Maryland
Department of the Environment

Aligning for Growth
Proposed Approach & Options

Presented to
Maryland's Trading Advisory Committee

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Introduction

- A specific proposal for an AfG policy is being presented to Maryland's Trading Advisory Committee as a tangible case for feedback.
- The decision to present a specific AfG proposal is motivated by the following insights:
  1. The Threshold Approach for calculating offsets operates on a continuum of scale down to the site-specific threshold scale, which is equivalent to the Pre/Post Approach.
  2. The major basin geography is the appropriate scale of analysis for maintaining the loading cap to the Bay. This rules out the Pre/Post Approach as an option at this time.

Logic of the AfG Proposal

- An explicit AfG policy is needed that ensures nutrient and sediment loads to the Chesapeake Bay are not increasing while fostering economic growth.
- EPA has identified the major basin geography as the appropriate scale for managing Bay water quality.
- Load reductions are projected to occur at the basin scale if the State reassigns all of the allocation from land conversion to new development.
- Therefore, the offset policy is dependent upon how existing allocations are reassigned by the State.
- If offsets are needed, then the Calculation Approach determines the amount based on the development site characteristics compared to a common threshold.

Overview of AfG Proposal

1. Land Use Changes & Changes in Loads
2. Proposed Re-Allocation Method
3. Assessment of Need for Offsets at Major Basin Scale
4. Proposed Offset Calculation Approach
5. Data Elements

1. Land Use Changes & Changes in Loads

- Land Use Projections:
  - Consider the MDP projections for 2025*
  - These projections account for applicable land-use laws, local zoning, protected lands and environmental constraints.

2010 – 2025 land use change projections

Basin Name	Agriculture Acres	Forest Acres
Eastern Shore	-25,500	-7,900
Patuxent	-16,500	-21,400
Potomac	-54,600	-57,600
Susquehanna	-10,700	-6,000
Western Shore	-29,100	-24,600
MD Bay Watershed Total	-136,500	-117,500
	54%	46%

* Maryland Dept. of Planning land use projections.

1. Land Use Changes & Changes in Loads

- Projected Load Reductions: Forest & Agriculture

Nitrogen (2010 – 2025)

Basin Name	Total Change From WIP Level
Eastern Shore	-288,200
Patuxent	-192,400
Potomac	-1,568,400
Susquehanna	-207,000
Western Shore	-498,200
Total	-2,754,200

Phosphorus (2010 – 2025)

Basin Name	Total Change From WIP Level
Eastern Shore	-21,300
Patuxent	-14,600
Potomac	-86,400
Susquehanna	-8,700
Western Shore	-25,100
Total	-156,100

Based on Maryland Dept. of Planning (MDP) land use change projections.

2. Re-dividing the Pie when Land Uses Change:

The Re-allocation policy determines how much of the prior land use allocation is reassigned to new development. It sets the foundation for whether or not offsets are needed.

2. Proposed Re-allocation Method

- Major basin projections identify the NPS loads associated with land that is likely to be developed.
- From those loads, set aside 30% (10% uncertainty, 20% Reserve)
- Remaining loads are available for allocation to new development.
- Any load remaining after allocation to new development will be credited to Bay reduction on behalf of the sector from which it originated.

2. Rationale for Re-Allocation Method Elements

- NPS loads associated with land use conversion revert to the State to be reallocated. This is analogous to loads from a point source that terminates operation.
- **10% Uncertainty:**
  - NPS loads are uncertain. A 10% safety margin is a norm used in water quality management context.
  - This uncertainty set-aside cannot be used for allocations unless proven otherwise via a public process.

2. Rationale for Re-Allocation Method Elements

- **20% Reserve:** The reserve is motivated by general public interest and fostering economic growth.
  - **Q: How large would the reserve be? A: Fairly modest.**
  - If the policy was adopted in 2009, the accumulated reserve would be about 100,000 lbs TN (~**17,000** lbs/yr*)
  - Compares with ~**50,000** lbs/yr increase in WWTP TN loads after all major ENR plants are upgraded.

* 20% of 500,000 lbs/yr loading from 68,000 acres of forest & Ag land converted between 2009 -2015. (Based on Phase 5.3.2 model results. EOS loads)

2. Rationale for Re-Allocation Method Elements

- **Remainder:** Any remainder, after addressing uncertainty, reserves and new development allocations, is credited toward Bay Reduction.

