

# **Term Nutrient Credit Generation Prospectus for the In-Situ Nutrient Remediation Program<sup>TM</sup>**

(Original March 6, 2015; Revised November 13, 2017)

## **I. INTRODUCTION**

### **A. Meeting Chesapeake Bay Cleanup and Other Policy Objectives.**

Overarching policy objectives set by the General Assembly for the Chesapeake Bay Watershed Nutrient Credit Exchange Program (“Exchange Program”) clearly mandate the incorporation of market-based solutions in development and exchange of nutrient credits.<sup>1</sup> The adoption of a market-based nutrient credit trading program aims to:

assist in (a) meeting these cap load allocations cost-effectively and as soon as possible in keeping with the 2010 timeline and objectives of the Chesapeake 2000 Agreement, (b) accommodating continued growth and economic development in the Chesapeake Bay watershed, and (c) providing a foundation for establishing market-based incentives to help achieve the Chesapeake Bay Program's nonpoint source reduction goals.<sup>2</sup>

Incorporating private sector aquaculture as a nutrient trading credit option meets these objectives and is consistent with Virginia Code Ann. (“Va. Code”) § 62.1-44.19:20.B.1.b. contemplating shellfish aquaculture as a means to generate non-point source nutrient credits.

The In-Situ Nutrient Remediation Program<sup>TM</sup>, or ISNRP<sup>TM</sup>, developed by the Oyster Company of Virginia, LLC (“OCVA”), is an oyster aquaculture-based nutrient reduction that would fulfill this role. First, the roll-out capability and long-term scalability of the ISNRP<sup>TM</sup> allows for quick introduction of additional nutrient credits into the market that can also be flexible over time to address market needs, nicely meeting the first Exchange Program policy objective. Second, implementation of the ISNRP<sup>TM</sup> would also enable further growth and economic development by adding more offsets and credits to the nutrient credit market at competitive values. ISNRP<sup>TM</sup> also offers unique and beneficial job-saving and generating effects for the oyster industry and related businesses in Virginia. Expanding growth and economic development in these ways fulfills the second goal of the Exchange Program. Finally, credits generated by the ISNRP<sup>TM</sup> would contribute to the foundation of a nonpoint source market by meeting the offset and credit needs of both point sources and nonpoint sources of nutrient loading, thus satisfying the third goal of the Exchange Program.

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<sup>1</sup> Va. Code Ann. (“VA Code”) § 62.1-44.19:12.

<sup>2</sup> *Id.*

## **B. ISNRP™ Certification History.**

After extensive review and vetting by DEQ, the original version of OCVA's Term Nutrient Credit Generation Prospectus for the In-Situ Nutrient Remediation Program™ ("Prospectus"), was finalized as of March 9, 2015. The scientific bases of the original Prospectus rested on the best available science at the time for determining oyster aquaculture nutrient reduction factors derived from the findings of the Chesapeake Bay Program's Scientific and Technical Advisory Committee ("STAC") and other leading studies.<sup>3</sup> DEQ issued its Nonpoint Nutrient Credit Generation Certification, Certificate No. Bay-001, to OCVA on March 13, 2015 for the ISNRP™. The nutrient reduction factors set forth in and credits to be generated pursuant to the 2015 Certification were consistent with the STAC findings and were based on nutrient content in both the tissue and shell of the harvested oysters using three shell size classifications as indications of the amount of nutrients being removed when harvested. This Certification was issued pursuant to Va. Code § 62.1-44.19:20.C; regulations for such nutrient credit generation and trading had not been promulgated by the SWCB.<sup>4</sup>

## **C. Recent CBP Actions Concerning Oyster Aquaculture as Best Management Practice for Nutrient Reduction and Credit Generation.**

Beginning in 2015, the Chesapeake Bay Program ("CBP") formed an Oyster BMP Expert Panel ("Expert Panel") to build on the work of the STAC and further consider specific nutrient reduction values and certain operational assurances for oyster aquaculture that in turn could be used as the basis for generation of non-point source nutrient credits. The credits could then be traded and used to compensate for discharge nutrient levels that exceed load allocations or permit nutrient limits for discharges into the Chesapeake Bay watershed, in keeping with the Chesapeake Bay Total Maximum Daily Load rule issued by EPA ("Bay TMDL"). After various proceedings and rounds of evaluations, the Expert Panel approved and issued on December 19, 2016 its *First Incremental Report* ("Expert Panel December 2016 Report").<sup>5</sup>

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<sup>3</sup> See, e.g., R. Newell and R. Mann, *Shellfish Aquaculture: Ecosystem Effects, Benthic-Pelagic Coupling and Potential for Nutrient Trading*, A Report Prepared for Virginia Secretary of Natural Resources, 13 (June 21, 2012); STAC Factsheet: Oyster Nutrient Reduction Potential (May 2014), found at [http://www.chesapeake.org/pubs/321\\_Luckenbach2014.pdf](http://www.chesapeake.org/pubs/321_Luckenbach2014.pdf) (last visited November 17, 2014).

<sup>3</sup> See C. Higgins., K. Stephenson, and B. Brown, "Nutrient Bioassimilation Capacity of Aquacultured Oysters: Quantification of an Ecosystem Service," *J. Environ. Qual.* 40:271–277 (2011), available at <https://www.vcu.edu/cesweb/faculty%20profiles/Brown/Higgins%20et%20al%20'11%20JEQ.pdf> (last visited November 17, 2014). The experiment used to verify these rates of reduction based on size class of the oysters was performed in floating cages located near the mouth of the Potomac River that were essentially identical in function to those to be used as part of the ISNRP™.

