Photo: Oyster Recovery Partnership

# Expert Panel Report on Oyster BMP for Restoration & Harvest

## Watershed Technical Workgroup

March 2, 2023

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Oyster Recovery® Partnership | ORP

Chesapeake Bay Program
Science. Restoration. Partnership.

# Oyster BMP Approval Timeline

**March 1** – Technical Appendix available for WTWG review

**March 2** – Present at WTWG Meeting

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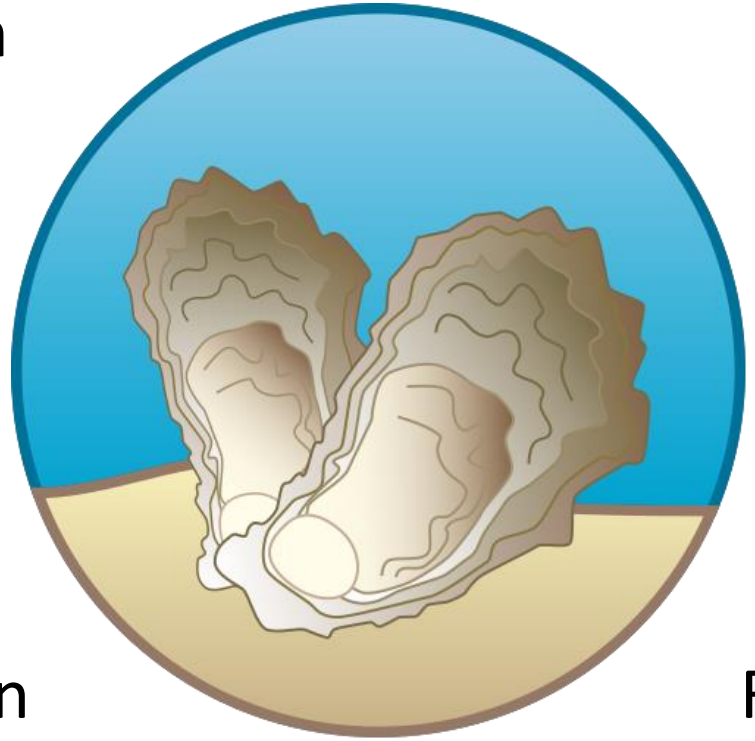
Feedback & questions to oysterBMPresponse@oysterrecovery.org

# Elements of the Oyster BMP Toolset

Aquaculture-Assimilation
Approved



Harvest-Assimilation
*Under Review*

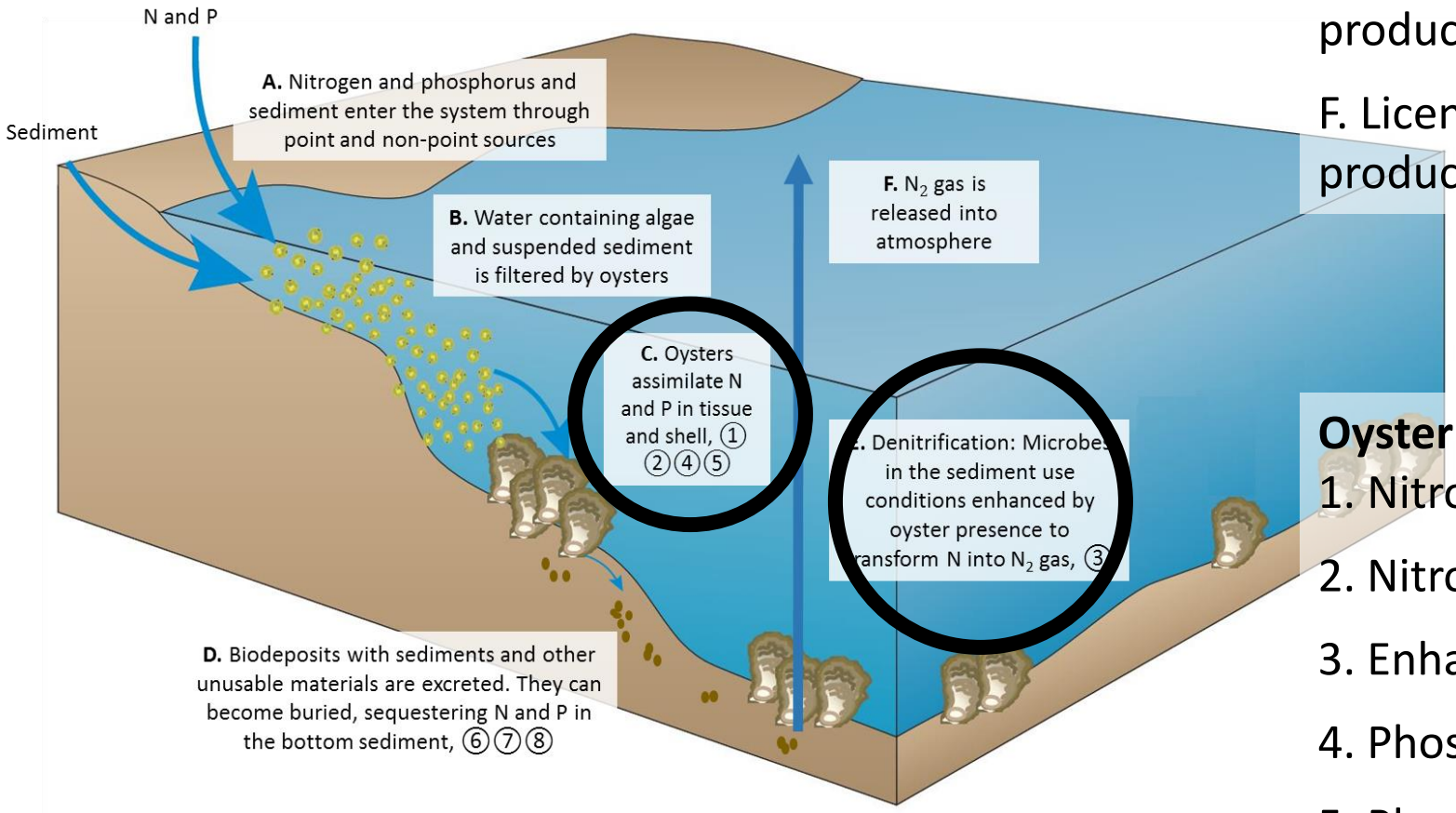
Restoration-Denitrification
*Under Review*

