

Biofuel Sustainability Performance Guidelines



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INTRODUCTION

Federal agencies and commercial entities are increasingly exploring opportunities to use alternative fuels, including biofuels, which can effectively displace conventional petroleum products. In doing so, they've recognized that increased biofuel use can help achieve sustainability benefits. However, these fuels also pose significant environmental risks that need to be considered and managed throughout the supply chain. As experience with these alternative fuel options has grown, it has become clear that the decision to purchase and use biofuel products should involve a proactive and thoughtful consideration of the product's upstream environmental and social aspects and impacts. Because of potential harm to air quality, water, soil, and wildlife habitat as well as rural development and food security concerns, improving biofuel sustainability performance is widely desired but has been challenging to put into practice, particularly from the perspective of government and corporate procurement agents. Moreover, many of the aspects and impacts of biofuels may not be intuitive or fully understood by the traditional-fuel technical and procurement communities across industry and the public sector.

The assessment of biofuel sustainability performance is a rapidly developing field but is currently underutilized in weighing alternative fuel purchases in a manner that maximizes their benefits and mitigates potential negative impacts. Fortunately, feedstock and biofuel sustainability standards and third-party certification systems are now emerging as practical options for informing best-value procurement evaluations.¹ This, however, raises questions of whether particular certification systems cover the entire biofuel life cycle; are comprehensive in their economic, social, and environmental coverage and in their implementation; achieve their intended outcomes; and are sufficiently protective.

PURPOSE

This document was prepared to help address these questions by proposing guidelines that define a suite of voluntary biofuel sustainability performance indicators and can be used to inform best-value procurement decisions. These guidelines propose a sustainability *framework* composed of *pillars*, criteria, and indicators of protective performance reflective of the relevant U.S. laws, regulations, best practices, and policies as well as international norms (in the case of imported products).² Key attributes of credible standards and systems are introduced and later applied to evaluate existing biofuel sustainability certification schemes. The results of an initial evaluation of existing biofuel feedstock and production sustainability certification systems are presented at the conclusion of these guidelines as a quick reference for consideration in public and private sector biofuel investments and procurements.

SCOPE

These guidelines seek to leverage and build on existing analytical foundations and best practices in standards development. First, this document's approach focuses on biofuel life cycle aspects and impacts. For consistency, we sought to conform with the understanding of life cycle conveyed in the International Organization for Standardization (ISO) 14040:2006E standard as well as to reflect the boundaries identified within the U.S. federal interagency Aviation Fuel Life-Cycle Analysis Working Group's *Framework and Guidance for Estimating Greenhouse Gas Footprints of Aviation Fuels*. In doing so, we defined the scope of these guidelines as covering the following five life cycle stages:

- Stage 1: Raw material acquisition³
- Stage 2: Raw material preprocessing and transport
- Stage 3: Liquid fuels production
- Stage 4: Product transport and refueling
- Stage 5: Use
- Stage 6: End of life /disposal

Stages 1–5 represent our functional life cycle; we do not include stage 6 (disposal) because biofuel products are assumed to be completely consumed during their use in stage 5. These are the boundaries used when evaluating standards applicability across the biofuel supply chain life cycle.

INTENDED USERS

These guidelines are intended to help major fuel consumers assess and understand the economic, environmental, and social sustainability performance of their biofuel choices. In particular, the proposed model guidelines were developed and tailored for the following intended users:

- Federal, state, or commercial (e.g., airlines, utilities) bulk fuel procurement officers
- Contracts professionals supporting federal or state biofuel grant programs or government biofuel bid requests or proposals
- Corporate sustainability, responsibility, and risk management officers

These guidelines have been developed so they can be easily understood and readily employed by the intended users. They are first meant to enable grant and procurement professionals to confidently utilize these biofuel sustainability performance indicators in the context of a best-value selection process. Second, our evaluation of the relevant standards provides these same users with an option to simply specify third-party certification to mitigate their risk of purchasing biofuels with poor environmental or social performance, where such systems provide adequate protection levels. This document is also meant to support a broader discussion on putting into practice sustainable best-value procurements of commercial-scale alternative fuels.

GUIDELINES

These sustainability performance guidelines were developed to introduce a proposed sustainability framework that is relevant across the applicable stages of a biofuel life cycle. The framework is designed as a manageable starting point for the intended users. However, organizations may have other aspect/impact concerns, priorities, or performance goals that may certainly be included as additional criteria and performance indicators, as desired and needed. In making such additions, users should ensure that performance indicators selected can be adequately evaluated and documented throughout the chain of custody (COC) so as to maintain the credibility of the best-value decisions made using this framework.

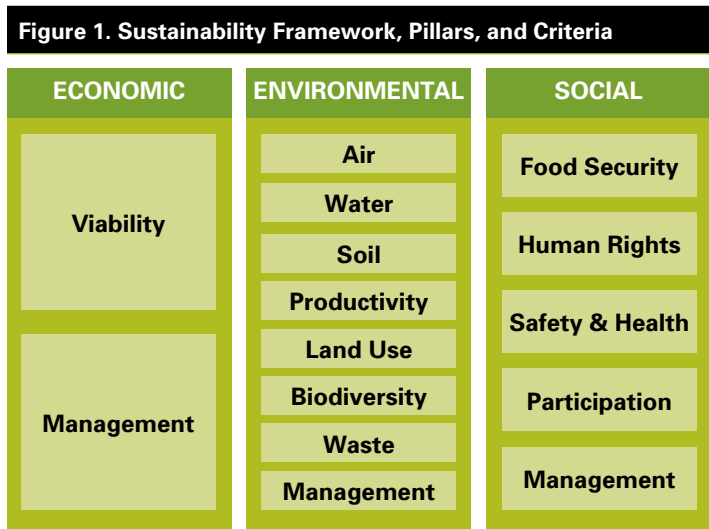
FRAMEWORK

What is sustainability within the context of biofuel life cycles? What is the analytical framework that should be considered by procurement officers to maximize value and be proactive supply chain risk managers? The proposed framework in Figure 1 was initially developed through a review of federal U.S. “green” product programs, biofuel sustainability standards, and broader corporate and federal sustainability efforts. First we reviewed green product programs, such as the Department of Agriculture’s BioPreferred®, USDA Organic, and the Environmental Protection Agency’s EnergyStar, as they represent highly successful voluntary standards used by both public and private sector consumers. Second, we reviewed existing biomass feedstock and biofuel producer sustainability certification standards that generally embody our “key attributes for credible standard” (presented

and elaborated later in this document) and identified a relevant breadth of sustainability principles and criteria areas. Finally, corporate and federal sustainability focus areas were considered, augmented, and used to draft the proposed framework.

The three traditional pillars of sustainability are represented within this framework. The economic pillar reflects not only the critical importance of biofuels’ financial viability but also the key management function of keeping compliant with U.S. laws and regulations. Likewise, the environmental and social pillars and their respective criteria are covered in additional detail to truly reflect federal policy mandates, such as Executive Orders 13423 and 13514, but also incorporate corporate social and environmental commitments, goals, practices, and reporting that go beyond minimum requirements.

Additional analysis of existing “green” product, sustainable feedstock, and biofuel certification standards yielded quite consistent criteria, highlighted in the following section. The broad applicability and inclusion of the proposed principles and criteria suggest a strong consensus on the importance of these challenges. The consistent focus on these priority criteria areas also speaks to their legitimacy and suitability as part of this proposed framework. The comparative analysis process used also provided additional detailed input on implementation and informed the development of the unbranded set of draft biofuel sustainability performance indicators presented later in Table 1.



CRITERIA

The proposed framework covers criteria across all three pillars. These guideline categories are defined in a manner that is descriptive, emphasizes relevance to federal mandates and drivers, and provides a broad context of potential sustainability impacts to consider. These criteria

summaries have been developed to provide intended users with a better understanding of these areas but also serve as an introduction to the applicable regulatory compliance requirements. While legal and regulatory compliance is a necessary prerequisite, it, by itself, does not provide a structure for proactive supply chain risk management or guarantee continual improvement in sustainability performance. Compliance is a required minimum, but this document's ultimate intent is to help users effectively mitigate the risks and enhance the potential benefits of commercial-scale biofuel production, purchase, and end use.

Viability

Financial viability of a biofuel feedstock or production venture is a foundational sustainability element. Many significant procurement activities already consider the ability of a business entity to cost effectively obtain the necessary inputs, labor, and capital to produce products at an affordable and market competitive price. While it should be acknowledged that new technologies and producers face start-up barriers, this explicit or implicit criterion can effectively represent a go/no-go gate for commercial-scale production as subsidies or justifications to purchase at a premium become a challenge to continued operation over the long term. This criterion considers the financial costs of biofuels compared with traditional fuel sources, but decision makers should, as much as possible, consider the life cycle costs and supply chain externalities elaborated in subsequent criteria to evaluate best value, subject to their organization's goals and mandates. Likewise, it is worth noting that environmental and financial risks are often closely linked. Unintended environmental consequences can give rise to regulatory restrictions, political perception challenges, or even branding risks that might affect a product's marketability and a producer's future economic success and viability.

Air

Biofuel supply chains have two potential areas of impact on the atmosphere: local/regional air quality and global greenhouse gas (GHG) emissions. Across all stages of the biofuel life cycle, physical disturbance, chemical processes, and combustion activities can generate air pollutants and GHG emissions.⁴ The Clean Air Act (CAA) of 1990 places regulations on activities in the United States that generate air pollutants (criteria or toxic) that have been identified as harmful to human health. For example, criteria air pollutants include carbon monoxide, ground level ozone, and particulate matter less than 2.5 µm in size (PM 2.5) and less than 10 µm in size (PM 10). To comply with existing federal and state air quality regulations, feedstock producers, processors, or biorefinery operators may be required to obtain air permits and be subject to pollutant emission reporting. Furthermore, the EPA has been authorized to regulate GHG emissions under Section 202(a) of the CAA. GHG emissions are considered to include carbon dioxide

(CO₂), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Statutory mandates, such as Section 201 and 526 of the Energy Security and Independence Act (EISA) of 2007, require federal biofuels programs to consider "direct emissions and significant indirect GHG emissions such as significant emissions from land use changes."⁵ EISA 2007 also defines categories of biofuel according to their percentage of reductions in life cycle GHG emissions relative to a petroleum fuel baseline, which provide the guidelines utilized by the EPA Renewable Fuels Standard (RFS2).⁶ This criterion reflects and acknowledges GHG emissions as an important regulatory consideration for biofuels, their potential contribution to climate impacts, and the precautionary need to consider and adapt to the supply chain risks posed by a changing climate.

Water

Freshwater is a requisite natural resource for human sustenance, agricultural production, industrial processes, natural system sustainment, and provision of ecological services. Federal and state laws cover and regulate two aspects and impacts of this criterion: quality and quantity. Activities managing or impacting water quality are regulated under federal statutes, such as the Clean Water Act (CWA) of 1990, and under numerous state and local regulations on the basis of riparian or prior appropriation water-rights laws. While some industrial activities are permitted, monitored, and reported to ensure human and ecosystem health, there are differing regulatory authorities and requirements for point and nonpoint source pollution. For example, many agricultural activities, as nonpoint sources, are not subject to the same CWA regulatory provisions and scrutiny as permitted industrial sources. Compliance with CWA and applicable state laws are the minimum requirement but do not alone ensure the environmental sustainability of feedstock production activities. Water quantity or availability is also a critical element but is largely managed via decentralized state laws that regulate water access and rights, along with some regional cooperative agreements. Water demand for biomass and biofuel production operations has been a focus of concern as its scale has increased over the past decade. Failure to consider the water requirements of a biofuel pathway and local availability can greatly compromise its viability and negatively impact the economic health of local communities. Sustained water overdraw can damage aquatic ecosystems and even aquifer water resources in extreme cases.

Soil

Agricultural production of any crop food, feed, fiber, or fuel requires sufficient and healthy soil. It is a natural resource required for biomass production and plays a key role in cultivation by providing structural stability, regulating water, storing nutrients, filtering harmful substances, and serving as a habitat....⁷ Soil health can either be well managed and support sustained production or be quickly damaged through

mismanagement. For example, overgrazing, slash-and-burn, intensive tillage cropping methods, or overuse of agricultural chemicals can break down organic matter, expose soils to rain and wind, and damage beneficial soil organisms.^{8,9} Direct loss of topsoil through erosion is often a result of mismanagement. However, a loss of nutrients, fertility, and soil ecosystem health can undermine sustainable production. In particular, this criterion focuses on biomass production ventures promoting best practices that build soil organic matter, improve nutrient levels, minimize degradation, and proactively manage soil health so as to maintain productive and economic viability and reduce spillover negative impacts in other criterion areas, such as water quality and biodiversity.

Productivity

Productivity is a key benefit and impact multiplier across numerous criteria. It refers largely to the efficiency of the biofuel production life cycle. Higher efficiency in each life cycle stage is generally a net benefit, except where cultivation intensity gains require a large increase in inputs per marginal improvement (excessive cultivation, herbicide or pesticide use) or generate downstream impacts (eutrophication from increased fertilizer application, erosion, or nutrient export), often due to the use of poor management practices. While productivity is not required by law or regulation, it inherently drives natural resource demand, input and production costs, financial viability, waste production, and downstream environmental impacts and benefits.

Land Use

Aside from biomass production, advanced biofuel supply chains are largely analogous to or even co-located with conventional petroleum fuel production and distribution infrastructure. However, the land area needed to cultivate biofuel feedstocks at commercial scale and the necessary site preprocessing facilities are a significant consideration. Biomass and intermediate feedstock materials could effectively require no or little additional land use (waste grease), may be integrated into existing cropping systems (cover crops, coproducts), or may require significant conversion of existing or fallow cropping areas. As such, land use changes resulting from feedstock cultivation must be quantified and considered. In discussing land use, an important distinction is made between direct land use change (DLUC) and indirect land use change (ILUC). DLUC is the conversion of one land use type directly to biomass production.¹⁰ ILUC focuses more on the regional-, national-, or international-scale economic market-driven displacement of existing products and land use change resulting from biofuel feedstock or intermediate commodity demand. Section 201 of EISA 2007 cites the need to consider both “direct emissions and significant indirect emissions such as significant emissions from land use change” and places restrictions on certain types of land use conversion in its definition of “renewable biomass.”¹¹ More broadly, it is

critical to avoid virgin or sensitive lands and the conversion of native ecosystems for the purpose of increasing biomass production, given potential impacts on biodiversity, air, water, and food security criteria.

Biodiversity

Conservation of species diversity, native habitats, and the broader terrestrial, aquatic, and marine ecosystems is a core federal mandate and responsibility dating back more than 100 years. Greater diversity and habitat preservation directly equate to healthier, more productive, and more resilient biological resources, which provide society with greater ecosystem services. Moreover, existing statutes, such as the National Environmental Policy Act (NEPA) of 1969 and the Endangered Species Act of 1974, and numerous federal policies emphasize the importance of conserving biodiversity and, by extension, the need to consider this criterion. The imperative to maintain biodiversity is not just limited to protecting endangered and threatened species or preventing the introduction of invasive species. Managing and protecting native habitats and their inherent biodiversity ensure their resilience, such as from drought or pests, and the continued provision of ecosystem services, such as water filtration, fisheries commodity production, and carbon sequestration. Loss of native habitat and diversity can contribute to significant economic losses or disasters, such as floods and wildfires.

Waste

As with any agricultural and industrial production life cycle, inputs, intermediates, coproducts, by-products, and waste are intricately linked to productivity, management practices, and ultimately the financial viability of any biofuel supply chain. This criterion focuses on effective materials management and minimization of wastes. Furthermore, given U.S. laws and regulations that govern waste materials, such as the Resource Conservation and Recovery Act (RCRA), legal compliance for biofuel production facilities is a significant consideration. Chemical inputs, coproducts, by-products, and wastes are subject to regulatory planning, monitoring, and reporting requirements mandated by provisions of the Oil Pollution Act (OPA), the Emergency Planning and Community Right to Know Act (EPCRA), and the Pollution Prevention Act (PPA). Consequences of failing to manage wastes range from community relations challenges to substantial fines, permit and operating license revocations, or even public health catastrophes.

Food Security

First-generation biofuels derived from commodity crops were encouraged by government mandates in numerous countries. In the United States, time-bound renewable fuel production mandates incentivized the use of readily available agricultural crops to meet those mandates. However, international food shortages and tensions have elevated a debate focused on food versus fuel and food security issues.¹²

While food security is not strictly a supply-and-demand issue, the real or even perceived impact of food crop use in biofuels and increased commodity prices make this a high visibility criterion, particular in supply chains involving trade between developed and developing markets.¹³ According to the World Health Organization (WHO), “Food security is built on three pillars.” They are:

- Food availability: having nutritious food available on a consistent basis
- Food access: having nutritious food resources readily available for use
- Food use: having a balanced diet, in addition to water and sanitation¹⁴

Biofuels can be linked to food security either directly or indirectly. Food crop feedstocks can be directly related to food security as a function of availability and access. However, indirect food security is a function of price and market-driven displacement of food crops by either food or nonfood biomass feedstock production, which exacerbates food access and use challenges in developing countries. Direct food security concerns have generated rapid advances in nonfood biofuel feedstocks, and indirect impacts are important to quantify and mitigate to the full extent possible.

Human Rights

While technology types and production systems are largely neutral in this regard, the human rights protection provisions that are implemented within the production supply chain are of utmost importance. For U.S.-based biofuel feedstock and production, this criterion is primarily a matter of compliance with the U.S. Constitution, the Civil Rights Act of 1964, the Fair Labor Standards Act (FLSA) of 1938, and state-level property and labor laws. However, for imported feedstocks, intermediate products, and biofuels, basic human rights may not be covered by laws or legal means by which to seek relief. Human rights provisions and protections should include—but are not limited to—land tenure/property rights, cultural and spiritual freedoms, gender equity and nondiscrimination, labor rights, and fair wages. Core conventions of the International Labour Organization (ILO) elaborate on accepted international norms.

Safety and Health

Biomass cultivation and biofuel production operations should consider and manage hazards applicable to internal worker occupational safety and health as well as external environmental health impacts on the broader community. All U.S. agricultural and petrochemical production activities are covered by the Occupational Safety and Health (OSH) Act of 1970, which regulates working conditions for men, women, and children, citizen or temporary workers. Current biomass feedstock and biofuel production systems are inherently no less hazardous than other work activities in these sectors. Imported feedstock and intermediate materials would be

subject to OSH standards in the country of origin, but should at a minimum harmonize with ILO conventions. In addition to safety and health in the workplace, this criterion includes external impacts of biofuel production on public health, which would be covered by provisions of EPCRA. In addition, federal agency users should consider whether large-scale procurement actions or grants include the potential for environmental justice considerations.¹⁵

Participation

As an aspect of corporate social responsibility, good business practices, or community membership, biofuel feedstock and production operations benefit from appropriate levels of public outreach and participation. In particular with new businesses and technologies, operators with proactive transparency and community engagement can build a foundation and constructive dialog with employees and the broader community. If a federal grant or financial support is involved, NEPA may require official and procedural hearings regarding a planned facility or operation.

Management

This is a core topic of leadership that is ubiquitous across all three pillars of sustainability. The first element is ensuring initial and continued compliance with all applicable financial, environmental, safety, health, and participation laws and regulations. The second is the setup and maintenance of internal management systems, such as ISO 9001–modeled quality management systems or ISO 14001–modeled environmental management systems (EMS). The third is the management of the biofuel production supply chain that ensures product chain of custody and ongoing certification of the biofuel products being purchased.

KEY SUSTAINABILITY INDICATORS OF PROTECTIVE PERFORMANCE

Each of the above criteria provides a context and focus area for sustainability performance. However, indicators of protective performance are needed to more precisely address the various aspects/impacts, framing them in a practical manner that reduces supply chain hazards, drives a higher-level sustainability performance through continual improvement, and provides sufficient detail to evaluate and ensure this performance. Table 1 presents all 15 criteria areas, their requisite indicators, and brief notes on how certification standards and systems may evaluate them.

Table 1. Key Sustainability Indicators of Protective Performance		
Criterion/Indicator	Protective Performance	Evaluation
Viability		
Financial Viability	<ul style="list-style-type: none"> Strategic business plan (3-5 year) is required that includes full supply chain cost model elements. 	<ul style="list-style-type: none"> Business plan is required and available for review with confidential business information (CBI) provisions.
Management		
Compliance with Financial Laws and Regulations	<ul style="list-style-type: none"> Financial and tax regulation compliance review processes are developed (and maintained), or an annual statement of compliance is issued. 	<ul style="list-style-type: none"> Legal and regulatory compliance review process, annual corporate compliance statement, or equivalent alternative is required.
Air		
Air Quality	<ul style="list-style-type: none"> Production operations air emissions (criteria pollutants and air toxins) are evaluated. Producer develops and maintains air management plan to minimize emissions. If no permit or annual air reporting is required, there should be an internal evaluation of annual air emissions that is incorporated into the plan. For imported feedstock or fuels, producer provides evidence of air quality compliance (if applicable), management plan, and product air emission factor(s). 	<ul style="list-style-type: none"> Compliance with air permitting and reporting requirements, if applicable, is demonstrated. Air emissions management plan is available. Evidence of origin nation compliance or air management plan, as applicable.
GHG Emissions	<ul style="list-style-type: none"> Biofuel pathway qualifies as an RFS2-defined advanced biomass-based or cellulosic fuel, including "significant indirect emissions" (i.e., EPA-calculated consequential "land use change" emissions). Producer/blender prepares and provides a third-party-audited life cycle GHG inventory (including calculated indirect emission estimates, when available) after the start of production. 	<ul style="list-style-type: none"> EPA RFS2 program life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). Producer/blender life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ).
Water		
Water Quality	<ul style="list-style-type: none"> U.S. producer evaluates operations and develops water management plan to maintain water quality, including CWA compliance evaluations or equivalent. Producer demonstrates the use of nutrient management, erosion control, and effluent treatment best practices to avoid water contamination, as applicable. For imported feedstocks or fuels, producer is able to provide evidence of water law compliance and management plans, as applicable. 	<ul style="list-style-type: none"> Compliance with CWA and permitted discharges (TOC= Total Organic Carbon; P= Phosphorous; N= Nitrate), if applicable, is demonstrated. Water management plan is available.¹⁶ Present evidence of BMP use. Evidence of origin nation water program compliance and water management plan, as applicable.

Table 1. Key Sustainability Indicators of Protective Performance

Criterion/Indicator	Protective Performance	Evaluation
Water Quantity	<ul style="list-style-type: none"> • Producer water management plan includes water quantity demand and local supply estimates. • Producer is water neutral or positive. If water negative, producer’s needs are met though renewable water consumption (not pumped [or mined] groundwater). • Producer demonstrates sufficient water rights or purchased capacity to meet estimated demand. If purchased, these should not be disproportionate or a burden on local community. 	<ul style="list-style-type: none"> • Water management plan includes quantity and is available. • Water demand of renewable water (L/MJ). • Water demand of nonrenewable water (L/MJ). • Provision to evidence water rights or equivalent alternative is available.
Soil		
Soil Health	<ul style="list-style-type: none"> • Feedstock producer soil management plan includes provisions to reduce or eliminate erosion, enhance soil quality, and monitor health. • Feedstock producer demonstrates the use of soil erosion control and building best practices, as applicable. 	<ul style="list-style-type: none"> • Soil assessments are conducted and management plan is developed and maintained. • Evidence of soil BMP use is available.
Productivity		
Nutrient Requirements/ Fertilizer Use	<ul style="list-style-type: none"> • Feedstock producer assesses and monitors nutrient levels to optimize nutrient management and reduce loss off-site to air and water. 	<ul style="list-style-type: none"> • Soil and nutrient management plan or equivalent alternative.
Pesticides/Herbicide Use/Management Practices	<ul style="list-style-type: none"> • Feedstock producer adopts practices that minimize pesticide and herbicide use. • Feedstock producer and workers are trained and licensed in pesticide application. 	<ul style="list-style-type: none"> • Pest control and chemical management plan(s) or equivalent alternatives are available.
Sustainable Harvest Rates/Biomass Yield	<ul style="list-style-type: none"> • Feedstock producer rate of production is not higher than sustainable yield applicable for local conditions. 	<ul style="list-style-type: none"> • Actual yield (MT/ha): Sustainable yield (MT/ha) < 1 or equivalent assessments are available.
Land Use		
Land Use - Direct	<ul style="list-style-type: none"> • Feedstock producer operations do not divert productive cropland or require the conversion of critical habitat for threatened, endangered, or vulnerable species; native grasslands and forests; and federal or protected lands. • Feedstock producer maximizes productivity and minimizes land use within the constraints of sustainable yields. 	<ul style="list-style-type: none"> • Product/land use (MT/ha or MJ/ha) factor or equivalent assessments are available. • Evidence of prior and current land cover type.
Biodiversity		
Endangered, Threatened and Vulnerable Species	<ul style="list-style-type: none"> • Prior to converting feedstock cultivation lands and/ or biofuel production facilities, proposed areas are surveyed for endangered or threatened species listed under the Endangered Species Act (ESA) or relevant state law, and vulnerable species identified by state natural heritage programs. Areas identified are managed to protect and enhance habitat values for these species. • For imported feedstocks, producer provides evidence that cultivation lands have been surveyed for species listed as endangered, threatened, and vulnerable under the United Nations Convention on Biological Diversity. Areas identified are managed to protect and enhance habitat values for these species. 	<ul style="list-style-type: none"> • Mechanism for determining the presence/ absence of species listed as endangered, threatened, or vulnerable under the ESA, state law, and Natural Heritage programs. • Mechanism for determining the presence or absence of species listed as endangered, threatened, or vulnerable on the International Union for Conservation of Nature Red List and/or state Natural Heritage programs. • Conservation plan is made available and includes the identification of these species/habitats, and plans for their protection and enhancement.
Native Habitat/ Ecosystem Health Preservation	<ul style="list-style-type: none"> • Producer protects native habitat from conversion. • Producer develops conservation plans that include best practices to maintain and restore ecosystem services. 	<ul style="list-style-type: none"> • Conservation plan is made available and includes ecosystem service restoration.

