Comments of Biotechnology Industry Organization on
EPA's Draft Report
Biofuels and the Environment:
First Triennial Report to Congress

EPA Docket # EPA-HQ-ORD-2010-1077

BIO is pleased to submit comments on EPA's Draft Report *Biofuels and the Environment: First Triennial Report to Congress* (Draft Report). EPA, as required by Congressional statute, has published its first triennial Draft Report and is seeking comments on its technical accuracy and its policy implications. BIO appreciates the opportunity to submit these overview comments on technical methodology issues and policy implications for the agency to consider in finalizing the Draft Report. BIO is the world's largest biotechnology organization, with more than 1,200 member companies worldwide. BIO's members are the leaders in the development and production of conventional and advanced biofuels, bioplastics, and other bioproducts, bioprocesses, biocatalysts, and next generation energy crops, such as switchgrass, miscanthus, short rotation woody crops, and algae.

BIO thanks EPA for its creditable effort to document the full array of considerations in evaluating the potential benefits and concerns associated with expanding biofuels production. This report is a valuable first step towards a fully comprehensive assessment that can help inform future policy on this important topic.

The U.S. Energy Independence and Security Act's (EISA) principal objectives are to reduce consumption of and dependence on foreign oil, through the increased production and use of renewable bio-based fuels. EISA relies on corn and soy based conventional biofuels in the near term, while accelerating the development and future commercialization of new, advanced biofuel technologies to sustain long term expansion of biofuels production. EISA is premised on a policy assessment Congress made that advanced biofuel technologies will positively impact

greenhouse gas emissions and encourage new and improved land use in the U.S. and abroad. The Draft Report affirms Congress' assessment, notwithstanding the Draft Report's focus primarily on potential detrimental environmental impacts of increased biofuel production. To better reflect the Draft Report's validation of Congress's assessment, BIO urges EPA to make clear, in its final report, that:

1. Important national objectives are served by increased usage of biofuels produced using renewable biomass in substitution for fossil fuels. The use of biofuels reduces dependence on imported petroleum products, creates new markets for sustainably grown crops, improves land utilization, reduces environmentally devastating oil spills, and, not least, reduces concentrations of GHG emissions in the atmosphere.
2. At present, EPA is only able to make largely qualitative assessments of environmental impacts, and that comprehensive quantitative impacts of increased biofuel production are not yet achievable due to substantial uncertainties and lack of data affecting modeling and peer-reviewed research results. Furthermore, potential negative impacts from the use of biofuels can be mitigated by good practice. Thus, potential negative impacts should inform, and not impede, the realization of potential benefits and positive impacts of biofuels use. This is the policy bottom line, which the Report should highlight and not obscure.
3. Nothing in the Report changes EPA's previous quantitative assessments that EISA directives will have a substantial net, positive impact on greenhouse gas emissions. The Report repeats several times—and does

not disavow or question—EPA's earlier quantitative assessment that EISA targets would result in a reduction of more than 100 million metric tons of CO_2, compared to a policy that abandons EISA targets. *See e.g.* Draft Report, §4.3.2 at pp. 4-9.

Technical Comments and Recommendations on Methodology Used by EPA

1. The net impacts of biofuels must be evaluated relative to impacts of alternative scenarios. EPA's Draft Report focuses on the potential negative environmental impacts of biofuels, but makes only the briefest comparison to the impacts from continued reliance on petroleum-derived baseline fuels. The Draft Report does not provide a basis for comparing the environmental impacts of increased production of conventional and advanced biofuels to the environmental impacts of increasing dependence on marginal sources of foreign oil. The Draft Report describes qualitative impacts of land use practices, while not analyzing the alternative impacts from use of fossil-fuel based petroleum and diesel. EPA should clarify to Congress that the policy assessment underlying EISA – that the potential net benefits of increased production of biofuels substantially outweighs the impacts of continued reliance on petroleum-derived fuels – remains valid.

2. The Draft Report understates the positive environmental benefits of biofuels. BIO believes that from a comprehensive vantage point, the Draft Report insufficiently addresses the myriad potential benefits of biofuels on the environment. For example, increased biofuel production will lead to less loss of agricultural land, and increased use of non-arable land[i].