Restoration-Assimilation
*Under Review*



Graphic: UMCES Integrated Application Network

# Recommended Practices & Protocols




**Oyster Practices**

J & K. Oyster reef restoration using (J) hatchery-produced oysters & (K) substrate addition

F. Licensed oyster harvest using hatchery-produced oysters

**Oyster Protocols**

1. Nitrogen Assimilation in Oyster Tissue
2. Nitrogen Assimilation in Oyster Shell
3. Enhanced Denitrification
4. Phosphorus Assimilation in Oyster Tissues
5. Phosphorus Assimilation in Oyster Shell

# Restoration-Enhanced Denitrification

**Practices:** Oyster reef restoration using hatchery-produced oysters & substrate addition

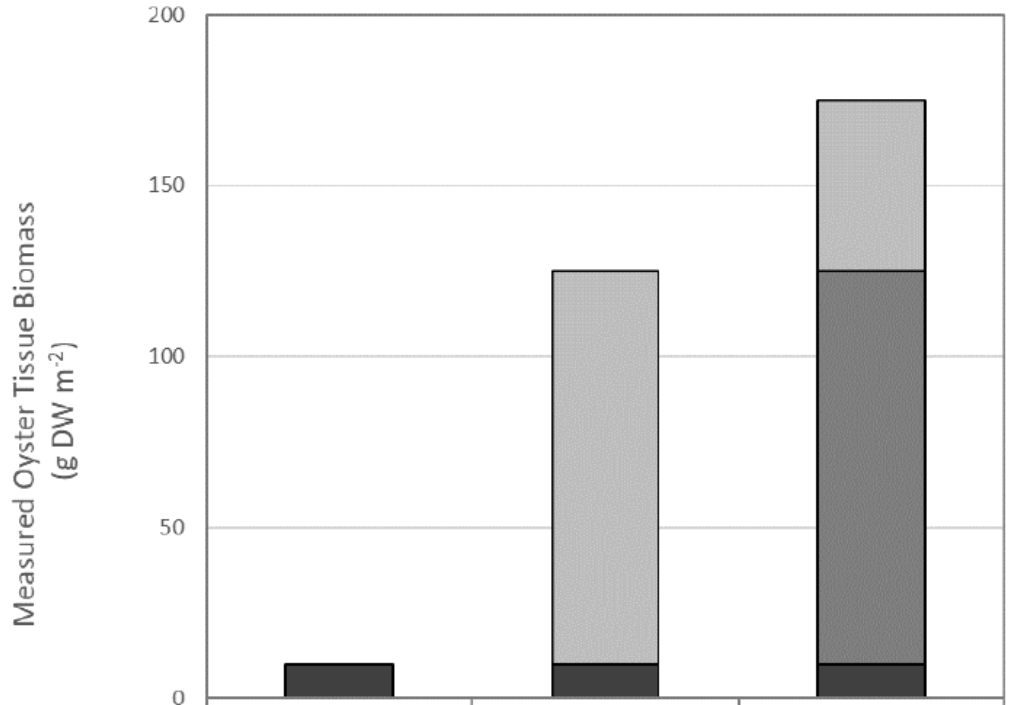
- **Oyster tissue biomass** is used to help estimate removal of N and $N_2$ under different conditions
- Default rates apply to subtidal reefs restored with small substrate
- Denitrification is an ongoing process, credit is continuous
- Post-restoration tissue biomass > baseline