  Rationale:

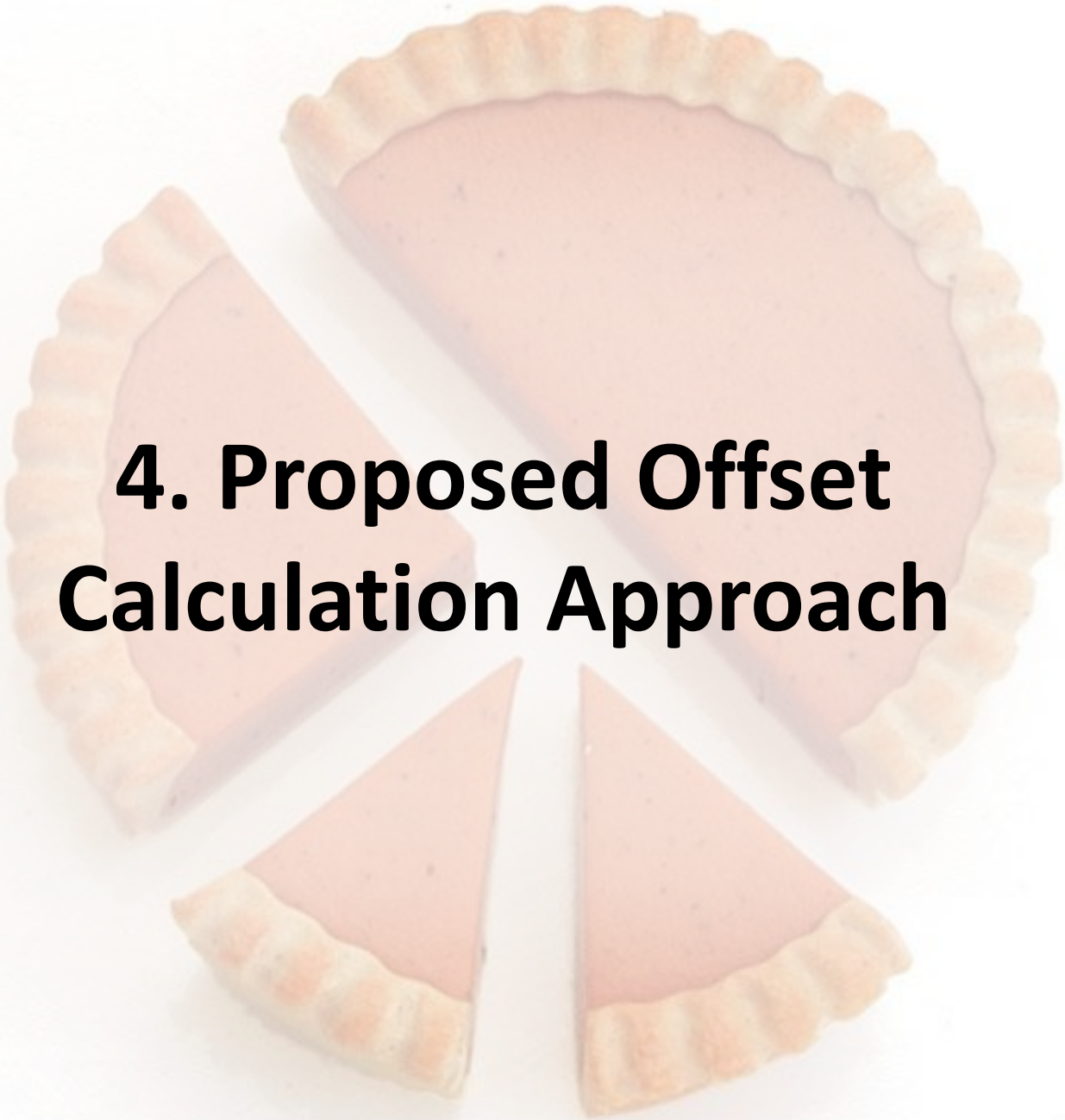
  - Because of the remainder load originates with the Ag sector, that sector has an interest in a share of what remains.
  - Crediting Bay reductions is a cost-free way to meet some of its Bay reduction goal. This is in the general public interest, because the public funds much of the reduction from the Ag sector.