Table 1. Key Sustainability Indicators of Protective Performance

Criterion/Indicator	Protective Performance	Evaluation
Invasive Species	<ul style="list-style-type: none"> • Feedstock producer does not introduce or cultivate cultivars identified by knowledgeable authorities as a high or potential invasive risk. • Feedstock producer conservation and management plans include invasive species management and mitigation safeguards. 	<ul style="list-style-type: none"> • Conservation/management plans are available and include invasive species management and mitigation.
Genetically Modified Organisms	<ul style="list-style-type: none"> • GMO crop cultivars are not introduced until cultivation and management practices are approved and released by USDA or origin country’s appropriate agricultural authorities. • GMO plant cultivars are handled conservatively and for potentially invasive and cross-hybridization risks. 	<ul style="list-style-type: none"> • Cultivation and management practices are available. • Management plan is available and includes protocols for GMO monitoring and control.
Waste		
Minimization, Reuse, and Recycle	<ul style="list-style-type: none"> • Producer develops and maintains material efficiency plan and “zero waste” goals. • Producer generates only primary and coproducts. 	<ul style="list-style-type: none"> • Material efficiency plan is available. • Primary product %: co-product % ratio > 1 or equivalent assessments are available.
Hazardous Waste	<ul style="list-style-type: none"> • Producer monitors production of all hazardous wastes and adheres to all applicable regulations, such as RCRA and EPCRA. • Producer demonstrates progress on green chemistry or process improvement to minimize or eliminate waste. 	<ul style="list-style-type: none"> • Evidence of hazardous material and waste compliance is demonstrated.
Management		
Compliance with Environmental Laws	<ul style="list-style-type: none"> • Comprehensive compliance review process is developed (and maintained) as part of the producer Environmental Management System (EMS). • Producer issues and publishes an annual statement of compliance. 	<ul style="list-style-type: none"> • Regulatory compliance review process or equivalent alternative is required. • Annual corporate compliance statement is required.
Planning, Monitoring and Continual Improvement (e.g., ISO 14001)	<ul style="list-style-type: none"> • Producer develops, maintains, and uses an EMS based on industry standards, such as ISO 14001. 	<ul style="list-style-type: none"> • EMS documentation or equivalent alternative (based on the scale of the operation) is available.
Supply Chain Management, COC, and Product Certification	<ul style="list-style-type: none"> • Producers/blenders develop, maintain, and fund a robust supply chain management system and chain-of-custody (COC) program to track product from the field through use. • Producer/blender contractually requires COC and the relevant data requirements so as to support life cycle analysis. • Producer/blender of biofuel product is third-party certified. 	<ul style="list-style-type: none"> • Supply chain and COC program documentation is available. • Product certification is achieved and maintained.
Food Security		
Food Security	<ul style="list-style-type: none"> • Producer does not use human-consumption-grade food feedstocks. • Producer performs initial food security impacts screening in local community and makes annual updates. • For imported feedstock or fuels, producer provides a copy of food security impact screening and participation provisions, if applicable. 	<ul style="list-style-type: none"> • Food security screening is available. • If screening indicates need, a food security assessment is performed and available.
Human Rights		

Table 1. Key Sustainability Indicators of Protective Performance

Criterion/Indicator	Protective Performance	Evaluation
Equity/Gender Rights	<ul style="list-style-type: none"> • U.S. producers have an equal opportunity policy compliant with the Civil Rights Act of 1964. • For imported feedstock or fuels, producer provides evidence of compliance with national laws or, in their absence, voluntary conformance with ILO convention norms regarding discrimination. • For imported feedstock or fuels, producer demonstrates use of similar flow-down requirements in supplier subcontracts. 	<ul style="list-style-type: none"> • Equal opportunity policy or equivalent alternative is available. • Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.
Labor Rights/Fair Wage	<ul style="list-style-type: none"> • U.S. producers have worker rights and fair labor standards compliant with provisions of Fair Labor Standards Act (FLSA) of 1938 (as amended) and state-level labor laws. • For imported feedstock or fuels, producer provides evidence of compliance with national laws or, in their absence, voluntary conformance with ILO convention norms regarding forced labor, child labor, freedom of association, and fair wage. • For imported feedstock or fuels, producer demonstrates use of similar flow-down requirements in supplier subcontracts. 	<ul style="list-style-type: none"> • Worker rights and fair labor policies or equivalent alternatives are publicly available. • Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.
Land Tenure/Property Rights	<ul style="list-style-type: none"> • U.S. producers include compliance with state property laws in annual corporate compliance statement. • For imported feedstock or fuels, producer provides evidence of compliance with national law on property rights and indigenous land rights. • If imported feedstock or fuels, producer documents screening for informal or cultural access rights of indigenous people, if applicable. 	<ul style="list-style-type: none"> • Annual corporate compliance statement or equivalent alternative includes property rights and is available. • Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. • Indigenous land rights screening is available, if applicable.
Safety and Health		
Occupational Safety and Health	<ul style="list-style-type: none"> • U.S. producers include OSH compliance in annual corporate compliance statement. • U.S. producers demonstrate commitment to worker safety and health risk reduction. • For imported feedstock or fuels, producer provides evidence of compliance and commitment to worker safety and health. 	<ul style="list-style-type: none"> • Annual corporate compliance statement or equivalent alternative includes OSH and is available. • OSH policy and training program or Voluntary Protection Program documentation is available. • Evidence of origin nation legal OSH compliance or voluntary OSH policy and training and PPE availability, as applicable.
Public Health/ Environmental Justice	<ul style="list-style-type: none"> • U.S. producers include EPCRA compliance in annual corporate compliance statement. If EPCRA reporter, producer demonstrates screening for disproportionate environmental burdens. • For imported feedstock or fuels, producer provides evidence of legal air quality, water quality, and toxics compliance. • For imported feedstock or fuels, producer provides evidence of screening for disproportionate environmental burdens. 	<ul style="list-style-type: none"> • Annual corporate compliance statement or equivalent alternative includes EPCRA and is available. • Environmental justice screening is available and integrated with internal EMS, as applicable. • Evidence of origin nation legal air quality, water quality, and toxics regulatory compliance is available, as applicable. • Evidence of origin nation environmental burden screening is available and integrated with internal EMS.
Participation		
Public Outreach/ Stakeholder Participation	<ul style="list-style-type: none"> • U.S. producers issue a public corporate social and environmental responsibility (CSER) report annually. If subject to NEPA, producer demonstrates compliance with public meeting requirements, as appropriate. • For imported feedstock or fuels, producer provides evidence of local community stakeholder engagement program and similar supplier subcontract requirements. 	<ul style="list-style-type: none"> • CSER report or equivalent alternative is available. • Annual corporate compliance statement or equivalent alternative includes NEPA, if applicable, and is available. • Evidence of origin nation public notification or access program is available or documented in CSER.

Table 1. Key Sustainability Indicators of Protective Performance

Criterion/Indicator	Protective Performance	Evaluation
Transparency	<ul style="list-style-type: none"> • U.S. producers ensure public access, appropriate to location, to all compliance statements, business plan, and public summaries of certification process documentation, where not CBI. • For imported feedstock or fuels, producer provides evidence of public access, appropriate to location, to all compliance statements, business plan, and certification process documentation, where not CBI. This should include similar supplier subcontract requirements. 	<ul style="list-style-type: none"> • Annual corporate compliance statement, business plan, certification documentation, or equivalent alternatives are available. • Evidence of origin nation public notification or access program is available or documented in CSER.
Management		
Compliance with Safety, Health, and Participation Laws	<ul style="list-style-type: none"> • U.S. producers include OSH (and, if applicable, NEPA) compliance in annual corporate compliance statement. • Producers include their transparency and public access policies in their CSER report or public website. 	<ul style="list-style-type: none"> • Annual corporate compliance statement or equivalent alternative includes OSH (and, if applicable, NEPA) provisions and is available. • Annual CSER or company website includes transparency and public access provisions.

KEY ATTRIBUTES OF CREDIBLE STANDARDS AND SYSTEMS

What makes a certification standard and system credible? We synthesized six key attributes based on best practice principles and used them to guide our evaluation of existing feedstock production and biofuel certification systems. In doing so, we drew heavily from broader international codes of good practice, such as the ISEAL Credibility Principles, 0.1 Public Draft, the Code of Good Practice, Setting Social and Environmental Standards, v5.0, and the Code of Good Practice, Assuring Compliance with Social and Environment Standards, v1.0.^{17,18,19} We also drew from applicable topic-specific protocol principles, such as the World Resource Institute (WRI)/World Business Council for Sustainable Development (WBCSD), GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard and the Product Life Cycle Accounting and Reporting Standard.^{20,21} These attributes were developed in this manner to reflect our first attribute, consistency. But this will need to be revisited annually as bioenergy sustainability standards are rapidly evolving, including the anticipated 2014 release of the ISO 13065, Sustainability Criteria for Bioenergy.

Standards are requisite foundations but do not alone make for a credible certification system, particularly one that will be useful for our intended decision-making audiences. These guidelines focus on how certification standards and systems reflect these key attributes and also how they demonstrate excellence in market-ready implementation mechanisms to assure and oversee conformance. Certification systems incorporating these key attributes and assurance practices, such as those found in the ISEAL Assurance Code, can achieve broader conformity and acceptance by international and national accreditation bodies, such as the International Accreditation Forum (IAF), Accreditation Services International (ASI), and American National Standards Institute–American Society of Quality National Accreditation Board (ANAB).

Given the anticipated evolution of biofuel sustainability standards in the near future, these guidelines describe six key attributes of credible standards and systems that reflect the core principles compiled in this context. Credible standards and systems should be:

- Consistent
- Balanced and Consensus Driven
- Transparent
- Objective and Traceable
- Assured and Accredited
- Relevant

These key certification standard and system attributes are elaborated below but are likewise complemented and reinforced by the ISEAL Credibility Principles.

CONSISTENT

Robust standards are structured to be consistent with consensus-based international standards and codes for assuring conformance and certification. The structure of the standard-setting process should parallel and comply with existing international norms, such as those developed by ISO and ISEAL. Certification standards should provide indicators and evaluative methodologies representative of good practice, accessibility, and interoperability.

BALANCED AND CONSENSUS DRIVEN

The certification standard includes a comprehensive and balanced consideration of economic, social, and environmental factors. The standard-setting process is participatory and consensus driven; convenes representative groups of economic, environmental, and social stakeholders in both formal and informal manners; and creates a representative steering committee, technical working group(s), and advisory group(s). Recommended standards should be provided for broad stakeholder review and consensus (but not necessarily unanimity). These inclusive efforts should be continued with the relevant stakeholders during the later development of verification mechanisms and the evolution of the certification system and its protocols.

TRANSPARENT

A credible certification standard must have clear, accessible, and transparent processes. The standards-development process should include stakeholder engagement and public comment mechanisms. Approved summaries, standards, and protocols should be made available in the public domain. Documentation should include and present all relevant issues, data sources, assumptions, and references in a technically correct and accessible manner.

OBJECTIVE AND TRACEABLE

Guidelines should be science based, provide clear targets to reach, and support demonstrable means of evaluation. The targets must conform with national laws and be linked with economic, environmental, and social performance. These requirements should identify principles, criteria, indicators, and evaluation benchmarks or outputs. Conformance with existing standards and demonstrable chain of custody needs to be verifiable by independent third parties.

ASSURED AND ACCREDITED

Credible certification systems should not only demonstrate the aforementioned key attributes but have oversight mechanisms to assure knowledgeable and rigorous compliance of national interpretations and of audit providers in the field. Both Accreditation and Assurance are key attributes that establish trust in the certification standard and the system overseeing its application. An accreditation body carries out independent checks on auditing firms ensuring an auditing firm's performance is consistent and competent. ISEAL's Assurance Code provides guidance for high quality assurance that supports sustainability and improves the effectiveness of different verification and certification models. Certification bodies should demonstrate conformity by achieving ISEAL full membership and international accreditation within the scope of the relevant standard.²²

RELEVANT

Reflecting the primary purpose of these guidelines, applicable biofuel sustainability certification standards and systems should clearly communicate what is evaluated and directly serve the decision-making needs of the intended audience, namely procurement officers; contract or grant specialists; and sustainability, responsibility, and risk management officers. In short, they should provide credible verification and clearly add value in serving these users' supply chain risk needs.

STANDARDS REVIEW AND EVALUATION

To best serve the intended audiences of this guidance, we've taken the next step of reviewing several existing biomass and biofuel standards, both native to the United States and applicable globally.²³ The certification standards reviewed include:

- Roundtable on Sustainable Biomaterials (RSB), Principles and Criteria for Sustainable Biofuel Production, Global Standard, RSB-STD-01-001, Version 1.0, May 11, 2010
- Council on Sustainable Biomass Production (CSBP), Standard for Sustainable Production of Agricultural Biomass, Version 1.0, June 6, 2012²⁴
- International Sustainability and Carbon Certification (ISCC), ISCC 202 Sustainability Requirements for the Production of Biomass, ISCC 11-03-15, V 2.3-EU, March 15, 2011
- Roundtable on Sustainable Palm Oil (RSPO), Principles and Criteria for Sustainable Palm Oil Production, October 2007
- Roundtable on Responsible Soy (RTRS), Standard for Responsible Soy Production, Version 1.0 (RTRS Standard)
- Bonsucro Production Standard, Including Bonsucro EU Production Standard, Version 3.0, March 2011
- Forest Stewardship Council (FSC), International Standard, FSC Principles and Criteria for Forest Stewardship, FSC-STD-01-001, Version 5-0

Our approach for evaluating these certification standards and systems was twofold. First, each certification standard and system was evaluated against the six key attributes. Second, each standard was reviewed in detail and evaluated on the basis of its topical coverage of each performance indicator described in Table 1. We then examined and evaluated each standard, its principles, and its criteria against our performance indicators. Table 2 summarizes the results of this two-step evaluation and rates each standard for each key attribute and indicator using the following legend:

- ⊗ Not Addressed/Insufficient
- ⊖ Topic Covered, but Weak Provisions
- ☑ Sufficiently Addressed

Detailed review and evaluation materials citing each standard's relevant provisions are included in Appendix B.

Table 2. Standards Evaluation Results Summary

	RSB	CSBP	ISCC	RSPO	RTRS ²⁵	Bonsucro	FSC
Life Cycle Focus*	1-3	1	1	1-2	1	1-2	1
Key Attributes							
Consistent	✓	✓	⊖	✓	✓	✓	✓
Balanced and Consensus Driven	✓	⊖	✓	✓	✓	✓	✓
Transparent	✓	✓	⊖	✓	✓	✓	✓
Objective and Traceable	✓	✓	✓	✓	✓	✓	✓
Assured and Accredited	✓	⊗	⊗	⊖	⊗	⊖	✓
Relevant	✓	✓	⊖	✓	✓	✓	✓
Economic Pillar							
Financial Viability	✓	⊗	⊗	✓	⊗	⊖	✓
Compliance with Financial Laws and Regulations	✓	✓	⊖	✓	✓	✓	✓
Environmental Pillar							
Air Quality	✓	✓	⊖	✓	⊗	✓	✓
GHG Emissions	✓	⊖	⊖	⊖	⊖	⊖	⊖
Water Quality	✓	✓	⊖	✓	⊖	✓	✓
Water Quantity	✓	✓	⊖	✓	⊖	✓	✓
Soil Health	✓	✓	✓	✓	✓	✓	✓
Nutrient Requirements /Fertilizer Use	✓	✓	✓	✓	✓	✓	✓
Pesticides/Herbicide Use and Management Practices	✓	✓	✓	✓	✓	✓	✓
Sustainable Harvest Rates/Biomass Yield	⊖	✓	⊖	✓	⊖	✓	✓
Land Use—Direct	✓	✓	⊖	✓	✓	✓	✓
Endangered, Threatened, and Vulnerable Species	✓	✓	⊖	✓	✓	✓	✓
Native Habitat /Ecosystem Health Preservation	✓	✓	⊖	✓	✓	✓	✓
Invasive Species	✓	✓	⊗	✓	✓	✓	✓
Genetically Modified Organisms	✓	⊖	⊗	⊖	✓	⊖	✓
Minimization, Reuse, and Recycling	✓	⊖	⊖	✓	✓	✓	✓
Hazardous Waste	✓	✓	⊖	✓	✓	✓	✓
Compliance with Environmental Laws	✓	✓	⊖	✓	✓	✓	✓
Planning, Monitoring, and Continual Improvement	✓	✓	⊗	✓	✓	✓	✓
Supply Chain Management, COC, and Product Certification	✓	✓	✓	✓	✓	✓	✓
Social Pillar							
Food Security	✓	⊗	⊖	⊖	⊖	⊗	⊗
Equity/Gender Rights	✓	✓	✓	✓	✓	✓	✓
Labor Rights/Fair Wage	✓	✓	✓	✓	✓	✓	✓
Land Tenure/Property Rights	✓	✓	✓	✓	✓	✓	✓
Occupational Safety and Health	✓	✓	✓	✓	✓	✓	✓
Public Health /Environmental Justice	✓	✓	⊗	✓	✓	✓	✓
Public Outreach/ Stakeholder Participation	✓	✓	⊖	✓	✓	✓	✓
Transparency	✓	✓	⊖	✓	✓	✓	✓
Compliance with Safety, Health, and Participation Laws	✓	✓	⊖	✓	✓	✓	✓
⊗ Not Addressed/Insufficient ⊖ Topic Covered, but Weak Provisions ✓ Sufficiently Addressed							

* The The numbers in this row represent the different stages of the biofuel product life cycle. Stage 1 represents feedstock production and collection. Stage 2 signifies feedstock processing and transport. Stage 3 represents fuel production. Stage 4 represents product transport and refueling.

These evaluation findings are intended to aid procurement officers, contract or grant specialists, and sustainability, responsibility, and risk management officers in their efforts to thoughtfully include sustainability considerations in biofuel

investment and procurement decisions. Product certification granted on the basis of the standards and systems evaluated can potentially provide a defensible basis and input for use in best value decision making.

APPENDIX A: REFERENCES AND RESOURCES

Bonsucro Production Standard, Including Bonsucro EU Production Standard, Version 3.0, March 2011, www.bonsucro.com/assets/Bonsucro_Production_Standard_March_2011_3.pdf.

CSBP, Standard for Sustainable Production of Agricultural Biomass, Version 1.0, June 6, 2012, www.csbp.org/Portals/0/Documents/CSBP%20Standard%20For%20Sustainable%20Production%20of%20Agricultural%20Biomass%2006122012_1.pdf.

Forest Stewardship Council (FSC), International Standard, FSC Principles and Criteria for Forest Stewardship, FSC-STD-01-001, Version 5-0, <https://ic.fsc.org/download.fsc-std-01-001-v5-0-revised-principles-and-criteria-for-forest-stewardship.a-1780.pdf>.

ISCC, ISCC 201 System Basics for the Certification of Sustainable Biomass and Bioenergy, ISCC 11-03-15, V 2.3-EU, www.iscc-system.org/en/certification-process/certification/basics/.

ISCC, ISCC 202 Sustainability Requirements for the Production of Biomass, ISCC 11-03-15, V 2.3-EU, March 15, 2011, www.iscc-system.org/en/certification-process/certification/basics/.

RSB, Principles and Criteria for Sustainable Biofuel Production, Global Standard, RSB-STD-01-001, Version 1.0, May 11, 2010, rsb.epfl.ch/files/content/sites/rsb2/files/Biofuels/Version%20PCs%20V2/11-03-08%20RSB%20PCs%20Version%20.pdf.

RSB, RSB Guidance on Principles and Criteria for Sustainable Biofuel Production, Global Standard, RSB-GUI-01-000, Version 2.0, May 11, 2010, rsb.epfl.ch/files/content/sites/rsb2/files/Biofuels/Version%20Guidance%20V2/10-11-12%20RSB%20Guidance%20for%20PCs%20Version%20.pdf.

RSB, Indicators of Compliance for the RSB Principles and Criteria, RSB-IND-01-001, Version 2.0, January 20, 2010, rsb.epfl.ch/files/content/sites/rsb2/files/Biofuels/Version%20Indicators/11-03-08%20RSB%20Indicators%20-0.pdf.

RSPO, Principles and Criteria for Sustainable Palm Oil Production, October 2007, www.rspo.org/sites/default/files/RSPO%20Principles%20and%20Criteria.pdf.

RTRS, Standard for Responsible Soy Production, Version 1.0 (RTRS Standard), www.responsiblesoy.org/index.php?option=com_docman&task=doc_download&gid=290&Itemid=19&lang=en.

APPENDIX B: EVALUATION MATERIALS

As introduced previously, our evaluation approach consists of reviewing standards, systems, and supplemental guidance documents where available. After a detailed review of publicly available materials on each standard and existing certification system, we apply the performance criteria, indicators, and evaluation guidelines elaborated in Table 1. To do so effectively and consistently, we developed and used the Standard Review and Evaluation Worksheet reproduced in Table B-1. The first section of this worksheet captures introductory information on the certification standard evaluated, document(s) reviewed, and how the standard and its certification system reflect our six key attributes. The worksheet's second section provides a step-by-step structure to consistently perform an evaluation of a standard against the biofuel sustainability guidelines and its established pillars, indicators, and performance evaluation (Table 1). The worksheet includes elements that are used during the detailed evaluation of the following:

Pillar/Indicator

Identifies the guideline's pillar and performance indicator being evaluated.

Covered?

Cites the standard's principle(s) (and in some cases criteria) found to have applicability to the specified performance indicator.

Life Cycle Stage(s)?

Identifies the standard's applicable parties and their life cycle stage applicability, such as feedstock producer covering stage 1.

Provision, Process, or Mechanism?

Cites the standard's identified criteria, guidance, procedures, verification mechanisms, etc. found applicable to and meeting one or more of the protective performance evaluation requirements.

Protective Performance Evaluation Met?

Using the cited provisions, processes, or mechanisms in the previous column, applicable protective performance evaluation elements are reviewed and classified as:

- ✓ met (sufficient provisions, processes, or mechanisms to ensure protection)
- not met (or insufficient to ensure protection)

Sufficiently Protective?

These results provide the basis for rating the standard's performance with each indicator.

We applied the following ratings:

- ⊗ Not Addressed/Insufficient (attribute not aligned or topic not mentioned)
- ⊖ Topic Covered, but Weak Provisions (evaluation element[s] not met)
- ☑ Sufficiently Addressed (indicator covered and all evaluation elements met)

The detailed review and evaluation worksheet for each standard is provided in Tables B-2 through B-8. These evaluation worksheets were used to prepare the summary evaluation results presented in Table 2.

Table B-1. Standard Review and Evaluation Worksheet

Standard Review and Evaluation Worksheet		
Key Attributes	Evaluation	Sufficiently Aligned?
Consistent		
Balanced and Consensus Driven		
Transparent		
Objective and Traceable		
Assured and Accredited		
Relevant		

Table B-1. Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Economic Pillar					
Financial Viability				<ul style="list-style-type: none"> <input type="radio"/> Business plan is required and available for review with CBI provisions. 	
Compliance with Financial Laws and Regulations				<ul style="list-style-type: none"> <input type="radio"/> Legal and regulatory compliance review process, annual corporate compliance statement, or equivalent alternative is required. 	
Environmental Pillar					
Air Quality				<ul style="list-style-type: none"> <input type="radio"/> Compliance with air permitting and reporting requirements, if applicable, is demonstrated. <input type="radio"/> Air emissions management plan is available. <input type="radio"/> Evidence of origin nation compliance or air management plan, as applicable. 	
GHG Emissions				<ul style="list-style-type: none"> <input type="radio"/> EPA RFS2 program life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). <input type="radio"/> Producer/blender life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). 	
Water Quality				<ul style="list-style-type: none"> <input type="radio"/> Compliance with CWA and permitted discharges (N, P, or TOC), if applicable, is demonstrated. <input type="radio"/> Water management plan is available. <input type="radio"/> Present evidence of BMP use. <input type="radio"/> Evidence of origin nation water program compliance and water management plan, as applicable. 	
Water Quantity				<ul style="list-style-type: none"> <input type="radio"/> Water management plan includes quantity and is available. <input type="radio"/> Water demand of renewable water (L/MJ) <input type="radio"/> Water demand of nonrenewable water (L/MJ) <input type="radio"/> Provision to evidence water rights or equivalent alternative is available. 	
Soil Health				<ul style="list-style-type: none"> <input type="radio"/> Soil assessments are conducted and management plan is developed and maintained. <input type="radio"/> Evidence of soil BMP use is available. 	

