Blue Plains
Nutrient Reduction Analysis Report
(December 2005)

Preliminary DRAFT

Prepared by MWCOG Staff
on behalf of
the Blue Plains Regional and Technical Committees

I. Background & Scope

Blue Plains is the largest wastewater treatment plant in the Potomac River as well as within the entire Bay watershed. In 1996 the plant began to treat half of its total flow through a pilot Biological Nutrient Reduction (BNR) process. Since early 2000 when the full-scale BNR process was put in-service, the plant has been successfully reducing its total nitrogen loads consistent with the original Chesapeake Bay Agreement's 40% nutrient reduction goal. As such, its successful nitrogen reduction efforts to-date have been a major source of the overall load reduction efforts made to-date in the Potomac River basin as well as the Chesapeake Bay watershed. This should continue to be a source of pride to all those involved at Blue Plains.

It is clear that Blue Plains will continue to be an important component of any future restoration efforts for those waters. In fact, because Blue Plains is a facility that provides wastewater treatment to customers in the District and Maryland, as well as in Virginia, each of those jurisdictions clearly needs Blue Plains's continued and potentially increased levels of nitrogen reductions in order to achieve and maintain their individual nitrogen load allocations. This view has been confirmed in all three jurisdiction's Tributary Strategy documents.

It is also clear that the issue of determining appropriate nitrogen reduction levels at Blue Plains has broad regional and multi-state implications, as well as levels of complexity that would clearly benefit from a thorough evaluation. To that end, the BPRC agreed to evaluate in detail a range of policy issues, potential options, and potential benefits associated with developing a nutrient reduction strategy for Blue Plains within the context of the region. This effort, to be conducted by COG staff, will expand upon the initial analysis done in the BPRC's *Blue Plains Service Area Phase I - Facility Planning Study*. This effort is also intended to complement and supplement DC-WASA's current Facility/Strategic Study, and to provide important background information for all the Blue Plains Users as they participate in DC-WASA's stakeholder process.

However, there are concerns that the three strategies make different assumptions about their respective 'shares' of Blue Plains' flows and what nitrogen concentrations they assume will be needed in order to achieve their respective nitrogen load allocations. That approach is inconsistent with managing a facility that operates under a single NPDES permit and the requirements of the 1985 Intermunicipal Agreement. The current successes at Blue Plains have been due in large part to the outstanding efforts of DC-WASA's management and staff – supported by the fact that the jurisdictions and agencies represented on the BPRC and the DC-WASA Board have worked together to develop a consensus approach regardless of the issue. This report therefore seeks to: a) identify the policy issues, as well as potential options and benefits for Blue Plain; b) aide the Blue Plains Users in determining what additional nutrient reduction requirements will need to be implemented at Blue Plains while addressing other competing permit and program requirements; and c) engage all stakeholders so that consensus can be achieved regarding this critical issue. Just as the current DC-WASA Facility Study is intended to define

technical options for how the Blue Plains plant can achieve various nitrogen levels, this report is intended to answer the following types of questions:

1. What role does the Blue Plains play in the proposed nitrogen regime for the Potomac River, the Chesapeake Bay, and the metropolitan Washington region?
2. What role does Blue Plains play in terms of other wastewater plants in the region?
3. What might be some of the potential benefits of nutrient trading at Blue Plains?

Note: This list of questions is merely indicative of the types of policy questions that could be informed by this report, and is not to be viewed as all inclusive.

II. Blue Plains Nutrient Load Profiles

A. Blue Plains WWTP

1. Current Performance & Historical Trends

Blue Plains' has been operating its BNR process for the past eight years. In 1996, a pilot process was begun to treat half of the total plant flow through a 3-stage BNR process to reduce Total Nitrogen (TN) levels to 7.5 mg/l. That treatment level enabled Blue Plains to achieve a 40% reduction in nitrogen (from its 1985 baseline load). Those load reductions were allocated towards the three 'state' jurisdictions (i.e., District, Maryland, Virginia) served by Blue Plains. These reductions allowed the District to achieve its 40% nitrogen reduction goal under the original Chesapeake Bay Agreement.

In early 2000 Blue Plains converted the pilot process to a full-scale process. That process continues to treat total Blue Plains' flows to achieve TN values of 7.5 mg/l or lower. This performance has enabled Blue Plains to consistently meet the 'goals' defined in its NPDES permit of 7.5 mg/l TN as well as 8.467 million pound annual load (calculated based on a 370 MGD flow rate at 7.5 mg/l TN).