3. Assessment of Need for Offsets at the Major Basin Scale

- Projected Basin Reductions: Forest & Agriculture

Nitrogen (2010 – 2025)

Basin Name	(A) Total Change in Pre-development Nitrogen from WIP Level	(B) = (A) * 0.7 Remaing Load After 30% Set-Aside	(C) New Development Load (Stormwater & Septic)	(D) = (B) - (C) Remainder Load
Eastern Shore	288,200	201,800	115,900	86,000
Patuxent	192,400	134,700	143,900	-8,400
Potomac	1,568,400	1,097,800	674,800	423,100
Susquehanna	207,000	144,900	97,700	47,200
Western Shore	498,200	348,700	240,600	108,200
Total	2,754,200	1,927,900	1,272,000	656,000



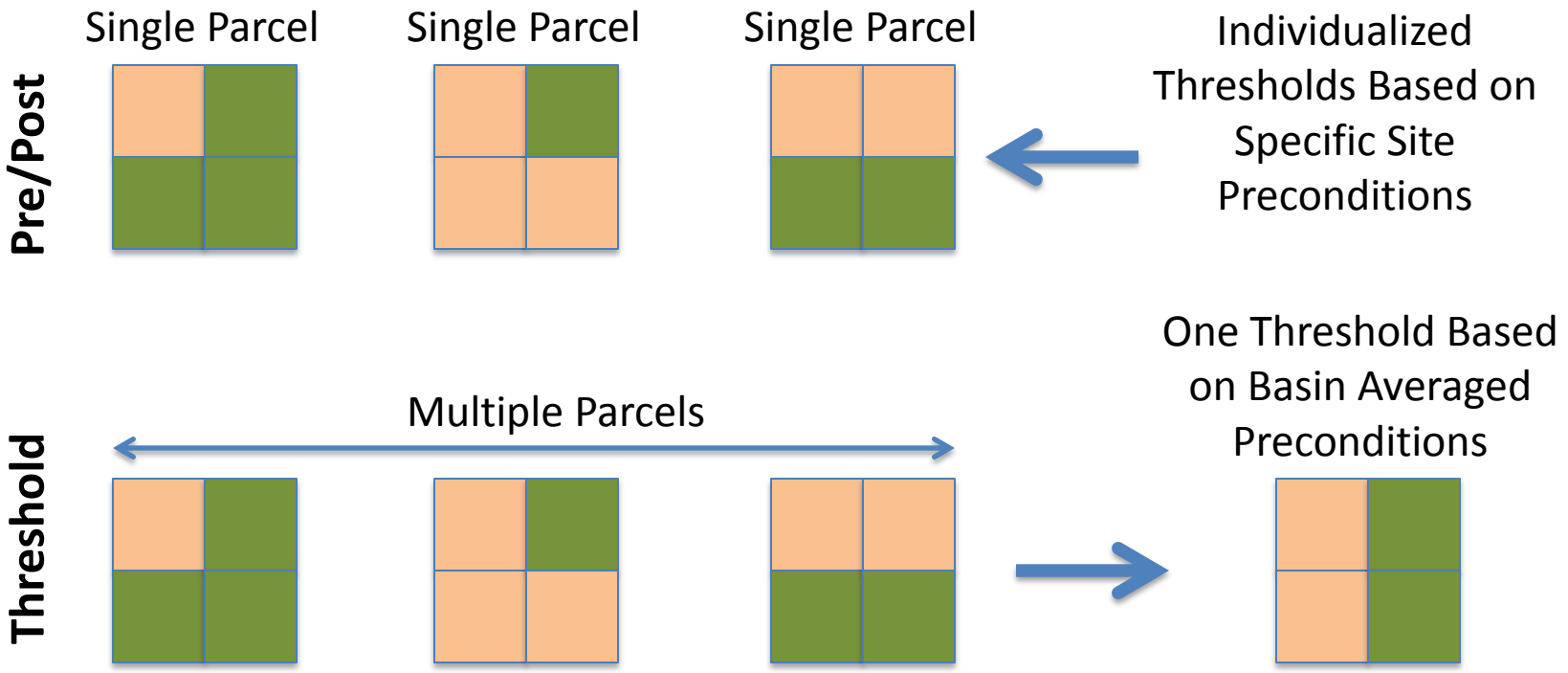
4. Proposed Offset Calculation Approach

4. Proposal: Threshold Approach

- Determine proportions of future Ag and Forest land likely to be developed at the major basin scale. MDP land use projection provides an initial estimate of this.
- Set the Threshold Loading Rate: Calculate the area-weighted average unit load of forest and agriculture at WIP implementation levels for each major basin.
- For each development project, compare the post-development unit load to the basin threshold. If it is below the threshold, no offset is needed.

4. Threshold Approach Vs Pre/Post

The Threshold Approach averages the land area that is likely to be developed in the future at a geographic scale that is protective of Bay Water Quality.



