GRASSLANDS ALLIANCE

Grasslands Alliance Certification Standard

For Sustainability in Beef Cattle and Bison Grazing Operations in North America

Version 5
January 2019

The Grasslands Alliance is a coalition of conservation organizations that uses this standard in collaboration with supply chain partners to guide and incentivize continuous improvements in beef production. This standard is a certification tool and a guide to good and continuously improving management of land, natural resources and livestock on beef cattle grazing operations in the United States and Canada, with these priorities: Conserve wildlife habitats and biodiversity; improve soil and water quality; protect public health; promote high animal welfare; support livelihoods, rural communities, and safe and fair working conditions; and provide incentives to implement climate-smart strategies. Additional modules will offer specific criteria for grass-finished beef and bison operations. This draws on standards developed by Food Alliance for certification of livestock operations in North America and is a companion to the Sustainable Agriculture Network standard, which supports Rainforest Alliance certification of many crops, including beef, throughout the tropics and subtropics. The authorized uses of this version of the standard are for stakeholder review (including public consultation) and field-testing.

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INTRODUCTION

Background

There has long been a need for agreement on what "sustainable" rangeland and pasture management looks like in practice. Many ranchers and farmers believe that their operations are examples of good practices in the three spheres of sustainability – environmental conservation, economic viability, and social responsibility. Yet because there are no widely adopted *comprehensive* standards for sustainable beef, they have no credible way to prove it – no mechanism to distinguish their beef in a marketplace that increasingly demands certified sustainably produced goods. Producers want guidance and access to the growing pools of knowledge about better management practices (BMPs) that generate triple bottom line benefits, and technical assistance in implementing them. Retailers, restaurant chains and consumers are seeking ways to recognize and reward well-managed beef cattle ranches and farms.

In other crops and commodities, stakeholders have come together to find common ground on identifying the environmental, economic and social challenges and associated improvement opportunities. They have found that setting standards provides the most productive forum for agreeing which detrimental practices and impacts should be prohibited, and which desired outcomes indicate well-managed, regenerative agriculture and deserve special recognition. Sustainable business leaders and consumer advocates recognize that the most thorough and credible way to verify the performance of a ranch or farm is through independent, third-party audits. In addition, they recommend that the best way for well-managed ranches to communicate with retailers and consumers is via a certification seal.

Sustainability standards and certification programs are transforming sectors such as coffee, tea, cocoa, palm oil, fisheries, forest products and tourism. In 2012, the Natural Resources Defense Council (NRDC) began research on standards for more sustainable livestock production in the United States, first documenting the latest and best science to identify priority impacts or "hot spots" resulting from poor management, and BMPs that have been proven to remedy each impact. It consulted with dozens of stakeholders – from ranchers and extension specialists to corporate beef buyers and NGO colleagues – to understand the economic and social barriers to improving ranch and farm management, and to identify solutions to each barrier. NRDC then evaluated existing programs for verifying which ranches and farms are mitigating impacts, and found that the Food Alliance had the most credible and comprehensive standard for crops and beef produced in the U.S., but limited market uptake. NRDC also found that the Sustainable Agriculture Network (SAN) had a comprehensive standard and certification program for tropical agriculture – including beef – that was growing quickly and proven effective in 40 countries, but did not apply to temperate ecoregions of North America (above Mexico).

In response to the need for a *comprehensive* standard and certification program for beef production in the U.S. and Canada, NRDC, Food Alliance and the Rainforest Alliance – which uses the SAN standard – formed the Grasslands Alliance and invited other conservation organizations to join. Multiple conservation groups with expertise in topic areas addressed by the Grasslands Alliance Standard have participated in the expert reviews, stakeholder meetings, and consultations that contributed to the development of this standard. These include Defenders of Wildlife, Environmental Defense Fund, California Rangeland Conservation Coalition, Holistic Management International, National Audubon Society, National Wildlife Federation,

Ducks Unlimited, The Nature Conservancy, World Wildlife Fund, The Savory Institute, the Western Landowners Alliance, Point Blue Conservation Science, Friends of the Earth U.S., and Tejon Ranch Conservancy.

