

Estimated costs of BMPs that could generate N reductions for trading. Please see the notes below for important assumptions and qualifications.

| Sector | BMP   | Unit         | Lifespan | Costs                      |                             |                                    |                               | TN Reduction                        |                             |                                 |                              |   |
|--------|---|--------------|----------|----------------------------|-----------------------------|------------------------------------|-------------------------------|-------------------------------------|-----------------------------|---------------------------------|------------------------------|---|
|        |   |              |          | Construction Cost per unit | Land Purchase Cost per unit | Land Rental Cost per unit per year | Annual Cost per unit per year | annual TN load reduction (lbs/unit) | Construction cost per pound | Land Acquisition cost per pound | O&M or Annual cost per pound | Total annual cost per pound of TN reduction |
| Ag     | Poultry Litter Treatment (alum, for example)                | animal unit  | 1        | \$0                        | \$0                         | \$0                                | \$5                           | 0.00                                | -                           | -                               | -                            | -   |
| Ag     | Barnyard Runoff Control                                     | acre         | 10       | \$5,700                    | \$0                         | \$0                                | \$0                           | 8.59                                | \$66                        | \$0                             | \$0                          | \$66  |
| Ag     | Alternative Crops   | acre         | 10       | \$181                      | \$0                         | \$0                                | \$0                           | 10.23                               | \$2                         | \$0                             | \$0                          | \$2   |
| Ag     | Conservation Tillage - Total Acres                          | acre         | 1        | \$0                        | \$0                         | \$0                                | \$17                          | 0.47                                | \$0                         | \$0                             | \$36                         | \$36  |
| Ag     | Cover Crop Standard Drilled Wheat                           | acre         | 1        | \$0                        | \$0                         | \$0                                | \$50                          | 3.65                                | \$0                         | \$0                             | \$14                         | \$14  |
| Ag     | Cropland Irrigation Management                              | acre         | 10       | \$9,600                    | \$0                         | \$0                                | \$0                           | 0.41                                | \$2,341                     | \$0                             | \$0                          | \$2,341                                     |
| Ag     | Decision Agriculture  | acre         | 10       | \$137                      | \$0                         | \$0                                | \$0                           | 0.52                                | \$26                        | \$0                             | \$0                          | \$26  |
| Ag     | Sorbing Materials in Ag Ditches                             | acre         | 5        | \$625                      | \$0                         | \$0                                | \$0                           | 0.00                                | -                           | -                               | -                            | -   |
| Ag     | Enhanced Nutrient Management                                | acre         | 1        | \$0                        | \$0                         | \$0                                | \$10                          | 0.89                                | \$0                         | \$0                             | \$11                         | \$11  |
| Ag     | Forest Buffers  | acre         | 15       | \$3,300                    | \$0                         | \$83                               | \$133                         | 29.50                               | \$7                         | \$3                             | \$5                          | \$15  |
| Ag     | Grass Buffers; Vegetated Open Channel - Agriculture         | acre         | 10       | \$260                      | \$0                         | \$83                               | \$170                         | 24.99                               | \$1                         | \$3                             | \$7                          | \$11  |
| Ag     | Horse Pasture Management                                    | acre         | 5        | \$3,000                    | \$0                         | \$0                                | \$0                           | 0.00                                | -                           | -                               | -                            | \$0   |
| Ag     | Land Retirement to hay without nutrients (HEL)              | acre         | 10       | \$1,304                    | \$0                         | \$83                               | \$0                           | 7.19                                | \$18                        | \$12                            | \$0                          | \$30  |
| Ag     | Land Retirement to pasture (HEL)                            | acre         | 10       | \$1,304                    | \$0                         | \$83                               | \$0                           | 8.33                                | \$16                        | \$10                            | \$0                          | \$26  |
| Ag     | Loafing Lot Management                                      | acre         | 10       | \$15,000                   | \$0                         | \$0                                | \$0                           | 25.58                               | \$59                        | \$0                             | \$0                          | \$59  |
| Ag     | Non Urban Stream Restoration; Shoreline Erosion Control     | foot         | 15       | \$100                      | \$0                         | \$0                                | \$0                           | 0.01                                | \$667                       | \$0                             | \$0                          | \$667                                       |
| Ag     | Prescribed Grazing  | acre         | 5        | \$3,000                    | \$0                         | \$0                                | \$0                           | 0.45                                | \$1,333                     | \$0                             | \$0                          | \$1,333                                     |
| Ag     | Precision Intensive Rotational Grazing                      | acre         | 5        | \$3,000                    | \$0                         | \$0                                | \$0                           | 0.64                                | \$938                       | \$0                             | \$0                          | \$938                                       |
| Ag     | Water Control Structures                                    | acre         | 10       | \$520                      | \$0                         | \$0                                | \$0                           | 3.72                                | \$14                        | \$0                             | \$0                          | \$14  |
| Ag     | Wetland Restoration   | acre         | 15       | \$3,375                    | \$0                         | \$83                               | \$0                           | 11.11                               | \$20                        | \$7                             | \$0                          | \$28  |
| Forest | Forest Harvesting Practices                                 | acre         | 1        | \$0                        | \$0                         | \$0                                | \$45                          | 7.21                                | \$0                         | \$0                             | \$6                          | \$6   |
| WWTP   | Set Permitted Load  | MGD          | 20       | \$0                        | \$0                         | \$0                                | \$0                           | 9198.00                             | -                           | \$0                             | \$0                          | -   |
| Urban  | Bioretention/raingardens                                    | acre treated | 20       | \$9,469                    | \$3,000                     | \$0                                | \$383                         | 4.16                                | \$114                       | \$36                            | \$92                         | \$242                                       |
| Urban  | Bioswale  | acre treated | 20       | \$9,000                    | \$2,000                     | \$0                                | \$233                         | 5.97                                | \$75                        | \$17                            | \$39                         | \$131                                       |
| Urban  | Urban Forest Buffers  | acre         | 20       | \$6,507                    | \$0                         | \$0                                | \$206                         | 5.73                                | \$57                        | \$0                             | \$36                         | \$93  |
| Urban  | Urban Infiltration Practices - no sand\veg no under drain   | acre treated | 20       | \$10,863                   | \$5,000                     | \$0                                | \$217                         | 5.68                                | \$96                        | \$44                            | \$38                         | \$178                                       |
| Urban  | Urban Infiltration Practices - with sand\veg no under drain | acre treated | 20       | \$11,563                   | \$5,000                     | \$0                                | \$227                         | 7.52                                | \$77                        | \$33                            | \$30                         | \$140                                       |
| Urban  | Vegetated Open Channel - Urban                              | acre treated | 20       | \$4,500                    | \$2,000                     | \$0                                | \$128                         | 3.06                                | \$74                        | \$33                            | \$42                         | \$148                                       |
| Septic | Septic Connection in Critical Area                          | system       | 20       | \$11,000                   | \$0                         | \$0                                | \$200                         | 17.57                               | \$31                        | \$0                             | \$11                         | \$43  |
| Septic | Septic Connection within 1,000 feet of stream               | system       | 20       | \$11,000                   | \$0                         | \$0                                | \$200                         | 11.03                               | \$50                        | \$0                             | \$18                         | \$68  |
| Septic | Septic Connection -- other                                  | system       | 20       | \$11,000                   | \$0                         | \$0                                | \$200                         | 6.57                                | \$84                        | \$0                             | \$30                         | \$114                                       |
| Septic | Septic Denitrification in Critical Area                     | system       | 20       | \$12,375                   | \$0                         | \$0                                | \$225                         | 8.82                                | \$70                        | \$0                             | \$26                         | \$96  |
| Septic | Septic Denitrification within 1,000 feet of stream          | system       | 20       | \$12,375                   | \$0                         | \$0                                | \$225                         | 4.96                                | \$125                       | \$0                             | \$45                         | \$170                                       |
| Septic | Septic Denitrification -- other                             | system       | 20       | \$12,375                   | \$0                         | \$0                                | \$225                         | 3.23                                | \$192                       | \$0                             | \$70                         | \$261                                       |
| Septic | Septic Pumping in Critical Area                             | system       | 1        | \$0                        | \$0                         | \$0                                | \$193                         | 0.79                                | \$0                         | \$0                             | \$244                        | \$244                                       |
| Septic | Septic Pumping within 1,000 feet of stream                  | system       | 1        | \$0                        | \$0                         | \$0                                | \$193                         | 0.50                                | \$0                         | \$0                             | \$386                        | \$386                                       |
| Septic | Septic Pumping -- other                                     | system       | 1        | \$0                        | \$0                         | \$0                                | \$193                         | 0.30                                | \$0                         | \$0                             | \$643                        | \$643                                       |