4. Insights About the Approaches

1. The threshold is the allocation for the land that is converted to development (WIP loading levels)
   A. At the site scale, the threshold is the load for pre-development land at full WIP implementation
   B. At the basin scale, the threshold is the load for the pre-development land that is likely to be developed in the future* at full WIP implementation.
2. The threshold equals the fully implemented WIP loading rate for the land that is likely to be converted in the future.

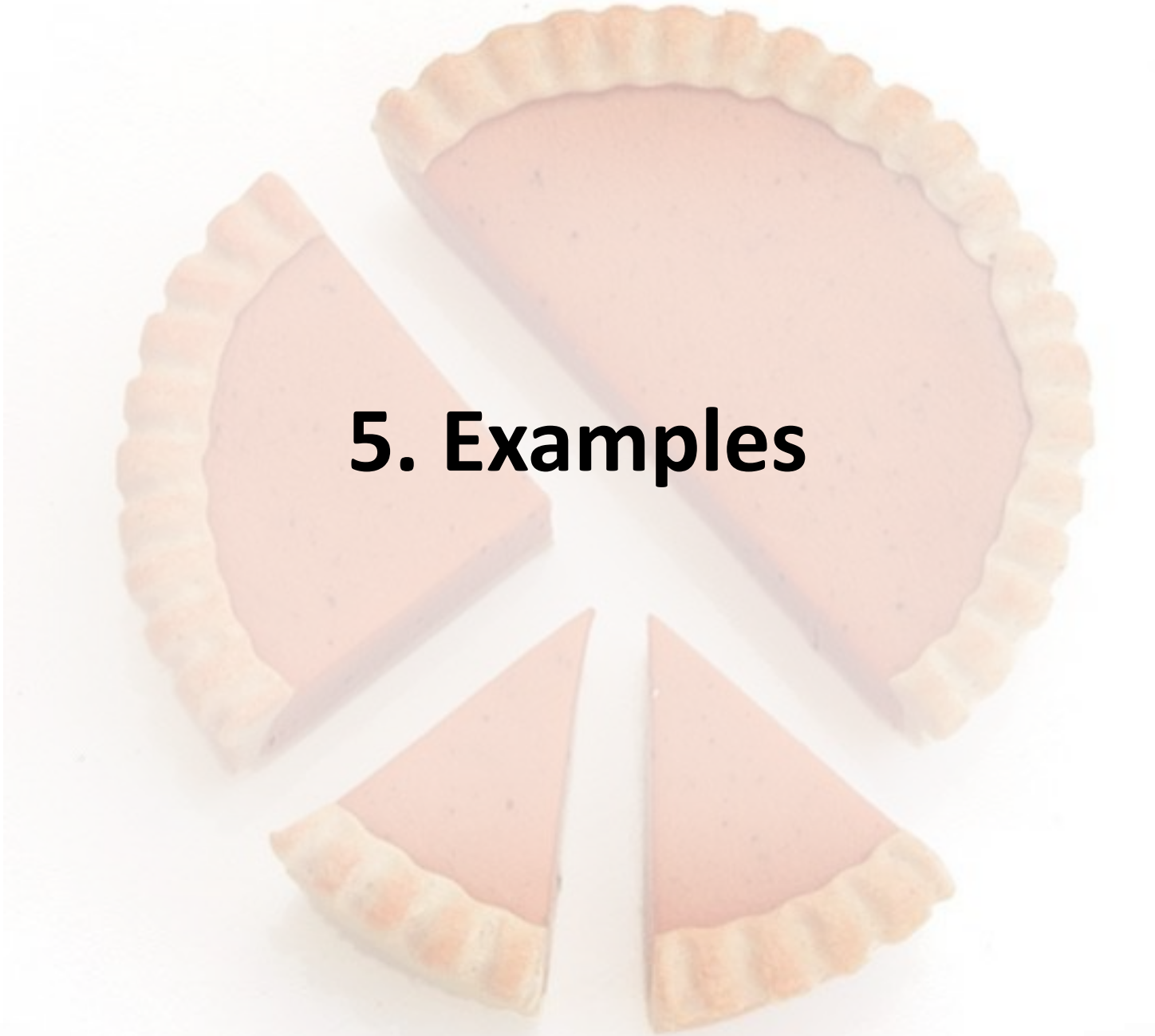
Insights About the Approaches (Con't)

3. Threshold loading rates are affected by:
   - Ratio of Ag to Forest
   - Ratio of Cropland to Pasture
   - Regional Variation in Loading Rates
   - Regional Variation in Reductions Implied by TMDL Allocations (e.g., Potomac basin has less reduction)
   - Land use projection approach
   - Watershed model (Phase 5 vs Phase 6)

4. Threshold method does not create an incentive to develop on Agriculture to capture allocation at a site level. However, there could be regional differences.

