

Horst, Rachel

From: CEER@brevardfl.gov
Sent: Friday, January 30, 2026 2:21 PM
To: Horst, Rachel
Subject: A new CEER Recommendation has been submitted as ID #2026045

Recommendation # 2026045

Dear CEER Administrator,

Speak Up Brevard Recommendation ID #2026045 has been submitted. Please login to the CEER Application to start the recommendation evaluation workflow.

Contact Information:

Group/Organization	Brevard Resident (employed by Wakefield Biochar)
Name	Robert Pickert
Address	121 Windward Way, INDN HBR BCH FL 32937
Phone	(321) 543-4414
Email	rpickert@ehsroundtable.org
Alternate Email	rpickert@ehsroundtable.org

Recommendation Information:

Recommendation ID	2026045
Recommendation Title	Soil Health Moonshot - Transform Brevard Soils into a Sustainable Living Filter
Areas Affected	Natural Resources - SOIRL, Solid Waste
Department Affected	Natural Resources Management
Current problem	I have proposed how the use of biochar (and other local natural ingredients) as a slow-release fertilizer (SRF) and soil amendment (SA) to enhance the beneficial reuse of some of the IRL muck, and possibly provide a sustainable non-tax revenue for the IRL restoration (comments attached). I have suggested this as one example of how biochar could be a keystone for soil health in the IRL watershed – a surprisingly critical missing link in the current SOIRL program. Biochar could be an effective tool to help address 77% of the identified IRL pollutant sources. Brevard County could provide all of the biochar it needs from the Solid Waste yard waste curbside pick-up program and accumulated storm debris. The SOIRL Citizen’s Advisory Committee is looking into the value biochar could provide to the IRL restoration. It is my hope the SOIRL COC will follow the science on biochar, and apply the original SOIRL ordinance and Comprehensive Management Plan, which requires the SOIRL COC to: • “not only allow, but foster tools and techniques for restoration of the lagoon”, and • “To identify and develop long-term funding sources to preserve, protect, restore and enhance the IRL system”. Kudos to the County Commission, the NEP Team, SOIRL staff and COC, and countless engaged citizens for their tremendous progress in the Herculean

task of addressing sources of pollutants to the Lagoon. Even if the County continues to make progress through the SOIRL programs (dependent on public funding) and implements new programs (e.g., encourage low impact design), it seems unlikely we will be able to declare victory in restoring the Lagoon from the relentless onslaught of nutrients and ubiquitous chemicals like PFAS/PFOS and tire stabilizer 6PPD-quinone as an expanding population loves the Lagoon to death. Biochar is produced by pyrolysis of clean wood sources to create a natural and stable material with incredible surface area similar to activated carbon that absorbs water and adsorbs nutrients in a way that makes them bio-available plants and less leachable to groundwater and the Lagoon. Biochar occurs naturally from forest fires and is a primary contributing factor to how we see green shoots and lush vegetative growth from fire-impacted forests. The incredible surface area of biochar provides the ideal habitat for the beneficial soil microbes critical to soil health. IFAS has done a lot of research demonstrating the benefits of biochar for soil health and is generally an advocate for biochar's role in soil health. The widespread addition of biochar (and other local ingredients such as worm castings for microbes and seaweed extract for nutrients) to landscaped soils in Brevard would transform our soils into a permanent living filter for the IRL where soil microbes do the work and no maintenance is required. A review of sales for commercial fertilizers in Brevard County could be used to establish a nutrient loading baseline. The list of uses for biochar to help restore the Lagoon is long. Biochar could be added to geotubes with raw muck to eliminate costly interstitial water treatment and render the resulting dewatered muck more useful for other beneficial uses. The current SOIRL Program chooses to exclude private companies from speaking to the COC and receiving SOIRL grants. The SOIRL mission belongs to everyone and is an "all hands" mission. The SOIRL Program should welcome private sector involvement and partnerships, especially a moonshot effort like improving soil health across the watershed. In fact, there may be a variety of public-private partnerships that could support SOIRL objectives in a way that is fair and open, makes best use of public funds, and avoids conflicts of interest.