| Enhanced Nitrogen Removal (lbs acre$^{-1}$ yr$^{-1}$) | | *Post-restoration Oyster Biomass Range (g DW m$^{-2}$)* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *15 - 24.9* | *25 - 34.9* | *35 - 44.9* | *45 - 54.9* | *55 - 64.9* | *65 - 74.9* | *75 - 84.9* | *85 - 94.9* | *95 - 104.9* | *105 - 114.9* | *115 - 124.9* | *125 - 134.9* | *135 - 144.9* |
| *Baseline Oyster Biomass Range (g DW m$^{-2}$)* | *0 - 14.9* | 29 | 51 | 74 | 97 | 120 | 143 | 165 | 169 | 172 | 176 | 179 | 183 | 186 |
| | *15 - 24.9* | | 23 | 46 | 68 | 91 | 114 | 137 | 140 | 144 | 147 | 151 | 154 | 158 |
| | *25 - 34.9* | | | 23 | 46 | 68 | 91 | 114 | 118 | 121 | 124 | 128 | 131 | 135 |
| | *35 - 44.9* | | | | 23 | 46 | 68 | 91 | 95 | 98 | 102 | 105 | 109 | 112 |
| | *45 - 54.9* | | | | | 23 | 46 | 68 | 72 | 75 | 79 | 82 | 86 | 89 |
| | *55 - 64.9* | | | | | | 23 | 46 | 49 | 53 | 56 | 59 | 63 | 66 |
| | *65 - 74.9* | | | | | | | 23 | 26 | 30 | 33 | 37 | 40 | 44 |
| | *75 - 84.9* | | | | | | | | 3 | 7 | 10 | 14 | 17 | 21 |
| | *85 - 94.9* | | | | | | | | | 3 | 7 | 10 | 14 | 17 |
| | *95 - 104.9* | | | | | | | | | | 3 | 7 | 10 | 14 |
| | *105 - 114.9* | | | | | | | | | | | 3 | 7 | 10 |
| | *115 - 124.9* | | | | | | | | | | | | 3 | 7 |
| | *125 - 134.9* | | | | | | | | | | | | | 3 |

# Restoration-Assimilation

**Practices:** Oyster reef restoration using hatchery-produced oysters & substrate addition

- **Oyster tissue & shell biomass** are used to estimate removal of N & P
- Net removal at reef-scale occurs if oyster biomass is stable or increasing
- Only **appreciated biomass** is credited
- Credit can be received **incrementally** when biomass is assessed




| | T0 (Baseline) | T1 | T2 |
|---|---|---|---|
| Eligible Appreciated | | 115 | 50 |
| Non-eligible Appreciated | | 0 | 115 |
| Baseline | 10 | 10 | 10 |

# Harvest-Assimilation

**Practice:** Licensed oyster harvest using hatchery-produced oysters

- **Oyster tissue biomass** is used to estimate removal of N & P
- Total N & P removed depends on oyster harvest size
- Challenging to assess baseline biomass
- The Panel developed strict qualifying conditions outlining (1) how many and (2) when oysters can be harvested

**Table K.1** (*Table 6.3 in report*)**.** Default nutrient reductions in pounds per one million harvested hatchery-produced oysters. Oyster size class based on shell height measurements.

| BMP Name | Oyster size class (in) | Nitrogen (lbs./million oysters) | Phosphorus (lbs./million oysters) |
|---|---|---|---|
| Diploid Licensed Oyster Harvest, Hatchery Produced 3.0 Inches | 3.00-3.49* | 198 | 22 |
| Diploid Licensed Oyster Harvest, Hatchery Produced 4.0 Inches | 3.50-4.49 | 331 | 44 |
| Diploid Licensed Oyster Harvest, Hatchery Produced 5.0 Inches | 4.50-5.49 | 485 | 44 |
| Diploid Licensed Oyster Harvest, Hatchery Produced >5.0 Inches | ≥ 5.50** | 683 | 66 |
| Diploid Licensed Oyster Harvest, Site-Specific Monitored | N/A | N/A | N/A |

* Adjusted from 2.5-3.49. See text for details.
** Based on midpoint of 6.0 inches

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