Table B-1. Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Nutrient Requirements/ Fertilizer Use				<input type="radio"/> Soil and nutrient management plan or equivalent alternative.	
Pesticides/Herbicide Use/ Management Practices				<input type="radio"/> Pest control and chemical management plan(s) or <input type="radio"/> equivalent alternatives are available.	
Sustainable Harvest Rates/Biomass Yield				<input type="radio"/> Actual yield (MT/ha): Sustainable yield (MT/ha) < 1 or <input type="radio"/> equivalent assessments are available.	
Land Use				<input type="radio"/> Product/land use (MT/ha or MJ/ha) factor or <input type="radio"/> equivalent assessments are available. <input type="radio"/> Evidence of prior and current land cover type.	
Endangered, Threatened, and Vulnerable Species				<input type="radio"/> Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable under the ESA, state law, and natural heritage programs. <input type="radio"/> Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable on the International Union for Conservation of Nature Red List and/or state Natural Heritage Program. <input type="radio"/> Conservation plan is made available and includes the identification of these species/habitats, and plans for their protection and enhancement.	
Native Habitat /Ecosystem Health Preservation				<input type="radio"/> Conservation plan is made available and includes ecosystem service restoration.	
Invasive Species				<input type="radio"/> Conservation/management plans are available and include invasive species management and mitigation.	
Genetically Modified Organisms				<input type="radio"/> Cultivation and management practices are available. <input type="radio"/> Management plan is available and includes protocols for GMO monitoring and control.	
Minimization, Reuse, and Recycling				<input type="radio"/> Material efficiency plan is available. <input type="radio"/> Primary product %: coproduct % ratio > 1 or <input type="radio"/> equivalent assessments are available.	
Hazardous Waste				<input type="radio"/> Evidence of hazardous material and waste compliance is demonstrated.	
Compliance with Environmental Laws				<input type="radio"/> Regulatory compliance review process or <input type="radio"/> equivalent alternative is required. <input type="radio"/> Annual corporate compliance statement is required.	
Planning, Monitoring, and Continual Improvement				<input type="radio"/> EMS documentation or <input type="radio"/> equivalent alternative (based on the scale of the operation) is available.	
Supply Chain Management, COC, and Product Certification				<input type="radio"/> Supply chain and COC program documentation is available. <input type="radio"/> Product certification is achieved and maintained.	
Social Pillar					
Food Security				<input type="radio"/> Food security screening is available. <input type="radio"/> If screening indicates need, a food security assessment is performed and available.	
Equity/ Gender Rights				<input type="radio"/> Equal opportunity policy or equivalent alternative is available. <input type="radio"/> Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.	

Table B-1. Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Labor Rights/ Fair Wage				<ul style="list-style-type: none"> <input type="radio"/> Worker rights and fair labor policies or equivalent alternatives are publicly available. <input type="radio"/> Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. 	
Land Tenure/ Property Rights				<ul style="list-style-type: none"> <input type="radio"/> Annual corporate compliance statement or equivalent alternative includes property rights and is available. <input type="radio"/> Evidence of origin nation legal compliance or <input type="radio"/> voluntary ILO convention conformance, as applicable. <input type="radio"/> Indigenous land rights screening is available, if applicable. 	
Occupational Safety and Health				<ul style="list-style-type: none"> <input type="radio"/> Annual corporate compliance statement or equivalent alternative includes OSH and is available. <input type="radio"/> OSH policy and training program or Voluntary Protection Program documentation is available. <input type="radio"/> Evidence of origin nation legal OSH compliance or voluntary OSH policy and training and PPE availability, as applicable. 	
Public Health / Environmental Justice				<ul style="list-style-type: none"> <input type="radio"/> Annual corporate compliance statement includes EPCRA or <input type="radio"/> equivalent alternative is available <input type="radio"/> Environmental justice screening is available and integrated with internal EMS, as applicable. <input type="radio"/> Evidence of origin nation legal air quality, water quality, and toxics regulatory compliance is available, as applicable. <input type="radio"/> Evidence of origin nation environmental burden screening is available and integrated with internal EMS. 	
Public Outreach/ Stakeholder Participation				<ul style="list-style-type: none"> <input type="radio"/> Annual corporate compliance statement or <input type="radio"/> equivalent alternative includes NEPA, if applicable, and is available. <input type="radio"/> CSER report or <input type="radio"/> equivalent alternative is available. <input type="radio"/> Evidence of origin nation public notification or access program is available or documented in CSER. 	
Transparency				<ul style="list-style-type: none"> <input type="radio"/> Annual corporate compliance statement or <input type="radio"/> Business plan, certification documentation, and equivalent alternatives are available. <input type="radio"/> Evidence of origin nation public notification or access program is available or documented in CSER. 	
Compliance with Safety, Health, and Participation Laws				<ul style="list-style-type: none"> <input type="radio"/> Annual corporate compliance statement or <input type="radio"/> equivalent alternatives include OSH (and, if applicable, NEPA) provisions and is available. <input type="radio"/> Annual CSER or company website includes transparency and public access provisions. 	
<p> <input checked="" type="checkbox"/> Not Addressed/Insufficient <input type="checkbox"/> Topic Covered, but Weak Provisions <input checked="" type="checkbox"/> Sufficiently Addressed </p>					

Table B-2. RSB Review and Evaluation Worksheet

Roundtable for Sustainable Biomaterials (RSB) Review and Evaluation Worksheet

RSB, Principles and Criteria for Sustainable Biofuel Production, Version 2.0

Key Attributes	Evaluation	Sufficiently Aligned?
Consistent	RSB structures, processes, and mechanisms build on and align well with ISO guidelines and ISEAL code. RSB is a Full Member of ISEAL. Furthermore, the consideration of World Trade Organization (WTO) agreements demonstrates good effort to maintain consistency with international law and norms and will allow sufficient flexibility to adapt to host nation laws, policies, and processes. The reviewers did, however, note reliance on branded guidelines, management systems, and analysis tools.	☑
Balanced and Consensus Driven	RSB Steering Board and member-oriented governance structures reflect a variety of stakeholders and interests that strive to balance considerations and move toward consensus. The principles and criteria addressed do cover the broad pillars of sustainability and largely all of these guidelines, criteria, and indicators. The RSB standard's introduction asserts consistency with the ISEAL Code of Good Practice and suggests continued activities toward addressing more contentious challenges, such as indirect land use.	☑
Transparent	RSB governance, standards, and technical procedures appear to be readily accessible to the public via its web portal. A good level of transparency is demonstrated for the broader public without a loss of technical rigor. Additional RSB guidance and procedural documents are accessible and used to direct users to clear activities to satisfy the criterion.	☑
Objective and Traceable	RSB principles and criteria are clearly written to frame areas of focus, providing guidelines for processes and mechanisms to demonstrate conformance. This comprehensive biofuel standard will benefit from additional quantitative provisions as the relevant science and industry mature. The principles and criterion clearly identify applicable parties and provide sufficient provisions to promote traceability throughout the supply chain.	☑
Assured and Accredited	RSB is a Full Member of ISEAL and, as such, is shown to be compliant with ISEAL Standards-Setting Code and Impact Code.	☑
Relevant	The RSB standard and certification process clearly defines the intended audiences and is highly relevant to the user of these guidelines. Adaptation of this global standard and certification system to the U.S. or North American context, regulations, and laws will enhance its relevance to the intended users of these guidelines.	☑

Table B-2. RSB Review and Evaluation Worksheet

Pillar/ Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Economic Pillar					
Financial Viability	Principle 2, Criterion 2c	1-3	Business Plan (with CBI Protections)	✓ Business plan is required and available for review with CBI provisions.	✓
Compliance with Financial Laws and Regulations	Principle 1, Criterion 1	1-3	RSB Guidance (RSB-GUI-01-000)	✓ Legal and regulatory compliance review process, annual corporate compliance statement, or equivalent alternative is required.	✓ (Note: Compliance provisions specified in RSB Guidance and Compliance Indicators.)
Environmental Pillar					
Air Quality	Principle 1, Criterion 1	1-3	RSB Guidance (RSB-GUI-01-000) Environmental and Social (ES) Management Plan Mitigation Strategies Best Available Technology No Open-Air Burning Material/Waste BMPs Waste-to-Energy or Clean Incineration Measures	<ul style="list-style-type: none"> ✓ Compliance with air permitting and reporting requirements, if applicable, is demonstrated. ✓ Air emissions management plan is available. ✓ Evidence of origin nation compliance or air management plan, as applicable. 	✓ (Note: Compliance provisions specified in RSB Guidance and Compliance Indicators.)
	Principle 10, Criterion 10a	2-3			
	Principle 10, Criterion 10b	1-2			
	Principle 11, Criterion 11e	1-3			
GHG Emissions	Principle 3, Criterion 3a	1-4	Qualify for Life Cycle GHG Policies and Incentives Life Cycle GHG Inventory (RSB-STD-01-003-01) >50% Life Cycle GHG Reduction Requirement	<ul style="list-style-type: none"> ✓ EPA RFS2 program life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). ✓ Producer/blender life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). 	✓
	Principle 3, Criterion 3b	4			
	Principle 3, Criterion 3c	4			
Water Quality	Principle 1, Criterion 1	1-3	RSB Guidance (RSB-GUI-01-000) Impact Assessment (RSB-GUI-01-002-01) Screening Assessment (RSB-GUI-01-002-02) ES Management Plan (RSB-GUI-01-002-05) Annual Monitoring Legal Compliance Water Assessment (RSB-GUI-01-009-01) Treatment and BMPs Buffer Zones Material/Waste BMPs	<ul style="list-style-type: none"> ✓ Compliance with CWA and permitted discharges (N, P, or TOC), if applicable, is demonstrated. ✓ Water management plan is available. ✓ Present evidence of BMP use. ✓ Evidence of origin nation water program compliance and water management plan, as applicable. 	✓ (Note: Compliance provisions specified in RSB Guidance and Compliance Indicators.)
	Principle 2, Criterion 2a	1-3			
	Principle 9, Criterion 9a	1-3			
	Principle 9, Criterion 9b	1-3			
	Principle 9, Criterion 9d	1-3			
	Principle 11, Criterion 11e	1-3			

Table B-2. RSB Review and Evaluation Worksheet

Pillar/ Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Water Quantity	Principle 2, Criterion 2a Principle 9, Criterion 9a Principle 9, Criterion 9b Principle 9, Criterion 9c	1-3 1-3 1-3 1-3	Impact Assessment (RSB-GUI-01-002-01) Screening Assessment (RSB-GUI-01-002-02) Water Assessment (RSB-GUI-01-009-01) No Use of Contested Water ES Management Plan (RSB-GUI-01-002-05) Annual Monitoring Reuse and Recycling BMPs	<ul style="list-style-type: none"> ✓ Water management plan includes quantity and is available. ✓ Water demand of renewable water (L/MJ) ✓ Water demand of nonrenewable water (L/MJ) ✓ Provision to evidence water rights or equivalent alternative is available. 	✓
Soil Health	Principle 8, Criterion 8a Principle 11, Criterion 11e	1 1-3	Screening Assessment (RSB-GUI-01-002-02) Soil Impact Assessment (RSB-GUI-01-008-01) Site Design and Soil BMPs ES Management Plan (RSB-GUI-01-002-05) Material/Waste BMPs	<ul style="list-style-type: none"> ✓ Soil assessments are conducted and management plan is developed and maintained. ✓ Evidence of soil BMP use is available. 	✓
Nutrient Requirements/ Fertilizer Use	Principle 8, Criterion 8a	1	Screening Assessment (RSB-GUI-01-002-02) Soil Impact Assessment (RSB-GUI-01-008-01) ES Management Plan (RSB-GUI-01-002-05)	<ul style="list-style-type: none"> ○ Soil and nutrient management plan or ✓ equivalent alternative are available. 	✓ (Note: Soil Impact Assessment and ES Management Plan provisions were determined to perform the equivalent functions required.)
Pesticides/ Herbicide Use/ Management Practices	Principle 11, Criterion 11d Principle 11, Guidance	1-3	Pesticide/Herbicide BMPs RSB Guidance (RSB-GUI-01-000)	<ul style="list-style-type: none"> ○ Pest control and chemical management plan(s) or ✓ equivalent alternative are available. 	✓ (Note: Pesticide and chemical management provisions specified in RSB Guidance and Compliance Indicators were determined to perform the equivalent functions required.)
Sustainable Harvest Rates/ Biomass Yield	Principle 11, Guidance Principle 7, Criterion 7a, Guidance	1-3	RSB Guidance (RSB-GUI-01-000) Compliance Indicators (RSB-IND-01-001)	<ul style="list-style-type: none"> ○ Actual yield (MT/ha): Sustainable yield (MT/ha) < 1 or ✓ equivalent assessments are available. 	⊖ (Note: Provisions specified in RSB Guidance and RSB Guidance and Compliance Indicators were identified but could be made more explicit.)

Table B-2. RSB Review and Evaluation Worksheet

Pillar/ Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Land Use	Introduction Principle 7, Criterion 7a, Guidance Principle 7, Criterion 7a, Guidance	1-3 1-3 1-3	Compliance Indicators (RSB-IND-01-001) Land Use Impact Assessment RSB Principles and Criteria, EU RED (RSB-STD-11-001-01-011) Conservation Impact Assessment (RSB- GUI-01-007-01)	<ul style="list-style-type: none"> ○ Product/land use (MT/ha or MJ/ha) factor or ✓ equivalent assessments are available. ✓ Evidence of prior and current land cover type. 	<p style="text-align: center;">✓</p> <p>(Note: Provisions specified in RSB Guidance and Compliance Indicators could be made more robust by incorporating requirements similar to those cited in EU RED Criterion 7a.)</p>
Endangered, Threatened, and Vulnerable Species	Principle 2, Criterion 2a Principle 7, Criterion 7a Principle 7, General Guidance	1-3 1-3	Impact Assessment (RSB-GUI-01-002-01) Conservation Impact Assessment (RSB-GUI-01-007-01)	<ul style="list-style-type: none"> ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable under the ESA, state law, and natural heritage programs. ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable on the International Union for Conservation of Nature Red List and/or state Natural Heritage Program. ✓ Conservation plan is made available and includes the identification of these species/habitats, and plans for their protection and enhancement. 	<p style="text-align: center;">✓</p> <p>(Note: Provisions specified in RSB Guidance were determined sufficient.)</p>
Native Habitat /Ecosystem Health Preservation	Principle 2, Criterion 2a Principle 7, Criterion 7a Principle 7, Criterion 7b Principle 7, Criterion 7c Principle 7, Criterion 7d	1-3 1-3 1-3 1-3	Impact Assessment (RSB-GUI-01-002-01) Conservation Impact Assessment (RSB-GUI-01-007-01) ES Management Plan (RSB-GUI-01-002-05) Buffer Zones Ecological Corridors	<ul style="list-style-type: none"> ✓ Conservation plan is made available and includes ecosystem service restoration. 	<p style="text-align: center;">✓</p>
Invasive Species	Principle 7, Criterion 7e	1-2	No Prohibited Species Use Weed Risk Assessment Management Plan and BMPs	<ul style="list-style-type: none"> ✓ Conservation/management plans are available and include invasive species management and mitigation. 	<p style="text-align: center;">✓</p>

Table B-2. RSB Review and Evaluation Worksheet

Pillar/ Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Genetically Modified Organisms	Principle 7, Criterion 7e	1-2	No Prohibited Species Use Weed Risk Assessment Management Plan and BMPs Comply with Int'l and Nat'l Agreements, Laws, and Guidelines Impact Assessment Risk Mitigation and BMPs ES Management Plan (RSB-GUI-01-002-05)	<input checked="" type="checkbox"/> Cultivation and management practices are available. <input checked="" type="checkbox"/> Management plan is available and includes protocols for GMO monitoring and control.	<input checked="" type="checkbox"/>
	Principle 11, Criterion 11b	1-3			
	Principle 11, Criterion 11c	1-3			
Minimization, Reuse, and Recycling	Principle 11, Criterion 11e	1-3	ES Management Plan (RSB-GUI-01-002-05) Material/Waste BMPs Waste-to-Energy or Clean Incineration Measures Reuse and Minimization	<input checked="" type="checkbox"/> Material efficiency plan is available. <input type="checkbox"/> Primary product %: coproduct % ratio > 1 or <input checked="" type="checkbox"/> equivalent assessments are available.	<input checked="" type="checkbox"/> (Note: Plan provisions specified in Compliance Indicators were determined to be sufficient.)
Hazardous Waste	Principle 1, Criterion 1	1-3	RSB Guidance (RSB-GUI-01-000) No Use/Phase-out of Persistent Organic Pollutant ES Management Plan (RSB-GUI-01-002-05) Material/Waste BMPs Reuse and Minimization	<input checked="" type="checkbox"/> Evidence of hazardous material and waste compliance is demonstrated.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance and Compliance Indicators.)
	Principle 11, Criterion 11d	1-3			
	Principle 11, Criterion 11e	1-3			
Compliance with Environmental Laws	Principle 1, Criterion 1	1-3	RSB Guidance (RSB-GUI-01-000) Compliance Indicators (RSB-IND-01-001)	<input checked="" type="checkbox"/> Regulatory compliance review process or equivalent alternative is required. <input checked="" type="checkbox"/> Annual corporate compliance statement is required.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance and Compliance Indicators.)
Planning, Monitoring, and Continual Improvement	Principle 2, Criterion 2a	1-3	Screening Assessment (RSB-GUI-01-002-02) Impact Assessment (RSB-GUI-01-002-01) ES Management Plan (RSB-GUI-01-002-05)	<input type="checkbox"/> EMS documentation or <input checked="" type="checkbox"/> equivalent alternative (based on the scale of the operation) is available.	<input checked="" type="checkbox"/> (Note: Provisions specified in RSB Guidance, Compliance Indicators, and ESMP Guidelines.)
Supply Chain Management, COC, and Product Certification	Introduction, Scope, Principles, and Criterion	1-4	Principles and Criterion Focus on Supply Chain Stages, Contract, and Certification Provisions	<input checked="" type="checkbox"/> Supply chain and COC program documentation is available. <input checked="" type="checkbox"/> Product certification is achieved and maintained.	<input checked="" type="checkbox"/>
Social Pillar					
Food Security	Principle 2, Criterion 2a	1-3	Impact Assessment (RSB-GUI-01-002-01) Food Security Assessment (RSB-GUI-01-006-01) ES Management Plan (RSB-GUI-01-002-05) Mitigation Measures	<input checked="" type="checkbox"/> Food security screening is available. <input checked="" type="checkbox"/> If screening indicates need, a food security assessment is performed and available.	<input checked="" type="checkbox"/>
	Principle 6, Criterion 6a	1-3			
	Principle 6, Criterion 6b				

Table B-2. RSB Review and Evaluation Worksheet

Pillar/ Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Equity/ Gender Rights	Principle 2, Criterion 2b	1-3	Impact Assessments (RSB-GUI-01-002-01) Stakeholder Engagement and Analysis Methods ILO 111 Convention Norms Compliance with Wage Law Contract Review and Mechanism	<input type="radio"/> Equal opportunity policy or <input checked="" type="checkbox"/> equivalent alternative is available. Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance and Compliance Indicators.)
	Principle 4, Criterion 4d	1-3			
	Principle 4, Criterion 4e	1-3			
	Principle 4, Criterion 4g	1-3			
Labor Rights/ Fair Wage	Principle 1, Criterion 1, Guidance	1-3	RSB Guidance (RSB-GUI-01-000) Compliance with Collective Bargaining, Wage Laws, and Informal Worker Mechanisms None Specified ILO 138 Convention Norms Contract Review and Mechanism	<input type="radio"/> Worker rights and fair labor policies or <input checked="" type="checkbox"/> equivalent alternatives are publicly available. <input checked="" type="checkbox"/> Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance.)
	Principle 4, Criterion 4a	1-3			
	Principle 4, Criterion 4e	1-3			
	Principle 4, Criterion 4b	1-3			
	Principle 4, Criterion 4c	1-3			
	Principle 4, Criterion 4g	1-3			
Land Tenure/ Property Rights	Principle 1, Criterion 1, Guidance	1-3	RSB Guidance (RSB-GUI-01-000) Screening Assessment (RSB-GUI-01-002-02) Land Rights Assessment (RSB-GUI-01-012-01) No Use of Contested Land No Forced Relocation or Coercion Fair Compensation Impact Assessment (RSB-GUI-01-002-01)	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes property rights and is available. <input checked="" type="checkbox"/> Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. <input checked="" type="checkbox"/> Indigenous land rights screening is available, if applicable.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance.)
	Principle 12, Criterion 12a	1-2			
	Principle 12, Criterion 12b	1-3			
Occupational Safety and Health	Principle 1, Criterion 1, Guidance	1-3	RSB Guidance (RSB-GUI-01-000) Compliance with OSH Laws and Norms Pesticide/Herbicide BMPs	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes OSH and is available. <input checked="" type="checkbox"/> OSH policy and training program or Voluntary Protection Program documentation is available. <input checked="" type="checkbox"/> Evidence of origin nation legal OSH compliance or voluntary OSH policy and training and PPE availability, as applicable.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance and Compliance Indicators.)
	Principle 4, Criterion 4f	1-3			
	Principle 11, Criterion 11d	1-3			

Table B-2. RSB Review and Evaluation Worksheet

Pillar/ Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Public Health / Environmental Justice	Principle 1, Criterion 1, Guidance Principle 11, Criterion 11a	1-3	RSB Guidance (RSB-GUI-01-000) Technology Hazards Disclosure (upon request and with CBI protections) Screening Assessment (RSB-GUI-01-002-02) ES Management Plan (RSB-GUI-01-002-05)	<input type="radio"/> Annual corporate compliance statement includes EPCRA or <input checked="" type="checkbox"/> equivalent alternative is available. <input checked="" type="checkbox"/> Environmental justice screening is available and integrated with internal EMS, as applicable. <input checked="" type="checkbox"/> Evidence of origin nation legal air quality, water quality, and toxics regulatory compliance is available, as applicable. <input checked="" type="checkbox"/> Evidence of origin nation environmental burden screening is available and integrated with internal EMS.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance.)
	Principle 2, Guidance	1-3			
	Principle 11, Criterion 11c	1-3			
Public Outreach/ Stakeholder Participation	Principle 1, Criterion 1, Guidance Principle 2, Criterion 2b	1-3	RSB Guidance (RSB-GUI-01-000) Screening Assessment (RSB-GUI-01-002-02) Impact Assessment (RSB-GUI-01-002-01) Stakeholder Engagement and Analysis Methods Social Impact Assessment (RSB-GUI-01-005-01) Impact Assessment (RSB-GUI-01-002-01)	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes NEPA, if applicable, and is available. <input checked="" type="checkbox"/> CSER report or <input checked="" type="checkbox"/> equivalent alternative is available. <input checked="" type="checkbox"/> Evidence of origin nation public notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance.)
	Principle 5, Criterion 5b	1-3			
	Principle 12, Criterion 12b	1-3			
Transparency	Principle 1, Criterion 1, Guidance Principle 2, Criterion 2b	1-3	RSB Guidance (RSB-GUI-01-000) Impact Assessments (RSB-GUI-01-002-01) Stakeholder Engagement and Analysis Methods ES Management Plan (RSB-GUI-01-002-05) Technology Hazards Disclosure (upon request and with CBI protections)	<input type="radio"/> Annual corporate compliance statement, or <input checked="" type="checkbox"/> business plan, certification documentation, and equivalent alternatives are available. <input checked="" type="checkbox"/> Evidence of origin nation public notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance.)
	Principle 9, Criterion 9b	1-3			
	Principle 11, Criterion 11a	1-3			
Compliance with Safety, Health, and Participation Laws	Principle 1, Criterion 1, Guidance Principle 2, Criterion 2a	1-3	RSB Guidance (RSB-GUI-01-000) Screening Assessment (RSB-GUI-01-002-02) Impact Assessment (RSB-GUI-01-002-01) ES Management Plan (RSB-GUI-01-002-05)	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternatives include OSH (and, if applicable, NEPA) provisions and is available. <input checked="" type="checkbox"/> Annual CSER or company website includes transparency and public access provisions.	<input checked="" type="checkbox"/> (Note: Compliance provisions specified in RSB Guidance, but policy provisions could be made more explicit.)
	Principle 4, Criterion 4f	1-3			