In addition, this standard is based on the Food Alliance's experience since 2000 with certification of beef in the U.S. and on the SAN's experience in the tropics since the early 1990s. Many ranchers have added their hard-earned wisdom, and scientists representing multiple areas of ecological, economic and land management expertise have provided rigorous analysis of previous drafts.

Mission

The Grasslands Alliance's mission is to conserve grasslands and their biodiversity; sustain productive, resilient grazing lands; enable North American ranchers and farmers to mitigate and adapt to climate change; and protect public health. We achieve this by synthesizing traditional ranching wisdom with modern science, sparking management innovation, encouraging continuous improvement, and aligning the values of beef producers, buyers, and consumers.

Vision

The Grasslands Alliance envisions cattle ranching that is regenerative, adaptive, profitable and climate-smart. More sustainable ranching generates benefits that include:

- conserving ecosystems, biodiversity, soil health and water;
- preventing pollution;
- reducing greenhouse gas emissions;
- maintaining high animal welfare;
- protecting public health;
- supporting rural communities; and
- producing traceable, high-quality beef.

Through the transparency created by the Grasslands Alliance's programs, businesses and consumers are empowered to recognize and reward producers of beef grown on certified well-managed ranches and farms.

Goals

- Create an independent, third-party, NGO-managed, voluntary, outcome-based, triple-bottom-line sustainability standard and certification system. One that synthesizes traditional ranching knowledge, current science, and multi-stakeholder input into agreement on the desired states ("outcomes") for wildlife habitat and biodiversity conservation; natural resource conservation; improved livelihoods and well-being; healthy and humane treatment of animals; and climate smart ranching and farming.
- Assemble the BMPs that will lead to these outcomes into guidance materials that enable producers to continuously improve toward and beyond certification.
- Promote research into rangeland and pasture stewardship, animal husbandry, ranch productivity and resilience, ranch economics, climate change mitigation and adaptation, wildlife and habitat and biodiversity conservation, and soil and water conservation.
- Facilitate access to the training, technical assistance, and financial support needed to enable producers to implement the standard.

- Contribute to awareness and understanding of what positive change looks like at the grassroots, enable producers to benefit from implementing those changes, and empower businesses and consumers with the opportunity to recognize and reward the improvements.
- Build trust, understanding, transparency and communication along the entire beef value chain, from ranch, to supermarkets and restaurants, to consumers.

Approach

- Build upon the standards and certification programs of the Food Alliance, the Sustainable Agriculture Network and the Rainforest Alliance. Help consolidate standards, marketing terms and labels in the beef sector.
- Use the standard development process as an organized, inclusive, transparently managed forum to agree on and incentivize the desired states of North American grazing lands, and the levels of well-being of producers and their livestock.
- Integrate the latest and best science with traditional ranching knowledge and experience to develop guidance materials – a best practices toolkit.
- Assess ranches according to the standard to identify priority improvement opportunities and associated needs in technical assistance and training, financial support, and research.
- Collaborate with the Global and U.S. Roundtables on Sustainable Beef in promoting constructive dialog among beef supply chain actors and managing a step-wise system of assessments, verification, audits and certification.
- Collaborate with scientific, NGO, ranching, and other supply chain partners to monitor and evaluate results, leverage lessons learned to improve Alliance programs, adapt and repeat.
- Start with the most pressing conservation and climate change mitigation opportunities – on ranches and farms – and move downstream on the supply chain to feed production, feedlots, and processing.