Recommendation

I recommend a moonshot effort to enhance soil health in Brevard County (together with the low-impact design recommendations provided by others) to transform Brevard soils into a sustainable living filter for the Lagoon. The result will be a Brevard-based industry, creating jobs and reducing taxes while restoring the IRL. I recommend the following path forward:

- Additional testing and inventory of dewatered muck from various dredge dewatering sites & management areas to determine appropriate beneficial uses, and/or disposal requirements,
- Convene an adhoc group of soil health experts and stakeholders to establish a consensus on appropriate soil health objective(s), and desirable product formulation specifications for a broadly-applicable lawn & garden slow-release fertilizer & soil amendment, including the beneficial use of IRL muck and biochar;
- Conduct nutrient loading and leaching performance testing of biochar, biochar-amended muck, and popular commercial fertilizers to demonstrate nutrient removal / prevention potential for the IRL;
- Sales & Marketing and/or distribution ground game (big box & other retail, nurseries & distributors) – this would require a County commitment, and would be good use of college environmental and marketing students if well managed,
- Limited blending, mixing, pelletizing for pilot production, and quality confirmation testing,
- Qualifications-based selection for limited production & distribution of the SRF & SA by the truckload (include bag label design),
- Competitive bid for expanded biochar supply and SRF & SA fertilizer production and distribution (especially if the SOIRL V2 tax referendum fails), and
- Brevard County installation and operation of pyrolysis equipment to produce our own biochar.

I propose the following potential sources of funding:

- SOIRL tax money to invest in as much of the above as possible while we have the funding,
- Savings from eliminating the need for current interstitial water treatment practices and costs.
- Sale of amended IRL muck as a SRF & SA (either at a profit for surplus proceeds to fund the program (especially if the referendum fails), or at a lower (breakeven) price to inspire greater distribution),
- Reduce solid waste garbage pick-up from twice per week to once per week (we have long since segregated yard waste and recyclables from the garbage stream, yet we still collect twice per week),
- Sale of carbon credits – Verified carbon credits for biochar production can be sold (through Puro Earth to various parties) on

the private market for reducing greenhouse gas emissions – in this case the methane and carbon dioxide that is not emitted from decomposing yard waste and storm debris.

- Pursue matching funds from federal or state grants such as US Department of Agriculture (Conservation Innovation Grants), USEPA (e.g., South Florida Program), FDEP Water Quality or HAB grants through non-profit partners).

Attachments

Circularity of IRL Muck - Comments Bob Pickert (Resident - Wakefield Biochar) 111825.pdf

Comments by Bob Pickert (Biochar-Soil Health) - Brevard County SOIRL Tax Extention Workshop (Jan 12,

Comments by Bob Pickert - Brevard County SOIRL Tax Extention Workshop (Jan 5, 2026).pdf

Please do not reply to this e-mail, as it will go to an unmonitored mailbox.

Good morning. I am Bob Pickert, a long-time Brevard resident, IRL supporter, and EHS manager for Wakefield Biochar. I would like to propose a circular approach to managing dredged Lagoon muck that would be good for the lagoon, the watershed, and Brevard's economy. In a word – biochar. Amending dewatered muck with biochar would:

- Transform the muck into a slow-release fertilizer and soil amendment,
- Replace or supplement the SOIRL Tax with a non-tax revenue from sales within (and beyond) the watershed,
- Distribute a high-quality and permanent source of carbon to landscaped soils that would reduce the flux of nutrients and other contaminants to the lagoon, and
- Provide a way for Brevard residents and businesses to contribute directly to the restoration of the Lagoon.

The irony is that to get the muck out - and stay the muck away – we need to **embrace** and enhance the muck.