<sup>4</sup> Such regulations have since been prepared in draft form and approved by the SWCB as proposed regulations subject to public comment, but they have not been released and published for public comment and so do not have any legal effect at this time.

<sup>5</sup> J. Cornwell et al., Oyster BMP Expert Panel, Chesapeake Bay Program, *First Incremental Report: Panel Recommendations on the Oyster BMP Nutrient and Suspended Sediment Reduction Effectiveness Determination Decision Framework and Nitrogen and Phosphorus Assimilation in Oyster Tissue Reduction Effectiveness for Oyster Aquaculture Practices* (December 19, 2016), available at [https://www.chesapeakebay.net/documents/Oyster\\_BMP\\_1st\\_Report\\_Final\\_Approved\\_2016-12-19.pdf](https://www.chesapeakebay.net/documents/Oyster_BMP_1st_Report_Final_Approved_2016-12-19.pdf) (last visited October 25, 2017).

The Expert Panel December 2016 Report describes the evaluations by the Expert Panel of certain oyster aquaculture methods for reduction of nutrients and generation of credits therefrom under certain conditions and expresses the Expert Panel's approval of the use of such oyster aquaculture methods for these purposes and in connection with meeting Bay TMDL rule requirements and nutrient load allocations and limits established for regulated parties. The Expert Panel December 2016 Report generally confirms the nature of the STAC findings that were the scientific basis for the original Prospectus and the 2015 Certification for the ISNRP. However, the Expert Panel December 2016 Report finds and approves discrete values for the nutrient reduction factors for aquaculture oysters that are different than those forth in the STAC findings. The difference is mainly due to a limitation of the newer values to nutrient content in the oyster tissue rather than tissue and shell and the use of different shell classifications to determine tissue weight. The Expert Panel is continuing its assessment of the nutrient content of shell that could be used as a nutrient reduction factor for generation of nutrient credits. Other Expert Panel analyses of the bases for such nutrient factors and how credits should be calculated, such as baseline and additionality analysis and uncertainty ratios, were also more fully addressed in the Expert Panel December 2016 Report than in the STAC findings. These issues are discussed more fully elsewhere in this revised Prospectus.

**D. Submission and Purpose of Revised Prospectus.**

This revised Prospectus reflects the relevant and necessary more recent findings and nutrient reduction factors as set forth in the Expert Panel December 2016 Report. OCVA submits this revised Prospectus to DEQ in support of OCVA's requested amendments to and reissuance of OCVA's Certificate No. Bay-001 for the ISNRP<sup>TM</sup> as a means to generate Term Nutrient Credits eligible for certification and trading under Va. Code §§ 62.1-44.19:20 *et seq.*<sup>6</sup>

**II. KEY DEFINITIONS**

“Department” or “DEQ” means the Virginia Department of Environmental Quality or its successor.

“In-Situ Nutrient Remediation Program<sup>TM</sup>” or “ISNRP<sup>TM</sup>” means that program and related business enterprise operated and managed by OCVA for the annual seeding, growing, harvesting and production and certification of oysters in and from cages placed above the bottom lands of the waters and tributaries of the Chesapeake Bay pursuant to leases granted by the Commonwealth to OCVA or ISNRP<sup>TM</sup> Operators, all as a means of reducing nutrient loadings in the Chesapeake Bay and its tributaries to generate nonpoint source Nutrient Credits that may be sold and traded within the Commonwealth of Virginia and to produce oysters for retail and commercial markets.

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<sup>6</sup> If in the future OCVA seeks to amend the terms of approval and authorization of the ISNRP<sup>TM</sup> to allow for expanded opportunities for ISNRP<sup>TM</sup> operations or use of Nutrient Credits generated through the ISNRP<sup>TM</sup>, OCVA will submit to DEQ a further revised Prospectus for approval by DEQ.

“ISNRP™ Co-op Contract” means a contract between OCVA and an ISNRP™ Operator for the ISNRP™ Operator to perform seeding, growing, harvesting and production services as part of the ISNRP and which may apply to one or more ISNRP™ Sites.

“ISNRP™ Cooperative” means a cooperative among OCVA and other ISNRP™ Operators and lessees of state bottomlands working under the ISNRP™ Co-op Contract for mutual assistance, support, economic gain, and water quality improvements to be achieved by the growth, harvesting, and production of oysters in the Chesapeake Bay and its tributaries.

“ISNRP™ Nonpoint Nutrient Offset Credit Certification Compliance Report” or “ISNRP™ Compliance Report” means the annual report of nonpoint source Nutrient Credits generated by the ISNRP™, based on the aggregate of all such credits generated through each ISNRP™ contract, which shall be calculated on the basis of oysters harvested in each twelve-month period from either July 1 through June 30 or on a calendar year basis, as required by DEQ, and submitted to the Department. The sample ISNRP™ Compliance Report form is shown in Appendix 1.

“ISNRP™ Number” means a distinct tracking number assigned to each ISNRP™ contract reflecting the VAR Permit Number or VPDES Number (or other applicable permit types/numbers as may be issued by DEQ for a remediation/discharge activity) to which the ISNRP™-based Nutrient Credits generated by that ISNRP™ contract have been allocated.

“ISNRP™ Operator” means an independent oyster grower participating in the ISNRP™ Cooperative who is a lessee or sub-lessee of state bottomlands, and with whom OCVA has entered into an ISNRP™ Co-op Contract for the seeding, growing, harvesting and production of oysters as part of the ISNRP™.

“ISNRP™ Performance Standards” means those Performance Standards established for and applicable to the ISNRP™ set forth in Article IV of this Prospectus and which have been approved by the Department or which are otherwise required by applicable law.