The Value of the Standard to Beef-sector Stakeholders

- **Ranchers and farmers** can use the Grasslands Alliance's programs and guidance materials to improve their operations' productivity, resilience to drought, efficiencies of input use, and access to technical and financial support; the standard as a tool to differentiate their products from the competition, and the certification as a way to verify their marketing claims, build trust in their brand, and convey their story of best-in-class performance through the value chain to end consumers. The standard serves as a comprehensive "one-stop-shop" that enables producers to address key environmental, public health, animal welfare, and social issues of concern in one audit. The Grasslands Alliance's programs provide a platform on which to access new markets, and to build relationships with conservation groups, public health and animal welfare advocates, government agencies, leading retail and restaurant buyers, and like-minded producers.
- **Brands and institutional buyers** can use the Grasslands Alliance standard and certification program as a ready-made, omnibus solution to their customer assurance and supply chain management needs; to benchmark and improve their procurement policies; and to boost brand reputation, sales and customer loyalty by conveying their sustainability commitment to consumers in an accurate, transparent manner. The standard provides corporate buyers with a structured framework that enables them to work with producers in their supply chains to implement locally appropriate better practices. It serves as an across-the-board solution that enables buyers to address key environmental, public health, animal welfare, and social risks in their beef supply chains via one trusted program.
- **Consumers**, through their values-based purchasing choices and activism, can reward sustainable land and livestock management by supporting a trustworthy certification mark that ensures that the beef

they are about to enjoy came from a ranch or farm that meets rigorous standards covering all the environmental, public health, animal welfare and social issues of concern. The Grasslands Alliance trustmark enables them to cut through the confusing array of sustainable beef marketing claims and make purchasing decisions based on one label they can trust.

- **Conservationists** can use the Grasslands Alliance standard and support programs to offer additional recognition and rewards to their ranching partners via the beef marketplace; and to help design and manage initiatives to protect and restore rangeland ecosystems and the valuable benefits that they provide to society. The program can be used to help mitigate and adapt to climate change, regenerate rangelands and pastures, become more resilient to drought and unexpected events, prevent and control weed invasions, and promote improvements in public policy. The standard and guidance materials synthesize generations of ranching experience with latest and best science, ensuring that conservationists are recommending the most advanced and locally appropriate better management systems and practices. Certification will bring an array of benefits to producers, incentivizing them to be partners in conservation. Auditing and certification are effective tools for independent monitoring, transparency, and improved communication and collaboration along the supply chain – all essential ingredients to durable and effective conservation initiatives.

The Grasslands Alliance Standard in the Marketplace

The Grasslands Alliance standard frames consensus agreement on what well-managed ranching looks like on the ground (the "criteria" – defined on page 11) and provides detailed guidance that enables producers to achieve this ideal level of performance. Each criterion includes "indicators" (defined on page 11) that will ensure consistent, meaningful audits.

In the early 1990s, the Sustainable Agriculture Network (SAN) and Food Alliance were the first to integrate the three spheres of sustainability – environmental conservation, economic viability and social responsibility – into certification standards. Now, many standards mirror this structure in recognition that ranch and farm-management challenges are linked and cannot be effectively tackled individually. Select any management issue – for example, soil health, water conservation, invasive species management, animal welfare, ranch-hand wages, product quality, productivity and profitability – and its linkages with the others is apparent.

The Grasslands Alliance standard, like that of the SAN[1] and Food Alliance[2], is comprehensive, meaning that it covers environmental, public health, animal welfare, and social responsibility concerns. It is being developed through an open, inclusive, transparent, multi-stakeholder process. As in the SAN, final decisions about the Grasslands Alliance standard and certification process will be made by nonprofit, apolitical, independent, experienced, conservation organizations – the Grasslands Alliance board of directors – guaranteeing that the standard is objective, credible and market-smart, but science driven.

Auditing will be conducted by experienced, well-trained, independent inspectors following clear protocols proven by the Food Alliance and Rainforest Alliance. The certification process, under development, will also mirror those systems.