First, let me talk about biochar. Biochar is a powerful plant-based soil amendment produced by woody biomass in a high-temperature, low oxygen environment through a process known as pyrolysis. This locks carbon into a lightweight and stable form with incredible surface area – think activated carbon – that remains stable in soils for hundreds of years. Biochar has impressive soil health benefits:

- *Absorbs* and retains water making landscaped soils more drought-resilient;
- *Adsorbs* nutrients - including nitrogen and phosphorus - making them more bio-available to plants, and less leachable to surface and groundwater;
- *Adsorbs* and retains metals (such as arsenic and chromium) and organic contaminants including the many emerging ubiquitous contaminants like PFAS;
- Provides the ideal habitat for beneficial microbes critical to soil health - increasing nutrient utilization, decreasing nutrient demand, and increasing microbial metabolism of a growing list of toxic chemicals; and
- Increases soil cationic exchange capacity making plants more salt-tolerant.

There are more benefits, including the fact that biochar is carbon negative, often providing sellable carbon credits in voluntary carbon markets. You don't have to take my word for it – I have distributed a biochar flyer from IFAS explaining some of the benefits of biochar. Pelletized biochar is also a highly effective media for stormwater treatment in low-impact designs.

To get a feel for how this could finance the SOIRL Programs - The sale of 2 million, 1 cubic foot bags for \$45 each – the equivalent of 4 bags for every home and business in Brevard, Volusia, Indian River, and Martin Counties - would generate nearly \$100 million of annual

gross sales. Assuming 40% goes to retailers, the remaining 60% (\$60M) would cover capital and operating costs and generate annual net non-tax revenues of \$20M-\$40M for SOIRL Programs. We could also produce super sacks for commercial landscapers. The numbers will start out smaller, but could be larger if distribution was extended beyond the IRL watershed (think taking market share from biosolids products like Milorganite).

The owner of a popular nursery said that if Sally Sclaera of the IFAS Brevard County Extension gave a dewatered muck-biochar soil amendment a favorable review in the Sunday paper, they would have a hundred customers asking for it Monday morning. Sally has responded to the idea enthusiastically calling it “fantastic”. I brought some bags of biochar for you to play with.

There are a variety of other powerful soil amending additives from local sources that could be incorporated into a dewatered muck-biochar product, including seaweed & worm casting extracts and beneficial microbes. The dewatered muck is likely to serve as a good base for the fertilizer-soil amendment. It contains 7% organic carbon – after all it is dead algae not toxic waste – and minerals (2% sulfur, 11% calcium, 2% magnesium). The only heavy metals analyzed include arsenic, chromium, and copper but these are present at very low concentrations consistent with background soil levels and government exposure standards, and well below fertilizer guidelines.

We suggest convening a group of experts and stakeholders to reach a consensus on the appropriate product formulation; and additional testing of dewatered muck from various dredge dewatering sites to better characterize the variability of muck quality and assist with the product formulation effort. The result will be a Brevard-based industry, creating jobs and reducing taxes. This is an aspirational and entrepreneurial vision. It would take a lot of work to do to make this happen, but we’re going to do a lot of work anyway, we might as well make it productive for the Lagoon.

We recommend the following path forward to limit initial investment while gaining confidence in the feasibility of the circularity of IRL muck:

- Additional testing and inventory of dewatered muck from various dredge dewatering sites & management areas,
- Nutrient loading and leaching performance testing,
- Product formulation consensus-building;
- Sales & Marketing ground game (big box & other retail, nurseries & distributors);
- Limited blending, mixing, pelletizing, confirmation testing;
- Bag design and limited production and distribution (by the truckload).

Caution: *Charge* your biochar sample by soaking it with nutrient-rich water before use.

I am Bob Pickert, long-time Brevard County resident, sailor, and lover of the IRL. I supported the initial SOIRL tax, and offer conditional support for a continued tax. I offer a general observation for improvement to the SOIRL program, and a specific proposal that would be good for the lagoon, watershed, and Brevard's economy; providing long-term funding to reduce or eliminate the SOIRL tax.

A Muck Fact Sheet on the SOIRL Project Plan website states (in part) "(The dewatered muck) can be used for beneficial purposes, if deemed to be safe and cost effective, or disposed of at a landfill, if contaminated".

