

Appendix D: Technical Requirements for Inclusion of Boat Pump-Out Practices in the Modeling Tools

Draft 7/3/18

**Background:** The BMP Review Protocol established by the Water Quality Goal Implementation Team (WQGIT, 2014) outlines the expectations for the content of expert panel reports. This appendix references the specific sections within the reports where the panel addressed the requested protocol criteria. The purpose of this technical appendix is to describe how the Boat Pump-Out Panel’s recommendations will be integrated in the CBP Partnership’s modeling tools, including NEIEN and Phase 6 CAST.

**1. How will the modeling tools simulate reductions from Boat Pump-out practices?**

**A.** The Boat Pump-Out panel recommended addition of a new load source to the modeling tools to simulate recreational boat discharge to tidal waters. The boat pump-out BMP would be applied as a simple load reduction in percentage of nitrogen and phosphorus reduced from the baseline load for boat discharge.

Boat discharge load is new to the Bay water quality model - there is no existing background accounted for in the model. Therefore, the Panel focused on estimating historical loads from jurisdictions with Bay tidal waters, developing time series nutrient load estimates for Virginia and Maryland (note that DC and Delaware also have some tidal waters but were not actively represented on the Panel). Both Maryland and Virginia have boat pump out laws requiring marinas with 50 or more slips to have pump-out facilities.

**2. How is historical (baseline) load from the new boat discharge load source calculated for integration into the modeling tools?**

Historical load estimates for the 1985 – 2015 period were calculated separately for the Maryland Chesapeake Bay areas and Virginia Chesapeake Bay areas. The estimate is calculated as a function of 6 key factors:

- A. Number of boats operating in the Chesapeake Bay with the ability to use pump-out facilities
- B. Annual use days per vessel
- C. Duration of trip per use day
- D. Number of persons aboard per trip
- E. Nutrient output per person per day
- F. Pump-out utilization by recreational boaters

Table 17. Range and Mean of Boat Discharge Nutrient Load Estimates for Maryland, 1985-2015

Nutrient	Min (tons)	Max (tons)	Mean (tons)
Nitrogen	26.6	34.9	31.3
Phosphorus	8.17	10.73	9.63

Table 21. Range and Mean of Boat Discharge Nutrient Load Estimates for Virginia, 1985-2015

**Commented [WM1]:** Were there also historical load calculations by county? Is state estimates ok for modeling tools, or would county calculations be more appropriate, or other geography such as LRS?

**Commented [DV2R1]:** Yes, we have developed county-scale load estimates for 1985-2015.

**Commented [DV3]:** Revised report provides estimates and recommendations in pound, rather than tons.

Nutrient	Min (tons)	Max (tons)	Mean (tons)
Nitrogen	20.2	30.2	27.11
Phosphorus	6.21	9.30	8.34

**3. What are the nitrogen, phosphorus and sediment reductions a jurisdiction can claim for Boat Pump-out in the modeling tools?**

As a programmatic BMP, jurisdictions will need to estimate and justify requested reductions. The Panel estimated load reductions attributable to boat pump-outs historically as summarized in Tables 9 and 12 for Maryland and Virginia, respectively. In the absence of more accurate data from direct observations, jurisdictions claiming credit for boat pump-out practices in Maryland may claim the mean percent reductions documented in Table 9 below for nitrogen and phosphorus pound reductions; jurisdictions in Virginia may claim the mean percent reductions for nitrogen and phosphorus reductions. No sediment reductions can be credited through boat pump-out practices.

**Commented [WM4]:** See question above regarding geographies

The methodology described and applied in the Maryland and Virginia estimates provides current baseline tracking, which could also be replicated by other interested states or local jurisdictions. Tracking of future loads and load reductions could use similar methodologies, although metering, other load estimation procedure, an additional future marina survey, etc. may be warranted and are recommended by the Panel.

Table 39. Annual Estimate of Nutrients Removed by Boat Pump-Out Facilities in Maryland

Parameter	Min	Max	Mean
Nitrogen (tons)	0.72	12.07	7.72
Phosphorus (tons)	0.22	3.71	2.38
% Reduction	3%	35%	25%

Table 442. Annual Estimate of Nutrients Removed by Boat Pump-Out Facilities in Virginia

Parameter	Min	Max	Mean
Nitrogen (tons)	0.20	4.49	2.47
Phosphorus (tons)	0.01	0.32	0.17
Nitrogen % Reduction	1.0%	14.9%	9.1%
Phosphorus % reduction	0.2%	3.4%	2.1%

**4. What types of practices are eligible to receive credit in the Phase 6 Watershed Model?**

**A.** The Panel recommends that the development of a boat pump out program be approved as a programmatic BMP. Although each individual pump-out facility installation would not be credited, the programmatic BMP could be part of a jurisdictions' Phase 3 (2018-2025) watershed implementation plans (WIPs) and included as a management target if desired by the jurisdiction.

**Commented [WM5]:** Unsure exactly what this means in the context of the modeling tools

**5. What do jurisdictions need to submit to NEIEN in order to qualify for reductions under the protocols listed in Table 1?**

- BMP Name: Boat Pump-Out Program
- Measurement Name and associated unit amount: Percent reduction of nitrogen and phosphorus
- Land use/load source: Recreational boat discharge
- Location: Tidal areas of Maryland and Virginia

**6. Is this BMP an annual or cumulative practice?**

A. This is reported as an annual practice.

**7. Can jurisdictions submit historic boat pump-out practices for credit?**

**8. How will reporting of this practice avoid double or over-counting of nutrient reduction credits for boat pump-out programs?**

**Commented [WM6]:** Unsure, couldn't find references to these in panel report

**Commented [DV7R6]:** My humble and uninformed opinion is that those historical practices (i.e., boat pump out installations) are accounted for in the baseline estimates, so probably not. I guess the question for the program is whether the baseline loads will be represented as an "additive" load to the model or come out of some other existing load. If it is an additive load, then the credits would be built in vis-à-vis the historical estimates that factor the load reduction effects of boat pump out installation.