⊗ Not Addressed/Insufficient ⊖ Topic Covered, but Weak Provisions Sufficiently Addressed

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Council on Sustainable Biomass Production (CSBP), Review and Evaluation Worksheet

CSBP, Standard for Sustainable Production of Agricultural Biomass, Version 1.0, June 6, 2012

Key Attributes	Evaluation	Sufficiently Aligned?
Consistent	CSBP is a broad, multi-stakeholder body that seems to be organized in a manner that aligns well with international consensus-based norms and codes. CSBP is not, however, a member of ISEAL. Its guidance and chain of custody provisions were recently released but have yet to achieve consensus agreement. As such, they were not evaluated at this time.	☑
Balanced and Consensus Driven	CSBP’s consensus-oriented organization and structures seem to include a broad variety of stakeholders and interests that explicitly strive to balance sustainability considerations. The agricultural biomass production standard covers the broad pillars of sustainability but could be made more balanced through greater specificity and inclusion of economic and financial performance principle(s). CSBP’s guidance and chain of custody provisions were just released but have not yet been finalized and approved by consensus agreement.	⊖
Transparent	Information on the organization and standard appear to be readily accessible to the public via its web portal. A sufficient level of transparency is demonstrated for the broader public without a loss of technical rigor. One of its stated principles is “Transparency.” While several USDA resources are cited, an area to revisit and review will be the technical procedures for auditors and certifying bodies as those products are developed, approved, and released.	☑
Objective and Traceable	CSBP’s principles and sub-elements are clearly written to frame areas of focus and provide guidelines for processes and mechanisms to demonstrate conformance. CSBP’s U.S. and North American focus makes its application more straightforward in this region but may require supplemental clarification and materials if applied on other continents. Like other bioenergy sustainability standards, its objectivity and traceability will likewise be improved with additional quantitative provisions as the relevant science and industry practices mature. The standard’s principles are clearly focused on biomass producers and their subcontractors. Once the chain of custody provisions have been approved by consensus and released, it will be necessary to review and evaluate the sufficiency of its traceability requirements throughout the supply chain.	☑
Assured and Accredited	CSBP is not a member of ISEAL and does not currently communicate a path forward for evolving into a certification system with assurance and accreditation provisions. As such, assurance and accreditation deployment is a key attribute where the certification system would need to be made more robust to achieve sufficient alignment.	⊗
Relevant	The “agricultural biomass production standard” is keenly focused on the sustainability aspects of bioenergy feedstock produced on agricultural land (not including forestland). As such, it is highly relevant to the user of these guidelines and is also tailored well to U.S. or North American context, regulations, and laws.	☑

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Economic Pillar					
Financial Viability	Not explicitly mentioned	1	None identified	○ Business plan is required and available for review with CBI provisions.	⊗ (Note: No mention or reference identified that focuses on business model viability, planning, management, or sustained performance.)
Compliance with Financial Laws and Regulations	Principle 7: Legality, 7.1 Knowledge of Laws	1	7.1.2 Knowledge of Laws 7.1.2 Ensuring Compliance	✓ Legal and regulatory compliance review process, annual corporate compliance statement, or equivalent alternative is required.	✓
Environmental Pillar					
Air Quality	Principle 5: Air Quality and Emissions Principle 7: Legality, 7.1 Knowledge of Laws Principle 1: IRMP	1 1	5.1.1 Yield Data 5.1.2 Production Inputs 5.1.3 Planting and Tillage 5.1.4 Soil Carbon and Organic Matter 5.1.5 Harvesting, Collection, Handling, Processing, and Storage 5.1.6 Transportation 7.1.2 Ensuring Compliance 1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan	✓ Compliance with air permitting and reporting requirements, if applicable, is demonstrated. ✓ Air emissions management plan is available. ✓ Evidence of origin nation compliance or air management plan, as applicable.	✓ (Note: Minimum evaluation requirements were met, but air quality emissions compliance, management, and reductions could be enhanced and made more explicit.)
GHG Emissions	Principle 5: Air Quality and Emissions	1	5.1.1 Yield Data 5.1.2 Production Inputs 5.1.3 Planting and Tillage 5.1.4 Soil Carbon and Organic Matter 5.1.5 Harvesting, Collection, Handling, Processing, and Storage 5.1.6 Transportation	○ EPA RFS2 program life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO ₂ -e/MJ). ○ Producer/blender life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO ₂ -e/MJ).	⊖ (Note: Scope is currently limited to stage 1 feedstock cultivation but stops short of providing the analysis to address evaluation criteria. That said, data required is clearly designed to support the calculation of a stage 1 life cycle inventory.)

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Water Quality	Principle 4: Water, 4.1 Water Quality	1	4.1.1 Water Quality Management Planning 4.1.2 Erosion and Sediment and Runoff Control 4.1.3 Use of Wastewater for Irrigation 4.1.4 Trace Elements in Biosolids 4.1.5 Nitrogen 4.1.6 Phosphorus 4.1.7 Pesticide Management	<ul style="list-style-type: none"> ✓ Compliance with CWA and permitted discharges (N, P, or TOC), if applicable, is demonstrated. ✓ Water management plan is available. ✓ Present evidence of BMP use. ✓ Evidence of origin nation water program compliance and water management plan, as applicable. 	✓
	Principle 4: Water, 4.2 Water Quantity	1	4.1.8 Pesticide Use 4.1.9 Waste Disposal 4.2.5 Irrigation/Salinity 4.3.1 Aquatic Ecosystem Management Plan 4.3.3 Stream Temperature 4.3.4 Hypoxia		
	Principle 4: Water, 4.3 Aquatic Ecosystems				
	Principle 7: Legality, 7.1 Knowledge of Laws	1	7.1.2 Ensuring Compliance		
	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
Water Quantity	Principle 4: Water, 4.2 Water Quantity	1	4.2.1 Irrigation Plan 4.2.2 Legal Compliance 4.2.3 Preventing Depletion 4.2.4 Use Rights 4.2.5 Irrigation/Salinity 4.2.6 Maximum Use Per Acre	<ul style="list-style-type: none"> ✓ Water management plan includes quantity and is available. ✓ Water demand of renewable water (L/MJ) ✓ Water demand of nonrenewable water (L/MJ) ✓ Provision to evidence water rights or equivalent alternative is available. 	✓
	Principle 4: Water, 4.3 Aquatic Ecosystems	1	4.3.1 Aquatic Ecosystem Management Plan 4.3.2 Stream Flow		
	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
Soil Health	Principle 2: Soil, 2.1 Maintain or Improve Soil Health	1	2.1.1 Soil Productivity and Conservation Planning 2.1.2 Residue Removal 2.1.3 Compaction 2.1.5 Erosion 2.1.6 Soil Carbon	<ul style="list-style-type: none"> ✓ Soil assessments are conducted and management plan is developed and maintained. ✓ Evidence of soil BMP use is available. 	✓
	Principle 1: IRMP				
	Principle 4: Water, 4.1 Water Quality	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
	Principle 4: Water, 4.2 Water Quantity	1	4.1.2 Erosion and Sediment and Runoff Control 4.2.5 Irrigation/Salinity		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.3 Good Agricultural Practices (GAP)		

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Nutrient Requirements/ Fertilizer Use	Principle 2: Soil, 2.1 Maintain or Improve Soil Health	1	2.1.1 Soil Productivity and Conservation Planning	✓ Soil and nutrient management plan or equivalent alternative.	☑
	Principle : IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
	Principle 4: Water, 4.1 Water Quality	1	4.1.5 Nitrogen 4.1.6 Phosphorus		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.3 GAP		
Pesticides/ Herbicide Use/ Management Practices	Principle 3: Biological Diversity, 3.4 Pest Management	1	3.4.1 Control Agents	✓ Pest control and chemical management plan(s) or equivalent alternatives are available.	☑
	Principle 4: Water, 4.1 Water Quality	1	4.1.7 Pesticide Management 4.1.8 Pesticide Use 4.1.9 Waste Disposal		
	Principle 1: IRMP	1	1.2 IRMP Objectives 1.3 Operations Plan		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.3 GAP		
Sustainable Harvest Rates/ Biomass Yield	Introduction	1	5.1.1 Yield Data	✓ Actual yield (MT/ha): Sustainable yield (MT/ha) < 1 or ○ equivalent assessments are available.	☑
	Principle 5: Air Quality and Emissions	1	5.1.2 Production Inputs		
	Principle 1: IRMP	1	1.3 Operations Plan		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.3 GAP		
Land Use	Principle 3: Biological Diversity, 3.3 Land Conversion	1	3.3.1 Documentation of Vegetative Category 3.3.2 Lands Eligible for Conversion	○ Product/land use (MT/ha or MJ/ha) factor or ✓ equivalent assessments are available. ✓ Evidence of prior and current land cover type.	☑

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Endangered, Threatened, and Vulnerable Species	Principle 3: Biological Diversity, 3.1 Biodiversity	1	3.1.1 Vegetative Types and Wildlife Habitat Planning 3.1.2 Important Wildlife Species and Their Habitats 3.1.3 Rare, Threatened, and Endangered Wildlife Communities, and Biodiversity	<ul style="list-style-type: none"> ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable under the ESA, state law, and natural heritage programs. ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable on the International Union for Conservation of Nature Red List and/or state Natural Heritage Program. ✓ Conservation plan is made available and includes the identification of these species/habitats, and plans for their protection and enhancement. 	<input checked="" type="checkbox"/>
	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
Native Habitat /Ecosystem Health Preservation	Principle 3: Biological Diversity, 3.1 Biodiversity	1	3.1.1 Vegetative Types and Wildlife Habitat Planning 3.1.2 Important Wildlife Species and Their Habitats	<ul style="list-style-type: none"> ✓ Conservation plan is made available and includes ecosystem service restoration. 	<input checked="" type="checkbox"/>
	Principle 3: Biological Diversity, 3.3 Land Conversion	1	3.3.2 Lands Eligible for Conversion		
	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
	Principle 4: Water, 4.3 Aquatic Ecosystems	1	4.3.1 Aquatic Ecosystem Management Plan 4.3.2 Stream Temperature 4.3.3 Stream Flow 4.3.4 Hypoxia 4.3.5 Wetlands		

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Invasive Species	Principle 3: Biological Diversity, 3.1 Biodiversity	1	3.1.4 Control of Non-Crop Invasive Species	✓ Conservation/management plans are available and include invasive species management and mitigation.	☑
	Principle 3: Biological Diversity, 3.2 Species and Cultivars	1	3.2.1 Invasiveness 3.2.2 Crop Spread		
	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
	Principle 3: Biological Diversity, 3.4 Pest Management	1	3.4.1 Control Agents		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.3 GAP		
Genetically Modified Organisms	Principle 3: Biological Diversity, 3.1 Biodiversity	1	3.1.4 Control of Non-Crop Invasive Species	✓ Cultivation and management practices are available. ○ Management plan is available and includes protocols for GMO monitoring and control.	⊖ (Note: Applicable provisions specified under Principles 3 and 1, but the standard does not explicitly address GMO-specific cultivar protocols.)
	Principle 3: Biological Diversity, 3.2 Species and Cultivars	1	3.2.1 Invasiveness 3.2.2 Crop Spread		
	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.3 GAP		
Minimization, Reuse, and Recycling	Principle 5: Air Quality and Emissions	1	5.1.1 Yield Data 5.1.2 Production Inputs	○ Material efficiency plan is available. ○ Primary product %: coproduct % ratio > 1 or ✓ equivalent assessments are available.	⊖ (Note: Applicable provisions specified under Principles 5, 4, and 1, but the standard does not explicitly address a materials efficiency plan.)
	Principle 4: Water, 4.1 Water Quality	1	4.1.9 Waste Disposal		
	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2. GAP		

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Hazardous Waste	Principle 4: Water, 4.1 Water Quality	1	4.1.9 Waste Disposal	✓ Evidence of hazardous material and waste compliance is demonstrated.	<input checked="" type="checkbox"/> (Note: Minimum evaluation requirements were met, but solid hazardous waste compliance, management, and reductions could be enhanced and made more explicit.)
	Principle 7: Legality, 7.1 Knowledge of Laws	1	7.1.2 Ensuring Compliance		
	Principle 6: Socioeconomic Well-being, 6.3 Environmental, Safety, and Health	1	6.3.3 Hazardous Material Protection 6.3.4 Accidents and Injuries		
	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.3 GAP		
Compliance with Environmental Laws	Principle 7: Legality, 7.1 Knowledge of Laws	1	7.1.2 Knowledge of Laws 7.1.2 Ensuring Compliance	✓ Regulatory compliance review process or ○ equivalent alternative is required. ✓ Annual corporate compliance statement is required.	<input checked="" type="checkbox"/>
	Principle: Water, 4.1 Water Quality	1	4.1.9 Waste Disposal		
	Principle 4: Water, 4.2 Water Quantity	1	4.2.1 Irrigation Plan 4.2.2 Legal Compliance 4.2.4 Use Rights		
Planning, Monitoring, and Continual Improvement	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan	○ EMS documentation or ✓ equivalent alternative (based on the scale of the operation) is available.	<input checked="" type="checkbox"/>
	Principle 9: Continual Improvement, 9.1 Compliance	1	9.1.1 Participant Compliance		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.1 Standard Review 9.2.2 Improve Performance 9.2.3 GAP		

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Supply Chain Management, COC, and Product Certification	Principle 1: IRMP	1	1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan	<input checked="" type="checkbox"/> Supply chain and COC program documentation is available. <input checked="" type="checkbox"/> Product certification is achieved and maintained.	<input checked="" type="checkbox"/> (Note: Primary focus of this standard, and includes good provisions for inputs and subcontractors. However, it is important to note that this standard covers only stage 1 of the life cycle.)
	Principle 9: Continual Improvement, 9.1 Compliance	1	9.1.1 Participant Compliance		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.1 Standard Review 9.2.2 Improve Performance 9.2.3 GAP		
Social Pillar					
Food Security	Not explicitly mentioned	1	None identified	<input type="checkbox"/> Food security screening is available. <input type="checkbox"/> If screening indicates need, a food security assessment is performed and available.	<input checked="" type="checkbox"/> (Note: This standard focuses solely on biomass production, which could include food, feed, or fuel feedstocks.)
Equity/ Gender Rights	Principle 6: Socioeconomic Well-being, 6.1 Compliance with Labor Laws	1	6.1.1 Fair Labor Standards Act	<input checked="" type="checkbox"/> Equal opportunity policy or equivalent alternative is available. <input checked="" type="checkbox"/> Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.	<input checked="" type="checkbox"/>
	Principle 6: Socioeconomic Well-being, 6.2 Fair Treatment of Workers	1	6.2.1 Grievance Procedures 6.2.2 Employment Contract 6.2.3 Workplace Improvements		
	Principle 7: Legality, 7.1 Knowledge of Laws	1	7.1.2 Knowledge of Laws 7.1.2 Ensuring Compliance		
Labor Rights/ Fair Wage	Principle 6: Socioeconomic Well-being, 6.1 Compliance with Labor Laws	1	6.1.1 Fair Labor Standards Act	<input checked="" type="checkbox"/> Worker rights and fair labor policies or equivalent alternatives are publicly available. <input checked="" type="checkbox"/> Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.	<input checked="" type="checkbox"/>
	Principle 6: Socioeconomic Well-being, 6.2 Fair Treatment of Workers	1	6.2.1 Grievance Procedures 6.2.2 Employment Contract 6.2.3 Workplace Improvements 6.2.4 Freedom of Association		
	Principle 7: Legality, 7.1 Knowledge of Laws	1	7.1.2 Knowledge of Laws 7.1.2 Ensuring Compliance		

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Land Tenure/ Property Rights	Principle 6: Socioeconomic Well-being Principle 7: Legality, 7.1 Knowledge of Laws	1 1	Introduction 7.1.2 Knowledge of Laws 7.1.2 Ensuring Compliance	<ul style="list-style-type: none"> <input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes property rights and is available. <input checked="" type="checkbox"/> Evidence of origin nation legal compliance or <input type="radio"/> voluntary ILO convention conformance, as applicable. <input type="radio"/> Indigenous land rights screening is available, if applicable. 	<input checked="" type="checkbox"/> (Note: Minimum requirements sufficient, particularly when applied in North America. However, indigenous land rights screening or assessment requirement could strengthen the standard if and when it is applied to other regions.)
Occupational Safety and Health	Principle 6: Socioeconomic Well-being, 6.3 Environmental, Safety, and Health Principle 7: Legality, 7.1 Knowledge of Laws	1 1	6.3.1 Compliance with Laws and Regulations 6.3.2 Training 6.3.3 Hazardous Material Protection 6.3.4 Accidents and Injuries 6.3.5 Sanitation 6.3.6 Insurance Against Workplace Injuries 7.1.2 Knowledge of Laws 7.1.2 Ensuring Compliance	<ul style="list-style-type: none"> <input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes OSH and is available. <input checked="" type="checkbox"/> OSH policy and training program or Voluntary Protection Program documentation is available. <input checked="" type="checkbox"/> Evidence of origin nation legal OSH compliance or voluntary OSH policy and training and PPE availability, as applicable. 	<input checked="" type="checkbox"/>
Public Health/ Environmental Justice	Principle 6: Socioeconomic Well-being, 6.3 Environmental, Safety, and Health Principle 7: Legality, 7.1 Knowledge of Laws Principle 1: IRMP Principle 8: Transparency, 8.1 Public Access Principle 9: Continual Improvement, 9.1 Compliance	1 1 1 1	6.3.1 Compliance with Laws and Regulations 6.3.2 Training 6.3.4 Accidents and Injuries 7.1.2 Knowledge of Laws 7.1.2 Ensuring Compliance 1.1 IRMP Assessment 1.2 IRMP Objectives 1.3 Operations Plan 8.1.1 Public Transparency 9.1.1 Participant Compliance	<ul style="list-style-type: none"> <input type="radio"/> Annual corporate compliance statement includes EPCRA or <input checked="" type="checkbox"/> equivalent alternative is available <input type="radio"/> Environmental justice screening is available and integrated with internal EMS, as applicable. <input checked="" type="checkbox"/> Evidence of origin nation legal air quality, water quality, and toxics regulatory compliance is available, as applicable. <input checked="" type="checkbox"/> Evidence of origin nation environmental burden screening is available and integrated with internal EMS. 	<input checked="" type="checkbox"/> (Note: Strong provisions specified under Principles 6, 7, and 8. The standard does not explicitly require environmental justice screening or assessments, but such are also limited in applicability to public sector per Executive Order 12898.)

Table B-3. CSBP Producer Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Public Outreach/ Stakeholder Participation	Principle 8: Transparency, 8.1 Public Access	1	8.1.1 Public Transparency	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes NEPA, if applicable, and is available. CSER report or <input checked="" type="checkbox"/> equivalent alternative is available. <input checked="" type="checkbox"/> Evidence of origin notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/>
	Principle 9: Continual Improvement, 9.1 Compliance	1	9.1.1 Participant Compliance		
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.1 Standard Review 9.2.2 Improve Performance		
	Principle 7: Legality, 7.1 Knowledge of Laws	1	7.1.2 Ensuring Compliance		
Transparency	Principle 8: Transparency, 8.1 Public Access	1	8.1.1 Public Transparency	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> Business plan, certification documentation, and equivalent alternatives are available. <input checked="" type="checkbox"/> Evidence of origin notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/> (Note: Minimum evaluation requirements were met, but business plan requirements could be made more explicit.)
	Principle 9: Continual Improvement, 9.2 Review and Improvements	1	9.2.1 Standard Review 9.2.2 Improve Performance		
	Principle 7: Legality, 7.1 Knowledge of Laws	1	7.1.2 Ensuring Compliance		
Compliance with Safety, Health, and Participation Laws	Principle 6: Socioeconomic Well-being, 6.1 Compliance with Labor Laws	1	6.1.1 Fair Labor Standards Act	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternatives include OSH (and, if applicable, NEPA) provisions and is available. <input checked="" type="checkbox"/> Annual CSER or company website includes transparency and public access provisions.	<input checked="" type="checkbox"/>
	Principle 6: Socioeconomic Well-being, 6.3 Environmental, Safety, and Health		6.3.1 Compliance with Laws and Regulations		
	Principle 8: Transparency, 8.1 Public Access	1	8.1.1 Public Transparency		
	Principle 9: Continual Improvement, 9.1 Compliance	1	9.1.1 Participant Compliance		
	Principle 7: Legality, 7.1 Knowledge of Laws	1	7.1.2 Knowledge of Laws 7.1.2 Ensuring Compliance		

Not Addressed/Insufficient
 Topic Covered, but Weak Provisions
 Sufficiently Addressed

Table B-4. ISCC Review and Evaluation Worksheet

International Sustainability and Carbon Certification (ISCC) Standard Review and Evaluation Worksheet

ISCC 202 Sustainability Requirements for the Production of Biomass, 11-03-15, V 2.3-EU
 ISCC 203 Requirements for Traceability, 11-03-15, V 2.3-EU
 ISCC 207 Risk Management, 11-03-15, V 2.3-EU

Key Attributes	Evaluation	Sufficiently Aligned?
Consistent	ISCC is a multi-stakeholder, not-for-profit organization that generally seems to align with international norms. ISCC is an ISEAL subscriber but is not currently a member. The ISCC governance structure, member engagement, and public comment mechanisms appear consistent with similar certification schemes. Its “Sustainability Requirements for the Production of Biomass,” “Requirements for Traceability,” and “Risk Management” provide a broad approach that is tailored to regional and national requirements. ISCC is consistent with the EU RED requirements but seems to be highly specific to this market and purpose. Its terminology and approach could be made more consistent with similar standards, and this would help it more robustly align with this key attribute. ²⁶	⊖
Balanced and Consensus Driven	ISCC is focused on establishing an international, practical, and transparent system for the certification of biomass and bioenergy sustainability. Its governance structure and approach appear to engage stakeholders from producer, trade group, and civil society organizations. ISCC’s operating statutes allow for up to two board members from these groups and an open General Assembly of voting members.	☑
Transparent	ISCC governance, standards, and technical procedures are readily accessible to the public via its web portal. A good level of transparency is demonstrated for the broader public without a loss of technical rigor. Several ISCC guidance and procedural documents are accessible and direct users to specific activities needed to satisfy this system’s requirements. However, some procedures are not available publicly, and posting these on ISCC’s public web portal would further bolster the system’s transparency. The ISCC presents its certification processes in a clear manner, but its requirement documents could be more effectively integrated and presented to enhance accessibility and understandability. It was difficult to identify the core standard document that ties all of the requirements together.	⊖
Objective and Traceable	The ISCC biomass production and traceability standards appear to be driven by the EU RED requirements and cover only select environmental and social performance criteria. ISCC maintains requirements for sustainability, greenhouse gas emission calculation and reduction, traceability and mass balance, and risk management. The producer standard is written clearly but would benefit from a more integrated principles and criteria document and should provide more specificity on required processes, mechanisms, and provisions. The producer requirements cover biomass producer activities, while the traceability requirements address the chain of custody provisions. Conformance with these requirements is verified by independent third parties that are provided on the ISCC web page.	☑
Assured and Accredited	ISCC is an ISEAL subscriber but is not currently an associate or full member. It is closely associated with the German Federal Ministry of Food, Agriculture and Consumer Protection (BLE), which funded and oversaw its development through 2012, when ISCC started independent operation. It maintains a network of certification bodies, but these organizations did not seem to be included in IAF member or associate member national accreditation bodies. ISCC’s association with BLE reflects acceptance by a recognized government body. However, as ISCC has not achieved ISEAL membership or international accreditation, it does not sufficiently address the Assurance and Accreditation key attribute at this time. Achieving ISEAL membership or recognition by an international accreditation body would make ISCC more robust in its alignment with this key attribute.	⊗
Relevant	ISCC’s stated objectives are to support the sustainable cultivation and use of biomass, assist stakeholders, and improve its certification system. The producer certification standard appears to be highly relevant for evaluating and certifying biomass-derived fuel supply chains. Its biomass production sustainability requirements cover GHG emissions, land use, soil health, and social aspects. However, it omits several important indicator areas across the economic, environmental, and social pillars. ISCC aspires to be a global certification system, but the current set of requirements is tailored to achieve EU RED compliance. As such, it seems to lack broader sustainability considerations, and this could limit its utility outside of the EU or among producers not exporting to the EU. It could, however, be made more robust and relevant by addressing these coverage gaps and specifying more robust assurance mechanisms.	⊖

Table B-4. ISCC Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Economic Pillar					
Financial Viability	Not explicitly mentioned	1	None identified	○ Business plan is required and available for review with CBI provisions.	⊗ (Note: No mention or reference identified that focuses on business model viability, planning, management, or sustained performance.)
Compliance with Financial Laws and Regulations	ISCC 202 Principle 5: Biomass production shall take place in compliance with all applicable regional and national laws and shall follow relevant international treaties	1	Criterion 5.2 There is awareness of, and compliance with, all applicable regional and national laws and ratified international treaties.	○ Legal and regulatory compliance review process, annual corporate compliance statement, or equivalent alternative is required.	⊖ (Note: Applicable provisions are identified under Principle 5 with verification via interviews, but robust compliance review mechanism is not elaborated.)
Environmental Pillar					
Air Quality	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way	1	None identified	○ Compliance with air permitting and reporting requirements, if applicable, is demonstrated. ○ Air emissions management plan is available. ○ Evidence of origin nation compliance or air management plan, as applicable.	⊖ (Note: Applicable provision is specified under Principle 2, but sufficient mechanisms for compliance verification or air emission management are not elaborated.)
GHG Emissions	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way ISCC 205 GHG Methodology	1 1-3	GHG audit	○ EPA RFS2 program life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO ₂ -e/MJ). ○ Producer/blender life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO ₂ -e/MJ).	⊖ (Note: Applicable provisions are identified under Principle 2 and further detailed in the GHG Methodology. However, the requirements specify only the EU RED mandated 35% GHG reduction, not the required 50% reduction goal.)