The County Muckateers did step up and arrange for 4 samples of the Grand Canal muck from the Pineda dewatering site and the results indicate the muck is likely to serve as a good base for a pelletized biochar-based fertilizer-soil amendment. The utility of a biochar-amended muck comes from the incredible properties of biochar to absorb water and adsorb nutrients to make them bioavailable to plants while dramatically reducing the leaching to surface and groundwater, and improving drought resistance. Adding 60-75% biochar and other ingredients to the muck could:

- Transform the muck into a slow-release fertilizer and soil amendment,
- Distribute a high quality and permanent source of carbon to landscaped soils that would reduce the flux of nutrients and other contaminants to the lagoon,
- Provide a way for Brevard residents and business and learn about soil health that would contribute directly to the restoration of the lagoon, and
- Replace or supplement the SOIRL tax with a non-tax revenue from sales within (and beyond) the watershed.

Think of it as adding the activated carbon in your water pitcher to the soil, using clean sources of wood waste.

The sale of 2 million bags of IRL SRF & SA at \$45 per bag (typical rate for biochar) could generate \$100 million in sales, and provide Brevard County \$20-40M in net proceeds to pay for SOIRL programs. This could be implemented as a pilot project to demonstrate the commercial viability, and scaled-up through greater investment. It would require a focused marketing campaign but would likely build quickly. The result would be a Brevard industry, creating jobs and reducing taxes. You don't have to take my word for it, Sally Scalera of the UF IFAS County Extension called the idea "fantastic". Fertilizer companies are adding biochar to their products. Biochar also makes an effective stormwater treatment media.

This would require a lot of biochar – fortunately the Solid Waste Department is in the process of developing a plan for the reuse of the county’s woody waste, and could eventually produce all the biochar needed for this effort.

I would support a renewed tax providing it was supplemented with a parallel effort to create a commercial soil health initiative featuring the IRL muck, biochar, and other local ingredients.

I suggest the SOIRL Program drop its exclusive focus on funding the efforts of only non-profit organizations, and **engage the private sector** - - this should be an “all hands” effort.

In addition, I would strongly recommend the program revisit some of the directives in the original ordinance (2016-15) and the IRL Comprehensive Management Plan, including:

- “**not only allow, but foster** tools and techniques for restoration of the lagoon”,
- “To identify and develop **long-term funding sources** to preserve, protect, restore and enhance the IRL system”.

What are these other funding sources?

Soil Health for a Healthy Lagoon

I am Bob Pickert, long-time Brevard resident, sailor, IRL supporter, career environmental professional, and EHS manager for Wakefield Biochar. I have provided previous comments proposing the beneficial reuse of IRL muck amended with biochar (and other Brevard natural resources) for a local industry to produce a slow-release fertilizer and soil amendment. I stand by my previous comments that the sale of this material could replace or supplement the SOIRL tax with \$20-40M of annual **non-tax net proceeds** to fund SOIRL programs, including muck dredging. Today, I would like to take a different tack and emphasize the soil health benefits for restoration of the Lagoon.

First, I want to make it clear my comments are mine and mine alone as a Brevard resident, and based on the limited muck analyses. Wakefield Biochar has been supportive, but the restoration of the IRL is not in the company's business plan. The County could produce all the biochar it would need. The Solid Waste Department is developing a plan to manage woody wastes from the curbside yard waste collection program and storm debris. The Director of Solid Waste has advised me that "the Solid Waste Department has no interest in a commercial venture in which we are attempting to sell a product". My 3-minute pitch to the SOIRL COC was not enough time to educate the Committee on the use of biochar to support the restoration of the IRL. I hope the COC invites me back for a more thorough presentation on the properties and relevant applications for biochar. The original SOIRL ordinance and Comprehensive Management Plan, requires the SOIRL COC to:

- "not only allow, but foster tools and techniques for restoration of the lagoon", and
- "To identify and develop **long-term funding sources** to preserve, protect, restore and enhance the IRL system".