“ISNRP™ Site” means one or more locations based on a lease of bottom lands of state waters from the Commonwealth of Virginia, at which location oysters are grown, harvested and produced as part of the ISNRP™, and which are either OCVA-leased or are operated pursuant to an ISNRP™ Co-op Contract between OCVA and the ISNRP™ Operator that leases such location.

“Nutrient Credit” means a nutrient reduction that is certified pursuant to Va. Code § 62.1-44.19:20 and expressed in pounds of phosphorus or nitrogen either (i) delivered to tidal waters when the credit is generated within the Chesapeake Bay Watershed or (ii) as otherwise specified when generated in the Southern Rivers watersheds. “Nutrient credit” as used herein does not include point source nitrogen credits or point source phosphorus credits as defined in Va. Code § 62.1-44.19:13.

“Nutrient Credit-Generating Entity” means an entity that generates nonpoint source Nutrient Credits.

“OCVA” means the Oyster Company of Virginia, LLC, a Virginia limited liability company, which operates and oversees the ISNRP™ and which, through operation of the ISNRP™, has been determined by the Department to be a Nutrient Credit-generating entity.

“Performance Standards” means the minimum objectives or specifications required of a particular management practice by the Department to assure predicted nutrient reductions will be achieved.

“Perpetual Nutrient Credit” or “Perpetual Credit” mean a Nutrient Credit sold and certified as being permanent in nature pursuant to Va. Code § 62.1-44.19:20.

“Term Nutrient Credit” or “Term Credit” means a Nutrient Credit resulting from a Nutrient-Generating Activity that reduces nutrients for a determined and finite period of at least one year but not permanently.

### **III. BACKGROUND AND SCIENTIFIC BASIS OF ISNRP™**

#### **A. BACKGROUND.**

The Oyster Company of Virginia, LLC (“OCVA”) was founded as a means to integrate three goals: (i) to help accelerate the emergence of Virginia’s oyster aquaculture industry, sustaining and protecting the “watermen” culture in Virginia; (ii) to produce the finest Virginia oysters for market; and (iii) to help improve the water quality of the Chesapeake Bay and its tributaries through oysters as natural filter feeders that can reduce nutrient and sediment loading in Bay tributaries and main stem waters.

As part of OCVA’s overall mission, it has created the ISNRP™ as a sustainable business model for integrating proven nutrient reduction and remediation based on modeled and measured science, oyster growing and harvesting technologies; watermen and other shellfish industry partners; retail/commercial, wholesale, and industrial customer markets; and nutrient credit trading opportunities for helping stormwater and wastewater dischargers in particular meet stringent new nutrient loading restrictions enforced through various water quality regulatory and permitting programs, including Bay TMDL requirements.

The definition of “Nutrient Credit” as discussed herein and the corresponding Term Nutrient Credit certification process are referenced or contemplated by statute in two major water quality permitting programs: municipal separate storm sewer systems (“MS4s”) and the Watershed General Virginia Pollutant Discharge Elimination System Permit (“Watershed General Permit”). For purposes of each, “Nutrient Credit” means a credit certified pursuant to the Exchange Program statutory authority, which would include DEQ’s statutory authority to issue such credits prior to the issuance of regulations.<sup>7</sup> An MS4 permittee is authorized to acquire nutrient credits to achieve compliance with permit terms.<sup>8</sup> Similarly, a permittee for a

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<sup>7</sup> See Va. Code Ann. § 62.1-44.19:13. That statutory authority is found at Va. Code Ann. § 62.1-44.19:20. C.

<sup>8</sup> Va. Code Ann. § 62.1-44.19:21.A. This is the same section defining nutrient credit by the certification process discussed above.

new or expanded Watershed General Permit discharge is authorized to use nutrient credits to achieve nutrient offsets for the effects of the new or expanded discharge.<sup>9</sup> Other potential beneficiaries of ISNRP Term Nutrient Credits include industrial stormwater discharge permittees and industrial or municipal wastewater treatment plants discharging pursuant to individual or general VPDES permits that require offsets or nutrient credits to compensate for nutrient loads in those discharges and who are eligible for such credits. Thus, ISNRP™ Term Nutrient Credits can be used by a variety of eligible MS4 permittees and VPDES stormwater or wastewater discharge permittees to help meet their nutrient waste load reduction goals and discharge permit limits.

Though decimated in recent decades due to disease and pollutants, oyster populations in the Bay are poised for a rebound and can accelerate the restoration of Bay water quality. Oysters, being filter feeders like other shellfish, are excellent natural filtration systems that can process large amounts of water and remove impressive levels of nutrients and sediments from those waters. When aggregated together in large numbers, the effects of their natural water quality improvement characteristics can produce substantial nutrient and sediment removal results. These effects occur through two main mechanisms: (i) filtration and return of filtered water to the environment and (ii) filtration and bio-assimilation (or retention) of nutrients and sediments in the body mass and in shell growth.

The ISNRP™ model focuses initially on the second means, the filtration and bio-assimilation mechanism, as the basis for demonstration of nutrient reduction and, in turn, generation of nutrient credits that can be sold and traded to those parties needing to offset their own nutrient loading in their stormwater or wastewater effluent discharges. As explained more fully below, the other major benefit of this model for nutrient reduction is that the amount of nutrient reduction is verifiable based on the size of the oysters harvested, so the ISNRP™ will result in annually measured and documented nutrient reduction and corresponding water quality improvement benefits. OCVA is not aware of any other nutrient reduction method that offers the degree of verifiable nutrient reduction effects resulting from such method. This lends great assurance of certainty and reliability to the nutrient reduction benefits and the nutrient credits that will be based on that reduction.