Table B-4. ISCC Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Water Quality	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way	1	Criterion 2.2 Natural watercourses Criterion 2.4 Soil organic matter and soil structure Criterion 2.5 Ground-water and irrigation Criterion 2.6 Use of fertilizer	<ul style="list-style-type: none"> <input type="radio"/> Compliance with CWA and permitted discharges (N, P, or TOC), if applicable, is demonstrated. <input checked="" type="checkbox"/> Water management plan is available. <input checked="" type="checkbox"/> Present evidence of BMP use. <input checked="" type="checkbox"/> Evidence of origin nation water program compliance and water management plan, as applicable. 	<p style="text-align: center;"><input type="radio"/></p> <p>(Note: Applicable statement under Principle 2 requires compliance with national and local laws and regulations on water quality. However, the applicable provision to verify compliance should be made more explicit and robust.)</p>
Water Quantity	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way	1	Criterion 2.5 Ground-water and irrigation	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Water management plan includes quantity and is available. <input type="radio"/> Water demand of renewable water (L/MJ) <input type="radio"/> Water demand of nonrenewable water (L/MJ) <input checked="" type="checkbox"/> Provision to evidence water rights or equivalent alternative is available. 	<p style="text-align: center;"><input type="radio"/></p> <p>(Note: Applicable provisions are specified under Criterion 2.5. However, the standard does not explicitly require a determination of water demand for renewable and nonrenewable water.)</p>
Soil Health	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way	1	Criterion 2.3 Soil conservation and avoidance of soil erosion Criterion 2.4 Soil organic matter and soil structure	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Soil assessments are conducted and management plan is developed and maintained. <input checked="" type="checkbox"/> Evidence of soil BMP use is available. 	<input checked="" type="checkbox"/>
Nutrient Requirements/ Fertilizer Use	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way	1	Criterion 2.6 Use of fertilizer	<input checked="" type="checkbox"/> Soil and nutrient management plan or equivalent alternative.	<input checked="" type="checkbox"/>
Pesticides/ Herbicide Use/ Management Practices	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way	1	Criterion 2.7 Integrated pest management (IPM) Criterion 2.8 Use of plant production products Criterion 2.9 Plant protection product storage Criterion 2.10 Empty plant protection product containers and waste disposal	<input checked="" type="checkbox"/> Pest control and chemical management plan(s) or equivalent alternatives are available.	<p style="text-align: center;"><input checked="" type="checkbox"/></p> <p>(Note: Applicable provisions are specified under Criteria 2.7 through 2.10. However, many of these are considered "minor musts," of which only 60 percent need to be fulfilled. This could be made more robust by making these provisions mandatory or "major musts.")</p>

Table B-4. ISCC Review and Evaluation Worksheet




Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Sustainable Harvest Rates/ Biomass Yield	ISCC 207 Risk Management	1	Risk audit	<ul style="list-style-type: none"> <input type="radio"/> Actual yield (MT/ha): Sustainable yield (MT/ha) < 1 or <input type="radio"/> equivalent assessments are available. 	<p style="text-align: center;"></p> <p>(Note: One supplementary risk indicator for biomass producers focuses on factors that significantly influence the output per acre or output per hectare.)</p>
Land Use	ISCC 202 Principle 1: Biomass shall not be produced on land with high biodiversity value or high-carbon stock.	1	<p>Criterion 1.1 Biomass is not produced on land with high biodiversity value (including forestland; nature protection; and rare, threatened, or endangered ecosystems or species)</p> <p>Criterion 1.2: Biomass is not produced on highly biodiverse grassland</p> <p>Criterion 1.3: Biomass is not produced on land with high-carbon stock (wetlands, forested areas)</p> <p>Criterion 1.4: Biomass is not produced on peatland</p> <p>Risk audit: Land conversion shortly before or after January 1, 2008, is a supplementary risk indicator for farms</p>	<ul style="list-style-type: none"> <input type="radio"/> Product/land use (MT/ha or MJ/ha) factor or <input type="radio"/> equivalent assessments are available. <input checked="" type="checkbox"/> Evidence of prior and current land cover type. 	<p style="text-align: center;"></p> <p>(Note: Applicable provisions are specified in Criteria 1.1 through 1.4, but, the standard does not explicitly require production versus land use factor or an equivalent mechanism).</p>
	ISCC 2017 Risk Management	1			
Endangered, Threatened, and Vulnerable Species	ISCC 202 Principle 1: Biomass shall not be produced on land with high biodiversity value or high-carbon stock	1	Criterion 1.1(3) Areas for the protection of rare, threatened, or endangered ecosystems or species	<ul style="list-style-type: none"> <input type="radio"/> Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable under the ESA, state law, and natural heritage programs. <input type="radio"/> Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable on the International Union for Conservation of Nature Red List and/or state Natural Heritage Program. <input type="radio"/> Conservation plan is available and includes the identification of these species/ habitats, and plans for their protection and enhancement. 	<p style="text-align: center;"></p> <p>(Note: Applicable provisions are specified in Criterion 1.1., with choice of mechanisms to include land utilization plans, proof documents by an officially accredited expert, or sufficiently close satellite pictures. However, the standard does not explicitly require a species screening or conservation plan.)</p>

Table B-4. ISCC Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Native Habitat/ Ecosystem Health Preservation	ISCC 202 Principle 1: Biomass shall not be produced on land with high biodiversity value or high-carbon stock ISCC 207 Risk Management	1	Criterion 1.1: Biomass is not produced on land with high biodiversity value (including forestland; nature protection; and rare, threatened, or endangered ecosystems or species) Criterion 1.2: Biomass is not produced on highly biodiverse grassland Criterion 1.3: Biomass is not produced on land with high-carbon stock (wetlands, forested areas) Criterion 1.4: Biomass is not produced on peatland Risk audit: Proximity to and/ or overlap with no-go areas [forestland, peatland, wetlands, etc.] is a supplementary risk indicator for farms	<input type="radio"/> Conservation plan is available and includes ecosystem service restoration.	<input type="radio"/> (Note: Applicable provisions are specified under Criteria 1.1 through 1.4, but standard does not explicitly require a conservation management plan.)
Invasive Species	Not explicitly mentioned	1	None identified	<input type="radio"/> Conservation/ management plans are available and include invasive species management and mitigation.	<input checked="" type="radio"/>
Genetically Modified Organisms	Not explicitly mentioned	1	None identified	<input type="radio"/> Cultivation and management practices are available. <input type="radio"/> Management plan is available and includes protocols for GMO monitoring and control.	<input checked="" type="radio"/>
Minimization, Reuse, and Recycling	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way	1	Criterion 2.10.5 The premises have adequate provisions for waste disposal Criterion 2.10.6 There is a farm waste management plan.	<input checked="" type="checkbox"/> Material efficiency plan is available. <input type="radio"/> Primary product %: coproduct % ratio > 1 or <input type="radio"/> equivalent assessments are available.	<input type="radio"/> (Note: Applicable provisions are specified under Criterion 2.10 but do not explicitly require mechanism for tracking production efficiency, such as primary product %: coproduct % ratio or equivalent assessment.)
Hazardous Waste	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way	1	Criterion 4.2.10 The disposal of empty plant protection containers does occur in a manner that avoids exposure to humans and the environment.	<input type="radio"/> Evidence of hazardous material and waste compliance is demonstrated.	<input type="radio"/> (Note: Applicable provision indirectly covered under Criterion 4.2.10 but could be more robustly addressed by providing an explicit mechanism for demonstrating hazardous material and waste compliance.)

Table B-4. ISCC Review and Evaluation Worksheet






Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Compliance with Environmental Laws	ISCC 202 Principle 2: Biomass shall be produced in an environmentally responsible way ISCC 202 Principle 5: Biomass production shall take place in compliance with all applicable regional and national laws and shall follow relevant international treaties	1	Criterion 5.2 There is awareness of, and compliance with, all applicable regional and national laws and ratified international treaties.	<input type="radio"/> Regulatory compliance review process or <input checked="" type="checkbox"/> equivalent alternative is required. <input type="radio"/> Annual corporate compliance statement is required.	 (Note: Applicable provisions identified under Principles 2 and 5. The interview mechanism could be made more robust but corporate compliance statement is a gap.)
Planning, Monitoring, and Continual Improvement	Not explicitly mentioned	1	None identified	<input type="radio"/> EMS documentation or <input type="radio"/> equivalent alternative (based on the scale of the operation) is available.	
Supply Chain Management, COC, and Product Certification	ISCC 303 Requirements for Traceability ISCC 204 Mass balance calculation methodology	1-3	Traceability and mass balance audit	<input checked="" type="checkbox"/> Supply chain and COC program documentation is available. <input checked="" type="checkbox"/> Product certification is achieved and maintained.	 (Note: There are different audit requirements for traceability for each life cycle stage.)
Social Pillar					
Food Security	ISCC 202 Principle 4: Biomass production shall not violate human rights, labor rights or land rights. It shall promote responsible labor conditions and worker's health, safety and welfare and shall be based on responsible community relations	1	Criterion 4.22 Biomass production does not impair food security	<input type="radio"/> Food security screening is available. <input type="radio"/> If screening indicates need, a food security assessment is performed and available.	 (Note: Applicable provisions are specified in Criterion 4.22, but no mechanism to assess food security issues is specified.)
Equity/ Gender Rights	ISCC 202 Principle 4: Biomass production shall not violate human rights, labor rights or land rights. It shall promote responsible labor conditions and worker's health, safety and welfare and shall be based on responsible community relations	1	Criterion 4.2 Employment conditions comply with equality principles Criterion 4.3 There is no indication of discrimination (distinction, exclusion or preference) practiced that denies or impairs equality of opportunity, conditions, or treatment based on individual characteristics and group membership or association. For example, on the basis of: race, caste, nationality, religion, disability, gender etc.	<input checked="" type="checkbox"/> Equal opportunity policy or equivalent alternative is available. <input checked="" type="checkbox"/> Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.	

Table B-4. ISCC Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Labor Rights/ Fair Wage	ISCC 202 Principle 4: Biomass production shall not violate human rights, labor rights or land rights. It shall promote responsible labor conditions and worker’s health, safety and welfare and shall be based on responsible community relations	1	Criterion 4.1 A self-declaration on good social practice regarding human rights has been communicated to the employees and signed by the farm management and the employees representatives	<ul style="list-style-type: none"> ✓ Worker rights and fair labor policies or equivalent alternatives are publicly available. ✓ Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. 	✓
Land Tenure/ Property Rights	ISCC 202 Principle 5: Biomass production shall take place in compliance with all applicable regional and national laws and shall follow relevant international treaties ISCC 202 Principle 6: Good management practices shall be implemented	1	<p>Criterion 5.1 The producer can prove that the land is used legitimately and that traditional land rights have been secured</p> <p>Criterion 6.2 Records are kept for the description of the areas in use</p>	<ul style="list-style-type: none"> ○ Annual corporate compliance statement or ✓ equivalent alternative includes property rights and is available. ✓ Evidence of origin nation legal compliance or ✓ Voluntary ILO convention conformance, as applicable. ✓ Indigenous land rights screening is available, if applicable. 	✓
Occupational Safety and Health	ISCC 202 Principle 3: Safe working conditions through training and education, use of protective clothing and proper and timely assistance in the event of accidents	1	<p>Criterion 3.1 Safe Working Conditions</p> <p>Criterion 3.2 Plant Protection Product Handling</p>	<ul style="list-style-type: none"> ○ Annual corporate compliance statement or ✓ equivalent alternative includes OSH and is available. ✓ OSH policy and training program or Voluntary Protection Program documentation is available. ✓ Evidence of origin nation legal OSH compliance or voluntary OSH policy and training and PPE availability, as applicable. 	✓ (Note: Applicable provisions are specified under Criteria 3.1 and 3.2. However, many of these are considered “minor musts,” of which only 60 percent need to be fulfilled. This could be made more robust by making these provisions mandatory or “major musts.”)

Table B-4. ISCC Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Public Health/ Environmental Justice	Not explicitly mentioned	1	None identified	<ul style="list-style-type: none"> <input type="checkbox"/> Annual corporate compliance statement includes EPCRA or <input type="checkbox"/> equivalent alternative is available <input type="checkbox"/> Environmental justice screening is available and integrated with internal EMS, as applicable. <input type="checkbox"/> Evidence of origin nation legal air quality, water quality, and toxics regulatory compliance is available, as applicable. <input type="checkbox"/> Evidence of origin nation environmental burden screening is available and integrated with internal EMS. 	⊗
Public Outreach/ Stakeholder Participation	ISCC 207 Risk Management	1-3	Risk indicators	<ul style="list-style-type: none"> <input type="checkbox"/> Annual corporate compliance statement or <input type="checkbox"/> equivalent alternative includes NEPA, if applicable, and is available. <input type="checkbox"/> CSER report or <input type="checkbox"/> equivalent alternative is available. <input type="checkbox"/> Evidence of origin nation public notification or access program is available or documented in CSER. 	⊖ (Note: Transparency, including public reporting and involvement of local interest group, is a general risk indicator, but there appears to be no specific mechanism in place to address at this time.)
Transparency	ISCC 207 Risk Management	1-3	Risk indicators	<ul style="list-style-type: none"> <input type="checkbox"/> Annual corporate compliance statement or <input type="checkbox"/> Business plan, certification documentation, and equivalent alternatives are available. <input type="checkbox"/> Evidence of origin nation public notification or access program is available or documented in CSER. 	⊖ (Note: Transparency is a general risk indicator, but there appears to be no specific mechanism in place to address at this time.)

Table B-4. ISCC Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Compliance with Safety, Health, and Participation Laws	ISCC 202 Principle 3: Safe working conditions through training and education, use of protective clothing, and proper and timely assistance in the event of accidents. ISCC 202 Principle 5: Biomass production shall take place in compliance with all applicable regional and national laws and shall follow relevant international treaties.	1	Criterion 5.2 There is awareness of, and compliance with, all applicable regional and national laws and ratified international treaties	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternatives include OSH (and, if applicable, NEPA) provisions and is available. <input type="radio"/> Annual CSER or company website includes transparency and public access provisions.	<input type="radio"/> (Note: Applicable provisions are identified under Principles 3 and 5 and are verified through interviews. However, annual CSER or public transparency access provisions would make standard sufficiently protective.)

Not Addressed/Insufficient
 Topic Covered, but Weak Provisions
 Sufficiently Addressed

Table B-5. RSPO Review and Evaluation Worksheet

Roundtable on Sustainable Palm Oil (RSPO) Review and Evaluation Worksheet

RSPO, Principles and Criteria for Sustainable Palm Oil Production, October 2007

Key Attributes	Evaluation	Sufficiently Aligned?
Consistent	RSPO is a multi-stakeholder organization that seems to be organized in a manner that aligns well with international consensus-based norms and codes. RSPO is an Associate Member of ISEAL. Its criteria directly reference international conventions and agreements, where applicable.	☑
Balanced and Consensus Driven	RSPO is a not-for-profit organization focused on developing consensus on credible global standards for sustainably produced palm oil. Its governance structure and approach appear to engage stakeholders from across the palm oil industry, including “oil palm producers, palm oil processors or traders, consumer goods manufacturers, retailers, banks and investors, environmental or nature conservation NGOs, and social or developmental NGOs,” in its promotion of palm oil-derived products.	☑
Transparent	Detailed information on RSPO, its governance structure, and its principles and criteria is readily accessible to the public via its web portal. Transparency is stressed throughout in every principle, and the criteria are accessible for consumption by the broader public without loss of technical rigor needed to consistently apply the criteria. The standard’s first principle is “Transparency.”	☑
Objective and Traceable	RSPO principles, criteria, indicators, and guidance are clearly written to frame areas of focus, provide guidelines for processes, and identify mechanisms that demonstrate conformance. The standard successfully balances clarity and practical application while also clearly identifying interconnections between principles and criteria. Like many sustainability standards, its objectivity and traceability could be further improved with additional quantitative provisions. While it does attempt to cover the entire palm oil supply chain, it is most applicable to stage 1 and 2 “growers” and “millers” segments, respectively.	☑
Assured and Accredited	RSPO is an Associate Member of ISEAL and is moving toward demonstrated compliance with ISEAL Standard-Setting Code and Impact Code. Accreditation Services International is currently RSPO’s delegated accreditation body and operates its accreditation program for certification bodies. Achieving Full Membership in ISEAL will demonstrate sufficient alignment with this key attribute.	⊖
Relevant	RSPO is appropriately focused on the sustainability aspects of palm oil production and provides commendable coverage across the sustainability spectrum. As such, it is highly relevant for use when evaluating biofuel pathways that utilize palm oil as a feedstock. Its current weaknesses are related to its limited detail on greenhouse gas reduction, GMO, and food security.	☑

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Economic Pillar					
Financial Viability	Principle 3: Commitment to long-term economic and financial viability	1-2	Criterion 3.1 Business and financial management plan Criterion 1.2 Management documents	✓ Business plan is required and available for review with CBI provisions.	✓
	Principle 2: Compliance with applicable laws and regulations	1-2			
	Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills		Criterion 6.10 Fair and transparent exchanges with smallholders and local businesses		
Compliance with Financial Laws and Regulations	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations	✓ Legal and regulatory compliance review process, annual corporate compliance statement, or equivalent alternative is required.	✓
	Principle 1: Commitment to transparency	1-2	Criterion 1.2 Management documents		
Environmental Pillar					
Air Quality	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations	✓ Compliance with air permitting and reporting requirements, if applicable, is demonstrated. ✓ Air emissions management plan is available. ✓ Evidence of origin nation compliance or air management plan, as applicable.	✓
	Principle 5: Environmental responsibility and conservation of natural resources and biodiversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement. Criterion 5.6 Air pollution and GHG plan, implementation, monitoring Criterion 5.5 Minimize open burn disposal		
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA Criterion 7.7 Minimize controlled burn use		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
GHG Emissions	Principle 5: Environmental responsibility and conservation of natural resources and biodiversity	1-2	Criterion 5.6 Air pollution and GHG plan, implementation and monitoring Criterion 5.4 Efficient energy use and renewables Criterion 5.5 Minimize open burn	<ul style="list-style-type: none"> ○ EPA RFS2 program life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). ○ Producer/blender life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). 	<p style="text-align: center;">⊖</p> <p>(Note: Applicable provisions specified under Principles 5 and 8. Principles 5 and 7 of RSPO's pending Principles and Criteria for the Production of Sustainable Palm Oil 2013 includes provisions for GHG emission identification, calculation, and reduction as well as National Interpretation, as evidenced in the RSPO-RED Section 3.2.2 GHG reduction requirement of 35% and 50% starting in 2017. However, the scope is currently limited to stage 1, feedstock cultivation, and stage 2, processing, emissions. National Interpretation for the U.S. would make this requirement more robust.)</p>
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		
	Guidance Document on: RSPO-RED Requirements for compliance with the EU Renewable Energy Directive requirements Version of February 4, 2013	1-2	3.2.2 Requirements on greenhouse gas criterion		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Water Quality	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations	<ul style="list-style-type: none"> ✓ Compliance with CWA and permitted discharges (N, P, or TOC), if applicable, is demonstrated. ✓ Water management plan is available. ✓ Present evidence of BMP use. ✓ Evidence of origin nation water program compliance and water management plan, as applicable. 	<input checked="" type="checkbox"/>
	Principle 5: Environmental responsibility and conservation of natural resources and biodiversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement.		
	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 4.1 Operating procedures available, implemented, and monitored Criterion 4.4 Water management plan, BMPs, and monitoring		
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		
Water Quantity	Principle 5: Environmental responsibility and conservation of natural resources and biodiversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement.	<ul style="list-style-type: none"> ✓ Water management plan includes quantity and is available. ✓ Water demand of renewable water (L/MJ) ✓ Water demand of nonrenewable water (L/MJ) ○ Provision to evidence water rights or ✓ equivalent alternative is available. 	<input checked="" type="checkbox"/>
	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 4.1 Operating procedures available, implemented, and monitored Criterion 4.4 Water management plan, BMPs, and monitoring		
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Soil Health	Principle 5: Environmental responsibility and conservation of natural resources and biodiversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement.	✓ Soil assessments are conducted and management plan is developed and maintained. ✓ Evidence of soil BMP use is available.	✓
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA Criterion 7.2 Soil surveys and site planning		
	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 7.2 Avoidance of marginal and fragile soils Criterion 4.1 Operating procedures available, implemented, and monitored Criterion 4.2 Soil fertility practices Criterion 4.3 Soil erosion control practices		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		
Nutrient Requirements/ Fertilizer Use	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 4.1 Operating procedures available, implemented, and monitored Criterion 4.2 Soil fertility practices	✓ Soil and nutrient management plan or equivalent alternative.	✓
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
Pesticides/ Herbicide Use/ Management Practices	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 4.1 Operating procedures available, implemented, and monitored Criterion 4.5 Integrated pest management (IPM) plan, practices, and monitoring	✓ Pest control and chemical management plan(s) or equivalent alternatives are available.	✓
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 4.6 Agrochemicals BMPs Criterion 2.1 Compliance with laws and regulations		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		
Sustainable Harvest Rates/ Biomass Yield	Principle 3: Commitment to long-term economic and financial viability	1-2	Criterion 3.1 Business and financial management plan	○ Actual yield (MT/ha): Sustainable yield (MT/ha) < 1 or ✓ equivalent assessments are available.	✓
	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 4.2 Soil fertility practices Criterion 4.3 Soil erosion control practices		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Land Use	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA Criterion 7.3 Primary forest or habitat cover change Criterion 7.7 Minimize controlled burn use	<ul style="list-style-type: none"> ○ Product/land use (MT/ha or MJ/ha) factor or ✓ equivalent assessments are available. ✓ Evidence of prior and current land cover type. 	✓
Endangered, Threatened, and Vulnerable Species	Principle 5: Environmental responsibility and conservation of natural resources and biodiversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement. Criterion 5.2 Rare, threatened, or endangered species and high conservation value habitats	<ul style="list-style-type: none"> ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable under the ESA, state law, and natural heritage programs. ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable on the International Union for Conservation of Nature Red List and/or state Natural Heritage Program. ✓ Conservation plan is made available and includes the identification of these species/habitats, and plans for their protection and enhancement. 	✓ (Note: Minimum evaluation requirements were met, but conservation plan requirements could be made more explicit.)
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA Criterion 7.3 Primary forest or habitat cover change		
Native Habitat/ Ecosystem Health Preservation	Principle 5: Environmental responsibility and conservation of natural resources and biodiversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement. Criterion 5.2 Rare, threatened, or endangered species and high conservation value habitats	<ul style="list-style-type: none"> ✓ Conservation plan is made available and includes ecosystem service restoration. 	✓ (Note: Minimum evaluation requirements were met, but conservation plan requirements could be made more explicit.)
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA Criterion 7.3 Primary forest or habitat cover change		
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Invasive Species	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 4.1 Operating procedures available, implemented, and monitored Criterion 4.5 IPM plan, practices, and monitoring Criterion 4.6 Agrochemicals BMPs	✓ Conservation/management plans are available and include invasive species management and mitigation.	☑
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		
Genetically Modified Organisms	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 4.1 Operating procedures available, implemented, and monitored Criterion 4.5 IPM plan, practices, and monitoring	✓ Cultivation and management practices are available. ○ Management plan is available and includes protocols for GMO monitoring and control.	⊖ (Note: Applicable provisions specified under Principles 2, 4, 5, and 8, but the standard does not address GMO-specific cultivar protocols within its management plans or BMPs. ²⁷)
	Principle 5: Environmental responsibility and conservation of natural resources and biodiversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement		
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		
Minimization, Reuse, and Recycling	Principle 5: Environmental responsibility and conservation of natural resources and bio-diversity	1-2	Criterion 5.3 Waste reduction, recycling, reuse, and disposal	✓ Material efficiency plan is available. ○ Primary product %: coproduct % ratio > 1 or ✓ equivalent assessments are available.	☑
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Hazardous Waste	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 4.1 Operating procedures available, implemented, and monitored Criterion 4.6 Agrochemicals BMPs	✓ Evidence of hazardous material and waste compliance is demonstrated.	✓
	Principle 5: Environmental responsibility and conservation of natural resources and bio-diversity	1-2	Criterion 5.3 Waste reduction, recycling, reuse, and disposal		
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		
Compliance with Environmental Laws	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations	✓ Regulatory compliance review process or equivalent alternative is required. ✓ Annual corporate compliance statement is required.	✓
	Principle 1: Commitment to transparency	1-2	Criterion 1.2 Management documents		
Planning, Monitoring, and Continual Improvement	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement	○ EMS documentation or ✓ equivalent alternative (based on the scale of the operation) is available.	✓
	Principle 5: Environmental responsibility and conservation of natural resources and bio-diversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement.		
	Principle 1: Commitment to transparency	1-2	Criterion 1.2 Management documents		
Supply Chain Management, COC, and Product Certification	Principle 1: Commitment to transparency	1-2	Criterion 1.2 Management documents	✓ Supply chain and COC program documentation is available. ✓ Product certification is achieved and maintained.	✓