Now to soil health. In all the IRL restoration projects discussed, there has been precious little focused on **soil health**. If I look at Virginia's slide on Pollution Sources vs. Fund Allocations, muck flux and stormwater treatment amount to over 50% of pollutant sources. I see an additional 26% where soil health is critical to the success of the lagoon restoration, including:

- Miscellaneous Base Flow,
- Atmospheric deposition, and
- Lawn Maintenance

Biochar provides habitat for beneficial soil microbes, absorbs water, and adsorbs nutrients in a way that makes nutrients bioavailable to plants and less leachable to groundwater and the lagoon. I recommend the SOIRL program convene a group of soil health experts and

Comments by Bob Pickert (Resident) January 12, 2026

stakeholders to evaluate 'the benefits of a muck-biochar-based fertilizer-soil amendment appropriate for Brevard's sandy soils. This effort could support a public soil health information campaign and become a galvanizing message for soil health in Brevard. But first additional testing of dewatered muck from each of the dredge dewatering sites, and an inventory of where the muck is being stored or land applied must be completed to properly manage the muck.

Biochar would help address 77% of IRL pollutant sources, and could serve as a long-term funding source for SOIRL, making biochar something of a silver bullet to support the IRL restoration. I support the re-authorization of the SOIRL tax, as a supplement and/or transition to more sustainable funding.



BOARD OF COUNTY COMMISSIONERS

TO: Jim Liesenfelt, County Manager

THRU: Tad Calkins, Assistant County Manager

FROM: Virginia Barker, Director, Natural Resources Management Dept.

SUBJ: Citizen Efficiency and Effectiveness Recommendation (CEER) # 2026045

CEER # 2026045, titled Soil Health Moonshot - Transform Brevard Soils into a Sustainable Living Filter, was received by the County from Robert Pickert.

Citizen Statement:

I have proposed how the use of biochar (and other local natural ingredients) as a slow-release fertilizer (SRF) and soil amendment (SA) to enhance the beneficial reuse of some of the IRL muck, and possibly provide a sustainable non-tax revenue for the IRL restoration (comments attached). I have suggested this as one example of how biochar could be a keystone for soil health in the IRL watershed – a surprisingly critical missing link in the current SOIRL program. Biochar could be an effective tool to help address 77% of the identified IRL pollutant sources. Brevard County could provide all of the biochar it needs from the Solid Waste yard waste curbside pick-up program and accumulated storm debris. The SOIRL Citizen's Advisory Committee is looking into the value biochar could provide to the IRL restoration. It is my hope the SOIRL COC will follow the science on biochar, and apply the original SOIRL ordinance and Comprehensive Management Plan, which requires the SOIRL COC to:

- “not only allow, but foster tools and techniques for restoration of the lagoon”, and
- “To identify and develop long-term funding sources to preserve, protect, restore and enhance the IRL system”.

Kudos to the County Commission, the NEP Team, SOIRL staff and COC, and countless engaged citizens for their tremendous progress in the Herculean task of addressing sources of pollutants to the Lagoon. Even if the County continues to make progress through the SOIRL programs (dependent on public funding) and implements new programs (e.g., encourage low impact design), it seems unlikely we will be able to declare victory in restoring the Lagoon from the relentless onslaught of nutrients and ubiquitous chemicals like PFAS/PFOS and tire stabilizer 6PPD-quinone as an expanding population loves the Lagoon to death.

Biochar is produced by pyrolysis of clean wood sources to create a natural and stable material with incredible surface area similar to activated carbon that absorbs water and adsorbs nutrients in a way that makes them bio-available plants and less leachable to

groundwater and the Lagoon. Biochar occurs naturally from forest fires and is a primary contributing factor to how we see green shoots and lush vegetative growth from fire-impacted forests. The incredible surface area of biochar provides the ideal habitat for the beneficial soil microbes critical to soil health. IFAS has done a lot of research demonstrating the benefits of biochar for soil health and is generally an advocate for biochar's role in soil health. The widespread addition of biochar (and other local ingredients such as worm castings for microbes and seaweed extract for nutrients) to landscaped soils in Brevard would transform our soils into a permanent living filter for the IRL where soil microbes do the work and no maintenance is required. A review of sales for commercial fertilizers in Brevard County could be used to establish a nutrient loading baseline.