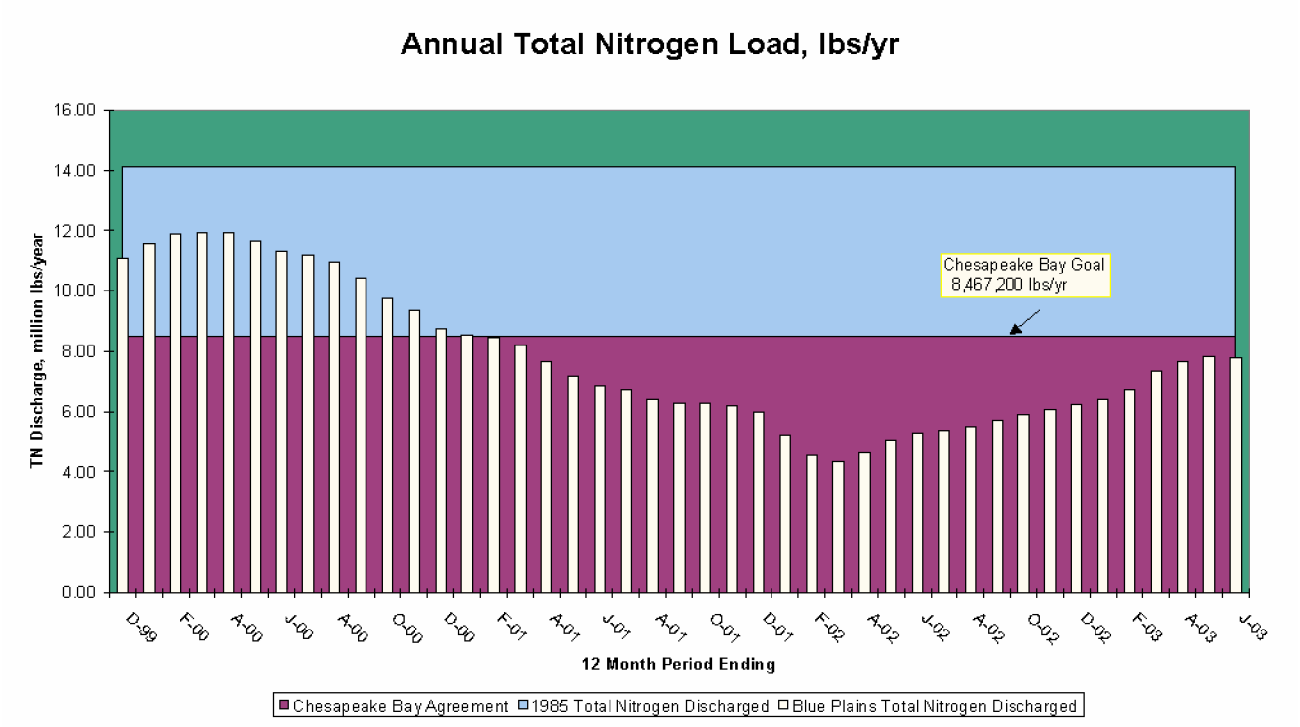
Figure 1 [updated figure to replace current version] demonstrates Blue Plains' full-scale BNR process performance over the past four years. It is important to note however, that while the overall plant performance continues to exceed its permit 'goal,' that overall plant processes (wastewater and biosolids) are often negatively impacted as a result of trying to operate the BNR process – primarily when the plant experiences high flows. This situation is exacerbated by the fact that one-third of the District's system is a combined sewage system, and that the current BNR process utilizes tankage (i.e., capacity) in the plant. These are critical issues that DC-WASA's current Facility Study seeks to address.

2. Current & Projected Load Allocations/Load Cap Assumptions

Blue Plain's current NPDES permit (issued December 2004) continues to include an overall 7.5 mg/l TN performance goal for the plant. However, this permit added the specific TN load goal (i.e., load cap) of 8,467,000 pounds/year based on applying the TN concentration to the total plant design capacity of 370 MGD. Although this load cap value continues to be portrayed as a 'goal' versus a permit 'limit,' the inclusion of a load cap is consistent with the EPA and Bay states' stated intentions and formal permit policy to include specific load caps (derived from their respective Tributary Strategies and load allocations – see Section III. B.) into individual wastewater plant NPDES permit limits.

At this time it is still somewhat uncertain what the final load allocation/load cap will be for Blue Plains given that it serves three state jurisdictions, and that there are three different Tributary Strategies making assumptions about their respective allocations of Blue Plains' total nitrogen load and future reductions – and EPA Region III's assumptions regarding Blue Plains' permit (see Section IV). In addition, various regulatory requirements will also be influencing these decisions (see Section III.A.). These issues also have the potential to impact various allocation and associated cost assumptions (see Section VI). It is clear however, that Blue Plains' next permit renewal (currently scheduled for February 2008) will include a TN load cap. Now that Maryland has issued its new nutrient water quality standards EPA may also decide to invoke Blue Plains' current permit's 're-opener' clause and insert a nitrogen load limit before the scheduled 2008 renewal. Current estimates for what that nitrogen load limit might be are assumed to be range from 4.7 to 4.9 Million lb/year – assuming an overall plant performance designed to achieve 3 mg/l. This also depends upon what peak flow factor is applied and how Outfall #001A's loads are addressed. This initial range of values is based strictly on mathematical calculations of total plant flow, TN concentrations, and incorporating the impact of high peak flows on BNR performance. The values do not include any adjustments for nutrient trading, application of nutrient equivalents, or accommodations for 'wet weather hydrologic year' impacts. All of these factors are likely to be negotiated and potentially incorporated into any final load cap/allocation that is incorporated into Blue Plains' future NPDES permits.

