay TMDL coefficients for both N and P (~ 12 lb/ac/yr N, 0.6 lb/ac/yr P).
- CMAQ model used to simulate loads;
 - Is this too high for Coastal Bays?
 - What are the alternatives?

- National Atmospheric Deposition Program (NADP);
 - Based on national network;
 - Measures wet deposition only;
 - Less than $\frac{1}{2}$ the load as simulated by CMAQ;
 - Nitrogen only.



- National Atmospheric Deposition Program (NADP):
- Monitoring sites measure wet deposition only
- TN: 4 – 6 kg/ha/yr is approximately 3.5 – 5.3 lb/ac/yr.
- No similar information for TP.



Atmospheric Deposition of Phosphorus

- Less information available for P than for N.
- Generally recognized that most P derived from AD is dry deposition;
 - Estimates range from significant to *de minimis*;
 - So... What approach to take?

- Retain current approach (based on CBP/EPA):
 - Advantages:
 - Vetted and approved by scientific community.
 - Incorporates dry deposition.
 - Disadvantages:
 - Different ecosystem (far less watershed, more water relative to land area).
 - May be too high (esp. P); may unrealistically dominate loading source in some bays.
 - Some question as to accuracy of dry-dep N simulation (Poor et al., 2012); others.

- Adopt NADP approach:
 - Advantages:
 - Longstanding method also approved by scientific community.
 - Perhaps more applicable to variety of ecosystems.
 - Lower loading more compatible with MDCBP estimates.
 - Disadvantages:
 - Additional approach needed for phosphorus.
 - Only includes wet deposition of N.



Proposed alternative for addressing AD of TN in Coastal Bays

- Adopt NADP - based approach for N:
 - Use upper end of estimate (~ 5-6 lbs/ac/yr) to account for lack of dry N deposition;
 - Approximately 40 – 50% of current Atmospheric load.





Options for addressing atmospheric TP loads in Coastal Bays

- Apply CMAQ ratios (TN:TP roughly 20:1) to NADP-derived N loads as arrived at above;
 - 0.175 - 0.265 lb/ac/yr
- Assume *de minimis*;
 - Unlikely that there is no contribution;
- Use loading coefficient from another source/study/area.





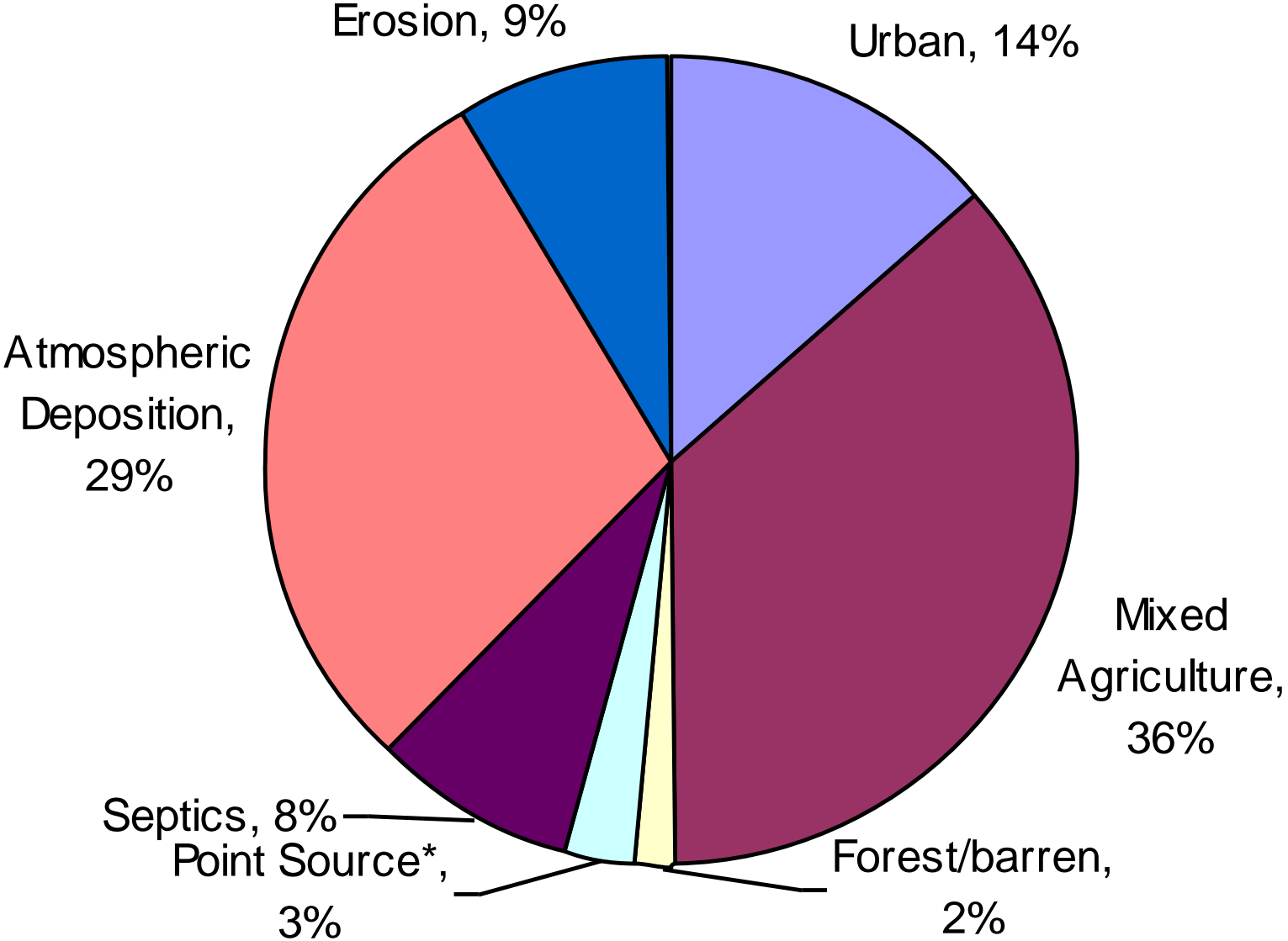
Literature-derived TP Atmospheric Loading Rates

