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**Testimony before the
Senate Agricultural and Rural Affairs Committee**

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Chairman Waugh, Chairman O’Pake, Senator Wenger, and distinguished members of the Agricultural and Rural Affairs Committee, my name is Matthew J. Ehrhart, and I am the Pennsylvania Executive Director of the Chesapeake Bay Foundation (“CBF”). On behalf of CBF and its 140,000 members, I would like to thank you for the opportunity to express our views on the Farmers First Agenda and, specifically, the “Alternative Uses for Manure” component.

CBF applauds the effort of the Farmers First Initiative to preserve farmland, protect the economic viability of farmers and to deal with the ever growing problem of excess manure from animal agriculture. I will focus our comments on the issues and needs surrounding developing alternative uses for manure.

Manure can be a valuable nutrient source, critical to growing crops, when utilized at appropriate application levels. Unfortunately, we have too much manure concentrated in small geographies. That’s true for Pennsylvania as well the Chesapeake Bay Watershed. It’s a problem locally, at a statewide level, and for the Bay Watershed. It doesn’t matter whether we’re trying to reduce nutrient loading to the Bay, removing water quality impairment in our local rivers and streams, or assisting livestock producers in figuring out how to comply with Pennsylvania’s Nutrient Management Planning regulations. Resolving this problem requires solutions other than locally land applying the current manure production.

Revitalizing the Agricultural By-Product Management Technology Board will provide a vital forum for discussion and the advancement of new technologies that can assist in utilizing animal waste. The Board may also play a key role in policy and funding discussions that will drive the viability of implementing new solutions on the landscape and creating economically viable alternatives for traditional waste management.

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Recent changes in nutrient management planning, including the implementation of phosphorous based planning and buffers and setbacks, are critical to improving water quality and, in many areas, meeting TMDLs (Total maximum Daily Load allocations) and removing water quality impairment. While CBF believes these steps are crucial to meeting the State's water quality obligations, we also recognize the burden they place on many individual farmers and landowners and are doing everything we can to bring additional resources to bear on the problem.

There are presently over 185 million livestock animals in the Chesapeake Bay watershed, producing over 44 million tons of manure per year. The Lower Susquehanna Watershed, the Middle Delmarva and the Shenandoah Valley stand out in livestock production and, therefore, in manure production. According to a 1993 analysis from USDA's Natural Resource Conservation Service (NRCS) the Lower Susquehanna produces over 286,000 tons of excess manure per year, a number that is sure to have grown in the interim. Lancaster County alone, with the 2nd highest agricultural production of any county east of the Mississippi and ranking 5th in livestock production nationally, produces over 72 million pounds of manure per year. That's 12% of the watershed's manure from 1.5 percent of the land area. These numbers do not indicate that farmers do a poor job in these geographies. What these numbers do indicate is that these are the places where we, as a society, grow our food and that we need to bring additional resources to bear for these areas.

We need to bring resources and solutions to these areas at a scale commensurate with the problem. Solutions that are economically sound, sustainable into the future, and add additional value to the agricultural economy. CBF has been working across three states, with a variety of partners, to assess and begin implementation of viable alternative manure uses. Much of the discussion focuses on poultry manure. It is important to point out that we are not singling out poultry manure as the problem, but recognizing that this waste has attributes that facilitate alternative use. Poultry waste has a higher energy value, is drier and more cost effectively transported, and is typically moved off the production facility currently. Poultry manure also has the highest phosphorus to nitrogen ratio, making land application proportionally more difficult under phosphorous based nutrient management plans. While the technologies discussed can be utilized with a variety of manure, at a landscape scale CBF believes the greatest efficiency and cost effectiveness will be realized by addressing poultry litter first.

Composting

Composting is the aerobic decomposition of manure or other organic materials in high temperatures. During this process, waste and organic matter are allowed to decay in a pile. Compost, the resulting product, is an odorless, low-moisture, high stability product. Nutrients in compost are more tightly fixed and less likely to be transported in runoff and leaching than nutrient in raw manure. Composting can be completed within several weeks and can occur outside or in an enclosed facility.

Manure-based compost has been applied to manage manure at livestock operations throughout the United States, Canada, and other countries. Composting has been widely applied on farms as a form of manure management. It has also been applied as a form of waste management for food scraps, shredded waste, yard trimmings, wood chips, and other types of waste.

Composting may be the only technology than can be implemented on the ground, full-scale, as we speak today. It provides the lowest cost per ton alternative – approximately \$3-3.5 million for a facility capable of processing approximately 100,000 tons of material per year.