FIGURE 1
Blue Plains BNR Performance Trends



B. Blue Plains versus Other Sources

The following graphics (Figures 2 - 4) present current nitrogen loads for the entire Chesapeake Bay watershed as well as those for the Potomac River basin, as well as nitrogen load information for Blue Plains for comparison purposes. These loads utilize the most current set of Bay-wide data for all nitrogen sources (i.e., 2003 Blue Plains actual performance, 2003 Bay-wide wastewater plant performance, and 2003 estimated model loads for a all other sources). The data is the same that is used in the Chesapeake Bay Program's Watershed Model and used to evaluate the annual 'progress' made from reductions from all nitrogen sources in the Bay watershed. The actual data is presented in Table 1 in the Appendix. Blue Plains's importance to the Potomac and Bay restoration efforts, as it provides wastewater treatment to a large percentage (approximately 42%) of the Potomac basin's population.

[Note: Data for the COG region, which is not broken out by the CBP's Watershed Model, is being evaluated to determine if the data can be reasonably estimated, and will be provided if possible.]

Figure 2

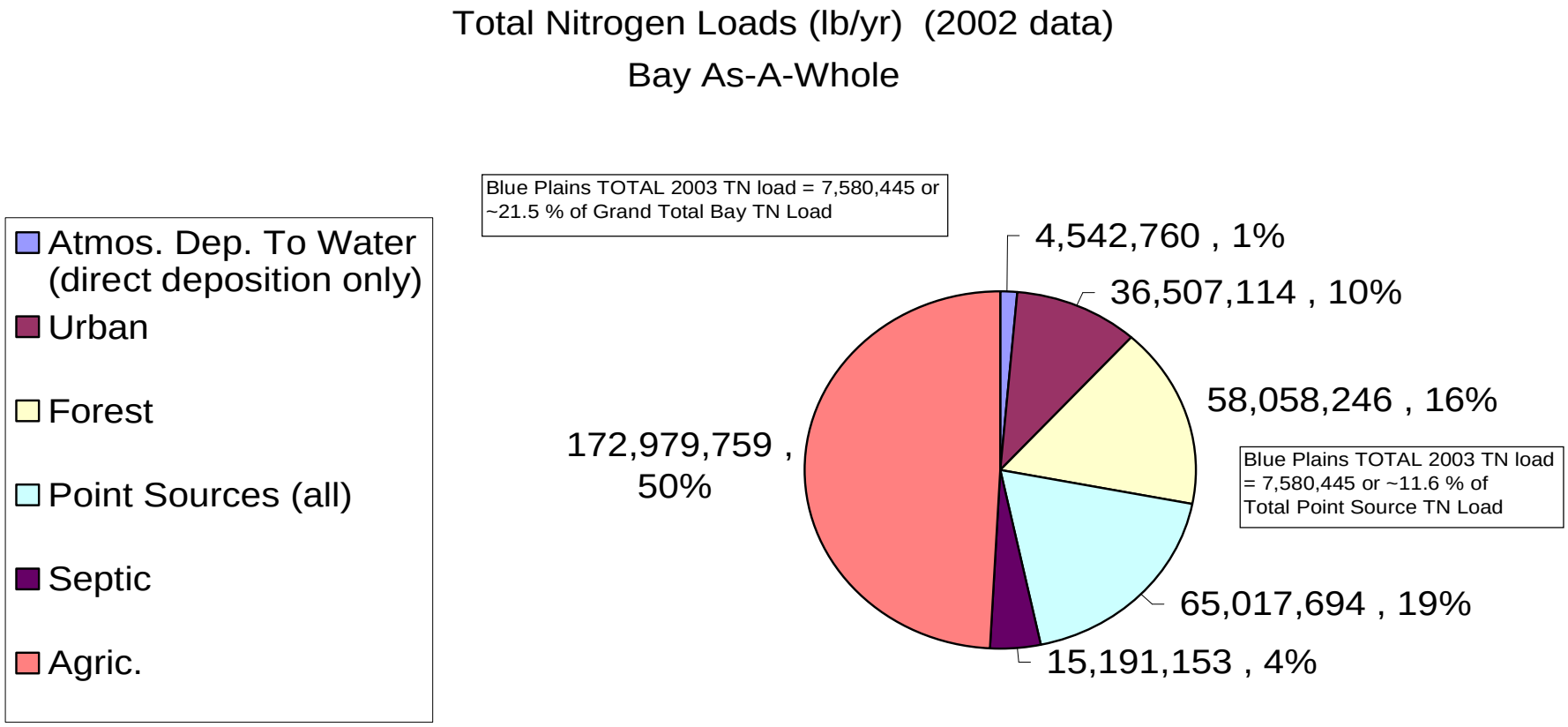

Total Nitrogen Loads (lb/yr) (2002 data)
Bay As-A-Whole
Atmos. Dep. To Water (direct deposition only)
Urban
Forest
Point Sources (all)
Septic
Agric.
Blue Plains TOTAL 2003 TN load = 7,580,445 or ~21.5 % of Grand Total Bay TN Load
4,542,760 , 1%
36,507,114 , 10%
58,058,246 , 16%
172,979,759 , 50%
Blue Plains TOTAL 2003 TN load = 7,580,445 or ~11.6 % of Total Point Source TN Load
65,017,694 , 19%
15,191,153 , 4%

Figure 3

Total Nitrogen Loads (lb/yr) (2002 data)