An additional benefit of the ISNRP™ is that a certain percentage of annual revenues from the sale of Term Nutrient Credits generated by the ISNRP™ will be used to fund the creation and implementation of permanent oyster reefs and flooding and storm surge protective measures using the OCVA Reeftek™ technology. This set-aside and use of revenues for this specific purpose is an aspirational and voluntary measure by OCVA to help further oyster growth in the Bay watershed; it is not required by law, nor will it be a condition for approval of ISNRP™ Term Nutrient Credits by DEQ. These new oyster reefs and flood/storm surge measures will add yet additional water quality benefits to the Chesapeake Bay and its tributaries through their bio-assimilative characteristics retaining nutrients and placement at key locations coordinated with the Virginia Marine Resources Commission and other federal, state and local agencies, though ISNRP Term Nutrient Credits are not being generated from such nutrient reduction benefits. Further modeled and measured studies with consensus should quantify additional nutrient remediation values through bio-assimilation and sequestration, along with other water quality

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<sup>9</sup> Va. Code Ann. § 62.1-44.19:14; Va. Code Ann. §§ 62.1-44.19:15(B)(1)(b), and -44.19:15(B)(1)(d).

and environmental benefits, providing the Commonwealth with asset-valued results without increasing government expenditures.<sup>10</sup>

**B. ISNRP™ SCIENTIFIC BASIS.**

Well documented scientific studies, including those favorably reviewed by the STAC and, more recently, the Expert Panel, have confirmed that oyster growth and harvesting have significant nutrient removal benefits in nutrient-laden waters due to nutrient assimilation within the shell and body mass of the oysters.<sup>11</sup> In a very slight adjustment from the STAC findings as to Phosphorous, the Expert Panel found that the nutrient filtration and bioaccumulation rates for aquacultured oyster tissue are those shown below in Table 1.<sup>12</sup>

**TABLE 1**

<b>Nutrient Reduced</b>	<b>In Soft Body Tissue (as % of dry weight)</b>
Nitrogen	8.2%
Phosphorous	0.9%

Using typical oyster sizes grown and harvested for commercial purposes, these nutrient reduction rates can then be used to establish benchmark levels of net nutrient removal and retention within the combined soft body tissue and shell body mass of the oyster.<sup>13</sup> While the STAC considered and recommended use of the nutrient reduction values of both tissue and shell, the Expert Panel December 2016 Report has so far only authorized the use of nutrient reduction values for tissue as set forth in Table 2.<sup>14</sup>

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<sup>10</sup> Though this set-aside is voluntary on the part of OCVA, and the number of Reeftek™ modules deployed will be at OCVA's discretion, OCVA offers to provide annual reports to DEQ (on a calendar or fiscal year basis to be agreed upon by OCVA and DEQ) describing the number of Reeftek™ modules placed into a particular tributary watershed in that year.

<sup>11</sup> See, e.g., R. Newell and R. Mann, *Shellfish Aquaculture: Ecosystem Effects, Benthic-Pelagic Coupling and Potential for Nutrient Trading*, A Report Prepared for Virginia Secretary of Natural Resources, 13 (June 21, 2012); STAC Factsheet: Oyster Nutrient Reduction Potential (May 2014), found at [http://www.chesapeake.org/pubs/321\\_Luckenbach2014.pdf](http://www.chesapeake.org/pubs/321_Luckenbach2014.pdf) (last visited November 17, 2014).

<sup>12</sup> *Expert Panel December 2016 Report* at 56-60. The STAC Report found that nutrient content in shell was 0.2% for Nitrogen and 0.06% for Phosphorous. The STAC Report also found bio-assimilative values for Carbon in tissue and shell, indicating that ISNRP™ will also yield carbon reduction benefits. The ISNRP™ therefore provides a platform for establishing carbon reduction credits that will help provide other Bay water quality benefits.<sup>12</sup>

<sup>13</sup> See C. Higgins., K. Stephenson, and B. Brown, "Nutrient Bioassimilation Capacity of Aquacultured Oysters: Quantification of an Ecosystem Service," *J. Environ. Qual.* 40:271–277 (2011), available at <https://www.vcu.edu/cesweb/faculty%20profiles/Brown/Higgins%20et%20al%20'11%20JEQ.pdf> (last visited November 17, 2014). The experiment used to verify these rates of reduction based on size class of the oysters was performed in floating cages located near the mouth of the Potomac River that were essentially identical in function to those to be used as part of the ISNRP.

<sup>14</sup> Upon the Expert Panel's expected issuance of its findings as to nutrient reduction value in the shell, size classification and counting of whole oysters at harvest will also provide a basis for earning Term Nutrient Credits for shell value. OCVA anticipates seeking a further amendment to its Certification at that time to incorporate and restore shell-based nutrient reduction value as part of the total nutrient reduction values it would use to generate Term Nutrient Credits, as it was certificated to do in March 2015.

TABLE 2

Oyster Size Class Rank**	Oyster Size Class Range (inches)	Size Class Midpoint (inches)	Size Class Midpoint (mm)	Content in Oyster Tissue (grams or lbs per oyster)			
				Diploid*		Triploid**	
				Nitrogen†	Phosphorus‡	Nitrogen†	Phosphorus‡
A	2.0 - 2.49	2.25	57	0.05 g or 0.00011 lbs	0.01 g or 0.000022 lbs	0.06 g or 0.00013 lbs	0.01 g or 0.000022 lbs
B	2.5 - 3.49	3	76	0.09 g or 0.0002 lbs	0.01 g or 0.000022 lbs	0.13 g or 0.00029 lbs	0.01 g or 0.000022 lbs
C	3.5 - 4.49	4	102	0.15 g or 0.00033 lbs	0.02 g or 0.000044 lbs	0.26 g or 0.00057 lbs	0.03 g or 0.000066 lbs
D	4.5 - 5.49	5	127	0.22 g or 0.00049 lbs	0.02 g or 0.000044 lbs	0.44 g or 0.00097 lbs	0.05 g or 0.00011 lbs
E	≥ 5.5	6	152	0.31 g or 0.00068 lbs	0.03 g or 0.000066 lbs	0.67 g or 0.00148 lbs	0.07 g or 0.00015 lbs