Notes:

1. Most of the Urban BMPs costs include land acquisition, but only the cost of Impervious Surface Reduction is increased significantly by the land acquisition costs. Urban Forest Buffers and Urban Nutrient
2. The selected Ag BMPs do not include ones that involve AFOs, CAFOs, nurseries or manure, and do not include BMPs that are required to meet the Ag baseline.
3. The Urban costs are for mixed urban (pervious and impervious).
4. Costs for upgrading WWTPs were based on actual costs of upgrades to ENR of WWTPs with hydraulic capacity over 500,000 gpd. Upgrading minors may be more or less expensive on a per pound basis,
5. The costs do not include costs of certification and verification, continuing inspections or administrative costs associated with trades.
6. Interest rate is initially set at 0.0%. Thus, the estimated costs in this spreadsheet represent the annual cost, in current dollars, for one unit of the BMP. This method makes no assumptions about funding
7. Costs for Urban BMPs were based on estimates from EPA and from King & Hagan. The load reduction model used was MAST.
8. Costs for septic BMPs considered the actual costs of Maryland-approved systems, and electricity costs based on manufacturers' estimates.
9. Costs for Agricultural BMPs were based on estimates from EPA, the Maryland Department of Agriculture, and Wieland. For some, the load reduction model was 5.3.2. A combination load reduction model