Potomac Basin

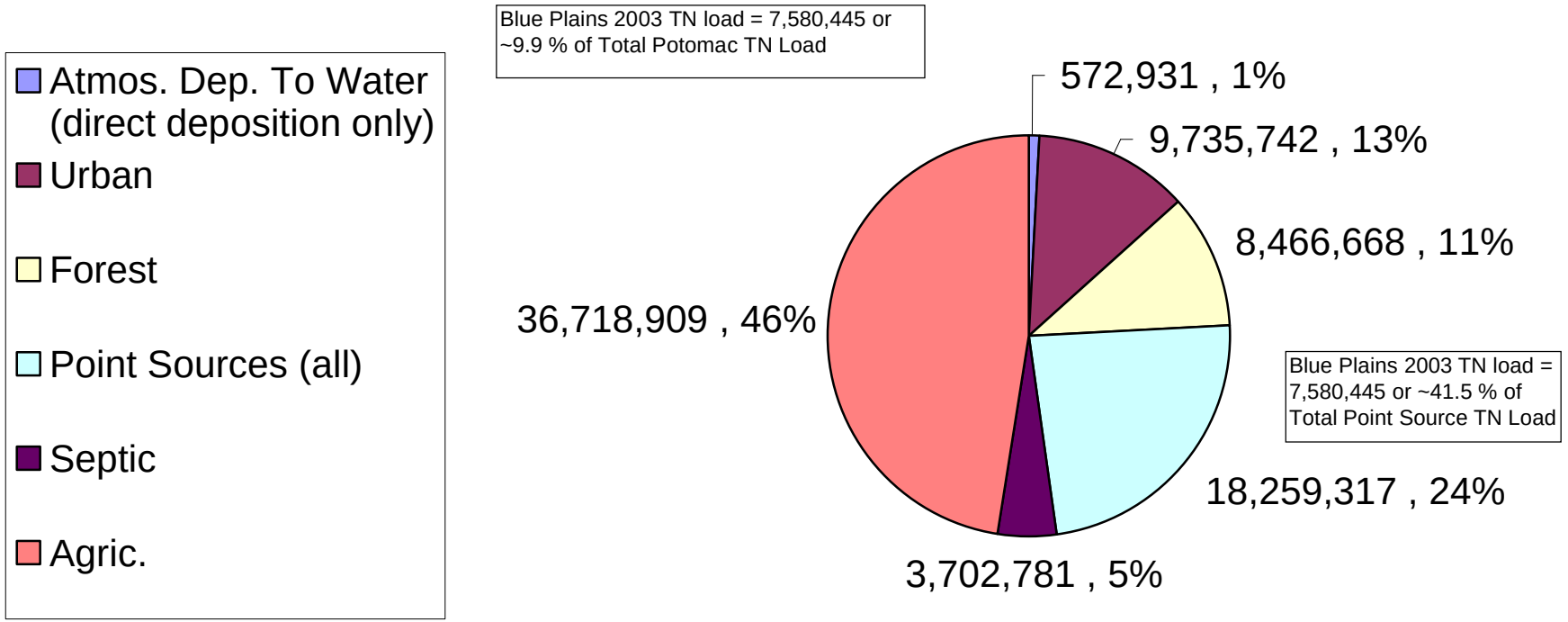


FIGURE 4

Total Nitrogen Loads (lb/yr) (2002 data)