Table B-5. RSPO Review and Evaluation Worksheet



Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Social Pillar					
Food Security	Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills	1-2	Criterion 6.1 Social impact assessment, plan, mitigation, monitoring, and continual improvement. Criterion 6.11 Local sustainable development	<ul style="list-style-type: none"> ✓ Food security screening is available. ○ If screening indicates need, a food security assessment is performed and available. 	<p style="text-align: center;"></p> <p>(Note: Applicable provisions specified under Principles 6, 7, and 8, but the current standard only briefly identifies food security concerns as an example of broader social impacts being considered.²⁸)</p>
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		
Equity/ Gender Rights	Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills	1-2	Criterion 6.1 Social impact assessment, plan, mitigation, monitoring, and continual improvement. Criterion 6.8 Equal opportunities policy Criterion 6.9 Sexual harassment and violence prevention policy Criterion 6.3 Complaints and grievances system Criterion 6.11 Local sustainable development	<ul style="list-style-type: none"> ✓ Equal opportunity policy or equivalent alternative is available. ✓ Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. 	
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Labor Rights/ Fair Wage	Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills	1-2	Criterion 6.5 Employee wage and conditions Criterion 6.6 Freedom of association and collective bargaining Criterion 6.7 Child labor Criterion 6.3 Complaints and grievances system	<ul style="list-style-type: none"> ✓ Worker rights and fair labor policies or equivalent alternatives are publicly available. ✓ Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. 	✓
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 1: Commitment to transparency	1-2	Criterion 1.2 Management documents		
Land Tenure/ Property Rights	Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills	1-2	Criterion 6.1 Social impact assessment, plan, mitigation, monitoring, and continual improvement.	<ul style="list-style-type: none"> ○ Annual corporate compliance statement or ✓ equivalent alternative includes property rights and is available. ✓ Evidence of origin nation legal compliance or ✓ voluntary ILO convention conformance, as applicable. ✓ Indigenous land rights screening is available, if applicable. 	✓
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations Criterion 2.2 Right to use the land Criterion 2.3 Respect of customary rights		
	Principle 1: Commitment to transparency	1-2	Criterion 1.2 Management documents		
	Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills	1-2	Criterion 6.3 Complaints and grievances system Criterion 6.4 Negotiation system		
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA Criterion 7.5 Consent for plantings Criterion 7.6 Compensation for land or plantings		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Occupational Safety and Health	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations	<ul style="list-style-type: none"> ○ Annual corporate compliance statement or ✓ equivalent alternative includes OSH and is available. ✓ OSH policy and training program or Voluntary Protection Program documentation is available. ✓ Evidence of origin nation legal OSH compliance or voluntary OSH policy and training and PPE availability, as applicable. 	<input checked="" type="checkbox"/>
	Principle 4: Use of appropriate best practices by growers and millers	1-2	Criterion 4.1 Operating procedures available, implemented, and monitored Criterion 4.6 Agrochemicals BMPs Criterion 4.7 OSH Plan communicated and implemented Criterion 4.8 Training		
	Principle 1: Commitment to transparency	1-2	Criterion 1.2 Management documents		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		
Public Health/ Environmental Justice	Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills	1-2	Criterion 6.1 Social impact assessment, plan, mitigation, monitoring, and continual improvement. Criterion 6.3 Complaints and grievances system Criterion 6.4 Negotiation system Criterion 6.11 Local sustainable development	<ul style="list-style-type: none"> ○ Annual corporate compliance statement includes EPCRA or ✓ equivalent alternative is available ✓ Environmental justice screening is available and integrated with internal EMS, as applicable. ✓ Evidence of origin nation legal air quality, water quality, and toxics regulatory compliance is available, as applicable. ✓ Evidence of origin nation environmental burden screening is available and integrated with internal EMS. 	<input checked="" type="checkbox"/>
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA		
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 1: Commitment to transparency	1-2	Criterion 1.2 Management documents		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Public Outreach/ Stakeholder Participation	Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills	1-2	Criterion 6.1 Social impact assessment, plan, mitigation, monitoring, and continual improvement. Criterion 6.2 Communication and consultation methods Criterion 6.3 Complaints and grievances system Criterion 6.4 Negotiation system Criterion 6.11 Local sustainable development	<input type="checkbox"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes NEPA, if applicable, and is available. <input type="checkbox"/> CSER report or <input checked="" type="checkbox"/> equivalent alternative is available. <input checked="" type="checkbox"/> Evidence of origin nation public notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/>
	Principle 7: Responsible development of new plantings	1-2	Criterion 7.1 SEIA		
	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations		
	Principle 1: Commitment to transparency	1-2	Criterion 1.1 Participation in decision making Criterion 1.2 Management documents		
	Principle 5: Environmental responsibility and conservation of natural resources and bio-diversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement		
	Principle 8: Commitment to continual improvement in key areas of activity	1-2	Criterion 8.1 Continual improvement		

Table B-5. RSPO Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Transparency	Principle 1: Commitment to transparency	1-2	Criterion 1.1 Participation in decision making Criterion 1.2 Management documents	○ Annual corporate compliance statement or ✓ Business plan, certification documentation, and equivalent alternatives are available.	☑
	Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills	1-2	Criterion 6.2 Communication and consultation methods Criterion 6.10 Fair and transparent exchanges with smallholders and local businesses Criterion 6.11 Local sustainable development	✓ Evidence of origin notification or access program is available or documented in CSER.	
Compliance with Safety, Health, and Participation Laws	Principle 2: Compliance with applicable laws and regulations	1-2	Criterion 2.1 Compliance with laws and regulations	○ Annual corporate compliance statement or ✓ equivalent alternatives include OSH (and, if applicable, NEPA) provisions and is available.	☑
	Principle 1: Commitment to transparency	1-2	Criterion 1.2 Management documents	✓ Annual CSER or company website includes transparency and public access provisions.	
	Principle 5: Environmental responsibility and conservation of natural resources and bio-diversity	1-2	Criterion 5.1 Environmental impact assessment, plan, mitigation, monitoring, and continual improvement		
⊗ Not Addressed/Insufficient ⊖ Topic Covered, but Weak Provisions ☑ Sufficiently Addressed					

Table B-6. RTRS Standards Review and Evaluation Worksheet

RTRS Standards Review and Evaluation Worksheet		
Roundtable on Responsible Soy (RTRS), Standard for Responsible Soy Production, Version 1.0 (RTRS Producer Standard) RTRS, Chain of Custody Standard, Version 2.1 (RTRS Chain of Custody Standard)		
Key Attributes	Evaluation	Sufficiently Aligned?
Consistent	RTRS’s structures, standards, and certification system seem to generally align well with international norms. RTRS is an ISEAL subscriber but is not currently a member. Notably, the detailed producer standard and complementary chain of custody standard seem to present a deep and wide approach. Likewise, the mechanisms for adapting the standards to particular “national interpretations” seem a prudent approach for maintaining the standard’s consistency while tailoring it to local laws, regulation, and norms.	☑
Balanced and Consensus Driven	RTRS is a not-for-profit organization focused on developing consensus on credible global standards related to promoting sustainable soy products. Its governance structure and approach appear to engage stakeholders from soy producer, industry, and civil society organizations. It is a multi-stakeholder, roundtable approach structured to provide balanced and consensus driven standards and certification structures to effectively expand the sustainable production and use of sustainable soy products.	☑
Transparent	Detailed information on RTRS, its governance structure, its principles and criteria, and certification process are readily accessible to the public via its web portal. The producer standard preamble highlights RTRS’s focus on transparency so the standard can credibly and effectively be used for the certification of sustainable soy products.	☑
Objective and Traceable	RTRS principles, criteria, and guidance are clearly written to frame areas of focus and provide easily understood guidelines to demonstrate conformance for the purposes of certification. The producer standard is written clearly and concisely but would benefit from additional specificity on required processes, mechanisms, and provisions. The producer standard covers soy producer activities well, and the chain of custody standard provides the necessary chain of custody data requirements to ensure downstream traceability.	☑
Assured and Accredited	RTRS is an ISEAL subscriber but is not currently an associate or full member. It is associated with Organismo Argentino de Acreditación (OAA), who is recognized by the IAF as an Accreditation Body Member. As such, RTRS is accepted by a recognized national accreditation body. However, as RTRS has not achieved ISEAL membership or international accreditation, it does not sufficiently address the Assurance and Accreditation key attribute at this time. Achieving ISEAL membership or recognition by an international accreditation body would make RTRS more robust in its alignment with this key attribute.	⊗
Relevant	RTRS is focused on the sustainability aspects of soy product production and provides good coverage across the sustainability spectrum. Aside from its omission of a business plan requirement, the producer standard and certification appear to be highly relevant for use when evaluating biofuel pathways that utilize soybean oil as a feedstock. The standard could, however, be made more robust and relevant through greater topical focus on financial viability, air quality, sustainable yields, and food security. Further detail or requirements for a water management plan would also address the identified gap in the water criteria.	☑

Table B-6. RTRS Standards Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Economic Pillar					
Financial Viability	Not explicitly mentioned	1	None identified	○ Business plan is required and available for review with CBI provisions.	⊗ (Note: No mention or reference identified that focuses on business model viability, planning, management, or sustained performance.)
Compliance with Financial Laws and Regulations	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement	○ Legal and regulatory compliance review process, annual corporate compliance statement, or equivalent alternative is required.	☑ (Note: Minimum evaluation requirements were met, but further details on compliance requirements and process would be more robust.)
Environmental Pillar					
Air Quality	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement	✓ Compliance with air permitting and reporting requirements, if applicable, is demonstrated.	⊗ (Note: Applicable provisions are specified under Principles 1 and 4. The standard does not mention air emissions, except for GHGs.)
	Principle 4: Environmental Responsibility	1	Criterion 4.1 Social and environmental impact assessment (SEIA), mitigate, and minimize Criterion 4.2 Pollution manage and minimize	○ Air emissions management plan is available. ✓ Evidence of origin nation compliance or air management plan, as applicable.	
GHG Emissions	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.2 Pollution manage and minimize Criterion 4.3 GHGs reduced and soil carbon increased	○ EPA RFS2 program life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO ₂ -e/MJ). ○ Producer/blender life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO ₂ -e/MJ).	⊖ (Note: Applicable provisions are identified under Principle 4 and further detailed in the RTRS EU RED compliance documents. However, the standard requires only the EU RED mandated 35% GHG reduction, not the required 50% reduction goal. National interpretation for the U.S. that includes RFS2 compliance would make this requirement sufficiently robust.)
	RTRS EU RED Compliance Requirements	1	RTRS EU RED Compliance Requirements for Producers 3.0_ENG		
		1	RTRS EU RED Compliance Requirements for the Supply Chain 3.0_ENG		
		1-3			

Table B-6. RTRS Standards Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Water Quality	<p>Principle 1: Legal Compliance and Good Business Practice</p> <p>Principle 4: Environmental Responsibility</p> <p>Principle 5: Good Agricultural Practice</p>	1	<p>Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement</p> <p>Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.2 Pollution manage and minimize</p> <p>Criterion 5.1 Water quality and supply maintained and improved Criterion 5.2 Riparian vegetation maintained or reestablished</p>	<p>✓ Compliance with CWA and permitted discharges (N, P, or TOC), if applicable, is demonstrated.</p> <p>○ Water management plan is available.</p> <p>✓ Present evidence of BMP use.</p> <p>✓ Evidence of origin nation water program compliance and water management plan, as applicable.</p>	<p>⊖</p> <p>(Note: Applicable provisions are specified under Principles 1, 4, and 5. However, the standard does not explicitly require a water management plan.)</p>
Water Quantity	<p>Principle 5: Good Agricultural Practice</p> <p>Principle 1: Legal Compliance and Good Business Practice</p>	<p>1</p> <p>1</p>	<p>Criterion 5.1 Water quality and supply maintained and improved Criterion 5.2 Riparian vegetation maintained or reestablished</p> <p>Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement</p>	<p>○ Water management plan includes quantity and is available.</p> <p>✓ Water demand of renewable water (L/MJ)</p> <p>✓ Water demand of nonrenewable water (L/MJ)</p> <p>✓ Provision to evidence water rights or equivalent alternative is available.</p>	<p>⊖</p> <p>(Note: Applicable provisions are specified under Principles 1, 4, and 5. However, the standard does not explicitly require a water management plan. Criterion 5.1 includes a highly applicable provision under 5.1.4 and would be sufficiently robust, except that it is applicable only to producers with irrigated land, or in group certifications of small farms when irrigated and not using BMPs.)</p>
Soil Health	<p>Principle 4: Environmental Responsibility</p> <p>Principle 5: Good Agricultural Practice</p>	<p>1</p> <p>1</p>	<p>Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.3 GHGs reduced and soil carbon increased</p> <p>Criterion 5.3 Soil quality is managed, maintained, and improved via BMPs</p>	<p>✓ Soil assessments are conducted and management plan is developed and maintained.</p> <p>✓ Evidence of soil BMP use is available.</p>	<p>✓</p>

Table B-6. RTRS Standards Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Nutrient Requirements/ Fertilizer Use	Principle 5: Good Agricultural Practice	1	Criterion 5.3 Soil quality is managed, maintained, and improved via BMPs Criterion 5.5 Agrochemicals managed, monitored, and compliant with BMPs Criterion 5.6 No prohibited agrochemicals Criterion 5.9 Agrochemical drift prevention measures	<input type="radio"/> Soil and nutrient management plan or <input checked="" type="checkbox"/> equivalent alternative.	<input checked="" type="checkbox"/>
	Principle 4: Environmental Responsibility	1	Criteria 4.1 SEIA, mitigate, and minimize Criteria 4.2 Pollution manage and minimize		
Pesticides/ Herbicide Use/ Management Practices	Principle 5: Good Agricultural Practice	1	Criterion 5.4 Integrated Crop Management techniques Criterion 5.5 Agrochemicals managed, monitored, and compliant with BMPs Criterion 5.6 No prohibited agrochemicals Criterion 5.7 Biological control agents managed, monitored, and controlled Criterion 5.9 Agrochemical drift prevention measures	<input checked="" type="checkbox"/> Pest control and chemical management plan(s) or equivalent alternatives are available.	<input checked="" type="checkbox"/>
	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.2 Pollution manage and minimize		
Sustainable Harvest Rates/ Biomass Yield	Principle 5: Good Agricultural Practice		Criterion 5.10 Production systems coexistence measures Criterion 5.11 Seeds management and control measures	<input type="radio"/> Actual yield (MT/ha): Sustainable yield (MT/ha) < 1 or <input type="radio"/> equivalent assessments are available.	<input type="radio"/> (Note: Principle 5's intent is highly relevant. However, the standard does not explicitly mention or focus on yield and productivity.)
Land Use	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.2 Pollution manage and minimize Criterion 4.3 GHGs reduced and soil carbon increased Criterion 4.4 Responsible soy expansion	<input type="radio"/> Product/land use (MT/ha or MJ/ha) factor or <input checked="" type="checkbox"/> equivalent assessments are available. <input checked="" type="checkbox"/> Evidence of prior and current land cover type.	<input checked="" type="checkbox"/>

Table B-6. RTRS Standards Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Endangered, Threatened, and Vulnerable Species	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement	<ul style="list-style-type: none"> ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable under the ESA, state law, and natural heritage programs. ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable on the International Union for Conservation of Nature Red List and/or state Natural Heritage Program. ✓ Conservation plan is made available and includes the identification of these species/habitats, and plans for their protection and enhancement. 	<input checked="" type="checkbox"/> (Note: Conservation plan provision is specified in Criterion 4.5 Guidance notes.)
	Principle 4: Environmental Responsibility		Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.4 Responsible soy expansion Criterion 4.5 On-farm biodiversity and native vegetation preserved		
	Principle 5: Good Agricultural Practice	1	Criterion 5.2 Riparian vegetation maintained or reestablished		
Native Habitat/ Ecosystem Health Preservation	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.4 Responsible soy expansion Criterion 4.5 On-farm biodiversity and native vegetation preserved	<ul style="list-style-type: none"> ○ Conservation plan is made available and includes ecosystem service restoration. 	<input checked="" type="checkbox"/> (Note: Conservation plan provision is specified in Criteria 4.5 Guidance notes.)
	Principle 5: Good Agricultural Practice	1	Criterion 5.2 Riparian vegetation maintained or reestablished		
Invasive Species	Principle 5: Good Agricultural Practice	1	Criterion 5.7 Biological control agents managed, monitored, and controlled Criterion 5.8 Invasives plan, manage, monitor, control, and minimize Criterion 5.11 Seeds management and control measures	<ul style="list-style-type: none"> ✓ Conservation/ management plans are available and include invasive species management and mitigation. 	<input checked="" type="checkbox"/> (Note: Conservation plan provision is specified in Criteria 4.5 Guidance notes.)
	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.5 On-farm biodiversity and native vegetation preserved		

Table B-6. RTRS Standards Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Genetically Modified Organisms	Principle 5: Good Agricultural Practice	1	Criterion 5.7 Biological control agents managed, monitored, and controlled Criterion 5.8 Invasives plan, manage, monitor, control, and minimize Criterion 5.11 Seeds management and control measures	<ul style="list-style-type: none"> ✓ Cultivation and management practices are available. ✓ Management plan is available and includes protocols for GMO monitoring and control. 	✓
	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.5 On-farm biodiversity and native vegetation preserved		
Minimization, Reuse, and Recycling	Principle 4: Environmental Responsibility		Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.2 Pollution manage and minimize	<ul style="list-style-type: none"> ✓ Material efficiency plan is available. ○ Primary product %: coproduct % ratio > 1 or ✓ equivalent assessments are available. 	✓ (Note: Minimum evaluation requirements were met, but further details on or a requirement for a material efficiency plan would make coverage more robust.)
Hazardous Waste	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws	<ul style="list-style-type: none"> ✓ Evidence of hazardous material and waste compliance is demonstrated. 	✓
	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.2 Pollution manage and minimize		
	Principle 5: Good Agricultural Practice	1	Criterion 5.4 Integrated crop management techniques Criterion 5.5 Agrochemicals managed, monitored, and compliant with BMPs		
Compliance with Environmental Laws	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.2 Pollution manage and minimize	<ul style="list-style-type: none"> ○ Regulatory compliance review process or ✓ equivalent alternative is required. ✓ Annual corporate compliance statement is required. 	✓ (Note: Minimum evaluation requirements were met, but further details on compliance requirements and process would make coverage more robust.)
	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws		
Planning, Monitoring, and Continual Improvement	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.3 Continual improvement	<ul style="list-style-type: none"> ○ EMS documentation or ✓ equivalent alternative (based on the scale of the operation) is available. 	✓
	Principle 4: Environmental Responsibility		Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.2 Pollution manage and minimize		

Table B-6. RTRS Standards Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Supply Chain Management, COC, and Product Certification	RTRS Chain of Custody Standard, Version 2.1	1-4		<ul style="list-style-type: none"> ✓ Supply chain and COC program documentation is available. ✓ Product certification is achieved and maintained. 	✓
	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.3 Continual improvement		
Social Pillar					
Food Security	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize	<ul style="list-style-type: none"> ○ Food security screening is available. ○ If screening indicates need, a food security assessment is performed and available. 	⊖ (Note: Applicable provisions are specified under Principle 4 and in a brief mention in Criterion 5.1 Guidance. The standard addresses food security concerns only peripherally in the context of broader social impacts or trade-offs in an emergency setting, such as a drought.)
Equity/ Gender Rights	Principle 2: Responsible Labor Conditions	1	Criterion 2.1 Child labor, forced labor, discrimination, and harassment prohibited Criterion 2.4 Remuneration	<ul style="list-style-type: none"> ○ Equal opportunity policy or ✓ equivalent alternative is available. ✓ Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. 	✓
	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement		
Labor Rights/ Fair Wage	Principle 2: Responsible Labor Conditions	1	Criterion 2.1 Child labor, forced labor, discrimination, and harassment prohibited Criterion 2.2 Workers informed and trained on rights and duties Criterion 2.4 Freedom of association and collective bargaining Criterion 2.4 Remuneration	<ul style="list-style-type: none"> ○ Worker rights and fair labor policies or ✓ equivalent alternatives are publicly available. ✓ Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. 	✓
	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement		

Table B-6. RTRS Standards Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Land Tenure/ Property Rights	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.2 Legal use rights to the land	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes property rights and is available.	<input checked="" type="checkbox"/>
	Principle 3: Responsible Community Relations	1	Criterion 3.1 Communication and dialogue channels Criterion 3.2 Traditional land use conflicts avoided Criterion 3.3 Complaints and grievance mechanism	<input checked="" type="checkbox"/> Evidence of origin nation legal compliance or <input type="radio"/> voluntary ILO convention conformance, as applicable.	
	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize Criterion 4.4 Responsible soy expansion	<input checked="" type="checkbox"/> Indigenous land rights screening is available, if applicable.	
Occupational Safety and Health	Principle 2: Responsible Labor Conditions	1	Criterion 2.1 Child labor, forced labor, discrimination, and harassment prohibited Criterion 2.2 Workers informed and trained on rights and duties Criterion 2.3 Safe and healthy workplace	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes OSH and is available. <input checked="" type="checkbox"/> OSH policy and training program or Voluntary Protection Program documentation is available.	<input checked="" type="checkbox"/>
	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement	<input checked="" type="checkbox"/> Evidence of origin nation legal OSH compliance or voluntary OSH policy and training and PPE availability, as applicable.	
	Principle 5: Good Agricultural Practice	1	Criterion 5.5 Agrochemicals managed, monitored, and compliant with BMPs		
Public Health/ Environmental Justice	Principle 3: Responsible Community Relations	1	Criterion 3.1 Communication and dialogue channels Criterion 3.3 Complaints and grievance mechanism	<input type="radio"/> Annual corporate compliance statement includes EPCRA or <input checked="" type="checkbox"/> equivalent alternative is available <input checked="" type="checkbox"/> Environmental justice screening is available and integrated with internal EMS, as applicable.	<input checked="" type="checkbox"/> (Note: Minimum evaluation requirements were met, but further details on integration with continual improvement mechanisms would make coverage more robust.)
	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize	<input checked="" type="checkbox"/> Evidence of origin nation legal air quality, water quality, and toxics regulatory compliance is available, as applicable.	
	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement		
	Principle 5: Good Agricultural Practice	1	Criterion 5.9 Agrochemical drift prevention measures	<input checked="" type="checkbox"/> Evidence of origin nation environmental burden screening is available and integrated with internal EMS.	