The list of uses for biochar to help restore the Lagoon is long. Biochar could be added to geotubes with raw muck to eliminate costly interstitial water treatment and render the resulting dewatered muck more useful for other beneficial uses.

The current SOIRL Program chooses to exclude private companies from speaking to the COC and receiving SOIRL grants. The SOIRL mission belongs to everyone and is an "all hands" mission. The SOIRL Program should welcome private sector involvement and partnerships, especially a moonshot effort like improving soil health across the watershed. In fact, there may be a variety of public-private partnerships that could support SOIRL objectives in a way that is fair and open, makes the best use of public funds, and avoids conflicts of interest.

Citizen Recommendation:

I recommend a moonshot effort to enhance soil health in Brevard County (together with the low-impact design recommendations provided by others) to transform Brevard soils into a sustainable living filter for the Lagoon. The result will be a Brevard-based industry, creating jobs and reducing taxes while restoring the IRL. I recommend the following path forward:

- Additional testing and inventory of dewatered muck from various dredge dewatering sites & management areas to determine appropriate beneficial uses, and/or disposal requirements,
- Convene an adhoc group of soil health experts and stakeholders to establish a consensus on appropriate soil health objective(s), and desirable product formulation specifications for a broadly-applicable lawn & garden slow-release fertilizer & soil amendment, including the beneficial use of IRL muck and biochar;
- Conduct nutrient loading and leaching performance testing of biochar, biochar-amended muck, and popular commercial fertilizers to demonstrate nutrient removal / prevention potential for the IRL;
- Sales & Marketing and/or distribution ground game (big box & other retail, nurseries & distributors) – this would require a County commitment, and would be good use of college environmental and marketing students if well managed,
- Limited blending, mixing, pelletizing for pilot production, and quality confirmation testing,

- Qualifications-based selection for limited production & distribution of the SRF & SA by the truckload (include bag label design),
- Competitive bid for expanded biochar supply and SRF & SA fertilizer production and distribution (especially if the SOIRL V2 tax referendum fails), and
- Brevard County installation and operation of pyrolysis equipment to produce our own biochar.

I propose the following potential sources of funding:

- SOIRL tax money to invest in as much of the above as possible while we have the funding,
- Savings from eliminating the need for current interstitial water treatment practices and costs.
- Sale of amended IRL muck as a SRF & SA (either at a profit for surplus proceeds to fund the program (especially if the referendum fails), or at a lower (breakeven) price to inspire greater distribution),
- Reduce solid waste garbage pick-up from twice per week to once per week (we have long since segregated yard waste and recyclables from the garbage stream, yet we still collect twice per week),
- Sale of carbon credits – Verified carbon credits for biochar production can be sold (through Puro Earth to various parties) on the private market for reducing greenhouse gas emissions – in this case the methane and carbon dioxide that is not emitted from decomposing yard waste and storm debris.
- Pursue matching funds from federal or state grants such as US Department of Agriculture (Conservation Innovation Grants), USEPA (e.g., South Florida Program), FDEP Water Quality or HAB grants through non-profit partners).

Staff Analysis:

The Citizen Recommendation statement above includes 8 requests:

1. Testing and inventory of muck;
 2. Creation of an ad hoc soil expert group for soil health objectives and evaluation of muck biochar fertilizer;
 3. Test the “loading and leaching performance” of biochar, biochar muck, and commercial fertilizers for nutrient removal/prevention;
 4. Sales and marketing to retail stores;
 5. Production pilot of biochar muck fertilizer;
 6. RFQ for “limited production and distribution” of biochar muck fertilizer/soil amendment;
 7. Competitive bid for expansion of production and distribution of the material;
 8. Installation and operation of biochar production equipment by the county.
- 1) Muck was previously inventoried by Florida Tech and used to determine proposed muck projects in the SOIRL plan. Testing has also been done for various nutrient content, physical properties, and contaminants of concern. Upon Mr. Pickert’s

request, a few samples of dewatered muck were tested for calcium, magnesium, sulfur, alkalinity, electrical conductivity, pH, and 27 geotechnical parameters.