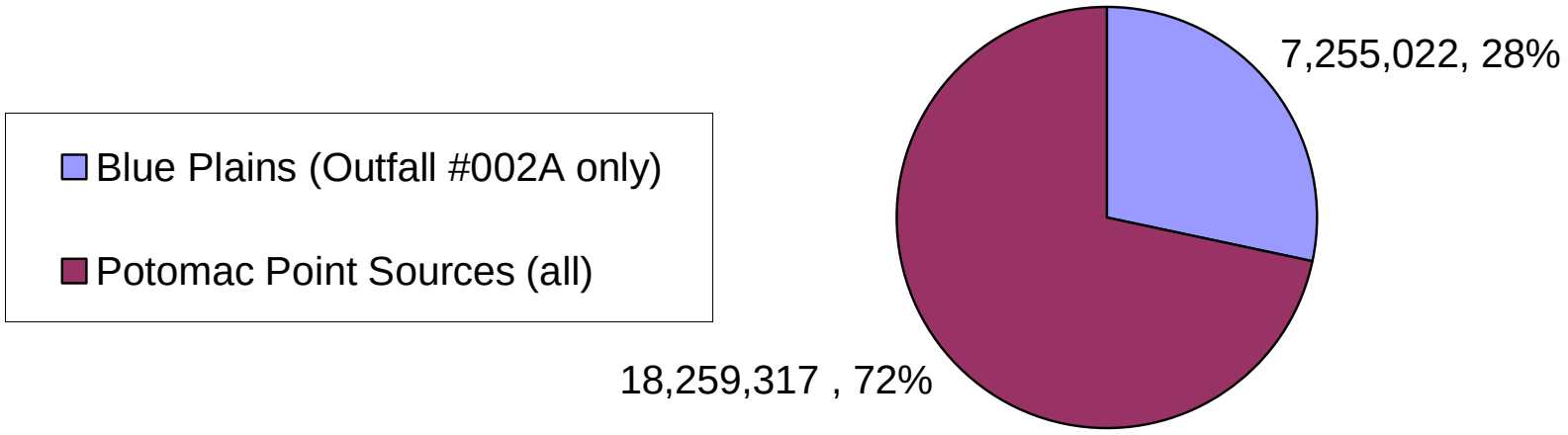
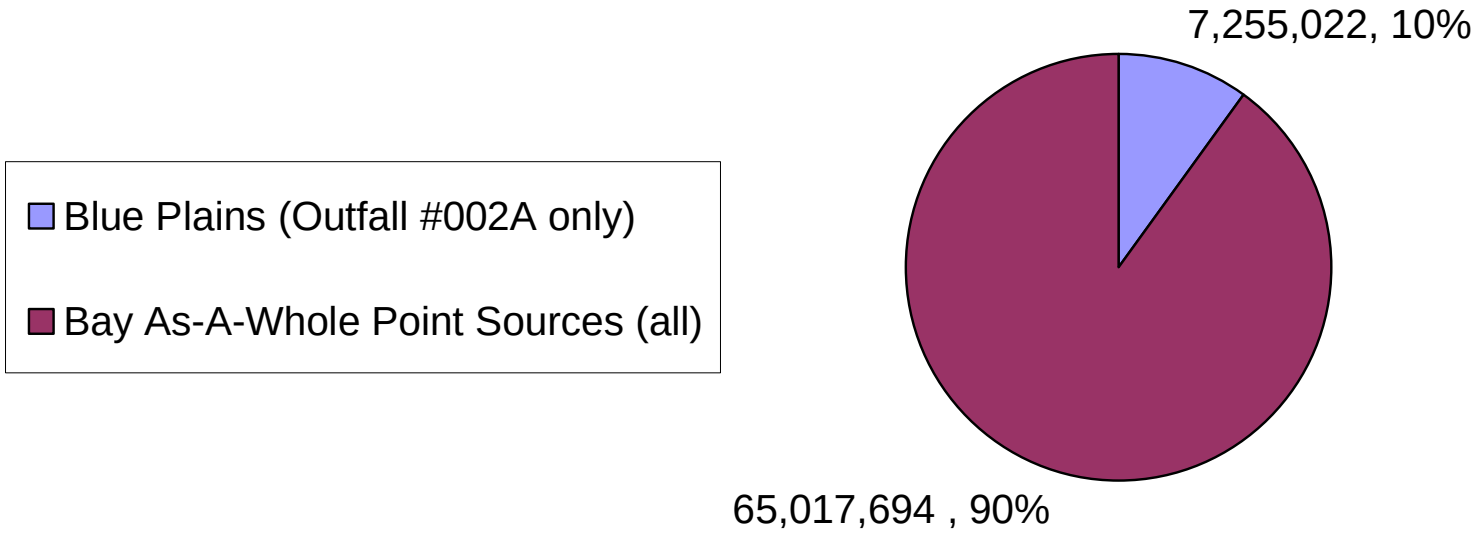


FIGURE 5

Total Nitrogen Loads (lb/yr) (2002 data)



III. Update/Assessment of Nutrient Load Reduction & Cap Requirements

A. Regulatory

1. **Blue Plains Permit Conditions**

As described in the BPSA Study, Blue Plains' permit conditions are driven primarily by the water quality requirements that exist in the District of Columbia's portion of the Potomac River. Those requirements are defined by the District's Department of Health (DC-DOH). Due to the District's unique status (i.e., not being an actual state), however, the DC-DOH must sign-off on the proposed NPDES permit, while EPA Region III actually issues the permit. In addition to the District's requirements, protecting water quality in the Potomac River is also impacted by the demands and requirements of neighboring states (Maryland and Virginia), whose waters abut the District's. Those same Potomac waters are also impacted by the actions and water quality regulations of upstream Potomac River jurisdictions (West Virginia and Pennsylvania). In addition, the permit must now address the new water quality standards created to protect the downstream waters of the Lower Potomac River and the Chesapeake Bay (in Maryland and Virginia). These standards are specifically addressed in this report.

Currently, Blue Plains' existing permit contains an annual nitrogen load 'goal' (i.e., load cap) of 8,467,000 pounds/year based on applying the TN concentration to the total plant design capacity of 370 MGD. While the current permit portrays this cap as a 'goal,' EPA has clearly indicated in its new wastewater plant Bay-nutrient permitting policy (December 2004) that it intends to incorporate a load cap into Blue Plains permit as an 'annual load limit.' The ability to design/build/operate a denitrification process to meet an annual load figure is obviously a significant improvement over the concept of implementing this requirement as a traditional weekly/monthly permit limit. However, a load cap would still need to be enforced under existing Clean Water Act compliance requirements. As a worst-case scenario, those requirements could result assessing fines for exceedance of an annual load cap at perhaps the maximum fines times 365 days/year. This issue could have considerable impacts if not adequately addressed, the potential implications have been recognized by EPA and the state regulators; however efforts to clarify or fully resolve this issue with EPA and the states has not yet been resolved.

2. **Watershed Permit & Bubble Permit Concepts**

In addition to an annual load limit, consideration is also being given to potential permit options and alternatives that could also be utilized when negotiating Blue Plains' next permit. The primary option includes the use of a watershed or bubble permit. This permit concept would allow sources (both point and non-point sources) to be group together and thereby combine their individual allocations and therefore utilize the most effective means of meeting the combined cap load. Maryland and Virginia appear to support such efforts within their own state jurisdiction boundaries, but are uncertain at this time how or if they might consider an interstate effort that would incorporate Blue Plains. For the District of Columbia, since Blue Plains is their only wastewater plant, and the primary nitrogen load, the concept of a watershed permit has somewhat limited applicability. It is uncertain at this time if or how such a concept could be utilized for a regional facility such as Blue Plains without invoking interstate regulations and compliance issues. EPA's recent permitting policy supports this concept, but does not specifically define how to apply it an interstate application.