In addition, in describing single directional impacts relating to land use associated with growing and harvesting non-food crops, the Draft Report does not adequately analyze the likely impacts of changing and improved land use practices in mitigating the environmental impacts

identified in the Draft Report. Increased crop yields and increased use of lower impact farming practices, such as no tilling, should reduce the environmental impacts shown in the Draft Report and improve the environmental impacts on land use dedicated to the same types of crops used for non-biofuel purposes.[ii] Further, the Draft Report insufficiently identifies the potential benefit from breakthroughs with new advanced feedstocks and production technologies. For example, new fuel molecules such as butanol, green gasoline, and green crude promise environmental benefits not fully explored in the Draft Report. It is important that EPA take account of environmental benefits to accrue from increased future use of new biofuels and feedstocks.

Finally, the Draft Report overlooks direct and indirect environmental benefits from biofuel production. For example, ethanol production and use lowers carbon monoxide, benzene, and other toxic emissions; and increased use of distillers' grains reduces livestock methane emissions.[iii]

3. The Draft Report insufficiently identifies scientific uncertainty. The Draft Report insufficiently identifies the range and causes of uncertainty within the scientific community regarding how to quantify environmental impacts of indirect land use change, as well as changes in land use practices. The Draft Report relies on estimates of greenhouse gas emissions due to indirect land use change (ILUC) published by Searchinger and colleagues three years ago, even though such data has been superseded by more recent and much less dramatic estimates. [See, e.g. the analysis by Hertel et al. (2010) as improved by Tyner et al. in the report called Land Use Changes and Consequent CO2 Emissions due to US Corn Ethanol Production: A Comprehensive Analysis.]

Much of the Draft Report's conclusions on Environmental Effects of Direct and Indirect Land Use Change in section 5.3 seem to be based on one model, the FAPRI-CARD. BIO

believes that there should be some discussion of the variation among models and the substantial degree of scientific uncertainty that prevails in this field. Additionally, the Draft Report's discussion of the invasiveness potential of certain perennial grasses, like switchgrass and miscanthus overlooks more than a decade of research by Dr. Stephen Long at the University of Illinois, which has not reported any evidence of *Miscanthus x giganteus* invasion in that state. BIO urges EPA to include in this discussion the targeted effort underway in public-private partnerships to develop and test new varieties of perennial grasses that are designed to minimize any risk of invasiveness in their target regions. Similarly, the Draft Report should acknowledge that stewardship programs offer another valuable mitigation technique to reduce this risk, much like the "refuge in a bag" stewardship programs that are part of certain biotech row crops currently offered by BIO's own members.

4. One element of the Draft Report in need of some attention is its analysis of algae-based fuel technologies. The Draft Report makes a few generalized conclusions about algae technology that are not supported by any industry or scientific consensus. For example, the Draft Report draws somewhat sweeping conclusions about the viability of competing algae technologies. Both open and enclosed production systems (and several hybrid models) have made significant progress towards commercialization, and both are supported by major strategic and institutional investors. And, in addition to the photosynthetic approaches outlined in the Report, several companies are developing platforms for heterotrophic production of algae-based fuels, which the Report does not consider.

In its section on algae, the Draft Report again devotes considerable attention to potential concerns, but under-represents potential benefits. EPA has determined under RFS2 that, on a lifecycle basis, algae-based diesel represents at least a 50 percent reduction in GHG emissions

relative to petroleum diesel. As such, EPA has already determined that algae-based fuel has a net positive impact on GHG emissions. Additionally, there is no evidence to support the assertion that open-water pond cultivation adversely impacts air quality any more than closed systems. In fact, open pond systems allow algae to absorb significant amounts of atmospheric carbon dioxide, thus positively impacting air quality. Likewise, many algae-based fuel companies utilize brackish or saline water, rather than fresh water, so as not to compete with precious agricultural water resources. Since algae uses water as a medium for growth, the only water use associated with algae's cultivation is evaporative loss in an open pond system.