Insights About the Approaches (Con't)

5. Threshold approach does not require a determination of pre-land use conditions, entails simpler calculations and simpler reporting.
6. Re-allocations under the Threshold Approach would have to be based on periodic analyses every few years (Annual estimates would be performed using Bay watershed model projections).
7. Threshold approach can be refined in geographic scale in the future if desired.
8. Threshold approach can incorporate local land use planning information.



5. Examples

5. Examples Explored

Are these sufficiently representative? Are there important special cases to consider?

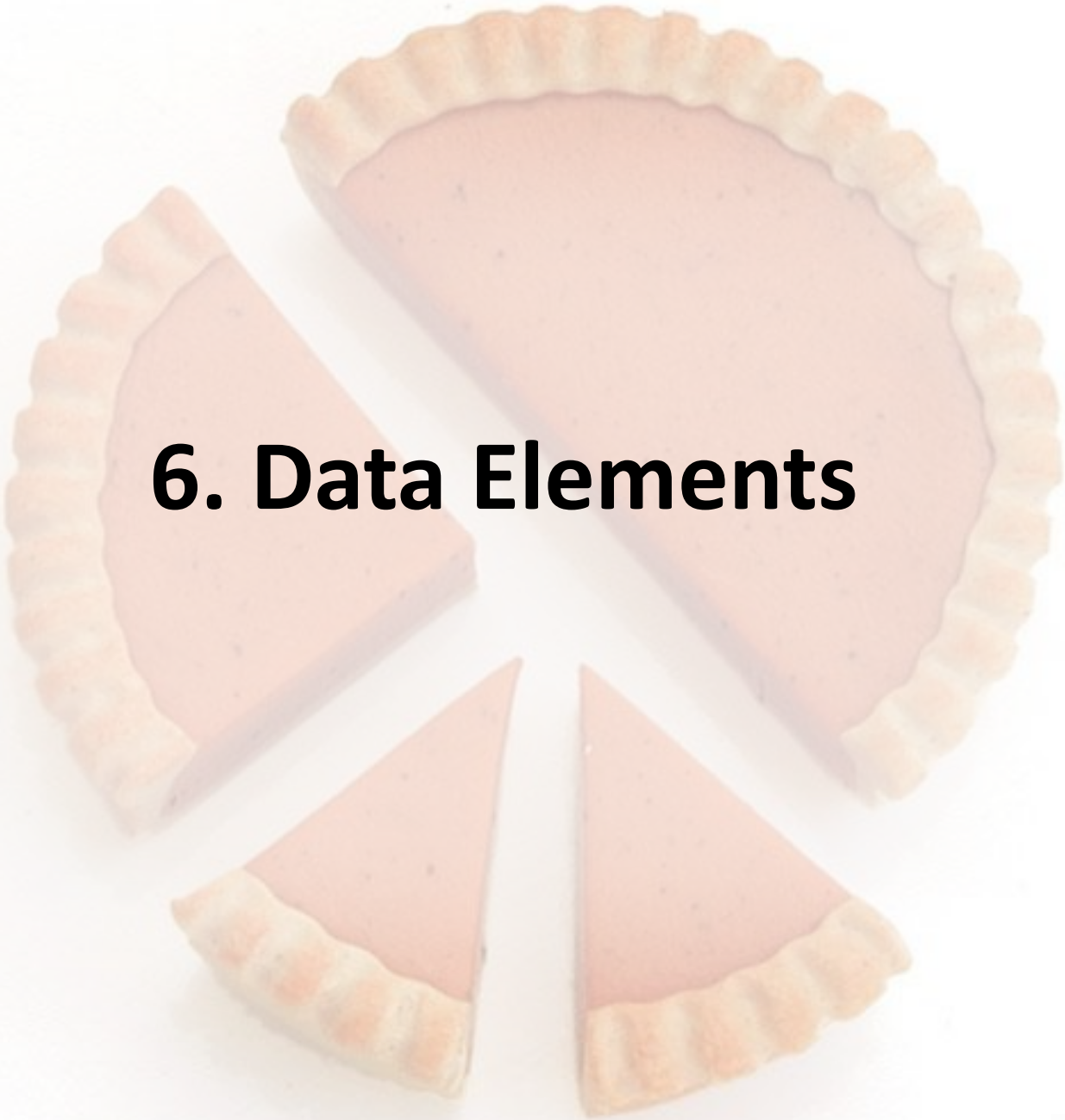
Development Type	Acreage	Septic/Sewer	% Impervious	% Pervious	% Forest
Very Low Density Residential	6 acres	Septic	5%	75%	20%
Low Density Residential	2 acres	Septic	15%	65%	20%
Medium Density Residential	NA	Sewer	30%	50%	20%
High Density Residential	NA	Sewer	40%	45%	15%
Commercial	NA	Sewer	70%	15%	15%