Another permit concept would be the utilization of nutrient trading. Under this approach, Blue Plains could agree to make additional nitrogen reductions and 'trade' them to the other entity; or vis-versa. Again, Maryland and Virginia have formally indicated their support for nutrient trading, as has the District; but in general the mechanics of how this might be achieved has not yet been defined beyond broad concepts. A significant regulatory constraint for this approach, beyond those interstate issued noted with watershed permits, is how trading might be implemented when plants are at or near limits of technology and have specific permit limits versus goals. This concept would require further development before its direct application to Blue Plains could be quantified.

3. **State Water Quality Standards & Designated Uses**

Blue Plains discharges directly into District of Columbia waters in the Potomac River. Those waters are immediately upstream of Maryland's Potomac River waters. In fact, state water quality standards/requirements for the Potomac River (where the Blue Plains WWTP discharges) vary as different state agencies have responsibility for different portions of the tidal portions of the Potomac River (i.e., DC-DOH, MDE, and VA-DEQ). The result of all these factors is that Blue Plains' issues are fundamentally multi-jurisdictional and multi-state in nature.

Currently, nutrient-based standards are being violated in most of these waters. As a result, the Potomac and the Bay are listed as 'impaired' (i.e., fail to meet the appropriate water quality standards), and are therefore 'listed' (i.e., 303(d) List of Impaired Waters). The nutrient load allocations, developed through the use of the CBP's Water Quality Model, and defined in each of the states' Tributary Strategies, are specifically intended to eliminate those impairments.

The status of implementing the new nutrient-related water quality standards is:

a. District of Columbia – Issued for public review April 2005; expected adoption 2005.
b. Maryland – Issued for public review December 2005; expected adoption 2005.
c. Virginia – Issued for public review January 2005; expected adoption mid-2006.

4. **Total Maximum Daily Loads (TMDLs)**

Compliance with these nutrient-based water quality standards has been impacted by the development and implementation of Total Maximum Daily Loads (TMDLs) which set load limits (i.e., load caps) on those pollutants that are determined to be causing the impairment. The load allocations defined within the states' Tributary Strategies are specifically intended to resolve those impairments. As described in the BPSA Study, currently Maryland's Potomac waters are scheduled to have a TMDL developed by 2008, and Virginia's downstream Potomac waters are scheduled to have TMDL in place by 2011. The Virginia TMDL schedule is currently drives the CBP's 2010 deadline which is codified in the recent CBP Agreement. Currently the position of the Bay Partners is that they intend to integrate the Bay allocations defined in the Tributary Strategies to any future nutrient-driven TMDLs and their wasteload allocations. However, if additional load reductions are required and defined in the CBP's 2007 Reevaluation process, additional load reductions could be expected of wastewater plants – including Blue Plains. At minimum, these load caps would have potential growth implications if a plant finds it cannot reduce its TN concentrations beyond current levels.

B. Non-Regulatory

1. Tributary Strategy Commitments

The current status of the Tributary Strategies and their commitments for Blue Plains are:

District of Columbia – Has issued its final plan. Plan includes the reference to the concept of 'nutrient equivalents' as a potential means of offsetting the requirement for imposing additional nutrient reduction requirements (for nitrogen) beyond their current 7.5 mg/l and associated load cap for their share of Blue Plains' load . All assumptions are assumed to be revisited during the 2007 Reevaluation.

Maryland - Intends to pursue its Enhanced Nutrient Removal (ENR) requirements (i.e., 3 mg/l) at Blue Plains – coupled with cost-share funding for its share of the Blue Plains nitrogen load. However, a final Tributary Strategy for the Middle Potomac still has not been issued. A date for issuing it is uncertain. They have indicated that they do not intend to utilize the concept of 'nutrient equivalents.'

Virginia – Has not yet issued their final Tributary Strategy for the Potomac; however a final version is expected in the next few months. In the meantime, Virginia has separately issued draft wastewater permit regulations that would require its plants to achieve 3 mg/l; but has indicated its intends to request 4 mg/l for its share of the Blue Plains nutrient loads. They had stated their view that nutrient equivalents might be used only as potential 'gap closers' as the strategies are developed.

CBP - Developed a formal process (i.e., 'Nutrient Equivalents Issue Paper', February 2004) for modeling and assessing the potential application of nutrient equivalents. The process included conducting water quality modeling and scientific/technical reviews, as well as seeking input from all the Bay participants through various committee processes. The process was intended to bring forth a recommendation to the Implementation Committee and reach agreement on the 'application of nutrient equivalents within the established cap load allocations and development of tributary strategies.' The Blue Plains Users provided input to this process through a September 30, 2003 work session with the states and EPA; and recommended specific model runs that would evaluate the applicability of nutrient equivalents to all Blue Plains loads, as well as the potential applicability to other wastewater plants in the MWCOG region. Preliminary analysis indicated that the ability to achieve the necessary nitrogen load reductions for the Potomac River in the metropolitan Washington region (i.e., the Middle Potomac) would by necessity require some level of additional load reductions at Blue Plains. The concept of 'nutrient equivalents' is essentially the ability to reduce levels of one pollutant rather than another (i.e., phosphorus or sediment versus nitrogen) while still achieving the same water quality benefits. These same water quality benefits could also presumably be achieved through changes in fisheries management and/or through the introduction of biological means of reducing nutrients/sediments (e.g., increasing the presence of oysters in the Bay). This concept was formally agreed to by the Bay Partners when they adopted the new nutrient and sediment cap loads in April 2003; and a process defined for modeling, evaluating and formally vetting the application of any of these processes for use in the state's tributary strategies through the CBP's committee process. At this time there have been no further developments regarding this concept since February 2004.