5. EPA should engage in more extensive collaboration with other agencies in developing methodologies and measures of the impacts of increased production and use of conventional and advanced biofuels.

EPA's Draft Report intends to shed light on potential environmental impacts of biofuels. BIO contends that the Draft Report should emphasize that there are many positive environmental impacts and that any potential negative impact to the environment from the use of biofuels can be mitigated by good practices. Indeed, any potential negative impacts should not stop EPA from enumerating the many current and potential positive benefits that more than counterbalance any negative impacts of biofuels production and use.

BIO strongly urges EPA to ensure deep and regular communication with other agencies that may have complementary expertise in this area when drafting future reports. The Draft Report mentions that EPA consulted with other agencies, such as the USDA and the DOE. However, the extent of this consultation is unclear. The EPA should not only collaborate closely with these and other agencies, but it should also consult broadly with scientific experts on all of the assumptions, data, and findings presented in this report. To that end, EPA should ensure

more thorough inclusion of industry stakeholders in the collection of information, data, and preparation for future reports. The RFS2 rulemaking process did an exceptionally good job of including stakeholders and obtaining and relying on the most recent relevant and available data. That process should be employed for future iterations of this Draft Report.

In addition to the previously identified inconsistencies between this Draft Report and work done by the EPA for the RFS2, BIO believes that the Draft Report overlooks some of the latest emerging research and draws broad conclusions where they may not be merited. In some instances, the information presented is inconsistent or misleading. For example, the Draft Report provides contradictory information regarding stover removal rates. BIO believes the Draft Report should simply state that there are concerns with stover removal related to erosion and maintaining adequate soil organic matter and stover removal rates should be based on site-specific criteria. There are tools such as the Soil Conditioning Index and RUSLE2 which can assist growers in deciding how much stover to remove in specific farming situations so that soil tilthe is maintained. The Natural Resources Conservation Service also provides assistance in this regard. The Draft Report should not merely rely on static practice with respect to Stover removal, once it becomes a substantial feedstock for advanced biofuels.

The Draft Report also alludes to environmental concerns associated with genetically engineered organisms that are currently used as biofuel feedstocks, as well as anticipated concerns for such organisms under development for the next generation of biofuel feedstocks. BIO wishes to point out that the commercial deployment of genetically engineered plants and microorganisms in the United States has not recorded a single confirmed instance of environmental or human harm during its 15 year history. Indeed, the advances in crops have allowed us to grow more corn per acre and have helped reduce environmental impacts.

Development of genetically enhanced microorganisms (GEMs) has helped innovative companies develop enzymes and microbes to produce advanced biofuels that will allow the transition to the use of crop residues and dedicated energy crops. We attribute this to the current science-based regulatory system for biotechnology-derived products. BIO believes that environmental concerns associated with genetically engineered organisms used in biofuel production are adequately addressed under multiple layers of current U.S. federal regulations, and should not be cited as a potentially negative impact of increased biofuels production and use.

The Draft Report presents a useful, but incomplete analysis of the potential environmental impacts of increased production and use of conventional and advanced biofuels. A more robust analysis would support the policy conclusion reached by Congress in enacting EISA: There are substantial net environmental benefits from biofuels compared to continued reliance on petroleum-based fuels. BIO appreciates EPA's consideration of the technical comments and recommendations made herein. BIO looks forward to working with EPA, as an industry stakeholder, to assess and to achieve EISA policy objectives.

[i] USDA ERS projects that over the next 10 years, strong demand continues to keep crop prices historically high, providing economic incentives to hold projected plantings at 249-250 million acres through 2020 (Paul Westcott, USDA Agricultural Projections to 2020, USDA ERS, Feb. 2011).

[ii] See for instance National Research Council, Impact of Genetically Engineered Crops on Farm Sustainability in the United States, April 2010, http://www.nap.edu/catalog.php?record_id=12804.

[iii] See for instance, Beauchemin, K. A., McAllister, T. A., McGinn, S. M, "Dietary mitigation of enteric methane from cattle." CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources, 2009, 4, 035, 1-18