Project/Site:	TP AD load (lbs/ac/yr)
NY Lake: Cossayuna	0.043
NY Lake: Lake Findley	0.673
FL: Florida Bay (78-79)	0.152
FL: Florida Bay (87-88)	0.205
Long Key (south FL)	0.005
NJADN Deposition (Lower Range)	0.045
NJADN Deposition (Upper Range)	0.071
Lake Taihu China	0.243
Choptank (1995 Boynton paper)	0.568
Coastal Bays Model (Unchanged)	0.587
NV: Lake Tahoe dry deposition	0.091



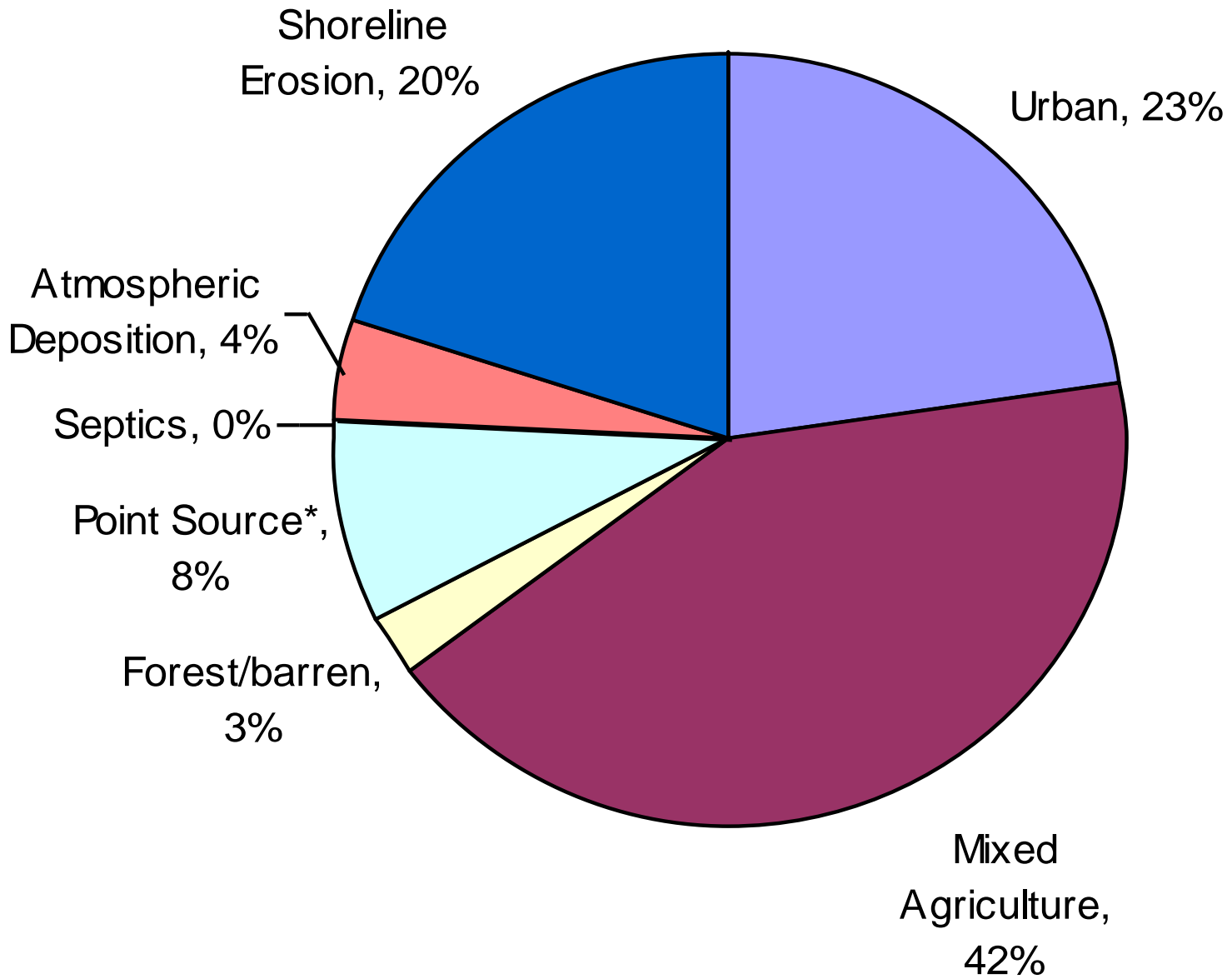
Coastal Bays -TN ATM_ADJ

Shoreline





Coastal Bays -TP ATM_ADJ



Next Steps

- Concurrence on updated Shoreline Erosion loads;
- Concurrence on approach to Atmospheric Deposition loads;
- Additional Scenario Run with new SE and AD loads;
- Documentation and review of final TMDL
 - MCBP included in IAR; 45-day PR



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