IV. Nitrogen Load, Concentration & Allocation Assumptions

Based on the current state Tributary Strategies, water quality regulations, and EPA's current correspondence, there are now some specific nitrogen load, concentration and allocation assumptions for Blue Plains. In addition, there are now updated flow projections (based on the Round 7.0 Cooperative Forecast) for Blue Plains for the year 2030 – when Blue Plains is estimated to reach (and possibly exceed) its 370 MGD capacity. These assumptions are summarized below based on current records. Note that, for purposes of this summary only, that the 'state' jurisdictional allocations are assumed to be approximately equal to the Blue Plains Users' allocations (i.e., both VA & MD PI Users' flows, which only amount to 3.47 MGD at year 2030, are included in the District's allocation figures).

As noted, depending on how flows are allocated amongst the jurisdictions the resulting Total Nitrogen load allocation and concentrations will vary. This is also true if capital costs are also linked to those allocations. In Table 1 below the various CBP & EPA figures begin with the allocated loads and assumed capacity flows and show the calculated TN mg/l concentration values that result. For comparison purposes, those same TN concentrations are then applied towards the existing IMA flow capacity allocations and updated flow projections for year 2030 to generate estimated annual TN loads.

Table 1
Allocations – At TN = 3 mg/l & Blue Plains @ 370 MGD

Current Permit		State Jurisdiction	CBP's C2K & Tributary Strategies & EPA's 7/28/05 Letter			1985 IMA		BPSA Rd. 7.0 Updated Flows @ Year 2030	
M lb/yr	mg/l		M lb/yr	MGD	mg/l	MGD	M lb/yr	MGD	M lb/yr
N/A	N/A	District	2.115	152.27	4.56	155.60	2.160	176.27	2.467
N/A	N/A	Maryland	2.070	170.00	4.00	169.60	2.065	155.53	1.909
N/A	N/A	Virginia	0.581	47.73	4.00	44.80	0.546	44.80	0.545
8.467	**7.5**	**TOTAL**	**4.766**	**370.00**	**4.23**	**370.00**	**4.771**	**376.60**	**4.921**

Note: The District TN concentration was back-calculated based on EPA's load allocation assumptions for Outfall #002 loads only (i.e., excludes Outfall #001, CSO loads, and District non-point source loads).

V. Nitrogen Reduction Cost Comparisons

The actual cost for achieving additional nitrogen reductions at Blue Plains has undergone several iterations over the past few years. In 2002 the first set of cost estimates were developed for DC-WASA, by their consultants and with assistance from COG staff, as part of the CBP's Use Attainability Analysis (UAA) effort. Those costs were developed for a range of TN concentrations (i.e., TN = 5 mg/l and TN = 3 mg/l) – under an assumed 'non-regulatory annual load' scenario. The CBP was also provided with cost figures for achieving those same TN values under a more stringent 'permit weekly limit' scenario in order to convey the significant cost benefits that could be achieved with more flexible requirements. Those costs were documented in the *'CBP's Nutrient Reduction Technology Cost Estimates for Point Sources in the Chesapeake Bay Watershed' (November 2002) (i.e., NRT report).*

Since that time EPA has issued its 'Point Source Bay-related Nutrient Permit Policy' which states that EPA will still require nitrogen permit limits for wastewater plants – but that those limits can be expressed as annual load limits versus more stringent weekly/monthly load limits. This was a significant policy decision which will have tremendous benefits to all Bay wastewater plants; however, EPA still has not resolved the ongoing question of how violations (even minor ones) of the annual load limits will be handled. It is not viewed as likely that application of the extreme '365 day/year X annual load exceedances' will be applied – but a formal policy statement by EPA would provide greater reassurance in that matter. In addition, DC-WASA's *'Blue Plains Feasibility/Long-term Planning Study'* has recently been able to identify some new process and flow treatment options that have the potential to significantly reduce the estimated cost for nutrient reductions from those costs originally developed in 2002.