\*Diploid 50th quantile regression equation: tissue dry weight (g) = 0.0004 \* Shell Height (mm)<sup>1,82</sup>

\*\*Triploid 50th quantile regression equation: tissue dry weight (g) = 0.00005 \* Shell Height (mm)<sup>2,39</sup>

†8.2% average nitrogen content in oyster tissue dry weight (based on seven studies in waterbodies along the Atlantic Coast; used the average of the site means for studies outside of Chesapeake Bay; site-specific averages were used for studies within Chesapeake Bay)

‡0.9% average phosphorus content in oyster tissue dry weight (based on three studies in Chesapeake Bay; same averaging approach as nitrogen, but only studies in Chesapeake Bay were found).

The scientific bases of the nutrient reduction performance of the oyster’s filtration and bio-assimilation action and the use of that performance to determine nutrient retention based on the size of the oyster are both well-researched, documented and accepted by the STAC and now the Expert Panel. Beyond the significant inherent benefit of the science supporting the ISNRP™, this science (and common experience) demonstrates and brings to light the following important benefits that distinguish the ISNRP™ from other nutrient reduction methods:

- Nutrient reduction through the ISNRP™ is very predictable and can be verified through measurement each harvesting season, providing great comfort that ISNRP™ Term Nutrient Credits are meaningful and reflect water quality benefits.
- The nutrient reduction efficiency of the ISNRP™ will also be much greater than that for other nutrient reduction practices, particularly typical land-based non-point source controls, offering potential economic and market cost savings.<sup>15</sup>

<sup>15</sup> In the cited study by C. Higgins, *et al.*, it is noted that:

on a hectare-per-hectare basis, aquacultured oysters remove greater amounts of nutrients as compared with agricultural BMPs, such as planting early cover crops or implementing continuous conservation tillage, which reduce TN loads between 0.04 and 2.25 kg ha<sup>-1</sup> and 2.7 and 0.8 kg ha<sup>-1</sup>, respectively, depending on the location of the land in the watershed (VADEQ, 2008).



- The science of the ISNRP™ approach holds true, whether one is operating only a few cages of oysters or thousands of cages, so that the nutrient reduction benefits are scalable along with the size of the ISNRP™ operation, allowing confidence in increased scale of operation and resulting greater nutrient reduction that comes with that increased scale of operation.

Further, it should be understood that ISNRP™ will use only triploid oysters. ISNRP oysters will be smaller than 2 inches in size when first placed into the water, and harvests will take from the cage only live oysters of at least 2.5 inches in length.<sup>16</sup> This size is above the Expert Panel recommended minimum size and fits with general industrial practice so that there is a convenient means to compare harvests, but it also ensures that the smaller oysters will be allowed to continue to grow to the standard size. This, in turn, allows for these smaller oysters to develop greater nutrient reduction capability over the next year, and means that there is a ready stock of “maturing oysters” in the cages to provide a buffering nutrient reduction capacity within the ISNRP™, further improving the water quality benefits associated with the ISNRP™.

So, if one is looking to offset the expected additional nutrient loads caused by municipal separate storm sewer system or wastewater treatment plant nutrient loadings on an annual basis, the nutrient reduction capability of the ISNRP™ can help the dischargers achieve their required nutrient reduction goals, and there will be verifiable results to confirm actual nutrient reductions.

#### IV. ISNRP™ PERFORMANCE STANDARDS

To implement the ISNRP™ and provide meaningful assurance to all stakeholders and regulatory agencies of the viability and efficacy of the ISNRP™ as a Term Nutrient Credit generating mechanism, OCVA has designed the ISNRP™ to include business model, operational, financial, and reporting and recordkeeping controls and systems, which shall constitute the ISNRP™ Performance Standards. These controls and systems create operational transparency as to the location, volume, harvest and mortality rate, and nutrient reduction rates achieved by the ISNRP™ on an annual basis, which in turn forms the basis for generating Term Nutrient Credits that can be certified by DEQ and traded in the marketplace with confidence.

##### A. OPERATIONS AND RELATED CONTROLS.

In its essence, the ISNRP™ is based on a system of ISNRP™-owned and sub-contracted oyster growing and harvesting operations that will generate Term Nutrient Credits. Because of the straightforward science behind the ISNRP™, operations are relatively straightforward as well.

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Converting agricultural land to forest cover can reduce TN by 3.6 to 23.2 kg ha<sup>-1</sup> (VADEQ, 2008).  
*Compared with these agricultural nonpoint source BMPs, oyster cultivation removes 29 to 1257 times the amount of TN per unit area.*

*Id.* at 276 (emphasis added).

<sup>16</sup> See *Expert Panel December 2016 Report* at 19 and 64. Aquaculture oysters generally take approximately one year to reach maturity, which means nearly all oysters in a given cage should achieve the minimum size by harvest time.