Table B-6. RTRS Standards Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Public Outreach/ Stakeholder Participation	Principle 3: Responsible Community Relations	1	Criterion 3.1 Communication and dialogue channels Criterion 3.2 Traditional land use conflicts avoided Criterion 3.3 Complaints and grievance mechanism Criterion 3.4 Fair employment, training, and access opportunities	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes NEPA, if applicable, and is available. <input type="radio"/> CSER report or <input checked="" type="checkbox"/> equivalent alternative is available. <input checked="" type="checkbox"/> Evidence of origin nation public notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/>
	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement		
Transparency	Principle 3: Responsible Community Relations	1	Criterion 3.1 Communication and dialogue channels Criterion 3.3 Complaints and grievance mechanism Criterion 3.4 Fair employment, training, and access opportunities	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> Business plan, certification documentation, and equivalent alternatives are available. <input checked="" type="checkbox"/> Evidence of origin nation public notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/>
	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws Criterion 1.3 Continual improvement		
Compliance with Safety, Health, and Participation Laws	Principle 1: Legal Compliance and Good Business Practice	1	Criterion 1.1 Awareness of and compliance with laws	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternatives include OSH (and, if applicable, NEPA) provisions and is available. <input checked="" type="checkbox"/> Annual CSER or company website includes transparency and public access provisions.	<input checked="" type="checkbox"/> (Note: Minimum evaluation requirements were met, but further details on compliance requirements and process would make coverage more robust.)
	Principle 4: Environmental Responsibility	1	Criterion 4.1 SEIA, mitigate, and minimize		
	Principle 3: Responsible Community Relations		Criterion 3.1 Communication and dialogue channels Criterion 3.3 Complaints and grievance mechanism Criterion 3.4 Fair employment, training, and access opportunities		
<input checked="" type="checkbox"/> Not Addressed/Insufficient <input type="checkbox"/> Topic Covered, but Weak Provisions <input checked="" type="checkbox"/> Sufficiently Addressed					

Table B-7. Bonsucro Standard Review and Evaluation Worksheet

Bonsucro Standard Review and Evaluation Worksheet		
Bonsucro Production Standard, Including Bonsucro EU Production Standard, Version 3.0, March 2011		
Key Attributes	Evaluation	Sufficiently Aligned?
Consistent	Bonsucro is an Associate Member of ISEAL and has applied the ISEAL Code of Best Practice in the development of the Bonsucro Production Standard. Bonsucro has developed a detailed producer standard and a complementary chain of custody standard that seems consistent with good practice and other commodity-oriented sustainable product standards.	✓
Balanced and Consensus Driven	The producer standard covers all pillars of sustainability. Bonsucro is a not-for-profit, multi-stakeholder association focused on moving toward, promoting, and certifying sustainable sugar cane products. While not utilizing the more common roundtable type structure, this sugarcane industry member-based association has a newly approved Code of Conduct for Bonsucro members. This code’s preamble describes Bonsucro as “an open, voluntary, not-for-profit multi-stakeholder organization aiming to improve the social, environmental, and economic sustainability of sugar cane production.”	✓
Transparent	Bonsucro provides clear and detailed information on its organization, code of conduct, and standards on its public web portal. Both its code of conduct and producer standard preamble highlight a focus on transparency so as to ensure “integrity, credibility and continued progress” in its efforts to move the sugar cane industry toward sustainable practices and products.	✓
Objective and Traceable	The production standard principles, criteria, and indicators are clearly written to frame areas of focus and provide specific metrics and auditor verification requirements. The producer standard is written concisely and provides specific metrics and requirements to aid in certification. The producer standard covers sugar cane producer and chain of custody requirements to help ensure downstream traceability.	✓
Assured and Accredited	Bonsucro is a Full Member of ISEAL and, as such, is shown to be compliant with ISEAL Standards-Setting Code and Impact Code.	✓
Relevant	Bonsucro provides fairly well-balanced coverage of the sustainability aspects of sugar cane production and processing. The producer standard and certification appear to be highly relevant for use when evaluating stage 1 of biofuel pathways that utilize sugar as a feedstock. The producer standard could be made even more robust and relevant through greater topical coverage of food security and by including explicit requirements for business plan, GMO management, and GHG reduction goal provisions. ²⁹	✓

Table B-7. Bonsucro Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Economic Pillar					
Financial Viability	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.9 Promote economic sustainability	○ Business plan is required and available for review with CBI provisions.	⊖ (Note: Applicable provisions are specified under Principle 5. However, the standard does not explicitly require a business plan or similar provision.)
Compliance with Financial Laws and Regulations	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws	○ Legal and regulatory compliance review process, annual corporate compliance statement, or ✓ equivalent alternative is required.	✓ (Note: Evaluation requirements are met through indicator, auditor, and verification provisions but could be made more robust by explicitly requiring a process or compliance statement mechanism. ³⁰⁾)
Environmental Pillar					
Air Quality	Principle 1: Obey the law Principle 4: Actively manage biodiversity and ecosystem services Principle 5: Continually improve key areas of the business	1-2 1-2 1-2	Criterion 1.1 Comply with applicable laws Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures Criterion 5.4 Promote energy efficiency Criterion 5.5 Reduce emissions and effluents and promote recycling Criterion 5.7 Consultative and participatory environmental and social impact assessment (ESIA)	✓ Compliance with air permitting and reporting requirements, if applicable, is demonstrated. ✓ Air emissions management plan is available. ✓ Evidence of origin nation compliance or air management plan, as applicable.	✓ (Note: Evaluation requirements are met through indicator, EMP, and mitigation mechanisms.)

Table B-7. Bonsucro Standard Review and Evaluation Worksheet





Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
GHG Emissions	Principle 3: Manage input, production, and processing efficiencies to enhance sustainability	1-2	Criterion 3.2 Monitor and minimize GHG/MJ	<ul style="list-style-type: none"> ○ EPA RFS2 program life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). ○ Producer/blender life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). 	<p style="text-align: center;"></p> <p>(Note: Applicable provisions are specified under Principles 3 and 5 and Section 6. However, the standard does not seem to explicitly require a reduction goal or similar provision at this time.)</p>
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.4 Promote energy efficiency		
	Section 6: Additional mandatory requirement under the EU RED (2009/28/EC)	1-2	Criterion 6.1 Monitor GHG emissions and minimizing climate change impacts Criterion 6.2 Protect biodiversity, high-carbon stock, and peatlands		
Water Quality	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws	<ul style="list-style-type: none"> ✓ Compliance with CWA and permitted discharges (N, P, or TOC), if applicable, is demonstrated. ✓ Water management plan is available. ✓ Present evidence of BMP use. ✓ Evidence of origin nation water program compliance and water management plan, as applicable. 	<p style="text-align: center;"></p> <p>(Note: Evaluation requirements are met through indicator, EMP, and mitigation mechanisms.)</p>
	Principle 4: Actively manage biodiversity and ecosystem services	1-2	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures		
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.2 Continual improvement of resources Criterion 5.7 Consultative and participatory ESIA		
Water Quantity	Principle 4: Actively manage biodiversity and ecosystem services	1-2	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures	<ul style="list-style-type: none"> ✓ Water management plan includes quantity and is available. ✓ Water demand of renewable water (L/MJ) ✓ Water demand of nonrenewable water (L/MJ) ✓ Provision to evidence water rights or equivalent alternative is available. 	<p style="text-align: center;"></p> <p>(Note: Evaluation requirements are met through indicator, EMP, mitigation, and continual improvement metrics. However, standard could be made more robust by separating renewable and nonrenewable water resources.)</p>
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.2 Continual improvement of resources Criterion 5.7 Consultative and participatory ESIA		
Soil Health	Principle 4: Actively manage biodiversity and ecosystem services	1	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures	<ul style="list-style-type: none"> ✓ Soil assessments are conducted and management plan is developed and maintained. ✓ Evidence of soil BMP use is available. 	<p style="text-align: center;"></p>
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.2 Continual improvement of resources Criterion 5.7 Consultative and participatory ESIA		

Table B-7. Bonsucro Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Nutrient Requirements/ Fertilizer Use	Principle 4: Actively manage biodiversity and ecosystem services	1	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures	<input type="radio"/> Soil and nutrient management plan or <input checked="" type="checkbox"/> equivalent alternative.	<input checked="" type="checkbox"/> (Note: Evaluation requirements are met through indicator, EMP, and mitigation mechanisms.)
	Principle 5: Continually improve key areas of the business	1	Criterion 5.7 Consultative and participatory ESIA		
Pesticides/ Herbicide Use/ Management Practices	Principle 4: Actively manage biodiversity and ecosystem services	1	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures	<input type="radio"/> Pest control and chemical management plan(s) or <input checked="" type="checkbox"/> equivalent alternatives are available.	<input checked="" type="checkbox"/> (Note: Evaluation requirements are met through indicator, EMP, and mitigation mechanisms.)
	Principle 5: Continually improve key areas of the business	1	Criterion 5.7 Consultative and participatory ESIA		
Sustainable Harvest Rates/ Biomass Yield	Principle 3: Manage input, production, and processing efficiencies to enhance sustainability	1-2	Criterion 3.1 Monitor, measure, and improve efficiency	<input checked="" type="checkbox"/> Actual yield (MT/ha): Sustainable yield (MT/ha) < 1 or <input checked="" type="checkbox"/> equivalent assessments are available.	<input checked="" type="checkbox"/>
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.3 Continual improvement of products		
Land Use	Principle 3: Manage input, production, and processing efficiencies to enhance sustainability	1	Criterion 3.1 Monitor, measure, and improve efficiency	<input checked="" type="checkbox"/> Product/land use (MT/ha or MJ/ha) factor or <input type="radio"/> equivalent assessments are available. <input checked="" type="checkbox"/> Evidence of prior and current land cover type.	<input checked="" type="checkbox"/>
	Principle 4: Actively manage biodiversity and ecosystem services	1	Criterion 4.1 Assess impacts on biodiversity and ecosystem services		
	Principle 5: Continually improve key areas of the business	1	Criterion 5.7 Consultative and participatory ESIA		
	Section 6: Additional mandatory requirement under the EU RED (2009/28/EC)	1	Criterion 6.2 Protect biodiversity, high-carbon stock, and peatlands		

Table B-7. Bonsucro Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Endangered, Threatened, and Vulnerable Species	Principle 1: Obey the law	1	Criterion 1.1 Comply with applicable laws	<ul style="list-style-type: none"> ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable under the ESA, state law, and natural heritage programs. ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable on the International Union for Conservation of Nature Red List and/or state Natural Heritage Program. ✓ Conservation plan is made available and includes the identification of these species/habitats, and plans for their protection and enhancement. 	<input checked="" type="checkbox"/>
	Principle 4: Actively manage biodiversity and ecosystem services	1	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures		
	Principle 5: Continually improve key areas of the business	1	Criterion 5.7 Consultative and participatory ESIA		
Native Habitat/ Ecosystem Health Preservation	Principle 4: Actively manage biodiversity and ecosystem services	1	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures	<ul style="list-style-type: none"> ✓ Conservation plan is made available and includes ecosystem service restoration. 	<input checked="" type="checkbox"/>
	Principle 5: Continually improve key areas of the business	1	Criterion 5.7 Consultative and participatory ESIA		
	Section 6: Additional mandatory requirement under the EU RED (2009/28/EC)	1	Criterion 6.2 Protect biodiversity, high-carbon stock, and peatlands		
Invasive Species	Principle 4: Actively manage biodiversity and ecosystem services	1	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures	<ul style="list-style-type: none"> ✓ Conservation/ management plans are available and include invasive species management and mitigation. 	<input checked="" type="checkbox"/>
	Principle 5: Continually improve key areas of the business	1	Criterion 5.7 Consultative and participatory ESIA		

Table B-7. Bonsucro Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Genetically Modified Organisms	Principle 4: Actively manage biodiversity and ecosystem services	1	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures	<input checked="" type="checkbox"/> Cultivation and management practices are available. <input type="checkbox"/> Management plan is available and includes protocols for GMO monitoring and control.	<input type="checkbox"/> (Note: Applicable provisions are specified under Principles 4 and 5, but the standard does not explicitly address GMO-specific cultivar protocols within its management plans or mitigations.)
	Principle 5: Continually improve key areas of the business	1	Criterion 5.7 Consultative and participatory ESIA		
Minimization, Reuse, and Recycling	Principle 3: Manage input, production, and processing efficiencies to enhance sustainability	1-2	Criterion 3.1 Monitor, measure, and improve efficiency	<input checked="" type="checkbox"/> Material efficiency plan is available. <input type="checkbox"/> Primary product %: coproduct % ratio > 1 or <input checked="" type="checkbox"/> equivalent assessments are available.	<input checked="" type="checkbox"/> (Note: Evaluation requirements are met through indicator, EMP, and mitigation mechanisms, but standard could be made more robust by explicitly requiring a material efficiency plan.)
	Principle 4: Actively manage biodiversity and ecosystem services	1-2	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures		
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.3 Continual improvement of product Criterion 5.5 Reduce emissions and effluents and promote recycling		
Hazardous Waste	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws	<input checked="" type="checkbox"/> Evidence of hazardous material and waste compliance is demonstrated.	<input checked="" type="checkbox"/> (Note: Evaluation requirements are met through indicator, auditor, and verification provisions, but standard could be made more robust by explicitly requiring a process or compliance statement mechanism. ³¹)
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.5 Reduce emissions and effluents and promote recycling		
Compliance with Environmental Laws	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws	<input type="checkbox"/> Regulatory compliance review process or <input checked="" type="checkbox"/> equivalent alternative is required. <input type="checkbox"/> Annual corporate compliance statement is required.	<input checked="" type="checkbox"/> (Note: Evaluation requirements are met through indicator, auditor, and verification provisions, but standard could be made more robust by explicitly requiring a process or compliance statement mechanism. ³²)

Table B-7. Bonsucro Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Planning, Monitoring, and Continual Improvement	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.1 Employee training Criterion 5.4 Promote energy efficiency Criterion 5.6 Foster research, development and extension Criterion 5.7 Consultative and participatory ESIA	<input type="radio"/> EMS documentation or <input checked="" type="checkbox"/> equivalent alternative (based on the scale of the operation) is available.	<input checked="" type="checkbox"/>
	Principle 3: Manage input, production, and processing efficiencies to enhance sustainability	1-2	Criterion 3.1 Monitor, measure, and improve efficiency		
Supply Chain Management, COC, and Product Certification	Section 7: Chain of custody requirements	1-4	Criterion 7.1 Traceability Criterion 7.2 Identification, traceability, and verifiability Criterion 7.3 Control of mass balance system Criterion 7.4 Control of consignments Criterion 7.5 Control of mixes of consignments 7.6 Control of splitting of consignments from mixes	<input checked="" type="checkbox"/> Supply chain and COC program documentation is available. <input checked="" type="checkbox"/> Product certification is achieved and maintained.	<input checked="" type="checkbox"/>
Social Pillar					
Food Security	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.7 Consultative and participatory ESIA	<input type="radio"/> Food security screening is available. <input type="radio"/> If screening indicates need, a food security assessment is performed and available.	<input checked="" type="checkbox"/> (Note: Applicable provisions are specified under Principle 5, but the standard does not appear to explicitly identify food as a topic of consideration.)
Equity/ Gender Rights	Principle 2: Respect human rights and labor standards	1-2	Criterion 2.1 Comply with ILO conventions on child labor, forced labor, discrimination, freedom of association, and collective bargaining Criterion 2.2 Apply human rights and labor standards in contracts Criterion 2.5 Clear, equitable, and comprehensive worker contracts	<input type="radio"/> Equal opportunity policy or <input checked="" type="checkbox"/> equivalent alternative is available. <input checked="" type="checkbox"/> Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.	<input checked="" type="checkbox"/> (Note: Evaluation requirements are met through indicator and auditor verification mechanisms, rather than policy statement.)
	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws		

Table B-7. Bonsucro Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Labor Rights/ Fair Wage	Principle 2: Respect human rights and labor standards	1-2	Criterion 2.1 Comply with ILO conventions on child labor, forced labor, discrimination, freedom of association, and collective bargaining Criterion 2.2 Apply human rights and labor standards in contracts Criterion 2.4 Minimum wage provided Criterion 2.5 Clear, equitable, and comprehensive worker contracts	<input type="radio"/> Worker rights and fair labor policies or <input checked="" type="checkbox"/> equivalent alternatives are publicly available. <input checked="" type="checkbox"/> Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable.	<input checked="" type="checkbox"/> (Note: Evaluation requirements are met through indicator and auditor verification mechanisms, rather than policy statement.)
	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws		
Land Tenure/ Property Rights	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws Criterion 1.2 Demonstrate title to land	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes property rights and is available. <input checked="" type="checkbox"/> Evidence of origin nation legal compliance or <input checked="" type="checkbox"/> voluntary ILO convention conformance, as applicable. <input checked="" type="checkbox"/> Indigenous land rights screening is available, if applicable.	<input checked="" type="checkbox"/>
	Principle 4: Actively manage biodiversity and ecosystem services	1-2	Criterion 4.1 Assess impacts on biodiversity and ecosystem services Criterion 4.2 Mitigation measures		
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.7 Consultative and participatory ESIA		
Occupational Safety and Health	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws Criterion 2.3 Safe and healthy work place	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes OSH and is available. <input checked="" type="checkbox"/> OSH policy and training program or Voluntary Protection Program documentation is available. <input checked="" type="checkbox"/> Evidence of origin nation legal OSH compliance or voluntary OSH policy and training and PPE availability, as applicable.	<input checked="" type="checkbox"/> (Note: Evaluation requirements are met through indicator and auditor verification mechanisms, rather than policy statement.)
	Principle 2: Respect human rights and labor standards	1-2	Criterion 5.1 Employee training Criterion 5.6 Foster research, development, and extension		
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.7 Consultative and participatory ESIA		

Table B-7. Bonsucro Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Public Health/ Environmental Justice	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws	<input type="radio"/> Annual corporate compliance statement includes EPCRA or <input checked="" type="checkbox"/> equivalent alternative is available <input checked="" type="checkbox"/> Environmental justice screening is available and integrated with internal EMS, as applicable. <input checked="" type="checkbox"/> Evidence of origin nation legal air quality, water quality, and toxics regulatory compliance is available, as applicable. <input checked="" type="checkbox"/> Evidence of origin nation environmental burden screening is available and integrated with internal EMS.	<input checked="" type="checkbox"/>
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.7 Consultative and participatory ESIA Criterion 5.8 Active engagement, transparency, consultative and participatory processes		
Public Outreach/ Stakeholder Participation	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> equivalent alternative includes NEPA, if applicable, and is available. <input type="radio"/> CSER report or <input checked="" type="checkbox"/> equivalent alternative is available. <input checked="" type="checkbox"/> Evidence of origin nation public notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/>
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.7 Consultative and participatory ESIA Criterion 5.8 Active engagement, transparency, consultative and participatory processes		
Transparency	Principle 1: Obey the law	1-2	Criterion 1.1 Comply with applicable laws	<input type="radio"/> Annual corporate compliance statement or <input checked="" type="checkbox"/> Business plan, certification documentation, and equivalent alternatives are available. <input checked="" type="checkbox"/> Evidence of origin nation public notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/>
	Principle 5: Continually improve key areas of the business	1-2	Criterion 5.7 Consultative and participatory ESIA Criterion 5.8 Active engagement, transparency, consultative and participatory processes		
	Section 7: Chain of custody requirements	1-4	Criterion 7.1 Traceability		

Table B-7. Bonsucro Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Compliance with Safety, Health, and Participation Laws	Principle 1: Obey the law Principle 5: Continually improve key areas of the business	1-2 1-2	Criterion 1.1 Comply with applicable laws Criterion 5.7 Consultative and participatory ESIA Criterion 5.8 Active engagement, transparency, consultative and participatory processes	○ Annual corporate compliance statement or ✓ equivalent alternatives include OSH (and, if applicable, NEPA) provisions and is available. ✓ Annual CSER or company website includes transparency and public access provisions.	<input checked="" type="checkbox"/>
⊗ Not Addressed/Insufficient ⊖ Topic Covered, but Weak Provisions ☑ Sufficiently Addressed					

Table B-8. FSC Standard Review and Evaluation Worksheet

FSC Standard Review and Evaluation Worksheet		
Forest Stewardship Council (FSC), International Standard, FSC Principles, and Criteria for Forest Stewardship, Version 5-0 ³³		
Key Attributes	Evaluation	Sufficiently Aligned?
Consistent	FSC in many ways pioneered international product sustainability standards and certification systems. FSC is a Full Member of ISEAL. Version 5-0 of the FSC international standard was developed with the intent to reflect and ensure consistency with the ISEAL Code of Good Practice, ISO/IEC Guide 59 Code of Good Practice, and WTO Agreement on Technical Barriers to Trade (TBT) and Adoption and Application of Standards (January 1995). The principles, criteria, and supplementary international indicators appear to be highly consistent with best practice.	☑
Balanced and Consensus Driven	The FSC international standard covers and elaborates on all pillars of sustainability. Organizationally, FSC is independent and not-for-profit, with a diverse membership that is open to organizations and individuals. Its stated intent is to “set standards under which forests and companies are certified. Our membership consists of three equally weighted chambers—environmental, economic, and social—to ensure the balance and the highest level of integrity.”	☑
Transparent	FSC provides clear and detailed information on its organization, standards, and certification on its public web portal. The FSC international standard emphasizes transparency throughout its preface and within criteria under its principles.	☑
Objective and Traceable	The FSC international standard presents principles and criteria that are clearly written and highly detailed. Great care and effort was obviously invested to consistently define terms and develop commendable specificity in the requirements. This high level of detail is necessary but could be presented in a more accessible manner to aid in understanding, auditing, and certification.	☑
Assured and Accredited	FSC is a Full Member of ISEAL and, as such, demonstrates compliance with ISEAL Standard -Setting Code and Impact Code. Accreditation Services International is FSC’s delegated accreditation body and operates their accreditation program.	☑
Relevant	FSC’s international standard provides balanced coverage of the sustainability aspects and a well-established certification program both in the United States and internationally. It is highly relevant for evaluating stage 1 of biofuel pathways that utilize forest products and wastes as a feedstock. Food security and GHG reduction goals are the only two areas that are not explicitly and robustly addressed. FSC currently considers them to be outside the scope of requirements for their forest management certification program.	☑

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Economic Pillar					
Financial Viability	Principle 5: Benefits from the Forest	1	Criterion 5.1 Identify, produce products and diversified benefits Criterion 5.2 Harvest products and services at sustainable rate Criterion 5.3 Develop management plan and consider externalities Criterion 5.4 Local processing and services Criterion 5.5 Plan and demonstrate long-term commitment to economic viability	✓ Business plan is required and available for review with CBI provisions.	<input checked="" type="checkbox"/>
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.3 Management plan includes objectives Criterion 7.4 Update and review management plan Criterion 7.5 Management plan summary publicly available		
	Principle 10: Implementation of Management Activities	1			
Compliance with Financial Laws and Regulations	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	✓ Legal and regulatory compliance review process, annual corporate compliance statement, or equivalent alternative is required.	<input checked="" type="checkbox"/>
Environmental Pillar					
Air Quality	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	✓ Compliance with air permitting and reporting requirements, if applicable, is demonstrated. ✓ Air emissions management plan is available. ✓ Evidence of origin nation compliance or air management plan, as applicable.	<input checked="" type="checkbox"/>
	Principle 4: Community Relations	1	Criterion 4.5 Identify, avoid, and mitigate impacts via engagement		
	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations		
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.4 Update and review management plan		

Table B-8. FSC Standard Review and Evaluation Worksheet



Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
GHG Emissions	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations	<ul style="list-style-type: none"> ○ EPA RFS2 program life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). ○ Producer/blender life cycle GHG emissions are >50% better than 2005 petroleum baseline (g CO₂-e/MJ). 	 (Note: Applicable provisions are specified under Principle 6. However, the standard does not seem to explicitly require a monitoring or reduction goal provision at this time.)
Water Quality	Principle 1: Compliance with Laws Principle 6: Environmental Values and Impacts Principle 7: Management Planning Principle 8: Monitoring and Assessment Principle 10: Implementation of Management Activities	1 1 1 1 1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations Criterion 6.7 Protect/restore aquatic or riparian zones and mitigate water quality/quantity impacts Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.4 Update and review management plan Criterion 7.5 Management plan summary publicly available Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning Criterion 10.1 Regenerate vegetation cover Criterion 10.5 Appropriate silvicultural practices Criterion 10.6 Avoid or eliminate fertilizer use Criterion 10.9 Assess and reduce natural hazard risks Criterion 10.10 Manage infrastructural, transport, and silviculture impacts	<ul style="list-style-type: none"> ✓ Compliance with CWA and permitted discharges (N, P, or TOC), if applicable, is demonstrated. ✓ Water management plan is available. ✓ Present evidence of BMP use. ✓ Evidence of origin nation water program compliance and water management plan, as applicable. 	