Table 2
Comparison of Total Nitrogen Reduction Costs to Achieve TN = 4 mg/l

Source Document	Load Limit Assumptions	WWTP(s)	MGD	Total Capital Costs ($ Million)	Range of Treatment Costs ($ Million /MGD)
CBP's NRT Report	Non-regulatory - annual average	Blue Plains	370	820	2.2
	Permit - weekly/monthly average	Blue Plains	370	1,080	2.9
M&E's Tier II estimates (8/10/05)	Permit – annual average & 2.0 Peaking Factor	Blue Plains	370	625	1.7
	Permit – annual average & 2.0 Peaking Factor	Blue Plains	370	495	1.3
CBP's NRT Report	Non-regulatory - annual average	Estimated costs for generic 30 MGD WWTPs	30	26	0.866
	Non-regulatory - annual average	Estimated costs for 304 'Significant' WWTPs in Bay watershed	2,336	4,373	1.9
	Non-regulatory - annual average	Costs for 255 of 304 'Significant' WWTPs in Bay watershed – where costs available	1,721	1,664	0.967

Note: All of the costs noted above are preliminary planning-level engineering estimates that are assumed have an accuracy of +50/-30. This potential variability in costs follow industry standards given the general nature of the cost estimating process at this time.

Implementation Schedules & Impacts

Table 2 outlines many of the upcoming critical regulatory and the related deadlines that would impact or influence nitrogen reduction requirements at Blue Plains or how they are implemented.

YEAR	EVENT	BLUE PLAINS IMPACT
2005	DC new WQ stds. approved (March)	
	MD new WQ stds. approved (summer)	EPA's Point Source Nutrient Permitting Policy permitting policy could invoke 're-opener' in Blue Plains' current permit – especially given potential 'downstream impacts' to MD's Bay-waters
	EPA's 7/28/05 letter re: Blue Plains' permit and preliminary TN requirements	Letter quantifies expected flow, concentration and load assumptions for all three state jurisdictions (i.e., District, Maryland, & Virginia) and calculates a TN concentration and load allocation for Blue Plains based on a 'blended' approach
	DC-WASA completes Blue Plains Facility Study	Options, costs, and feasibility defined for achieving additional nitrogen reductions
	DC-WASA completes Governance Study	Potential recommendations to change governance structure and/or create an interstate agency could influence how current state load allocations are incorporated into an overall Blue Plains performance level
	VA new WQ stds. approved (fall/winter)	
2006-2008	303 (d) Lists issued by states	Increased pressure likely to invoke TMDLs is impairments still observed
2007-2008	CBP's Reevaluation Process	Upgraded model & data collection could indicate need for greater nitrogen reductions than currently planned
2008	Blue Plains permit renewed	TN permit limit assumed to be added to permit
	MD's Potomac TMDL is to be issued	Could require permit requirements for all upstream point sources
2008-2009	State/DC Triennial Review of WQ stds.	
2010	Bay nutrient TMDL deadline - To be agreed to, deferred, or redefined via application of existing Tributary Strategies	Increased pressure to add permit limits to all wwtps
2011	VA's Potomac TMDL deadline	Could require permit requirements for all upstream point sources

VI. Summary of Options, Barriers, Potential Benefits, & Uncertainties

[Section to be developed based on BPTC feedback.]

APPENDIX

TABLE 1

COMPONENT	TOTAL NITROGEN		TOTAL PHOSPHORUS		BAY JURISDICTION %'S			NOTES
	mg/l	lb/year	mg/l	lb/year	DC	MD	VA	
Blue Plains WWTP								
Outfall #001A	16.64	325,423	2.11	40,791	100	0	0	2003 Data
Outfall #002A	6.35	7,255,022	0.10	111,020	48	40	11	2003 Data
Total	-	**7,580,445**	-	**151,811**				%'s Based on Actual % 2003 Flows
CSO LTCP								
Baseline	?	132,050	?	28,675	100	0	0	Data from M&E
Phase I	?	78,896	?	16,156	100	0	0	Data from M&E
Full Implementation	4.81	5,282	1.01	1,147	100	0	0	Data from M&E
Blue Plains WWTP								
Outfall #002A								
Status Quo	7.5	8,467,200			48	39	13	%'s based on alloc. of 370 MGD @ 2030 & state PI shares
Blended	5.7	6,133,355			57	8.8	34.3	%'s based on alloc. of Load vs. Flow
CBP Tier III	5.0	5,644,800			48	39	13	%'s based on alloc. of 370 MGD @ 2030 & state PI shares
ENR ? (VA & MD Cap)	4.0	4,515,840			48	39	13	%'s based on alloc. of 370 MGD @ 2030 & state PI shares
CBP Tier IV	3.0	3,386,880			48	39	13	%'s based on alloc. of 370 MGD @ 2030 & state PI shares
Potomac Basin								2002 Data
Atmos. Dep. To Water (direct deposition only)		572,931		32,982				2002 Data
Urban		9,735,742		989,914				2002 Data
Forest		8,466,668		102,003				2002 Data
Point Sources (all)		18,259,317		1,146,217				2002 Data
Septic		3,702,781		-				2002 Data
Agric.		36,718,909		3,716,434				2002 Data
Grand Total		**77,456,348**		**5,987,550**				2002 Data
Potomac Basin								
COG Region WWTPs		15,673,383		336,323				2002 Data
COG Region Other		?		?				2002 Data (segmentation changing slightly; loads TBD)
Bay As-A-Whole								
Atmos. Dep. To Water (direct deposition only)		4,542,760		239,913				2002 Data
Urban		36,507,114		3,720,818				2002 Data
Forest		58,058,246		626,619				2002 Data
Point Sources (all)		65,017,694		5,718,093				2002 Data
Septic		15,191,153		-				2002 Data
Agric.		172,979,759		16,363,288				2002 Data
Bay Grand Total		**352,296,726**		**26,668,731**				2002 Data