Likewise, the ISNRP™ builds upon existing regulatory model for reporting, recordkeeping and operational controls to ensure Term Nutrient Credits relate to approved credit generating activities that can be verified in the field. The following is a description of the main ISNRP™ operational elements and controls:

- **OCVA Sites.** OCVA or ISNRP™ Operators will obtain or use existing leases of submerged bottom lands to establish ISNRP™ Sites for the growth and harvesting of oysters. Multiple leaseholds may comprise a single ISNRP™ Site if the leaseholds are adjacent or proximately located and are under a common ISNRP™ Co-op Contract. Each ISNRP™ Site shall be contained within the same designated watershed, and no single ISNRP™ Site may extend from one Chesapeake Bay watershed to another.
- **Oyster Growth Management.** Oyster seeds will be placed into and grown in “off bottom oyster cages” specifically designed for their growth, protection and harvesting, which are secured on long lines and anchored at each ISNRP™ Site. Therefore, ISNRP oysters will be less than 2 inches in size when first introduced into the water. Each oyster cage used for the ISNRP™ will be assigned: (i) to a specific Chesapeake Bay watershed and ISNRP™ Site; (ii) a specific cage number reflecting the designated watershed and ISNRP™ Site of that cage; and (iii) a specific ISNRP™ Number. No cages, or oysters within those cages, may be moved beyond their designated ISNRP™ Site or watershed prior to harvest/certification. No oysters may be moved among cages, except among those within the same ISNRP™ Site.
- **Generation of Term Nutrient Credits.** Only aquaculture oysters that are harvested from ISNRP™ cages with both individual cage numbers and ISNRP™ Numbers may be used to generate certified Term Nutrient Credits. No native, wild or aquaculture oysters grown loose (such as spat on shell) qualify. For each ISNRP™ cage, harvested ISNRP™ oysters will be counted individually (*not* by bushel) and classified by size using the classification system set out in Table 2 above (also included in ISNRP™ Compliance Report form).<sup>17</sup> Tallies of oysters harvested will be made for each ISNRP™ Site and according to each ISNRP™ contract and each watershed, which tallies shall be included as part of the ISNRP™ Compliance Report included as Appendix 1. The ISNRP™ oyster count and size classification will be used to determine the total number of eligible nitrogen and phosphorous Term Nutrient Credits available for each watershed, according to Table 2 above. ISNRP™-produced oysters may be sold as whole oysters, body and shell together, or may be sold shucked from the shell, depending on market demand.<sup>18</sup>

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<sup>17</sup> Counting of oysters may be performed by automated oyster counter systems or by hand.

<sup>18</sup> It is clear from available science that returning clean shells from harvested oysters to Bay water for use in reestablishing natural or creating new oyster reefs and grounds would provide a many-fold nutrient reduction benefit above the reintroduction of the shell into the water for two main reasons: (i) nutrient content in the shell is bound in the shell and would only “leach” back into the water, if at all, over many years, and (ii) the oyster growth on these shells will add much more nutrient reduction capacity than would otherwise leach back into the water, offering a substantial net positive water quality impact.

- **Reporting.** A tally of ISNRP oysters first introduced to the waters of each Bay watershed during each calendar year will be reported to DEQ by January 20 of the following year. Reports of oysters harvested and the eligible Nitrogen and Phosphorous Term Nutrient Credits will be submitted to DEQ through ISNRP™ Compliance Reports, along with required certifications of the information in the ISNRP™ Compliance Reports.
- **Allocation of ISNRP™ Term Nutrient Credits by Permittees.** Annual compliance dates for allocation of the certified credits by the permittee or regulated entity are established or approved by DEQ (calendar, fiscal, and or by Permit).

**B. DOCUMENTATION OF OPERATIONS, OYSTER PRODUCTION, AND CERTIFICATION OF ISNRP™ TERM NUTRIENT CREDITS.**

Each Nutrient Credit Generating Entity, whether OCVA or an ISNRP™ Operator, or the discharger seeking to use ISNRP™ Nutrient Credits, shall complete an ISNRP™ Registration form and related Appendix 1 – ISNRP™ Cage Summary form (both part of the ISNRP™ Compliance Report). This form provides information about the Nutrient Credit Generating Entity, the Bay watersheds involved, the number and locations of cages to be used for the generation of Term Nutrient Credits and to be certified, the name of the Term Nutrient Credit broker, and the location of the discharging activity that will acquire the Term Nutrient Credits.

Duplicate annual harvesting reports will be filed with the Virginia Marine Resources Commission (“VMRC”) for oyster harvesting reporting purposes and with DEQ for reporting of nonpoint offset nutrient credits and credit-generating activities. This comports with the Expert Panel’s approach to reporting harvested oysters to be used for Nutrient Credit generation.<sup>19</sup> These harvesting reports will be aggregated and submitted to DEQ in whole, not in part, unless otherwise agreed to by DEQ, and will be summarized within, and submitted to DEQ as supporting documentation for, the attached form of the ISNRP™ Compliance Report. These reports will contain the references for each of the following: the relevant watershed where the oysters were grown and harvested, the leased bottom lands, and ISNRP™ Number (or whether for sale posted through the Nutrient Credit Registry). In addition, interim, quarterly summary reports of oysters harvested from each tributary system (and the nutrient reductions associated with same) will be provided to DEQ within twenty (20) days of the end of each calendar year quarter.<sup>20</sup>

Term Nutrient Credits eligible for certification shall be calculated in accordance with the ISNRP™ Nutrient Credit Calculation Table shown in the ISNRP™ Compliance Report. Term Nutrient Credits generated annually through the ISNRP™ quarterly harvests shall be certified by or through the DEQ. Depending on whether the Term Nutrient Credits are sold beforehand or not, Term Nutrient Credits may be (a) certified, posted to the DEQ Credit Registry, assigned and retired as an offset for a specific period of time of nutrient loading under a specific permit or (b) certified and offered through the DEQ Credit Registry to the market. However, ISNRP™ Term

<sup>19</sup> See *Expert Panel December 2016 Report* at 65.