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Water Quantity	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	<ul style="list-style-type: none"> ✓ Water management plan includes quantity and is available. ✓ Water demand of renewable water (L/MJ) ✓ Water demand of nonrenewable water (L/MJ) ✓ Provision to evidence water rights or equivalent alternative is available. 	<input checked="" type="checkbox"/> (Note: Evaluation requirements are met through Criterion 7.3, but standard could be made more robust by explicitly identifying water demand metrics.)
	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations Criterion 6.7 Protect/restore aquatic or riparian zones and mitigate water quality/quantity impacts		
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.3 Management plan includes objectives Criterion 7.4 Update and review management plan Criterion 7.5 Management plan summary publicly available		
	Principle 8: Monitoring and Assessment	1	Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning		
	Principle 10: Implementation of Management Activities	1	Criterion 10.1 Regenerate vegetation cover Criterion 10.5 Appropriate silvicultural practices Criterion 10.9 Assess and reduce natural hazard risks Criterion 10.10 Manage infrastructural, transport, and silviculture impacts		

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Soil Health	Principle 6: Environmental Values and Impacts Principle 7: Management Planning Principle 8: Monitoring and Assessment Principle 10: Implementation of Management Activities	1 1 1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.4 Update and review management plan Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning Criterion 10.1 Regenerate vegetation cover Criterion 10.2 Native species use for regeneration Criterion 10.5 Appropriate silvicultural practices Criterion 10.6 Avoid or eliminate fertilizer use Criterion 10.9 Assess and reduce natural hazard risks Criterion 10.10 Manage infrastructural, transport, and silviculture impacts Criterion 10.11 Manage extraction impacts and minimize waste	✓ Soil assessments are conducted and management plan is developed and maintained. E ✓ Evidence of soil BMP use is available.	<input checked="" type="checkbox"/>
Nutrient Requirements/ Fertilizer Use	Principle 6: Environmental Values and Impacts Principle 7: Management Planning Principle 8: Monitoring and Assessment Principle 10: Implementation of Management Activities	1 1 1 1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management, and mitigations Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.4 Update and review management plan Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning Criterion 10.1 Regenerate vegetation cover Criterion 10.5 Appropriate silvicultural practices Criterion 10.6 Avoid or eliminate fertilizer use Criterion 10.9 Assess and reduce natural hazard risks Criterion 10.10 Manage infrastructural, transport, and silviculture impacts	✓ Soil and nutrient management plan or equivalent alternative.	<input checked="" type="checkbox"/>

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Pesticides/ Herbicide Use/ Management Practices	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations	✓ Pest control and chemical management plan(s) or equivalent alternatives are available.	☑
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.4 Update and review management plan		
	Principle 8: Monitoring and Assessment	1	Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning		
	Principle 10: Implementation of Management Activities	1	Criterion 10.7 Integrated pest management use Criterion 10.8 Minimize, monitor, and control biological control agent use Criterion 10.12 Dispose of waste properly		
Sustainable Harvest Rates/ Biomass Yield	Principle 5: Benefits from the Forest	1	Criterion 5.2 Normally harvest products and services at sustainable rate	○ Actual yield (MT/ha): Sustainable yield (MT/ha) < 1 or ✓ equivalent assessments are available.	☑
	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values		
Land Use	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations Criterion 6.8 Manage landscape and enhance resiliency Criterion 6.9 No forest and cover conversions Criterion 6.10 Converted plantations' ineligibility	○ Product/land use (MT/ha or MJ/ha) factor or ✓ equivalent assessments are available. ✓ Evidence of prior and current land cover type.	☑
	Principle 10: Implementation of Management Activities	1	Criterion 10.1 Regenerate vegetation cover		

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Endangered, Threatened, and Vulnerable Species	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable under the ESA, state law, and natural heritage programs. ✓ Mechanism for determining the presence/absence of species listed as endangered, threatened, or vulnerable on the International Union for Conservation of Nature Red List and/or state Natural Heritage Program. ✓ Conservation plan is made available and includes the identification of these species/habitats, and plans for their protection and enhancement.	<input checked="" type="checkbox"/>
	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations Criterion 6.4 Protect, manage, and conserve species and habitats Criterion 6.5 Identify, protect, and restore habitat Criterion 6.6 Maintain native species, manage habitat, and protect from biodiversity loss Criterion 6.7 Protect/restore aquatic or riparian zones and mitigate water quality/quantity impacts		
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.4 Update and review management plan Criterion 7.5 Management plan summary publicly available		
	Principle 8: Monitoring and Assessment	1	Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning		
	Principle 9: High Conservation Values	1	Criterion 9.1 Engage stakeholders and assess for high conservation values (HCV) Criterion 9.2 Develop strategies to maintain and/or enhance HCV Criterion 9.3 Implement strategies to maintain and/or enhance HCV Criterion 9.4 Monitor and assess HCV changes		
Principle 10: Implementation of Management Activities	1	Criterion 10.1 Regenerate vegetation cover Criterion 10.2 Native species use for regeneration Criterion 10.3 Alien species use and management Criterion 10.4 No GMOs Criterion 10.5 Appropriate silvicultural practices Criterion 10.10 Manage infrastructural, transport, and silviculture impacts Criterion 10.11 Manage extraction impacts and minimize waste			

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Native Habitat/ Ecosystem Health Preservation	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations Criterion 6.4 Protect, manage, and conserve species and habitats Criterion 6.5 Identify, protect, and restore habitat Criterion 6.6 Maintain native species, manage habitat, and protect from biodiversity loss Criterion 6.7 Protect/ restore aquatic or riparian zones and mitigate water quality/quantity impacts Criterion 6.8 Manage landscape and enhance resiliency Criterion 6.9 No forest and cover conversions Criterion 6.10 Converted plantations' ineligibility	✓ Conservation plan is made available and includes ecosystem service restoration.	<input checked="" type="checkbox"/>
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.4 Update and review management plan Criterion 7.5 Management plan summary publicly available		
	Principle 8: Monitoring and Assessment	1	Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning		
	Principle 9: High Conservation Values	1	Criterion 9.1 Engage stakeholders and assess for HCV Criterion 9.2 Develop strategies to maintain and/or enhance HCV Criterion 9.3 Implement strategies to maintain and/or enhance HCV Criterion 9.4 Monitor and assess HCV changes		
	Principle 10: Implementation of Management Activities	1	Criterion 10.1 Regenerate vegetation cover Criterion 10.2 Native species use for regeneration Criterion 10.3 Alien species use and management Criterion 10.4 No GMOs Criterion 10.5 Appropriate silvicultural practices Criterion 10.9 Assess and reduce natural hazard risks Criterion 10.10 Manage infrastructural, transport, and silviculture impacts		

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Invasive Species	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations Criterion 6.6 Maintain native species, manage habitat, and protect from biodiversity loss Criterion 6.8 Manage landscape and enhance resiliency	✓ Conservation/management plans are available and include invasive species management and mitigation.	<input checked="" type="checkbox"/>
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.4 Update and review management plan Criterion 7.5 Management plan summary publicly available		
	Principle 8: Monitoring and Assessment	1	Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning		
	Principle 9: High Conservation Values	1	Criterion 9.1 Engage stakeholders and assess for HCV Criterion 9.2 Develop strategies to maintain and/or enhance HCV Criterion 9.3 Implement strategies to maintain and/or enhance HCV Criterion 9.4 Monitor and assess HCV changes		
	Principle 10: Implementation of Management Activities	1	Criterion 10.3 Alien species use and management Criterion 10.4 No GMOs Criterion 10.5 Appropriate silvicultural practices Criterion 10.8 Minimize, monitor, and control biological control agent use Criterion 10.9 Assess and reduce natural hazard risks		

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Genetically Modified Organisms	Principle 6: Environmental Values and Impacts	1	Criterion 6.1 Assess environmental values Criterion 6.2 Identify and assess impacts Criterion 6.3 Identify impacts, implement management and mitigations Criterion 6.6 Maintain native species, manage habitat, and protect from biodiversity loss Criterion 6.8 Manage landscape and enhance resiliency	✓ Cultivation and management practices are available. ✓ Management plan is available and includes protocols for GMO monitoring and control.	<input checked="" type="checkbox"/>
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.4 Update and review management plan Criterion 7.5 Management plan summary publicly available		
	Principle 8: Monitoring and Assessment	1	Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning		
	Principle 9: High Conservation Values	1	Criterion 9.1 Engage stakeholders and assess for HCV Criterion 9.2 Develop strategies to maintain and/or enhance HCV Criterion 9.3 Implement strategies to maintain and/or enhance HCV Criterion 9.4 Monitor and assess HCV changes		
	Principle 10: Implementation of Management Activities	1	Criterion 10.3 Alien species use and management Criterion 10.4 No GMOs Criterion 10.8 Minimize, monitor, and control biological control agent use		
Minimization, Reuse, and Recycling	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.3 Management plan includes objectives Criterion 7.4 Update and review management plan Criterion 7.5 Management plan summary publicly available	✓ Material efficiency plan is available. ○ Primary product %: coproduct % ratio > 1 or ✓ equivalent assessments are available.	<input checked="" type="checkbox"/>
	Principle 10: Implementation of Management Activities	1	Criterion 10.11 Manage extraction impacts and minimize waste		

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Hazardous Waste	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	✓ Evidence of hazardous material and waste compliance is demonstrated.	☑
	Principle 10: Implementation of Management Activities	1	Criterion 10.6 Avoid or eliminate fertilizer use Criterion 10.7 Integrated pest management use Criterion 10.11 Manage extraction impacts and minimize waste Criterion 10.12 Dispose of waste properly		
Compliance with Environmental Laws	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	○ Regulatory compliance review process or ✓ equivalent alternative is required. ✓ Annual corporate compliance statement is required.	☑
	Principle 10: Implementation of Management Activities	1			
Planning, Monitoring, and Continual Improvement	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	○ EMS documentation or ✓ equivalent alternative (based on the scale of the operation) is available.	☑
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.2 Implement management plan Criterion 7.3 Management plan includes objectives Criterion 7.4 Update and review management plan Criterion 7.5 Management plan summary publicly available		
	Principle 8: Monitoring and Assessment	1	Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.3 Feed results into planning Criterion 8.4 Results made publicly available Criterion 8.5 Implement a tracking and tracing system		
	Principle 10: Implementation of Management Activities	1	Criterion 10.9 Assess and reduce natural hazard risks Criterion 10.10 Manage infrastructural, transport, and silviculture impacts Criterion 10.11 Manage extraction impacts and minimize waste		

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Supply Chain Management, COC, and Product Certification	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	<ul style="list-style-type: none"> ✓ Supply chain and COC program documentation is available. ✓ Product certification is achieved and maintained. 	✓
Social Pillar					
Food Security	Principle 4: Community Relations	1	Criterion 4.1 Identify local communities and their tenure, access, customary, and legal rights Criterion 4.5 Identify, avoid, and mitigate impacts via engagement Criterion 4.6 Grievance resolution and fair compensation mechanisms	<ul style="list-style-type: none"> ○ Food security screening is available. ○ If screening indicates need, a food security assessment is performed and available. 	⊗ (Note: Highly applicable provisions are specified under Principle 4, but the standard does not appear to identify food as a topic of consideration. ³⁴)
Equity/ Gender Rights	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	<ul style="list-style-type: none"> ○ Equal opportunity policy or ✓ equivalent alternative is available. ✓ Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. 	✓
	Principle 2: Workers' Rights and Employment Conditions	1	Criterion 2.1 Uphold ILO Conventions Criterion 2.2 Promote gender equality Criterion 2.5 Training and management plan Criterion 2.6 Worker engagement and grievance resolution		
Labor Rights/ Fair Wage	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	<ul style="list-style-type: none"> ○ Worker rights and fair labor policies or ✓ equivalent alternatives are publicly available. ✓ Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. 	✓
	Principle 2: Workers' Rights and Employment Conditions	1	Criterion 2.1 Uphold ILO Conventions Criterion 2.4 Living wages Criterion 2.5 Training and management plan Criterion 2.6 Worker engagement and grievance resolution		

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Land Tenure/ Property Rights	Principle 1: Compliance with Laws	1	Criterion 1.2 Tenure and use rights Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.6 Identify, prevent, and resolve disputes through engagement Criterion 1.8 Corporate commitment statement	✓ Annual corporate compliance statement or equivalent alternative includes property rights and is available. ✓ Evidence of origin nation legal compliance or voluntary ILO convention conformance, as applicable. ✓ Indigenous land rights screening is available, if applicable.	<input checked="" type="checkbox"/>
	Principle 3: Indigenous Peoples' Rights	1	Criterion 3.1 Identify and engage indigenous peoples Criterion 3.2 Recognize and uphold legal and customary rights Criterion 3.3 Free, prior, and informed consent Criterion 3.4 Recognize and uphold rights, customs, and culture Criterion 3.5 Identify and engage on-site legal or customary rights Criterion 3.6 Uphold indigenous peoples' intellectual property rights		
	Principle 4: Community Relations	1	Criterion 4.1 Identify local communities and their tenure, access, customary, and legal rights Criterion 4.2 Recognize and uphold legal and customary rights Criterion 4.4 Community engagement activities Criterion 4.5 Identify, avoid, and mitigate impacts via engagement Criterion 4.6 Grievance resolution and fair compensation mechanisms Criterion 4.7 Identify and engage on-site legal or customary rights Criterion 4.8 Uphold community's intellectual property rights		
Occupational Safety and Health	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	✓ Annual corporate compliance statement or equivalent alternative includes OSH and is available. ✓ OSH policy and training program or Voluntary Protection Program documentation is available. ✓ Evidence of origin nation legal OSH compliance or voluntary OSH policy and training and PPE availability, as applicable.	<input checked="" type="checkbox"/>
	Principle 2: Workers' Rights and Employment Conditions	1	Criterion 2.1 Uphold ILO Conventions Criterion 2.3 Health and safety practices Criterion 2.5 Training and management plan Criterion 2.6 Worker engagement and grievance resolution		

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Public Health/ Environmental Justice	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.6 Identify, prevent, and resolve disputes through engagement Criterion 1.8 Corporate commitment statement	<ul style="list-style-type: none"> ✓ Annual corporate compliance statement includes EPCRA or equivalent alternative is available ✓ Environmental justice screening is available and integrated with internal EMS, as applicable. ✓ Evidence of origin nation legal air quality, water quality, and toxics regulatory compliance is available, as applicable. ✓ Evidence of origin nation environmental burden screening is available and integrated with internal EMS. 	<input checked="" type="checkbox"/>

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Public Outreach/ Stakeholder Participation	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.6 Identify, prevent, and resolve disputes through engagement Criterion 1.8 Corporate commitment statement	✓ Annual corporate compliance statement or equivalent alternative includes NEPA, if applicable, and is available. ○ CSER report or ✓ equivalent alternative is available. ✓ Evidence of origin nation public notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/>
	Principle 4: Community Relations	1	Criterion 4.1 Identify local communities and their tenure, access, customary, and legal rights Criterion 4.2 Recognize and uphold legal and customary rights Criterion 4.3 Provide access for employment, training and services Criterion 4.4 Community engagement activities Criterion 4.5 Identify, avoid, and mitigate impacts via engagement Criterion 4.6 Grievance resolution and fair compensation mechanisms Criterion 4.7 Identify and engage on-site legal or customary rights Criterion 4.8 Uphold community's intellectual property rights		
	Principle 3: Indigenous Peoples' Rights	1	Criterion 3.1 Identify and engage indigenous peoples Criterion 3.3 Free, prior, and informed consent Criterion 3.5 Identify and engage on-site legal or customary rights		
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.5 Management plan summary publicly available Criterion 7.6 Engage stakeholders on plan		
	Principle 8: Monitoring and Assessment	1	Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.4 Results made publicly available		

Table B-8. FSC Standard Review and Evaluation Worksheet

Pillar/Indicator	Covered?	Life Cycle Stage(s)?	Provision, Process, or Mechanism?	Protective Performance Evaluation Met?	Sufficiently Protective?
Transparency	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	✓ Annual corporate compliance statement or business plan, certification documentation, and equivalent alternatives are available. ✓ Evidence of origin nation public notification or access program is available or documented in CSER.	<input checked="" type="checkbox"/>
	Principle 4: Community Relations	1	Criterion 4.1 Identify local communities and their tenure, access, customary, and legal rights Criterion 4.3 Provide access for employment, training, and services Criterion 4.4 Community engagement activities Criterion 4.6 Grievance resolution and fair compensation mechanisms		
	Principle 7: Management Planning	1	Criterion 7.1 Develop policies and management plan Criterion 7.5 Management plan summary publicly available Criterion 7.6 Engage stakeholders on plan		
	Principle 8: Monitoring and Assessment	1	Criterion 8.1 Monitor management plan progress Criterion 8.2 Monitor and evaluate environmental and social impacts Criterion 8.4 Results made publicly available		
Compliance with Safety, Health, and Participation Laws	Principle 1: Compliance with Laws	1	Criterion 1.5 Comply with laws, conventions, and codes of practice Criterion 1.8 Corporate commitment statement	✓ Annual corporate compliance statement or equivalent alternatives include OSH (and, if applicable, NEPA) provisions and is available. ✓ Annual CSER or company website includes transparency and public access provisions.	<input checked="" type="checkbox"/>
⊗ Not Addressed/Insufficient ⊖ Topic Covered, but Weak Provisions ✓ Sufficiently Addressed					

Endnotes

- 1 *Best value* procurement occurs when buyers review and select a proposal not just on the basis of price but through the evaluation and comparison of multiple factors.
- 2 *Framework* refers to a basic conceptual structure and hierarchy developed to help organize the assessment of the applicable pillars, criteria, and indicators relevant to biofuel sustainability. *Pillar* refers to the foundational sectors within a stated sustainability framework, often including economic, environmental, and social aspects. Each pillar includes one or more criteria. *Criteria* are a second tier of categories that describe topics and attributes potentially applicable across the biofuel life cycle. *Criteria* are composed of one or more indicators. *Indicators* are a third tier of categories that identify an aspect/impact that can constitute a biofuel supply chain risk within a given criterion. In this document, they have been explicitly defined in a manner that characterizes protective levels of performance or attributes.
- 3 Raw material acquisition focuses on biomass feedstock cultivation but is a broader term in alternative fuel life cycle analysis, as it can also include feedstocks other than biomass.
- 4 Global Bioenergy Partnership, *Sustainability Indicators for Bioenergy*, 1st ed., 2011, p. 22, www.globalbioenergy.org/fileadmin/user_upload/gbep/docs/Indicators/The_GBEP_Sustainability_Indicators_for_Bioenergy_FINAL.pdf.
- 5 Energy Independence and Security Act (EISA) of 2007, Public Law 110-140, www.gpo.gov/fdsys/pkg/BILLS-110hr6enr/pdf/BILLS-110hr6enr.pdf.
- 6 U.S. Environmental Protection Agency (EPA), Office of Transportation and Air Quality, *EPA Finalizes Regulations for the National Renewable Fuel Standard Program for 2010 and Beyond*, February 2010, p. 5, EPA-420-F-10-007, www.epa.gov/oms/renewablefuels/420f10007.pdf.
- 7 U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), *Soil Quality Indicators*, 2009, http://www.nrcs.usda.gov/wps/PA_NRCSCConsumption/download?cid=nrcs142p2_051275&ext=pdf.
- 8 USDA NRCS, *Soil Quality Indicators: Aggregate Stability*, 2008, http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053287.pdf.
- 9 USDA NRCS, *Soil Quality Indicators: Available Water Capacity*, 2008, http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053288.pdf.
- 10 U.S. EPA, *Biofuels and the Environment: First Triennial Report to Congress*, Office of Research and Development, National Center for Environmental Assessment, December 2011, EPA/600/R-10/183F, ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=506091.
- 11 EISA of 2007, Public Law 110-140, www.gpo.gov/fdsys/pkg/BILLS-110hr6enr/pdf/BILLS-110hr6enr.pdf.
- 12 Johnson, K., "Biofuels Have Mixed Impacts on Food Security," *FSI Stanford News*, Stanford University, April 19, 2012, fsi.stanford.edu/news/biofuels_have_mixed_impacts_on_food_security_20120419/.
- 13 International Food Policy Research Institute (IFPRI), *Biofuels and Food Security: Balancing Needs for Food, Feed, and Fuel*, 2008, www.ifpri.org/publication/biofuels-and-food-security.
- 14 World Health Organization (WHO), *Food Security*, 2012, www.who.int/trade/glossary/story028/en/.
- 15 Clinton, W., Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994, www.epa.gov/compliance/ej/resources/policy/exec_order_12898.pdf.
- 16 In this context, a water management plan is intended as an integrated planning mechanism. It should identify activities that have water quality and quantity implications, identify appropriate BMPs and mitigation mechanisms, and elaborate the processes for managing the potential impacts of the applicable activities. For example, an acceptably robust water management plan should identify the need to deploy nutrient management planning as a BMP for agricultural feedstock production activities. Given nutrient management's key importance in preventing nonpoint source pollution and maintaining water quality, NRDC will continue to evaluate the need to establish a separate nutrient management plan requirement and may opt to deploy this as an evaluation requirement in future updates of these guidelines.
- 17 ISEAL Alliance, *Defining Credibility*, 2012, www.isealliance.org/our-work/defining-credibility.
- 18 ISEAL Alliance, *Standard-Setting Code*, 2012, <http://www.isealliance.org/our-work/defining-credibility/codes-of-good-practice/standard-setting-code>.
- 19 ISEAL Alliance, *Assurance Code*, 2012, <http://www.isealliance.org/our-work/defining-credibility/codes-of-good-practice/assurance-code>.
- 20 World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD), *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*, 2011, www.ghgprotocol.org/files/ghgp/public/Corporate%20Value%20Chain%20%28Scope%203%29%20Accounting%20and%20Reporting%20Standard.pdf.
- 21 WRI/WBCSD, *Product Life Cycle Accounting and Reporting Standard*, 2011, www.ghgprotocol.org/files/ghgp/Product%20Life%20Cycle%20Accounting%20and%20Reporting%20Standard.pdf.
- 22 At this time, NRDC has determined that national or government accreditation does not adequately address the Assured and Accredited attribute because of the substantial variability in such bodies' rigor and transparency as compared with this document's global scope. NRDC acknowledges that some national or government accreditation bodies are of high quality and fully capable of addressing this key attribute in an adequate manner. However, accreditation is fundamental to a certification system's integrity, and blanket acceptance of national or government accreditation would not ensure uniform integrity globally. Therefore, NRDC does not, at this time, consider national or government accreditation sufficiently adequate but will revisit this determination in future versions of these guidelines as adequate safeguards are developed and identified.
- 23 This review focused primarily on certification standards, but as necessary, supplemental certification system guidance documents and materials were evaluated where readily available for public review. Where not directly present in a standard, the presence of prescribed mechanisms or elements in supplemental documents is noted in the review and evaluation worksheets as applicable.
- 24 The Council on Sustainable Biomass Production ceased operations during the production of this report. Nonetheless, we have retained our review of CSBP to further illustrate the strengths, weaknesses, and variability among different certification systems.
- 25 ISCC, RTRS, Bonsucro, and FSC all have separate chain of custody standards that somewhat expand their life cycle supply chain coverage. This is commendable, but chain of custody requirements are narrower in scope than the full range of indicators evaluated in this report. For purposes of clarity, each standard's primary life cycle stages are indicated under Table 2. While each standard may have a few indicators with greater coverage than shown in Table 2, the summary value indicates each one's focus as a general rule.

26 For purposes of these guidelines and certification system evaluations, NRDC only considers mandatory standards and requirements necessary to achieve certification under each system. This is to ensure that all requisite criteria and mechanisms for sustainable production are reflected in a certification system as minimum standard requirements for certification. The ISCC certification system does include an optional ISCC PLUS add-on certification module that extends the scope of activities (i.e., food, feed, biochemical, and solid biomass fuels) and the sustainability criteria covered. However, as it is not a mandatory requirement for achieving the basic ISCC certification, it could not be considered as part of this evaluation at this time. NRDC may revisit this determination in future versions of these guidelines and evaluations.

27 RSPO provisions currently do not address GMO-specific cultivar protocols due to little or no usage of such cultivars in this industry. Absence of GMO cultivar use in current industry practices does not, however, preclude their adoption in the future. Therefore, adding explicit mention of GMO provisions and risk management mechanisms would make the RSPO standard more robust.

28 Principle 6, Criterion 6.5, Indicator 6.5.4 of RSPO's draft "Principles and Criteria for the Production of Sustainable Palm Oil 2013" includes new provisions for monitoring and action to mitigate, as necessary. Once fully approved by RSPO membership, these new provisions can be fully considered and will allow this rating to be upgraded to "sufficiently protective."

29 In August 2012, Bonsucro, its members, and its stakeholders initiated a standards revision process to develop a revised Production Standard. This process is currently under way and is an opportunity to consider and potentially address the noted coverage issues. The release of a new version of Bonsucro's Production Standard is anticipated in June 2014. For updated process status information, visit www.bonsucro.com/site/standard-revision/.

30 Bonsucro relies on applicable certification body provisions and mechanisms to verify compliance.

31 Bonsucro relies on applicable certification body provisions and mechanisms to verify compliance.

32 *Supra*, note 30.

33 Version 5.0 is the most current standard available to the public, but it will not come into force and be used for certification until sometime in 2014.

34 As noted, FSC has highly applicable and robust community impact avoidance and mitigation provisions specified under Principle 4. However, the standard does not explicitly identify food security as a topic to include. While the forest products being cultivated may not be food sources in and of themselves, the topic is still applicable, as such production could potentially compete with local food cultivation and could have an indirect food security impact. As such, the topic should be called out explicitly and considered as part of the Criterion 4.5 mechanisms to robustly address this issue.