- 2) UF/IFAS already has soil experts that have made recommendations for soil health objectives and conveyed that to citizens through the Soil Guardian's program. Formulation of fertilizer is conducted by the fertilizer industry and questions regarding the formulation are included in the attached IRL Muck and Biochar White Paper recommended by the SOIRL COC to the County Commission. Brevard County already provides guidance on accepted fertilizer formulation through the Fertilizer Use on Urban Landscape Ordinance, Chapter 46, Article VIII. The ordinance states that fertilizer must contain no phosphorus unless there is "a soil or plant tissue deficiency as verified by a University of Florida." Muck contains phosphorus so a biochar muck fertilizer would not be permitted for common use without additional tests and verification of a phosphorus deficiency.
- 3) Biochar has been tested for nutrient removal and prevention and is an accepted media for use in various nutrient removal projects including stormwater treatment. Biochar muck fertilizer and commercial fertilizers are intended to release nutrients to feed plants and have the potential of adding excess nutrients to the system. Mr. Pickert indicated in previous conversations that the nutrient content of muck was not high enough in comparison to current retail fertilizer so would need to be amended with additional nutrients to be viable for residential and commercial land use as fertilizer. This suggests there is potential for additional nutrient pollution introduction to the Indian River Lagoon using amended biochar muck fertilizer. The SOIRL program has been directing education efforts toward reducing fertilizer use, so it would be counter to current messaging to suggest use of biochar muck fertilizer. SOIRL has promoted the UF/IFAS Soil Guardians program in the past to encourage the creation of healthier soils, including through soil amendments.
- 4) Muck is considered "Sovereignty Submerged Lands" owned by the state and all use must be authorized by the State's Board of Trustees. FDEP states that any permitted activities using Sovereignty Submerged Lands must "not be revenue generating." Therefore, sales to retailers would have to be cost neutral and would have no financial benefit to SOIRL. There is also a question of whether retailers would be able to mark up the cost when selling it to consumers.
- 5) Brevard County does not currently have facilities or staff trained to produce fertilizer. Mr. Pickert's grant application to FDEP estimated initial startup costs for such a facility to be \$11,250,000 and additional yearly operating costs to be \$1,000,000. While standard retail markups are estimated to be 40%-50%, some sources suggest markups for organic fertilizers may be as high as 90% of the production cost due to the proprietary nature of the products. A preliminary search showed the retail cost of organic fertilizers ranges from an average per bag of \$6.30 for Black Cow, \$26.09 for Milorganite, and \$28.05 for other organic fertilizers, thus putting the average cost around \$20.15. At a markup of 40% to 90%, this would put the production cost of

organic fertilizers between \$2.01-\$12.09. Assuming a biochar muck fertilizer was comparable in production costs, this would mean neutral-cost sales of this product would require the sale of over 1 to 6 million bags of fertilizer to cover the startup and first year production costs and 83,000-498,000 bags to cover yearly operating costs. Retail sales of fertilizer for Brevard County in 2015 (the last year the state reported fertilizers sales) was 81,644 pounds of nitrogen and most lawn fertilizer contains around 12 pounds of fertilizer per bag providing an estimated 6,800 bags sold in one year. Therefore, it would take over 147 to 882 years just to break even on the startup costs if everyone in Brevard County switched to buying only this fertilizer. Even if marketing to the other 4 IRL-based counties, which combined are nearly twice the population of Brevard, the cost and time to break even would not be financially feasible.

- 6,7) Considering companies would not be able to make a profit from the production and sale of this material, it is unlikely there would be interest in participating in the production.
- 8) Considering there are many private companies offering biochar commercially, the county would be in direct competition with them. It is unknown what the cost of building this facility would be or where it could be located.

Staff Recommended Action:

It is recommended that the Board of County Commissioners reject CEER # 2026045 as stated in staff analysis and because it does not enhance the effectiveness or efficiency as required by Home Rule Charter.

Over 800,000 cubic yards of muck has been removed using SOIRL funds. This muck has been deposited at permitted dredged material management areas and applied in uplands and other approved sites. In the upland sites, the muck is mixed and tilled into soils. The contractors handling the muck are not permitted to sell it.