<sup>20</sup> DEQ should understand that some of these quarterly reports may show little or even no harvested oysters, depending on the timing of the oyster growing and harvest seasons.

Nutrient Credits may only be applied to the year designated in such certifications and may not be carried forward unless otherwise agreed to by DEQ.

DEQ will review the ISNRP™ Compliance Reports in a timely manner and notify OCVA of its determination of concurrence with the calculated number of Term Nutrient Credits eligible for certification. Under the amended Certificate issued to OCVA as contemplated herein, the Certificate would be subject to a term of five (5) years.

## **V. PERFORMANCE ASSURANCES**

The sale of Term Nutrient Credits will involve contractual provisions and obligations requiring OCVA to ensure generation of the required number of Term Nutrient Credits each year. Such obligations will be enforceable contractual duties and, depending on the arrangements between the parties, may include other performance assurances like indemnification or financial mechanisms. As a result, the contractual obligations between the parties will provide sufficient performance assurances for generation and certification of Term Nutrient Credits.

## **VI. BASELINE AND ADDITIONALITY ANALYSIS**

As part of the evaluation of how Term Nutrient Credits would be generated and applied to the nutrient reduction effects of the ISNRP™, this section of the Prospectus provides what is commonly called the baseline and additionality analyses. These analyses are used to determine the relative nutrient reduction benefits associated with a proposed nutrient reduction method or practice for which Term Nutrient Credits may be awarded and traded. Baseline and additionality analyses should be based on the unique operational model of the method or practice proposed to receive Term Nutrient Credits. However, the nature of the operations of the ISNRP™ requires a somewhat different approach than used for traditional land-side practices baseline and additionality analyses.

The Expert Panel considered the baseline and additionality effect of authorizing oyster aquaculture as a BMP to offset nutrient loadings into the Chesapeake Bay watershed. It found that the appropriate baseline condition was that existing as of December 2016 and that only oysters harvested from approved aquaculture practices after the issuance of the December 2016 Report would be eligible to count toward additionality of nutrient reduction and generation of Nutrient Credits. Therefore, any qualifying ISNRP oysters harvested beginning and after January 1, 2017 would satisfy the baseline and additionality analysis of the Expert Panel and be eligible for generation of Term Nutrient Credits.<sup>21</sup>

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<sup>21</sup> See *Expert Panel December 2016 Report* at 19 and 64.

**Appendix 1**

**Nonpoint Term Nutrient Credit  
Certification Compliance Report**

**NONPOINT TERM NUTRIENT CREDIT**  
**CERTIFICATION COMPLIANCE REPORT**  
**IN-SITU NUTRIENT REMEDIATION PROGRAM (“ISNRP™”)**

**Instructions:**

Nonpoint term nutrient credits created, purchased and or assigned through the oyster aquaculture operations shall be registered and certified by or through the Department of Environmental Quality (“DEQ”).

Harvesting reports completed and filed with the Virginia Marine Resource Commission (VMRC) will be submitted to DEQ as an identical copy in support of annual certification of nonpoint term nutrient credits. These harvesting reports must be aggregated and submitted to DEQ in whole, not in part, unless otherwise agreed to by DEQ. These reports must contain the appropriate reference for each watershed, private leased bottom and cage numbers assigned to the permit for which the credits will be applied or note that they are for sale through the Credit Registry. No cages, or oysters within those cages, can be relayed outside the designated watershed prior to harvest/certification. No oysters may be relayed into those cages, except from other cages within the same watershed. Only aquaculture oysters that are contained in numbered cages or floats may be certified. No native wild or aquaculture oysters grown loose (such as spat on shell) qualify.

The sum total of harvested aquaculture oysters submitted by size, classification and unit count (*not* by bushels) are applied to the “formula”, validated by DEQ and certified for compliance. Annual compliance dates are set by DEQ (calendar, fiscal, and or by Permit).

Depending on whether the Term Nutrient Credits are sold beforehand or not, Term Nutrient Credits may be (a) certified, posted to the DEQ Credit Registry, assigned and retired as an offset for a specific period of nutrient loading under a specific permit or (b) certified and offered through the DEQ Credit Registry to the market but only applied and sold for the year designated and may not be carried forward, unless otherwise agreed to by DEQ.

DEQ will review the ISNRP™ Compliance Reports in a timely manner and notify OCVA of its determination of concurrence with the number of Term Nutrient Credits eligible for certification.

# NONPOINT TERM NUTRIENT CREDIT CERTIFICATION COMPLIANCE REPORT

## ISNRP™ CREDIT-GENERATING ENTITY REGISTRATION

(Fill In For Nutrient Credit Registration Compliance  
for  
\_\_\_\_\_ Quarter, 20\_\_\_\_  
or  
Fiscal/Calendar Year\* Ending 20\_\_\_\_):

**Nutrient Credit-Generating Entity:**

Name: \_\_\_\_\_ Fed ID No: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: (    ) \_\_\_\_\_

VMRC Aquaculture Producer(s) / Harvester Number(s): \_\_\_\_\_

Watershed:	Number of Cages**	# of Oysters Harvested by Size Class***				Nutrient Credits (lbs) ****	
		B	C	D	E	Nitrogen	Phosphorous
Potomac							
Rappahannock							
York							
James							
Eastern Shore							

\* Use of calendar v. fiscal year to be determined by DEQ. (Fiscal Year is July 1-June 30.)

\*\* Using "Standard Double Stack Cage" (4' x 3'). See Exhibit A.

\*\*\* Using ISNRP™ Nutrient Credit Calculation Table.

\*\*\*\* Using ISNRP™ Nutrient Credit Calculation Table.