5. Examples: Preliminary Findings

Preliminary findings show that sufficient allocation capacity is available to protect water quality, which obviates the need for offsets . However, if calculations were performed, only offsets would be limited and modest.

Development Type	Nitrogen	Phosphorus
Very Low Density Residential	No Offset	No Offset
Low Density Residential	~1 lb/ac potential offset in one basin	No Offset
Medium Density Residential	No Offset	No Offset
High Density Residential	No Offset	No Offset
Commercial	No Offset	No Offset

* MDP 2025 land use projections, Phase 5.3.2 model. Other potential variations: CBP or other projections, different projection years, Phase 6 model.



6. Data Elements

6. Data Elements

- Data Needs:
  - Land use change information
  - Better reporting of stormwater BMPs on new development
  - New septic systems
- Data Reporting Options:
  - Stormwater:
    - MDE Water Management, SSDS Geo-Database
    - MDE Water Management, Compliance eNOI system
  - Septic System
    - MDE Water Management, Online Septic Reporting System

Summary of Preliminary AfG Policy Proposal Elements

- Re-allocation of Loads as Land Use Changes
- Offset Calculation Approach
- Data Elements

Preliminary Policy Proposal Elements

Scale and Bay Water Quality Protection:

- EPA has identified the major basin geography as the appropriate scale for managing Bay water quality.
- The proposal is to adopt the major basins as the geographic scale at which the AfG policy will be adopted. This scale can be refined in the future if warranted.
- Loads at the basin scale are projected to decrease as land use is converted, even if 30% of the pre-development WIP-level load is set aside and the new development is given an allocation. Therefore, baring new information or adoption of a more refined geographic scale, water quality is protected without the need to perform offset calculations.

Preliminary Policy Proposal Elements

Proposal on Re-dividing the Pie:

- Set aside 30% of existing land use allocation load. Provide allocation to new development. Remainder reverts to original source sector for reduction to the Bay.
- Preliminary findings suggest sufficient allocation will be available to obviate the need for offsets.
- Question: Should Septic & Stormwater should be assessed together or should septics be separated?
- If septics are separated, what allotment of load should be given to them?

Preliminary Policy Proposal Elements

- Adopt the Threshold Calculation Approach:
  - Although preliminary findings suggest no need to perform offset calculations at the present time, the proposal is to adopt the Threshold Approach at the major basin scale as part of the State's AfG policy.
  - The Threshold Approach would be used if future changes in data or analytical tools suggest the need, or if the State is compelled to adopt a refined geographic scale of analysis.

Preliminary Policy Proposal Elements

- Data Policy Questions:
  - Question 1: The threshold approach precludes the need to assess pre-land cover information. Should we strive to collect it anyway?
  - Question 2: The eNOI system has promise for managing information associated with AfG? Should we investigate that potential?
  - Question 3: Regardless of whether septics are combined or separated from stormwater, should we consider requiring installation of all septic systems to be reported by service providers to the State via the existing online system?
  - Question 4: Are there other data issues we should be considering?

END

EPA CBP Nitrogen Loading Rates

WIP Implementation Nitrogen Loading Rates:

Agricultural Land
16 lbs/ac yr

Forest Land
3 lbs/ac yr

Urban Runoff ESD
Stormwater: 4 lbs/ac yr

Septic System Unit Load (Conventional)

Location (Zone)	TN lbs/yr (EOS)	Pass Through Pct
Critical Area	18.6	80%
Within 1000' of a Stream	11.6	50%
Everywhere else	7.0	30%
Average	9.9	42%

LOADS REPRESENT STATEWIDE (EOS) RATES

Treatment	TN lbs/yr
WWTP secondary treatment	10.8
WWTP BNR treatment	4.8
WWTP ENR treatment	2.4
WWTP with allocated capacity	0