Undetermined issues

What conductivity levels would be acceptable for use as a fertilizer?

What material(s) would be added to the muck to increase the nutrient availability?

What ratio of muck to biochar and charging agents is needed?

Has a market analysis been performed to assess the viability of this proposed product?

Regulatory Concerns

As muck contains phosphorous, adding it to biochar as a fertilizer could prohibit its application in Brevard County unless soil testing indicated phosphorous deficiency. (Brevard County Chapter 46 Article VIII Fertilizer Use on Urban Landscape, Section 46-341 Fertilizer Content and Application Rates).

SOIRL dredging projects must comply with strict FDEP permits¹. Mixing muck with biochar, marketing, and selling it as a product is NOT authorized by any active permit. There is a permit modification process, but NRMD staff believe that FDEP will NOT authorize the proposed use, blended with biochar and sold to homeowners, for the following reasons:

- 1) "Construction, alteration and operation shall not allow excavated or dredged material to be placed in a location other than a self-contained upland disposal site"².
- 2) The muck itself is "Sovereignty Submerged Lands" and owned by the State of Florida³. As such, the State's Board of Trustees must authorize any activities that are not specified on FDEP permits⁴.
- 3) Permitted activities using Sovereignty Submerged Lands must "not be revenue-generating"⁵.

References:

¹FDEP "General Conditions for Individual Permits"

²Florida Administrative Code 62-330.-50 (9) (a)

³FDEP "General Conditions for Sovereignty Submerged Lands Authorization"

⁴Florida Administrative Code 18-21.003 (67)

⁵Florida Administrative Code 18-21.005 Forms of Authorization

*This is based on NRMD staff review. A more detailed analysis would require County legal staff review.

Technical Issues

SOIRL projects' effectiveness are primarily based on nutrient reduction. What nutrient reduction would be realized by the application of biochar fertilizers to all homeowners (Brevard, Indian River, Martin and Volusia Counties) in the IRL watershed?

The benefits of biochar to soil health has been reported in scientific journals. However, there is no evidence that the addition of muck to biochar will enhance its effectiveness. It appears muck would act more as a filler.

Muck management projects are shifting to capping rather than dredging. The costs associated with capping are much less than dredging. Dredged muck soon may not be available to blend with biochar.

Recommendations

As no studies have been conducted by the proponent to assess the viability of this concept, extensive research would be required. The SOIRL program does not include a category for primary research. To date, data collection through SOIRL funds has been limited to assessing project performance.

There would not be any reduction of nitrogen or phosphorus from this proposal (based on the FDEP grant application).

\$250,000 is a significant amount of funds, especially for an unproven concept. This cost estimate does not include the price to bring this proposed product to market.

In the FDEP grant application Wakefield stated they have the "capacity to produce, ship, and blend bulk biochar for a larger-scale proof of concept project (Phase 2); and to establish and operate a company-owned & operated turn-key full-scale biochar production and fertilizer bagging operation using Brevard County waste biomass (e.g., IRL muck sludge, woody yard wastes, hurricane debris, and wastewater treatment sludge) for local and regional distribution through retail outlets in and around Brevard County while generating and selling carbon credits to enhance the project feasibility." Awarding a single source contract to Wakefield would be inconsistent with Brevard County's competitive procurement policies.

This is a project that should be funded with private funds (venture capitalist). The proponent should conduct the studies to assess the viability of their idea. Information needed includes how a muck/biochar fertilizer would perform in a lab as well as in the field. Does the muck/biochar fertilizer slowly release nutrients at an acceptable rate? Would the muck/biochar

fertilizer adsorb other contaminants such as atmospheric nitrogen and PFAS? If testing proves IRL muck/biochar functions as they theorize, this concept could be brought back to the SOIRL COC. Brevard County cannot sell what is defined as sovereign submerged lands owned by the state of Florida. If requirements can be changed to allow the transfer of muck to a fertilizer/biochar company, any profits from the sale of the proposed would flow to the producer although they may be able to donate to the county for SOIRL.

The proponent could seek grant funding for innovative technologies from organizations such as the IRLNEP.