# NONPOINT TERM NUTRIENT CREDIT CERTIFICATION COMPLIANCE REPORT

## ISNRP™ PURCHASER REGISTRATION

Fill In For *Each* Permit to Which Term Nutrient Credits Are Applied  
in Calendar/Fiscal Year Ending 20\_\_

### Name of Nutrient Credit Purchaser

ISNRP™ Number: \_\_\_\_\_ Permit Number: \_\_\_\_\_

Name/ Entity: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Watershed: \_\_\_\_\_

Annual Nitrogen Credits Purchased: \_\_\_\_\_ lbs.

Annual Phosphorous Credits Purchased: \_\_\_\_\_ lbs.

ISNRP™ Cage numbers Assigned to Permit: \_\_\_\_\_

\_\_\_\_\_

### Nutrient Credit Broker:

Name: \_\_\_\_\_ Fed. ID No. \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_

Daytime Phone Number: ( ) \_\_\_\_\_

### Nutrient Bank (if applicable):

Bank Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_



**EXHIBIT A**

**NONPOINT TERM NUTRIENT CREDIT CERTIFICATION COMPLIANCE REPORT  
ISNRP™ Registration and Cage Summary  
Calendar/Fiscal Year 20\_\_ / \_\_ Quarter**

**WATERSHED**

**NUMBER OF CAGES**

**Potomac**

\_\_\_\_\_ Total Cages

**ASSIGNED TO PERMITS**

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

**UNASSIGNED, AVAILABLE FOR SALE THRU REGISTRY\*\***

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

**Rappahannock**

\_\_\_\_\_ Total Cages

**ASSIGNED TO PERMITS**

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

**UNASSIGNED, AVAILABLE FOR SALE THRU REGISTRY \*\***

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

**Eastern Shore**

\_\_\_\_\_ Total Cages

**ASSIGNED TO PERMITS**

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

**UNASSIGNED, AVAILABLE FOR SALE THRU REGISTRY\*\***

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

\* Use of calendar v. fiscal year to be determined by DEQ. (Fiscal Year is July 1-June 30.)

\*\* Shown on Registry in Pounds of N/P

**EXHIBIT A (Cont.)**

**NONPOINT TERM NUTRIENT CREDIT CERTIFICATION COMPLIANCE REPORT  
ISNRP™ Registration  
ISNRP™ Cage Summary**

Calendar / Fiscal Year 20\_\_ / \_\_ Quarter\*

**WATERSHED**

**NUMBER OF CAGES**

**York**

\_\_\_\_\_ Total Cages

**ASSIGNED TO PERMITS**

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

**UNASSIGNED, AVAILABLE FOR SALE THRU REGISTRY\*\***

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

**James**

\_\_\_\_\_ Total Cages

**ASSIGNED TO PERMITS**

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

**UNASSIGNED, AVAILABLE FOR SALE THRU REGISTRY\*\***

\_\_\_\_\_ Cages

**Cage Numbers:**

\_\_\_\_\_

\* Use of calendar v. fiscal year to be determined by DEQ. (Fiscal Year is July 1-June 30.)

\*\* Shown on Registry in Pounds of N/P

# NONPOINT NUTRIENT CREDIT CERTIFICATION COMPLIANCE REPORT

## ISNRP™ NUTRIENT CREDIT CALCULATION TABLE

The following results have been published and received general consensus for baseline nutrient values for the aquaculture oyster tissue and is hereby being used for modeled and measured “In- Situ Nutrient Remediation” nonpoint source nutrient credits:\*

Oyster Size Class Rank**	Oyster Size Class Range (inches)	Size Class Midpoint (inches)	Size Class Midpoint (mm)	Content in Oyster Tissue (grams or lbs per oyster)			
				Diploid		Triploid	
				Nitrogen	Phosphorus	Nitrogen	Phosphorus
A	2.0 - 2.49	2.25	57	0.05 g or 0.00011 lbs	0.01 g or 0.000022 lbs	0.06 g or 0.00013 lbs	0.01 g or 0.000022 lbs
B	2.5 - 3.49	3	76	0.09 g or 0.0002 lbs	0.01 g or 0.000022 lbs	0.13 g or 0.00029 lbs	0.01 g or 0.000022 lbs
C	3.5 - 4.49	4	102	0.15 g or 0.00033 lbs	0.02 g or 0.000044 lbs	0.26 g or 0.00057 lbs	0.03 g or 0.000066 lbs
D	4.5 - 5.49	5	127	0.22 g or 0.00049 lbs	0.02 g or 0.000044 lbs	0.44 g or 0.00097 lbs	0.05 g or 0.00011 lbs
E	≥ 5.5	6	152	0.31 g or 0.00068 lbs	0.03 g or 0.000066 lbs	0.67 g or 0.00148 lbs	0.07 g or 0.00015 lbs

J. Cornwell et al., Oyster BMP Expert Panel, Chesapeake Bay Program, *First Incremental Report: Panel Recommendations on the Oyster BMP Nutrient and Suspended Sediment Reduction Effectiveness Determination Decision Framework and Nitrogen and Phosphorus Assimilation in Oyster Tissue Reduction Effectiveness for Oyster Aquaculture Practices* (December 19, 2016), available at [https://www.chesapeakebay.net/documents/Oyster BMP 1st Report Final Approved 2016-12-19.pdf](https://www.chesapeakebay.net/documents/Oyster_BMP_1st_Report_Final_Approved_2016-12-19.pdf).

The factors listed in this table shall be used in determining the number of Nutrient Credits eligible for certification.

\* *Expert Panel December 2016 Report* at 19 and 61.

\*\* These Oyster Size Class Rank designations are provided by OCVA as a convenient shorthand reference to the sized classes and is used for operational and compliance tracking purposes only.

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