It is also important to remember that composting alters the form of the waste but does not eliminate nutrients. The key component of utilizing composting as an alternative use for manure is developing markets for the final material. Markets may include bulk media for the State's rapidly growing nursery industry, bagged product in retail outlets, or use in reclaiming abandoned mineland. The Chesapeake Bay states contain hundreds of thousands of acres of abandoned mine lands that support little or no vegetation. As a result, acid runoff from mine residues flows across these barren areas and into local streams. The manure nutrients in compost are of tremendous value in restoring vegetative cover in these areas when combined with lime applications to balance the soil's pH. The higher concentrations of phosphorus in poultry manure are particularly useful.

CBF has been working with local partners and a nationally known composting company to evaluate the possibility of a large composting facility in the Lower Susquehanna region. This company has successfully created and implemented marketing strategies to utilize the final compost product at numerous large scale facilities in the US.

Energy Generation

The energy value of the 14 million tons of recoverable manure generated in the Bay watershed each year is 70 trillion British thermal units (Btu), which is roughly equivalent to 2.6 million tons of coal or 400 million gallons of gasoline.

There are several methods of converting manure to energy. Although numerous processes hold promise, those that have received the most research are gasification, cofiring, and anaerobic digestion.

Gasification is a process that uses heat to convert animal manure, usually poultry litter, into a clean gaseous fuel. This gaseous nature of the fuel gives tremendous flexibility in the way it can be used to produce power. Several companies have developed and refining and piloting gasification technology in Europe and the United States. A gasification facility is currently planned for the eastern shore of Maryland, adjacent to a food processing facility that utilize gas fired steam for it's processing. These facilities can be utilized to directly power industrial processes, eliminating the issues with selling electricity back to the grid , or be utilized by energy utilities to generate renewable electricity for consumption.

Cofiring is the simultaneous combustion of a fuel, such as manure, with a base fuel, such as coal. It is proving to be one of the most promising near-term methods of increasing the use of manure in electricity generation. Even though cofiring has successfully been incorporated into the commercial market in Europe, it is not widely used in the U.S. For instance, the English company Fibrowatt has built large-scale power plants in the United Kingdom. These power plants are designed to be cofired with

poultry litter and wood shavings, straw, or both. As Pennsylvania advances cogeneration technology, utilizing poultry litter in addition to waste coal and other fuels can provide efficient energy generation while dealing with the excess manure waste stream.

Gasification and cofiring produce an ash, which can also contain significant amounts of nutrients. This ash may be fixed in concrete or asphalt, it may also be added in the composting process to boost the nutrient levels of the finished compost, or marketed as a fertilizer component.

Anaerobic digestion is the decomposition of manure in an oxygen-free (anaerobic) environment. The process works in much the same way as an animal's digestive tract; microorganisms breakdown or digest the manure and along the way produce methane by bacteria. The methane in biogas is similar to natural gas, and after scrubbing it can be used to fuel internal combustion engines that run generators and produce electricity.

A typical farm system that produces manure includes a manure-handling system, a reactor tank where anaerobic digestion occurs, and an apparatus for the collection, pretreatment, and use of biogas. Farmers are often reluctant to use digesters because the operation and maintenance costs are often high compared to the financial returns. Issues associated with selling electricity back to utilities have also been a problem in the past. As many of you may know, current efforts around net-metering and other issues are aimed at solving those issues.

The difficulty to date with digesters is that they have been small, unable to tap into economies of scale. Larger multi-farm facilities are now in the planning stages and new high solid, high temperature digesters are in the pilot stage, promising greater efficiencies. These facilities are typically 2-3x more expensive than composting facilities. The overall cost effectiveness is dependent on the value of the energy production. The digestion process does not substantially reduce the nutrient load, leaving the same final product disposal challenge faced by the composters, and adding to the costs of this process as an alternative use for manure.

Ultimately the question becomes, "How will we develop these alternative uses?" I would advocate that we should not establish programs that require long-term subsidies, but invest in initial capital grants that can facilitate alternative use operations with long term lifespans. CBF advocates adding a funding component to this component of the Farmers First Agenda that will provide up to \$100 Million over a 5 year period to assist in capitalizing these facilities. The return to the state in nutrient reduction and water quality benefits, economic stimulation in the agricultural sector, and renewable energy opportunities will dwarf the investment.

We also urge the committee to evaluate opportunities to provide incentives for or require the use of organic, composted material for fertilizer and soil amendments by some sectors of the state. If state agencies and institutions shifted from chemical fertilizers to composted manure based fertilizers and stabilization products, it would create a tremendous demand for what is now a problematic waste product. Creating incentives for the development community would have a similar impact. It is possible to imagine a scenario, in the not too distant future, where manure is a sought after

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commodity for renewable energy production and for soil amendments, increasing the economic vitality of the livestock industry.

Thank you for the opportunity to testify. I'm glad to answer any questions any the committee members may have.