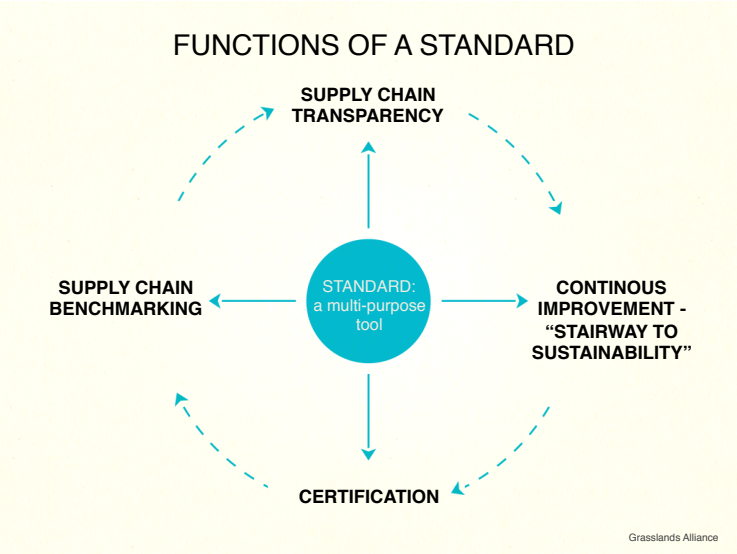
The standards of the Grasslands Alliance and the SAN are aligned, so producers in the tropics and in North America will meet similar criteria, adapted to their region's climate, environmental, economic and social

conditions. Commercial buyers and consumers will benefit from this alignment of sister programs, which will enable them to purchase certified beef from domestic or international producers with full sustainability assurance.

The Grasslands Alliance standard satisfies the principles and criteria of the Global Roundtable on Sustainable Beef. The Alliance aims to work with narrower and issue-specific certification programs such as Animal Welfare Approved, USDA and other Organic labels, the American Grassfed Association and other grass-fed programs, and Whole Foods GAP to develop protocols allowing producers to receive two or more certificates in one audit.

Applications of the Grasslands Alliance Standard

Grasslands Alliance Certification: One purpose of a standard and certification program is to distinguish the best performing operations. Only those that comply with the standard can earn the certification. The indicators in the standard are designed to be as objective as possible, and auditors are cross-trained to maintain consistent interpretation of them. Compliance is determined by a scoring system that allows some flexibility. Grazing operations can be certified when they meet the Critical Criteria, score high enough overall on remaining criteria, and commit to additional improvements before the next audit in the three-year cycle. The Grasslands Alliance's programs nurture a culture of continuous improvement.



The Grasslands Alliance will have a certification seal or "trustmark". Ranches and farms that earn the certification can market their beef products with the Grasslands Alliance's seal of approval so that buyers and consumers can recognize them. Restaurants, retailers, and other beef buyers can employ the seal to convey their sustainability commitment to other businesses, stakeholders, and directly to customers.

The Grasslands Alliance trustmark, as with the Rainforest Alliance Certified™ green frog seal, will signify that the beef came from a ranch or farm that meets the standards. While most certified beef will be a cut above in quality, the seal is a claim about sustainable production, not meat quality. The program will begin with cattle grazing operations and may later extend to cover grain finishing and other facilities downstream in beef supply chains.

Enabling Producers to Achieve Stepwise Continuous Improvement Goals: Sustainability is the goal, and earning certification is a milestone to celebrate. The Grasslands Alliance understands that many operations will need time and support to achieve certification. Producers should benefit at every step along the way. Those who do not yet qualify for certification and corporate buyers who seek to improve their supply

chains can partner with the Grasslands Alliance to achieve step-wise continuous improvement goals. For example, completing the Grasslands Alliance application helps ranchers and farmers assess the current status of their natural resource base, identify improvement opportunities, and develop a better ranch or farm management plan to implement the improvements. Entry into the program brings producers to the attention of commercial buyers who are planning their beef supply chain sustainability and procurement strategies. The standard will serve as a guide to continuous improvement, and the Grasslands Alliance community of partners will provide assistance, information, and peer support during each step of the journey toward sustainability.

Enabling Buyers to Achieve Beef Supply Chain Sustainability Goals: The Grasslands Alliance can help commercial buyers and brands manage risks and opportunities in their beef supply chains, benchmark their own sustainable sourcing guidelines against the standard, and develop accurate and transparent claims about more sustainably produced beef. The program will underwrite marketing claims with independent, third-party, sustainability certification.

Grasslands Alliance Governance

The Grasslands Alliance was founded by the Food Alliance, NRDC, and the Rainforest Alliance with support from other nonprofit organizations, ranchers and farmers, scientists, and other stakeholders. We also wish to recognize the contributions of the Sustainable Agriculture Network. The Grasslands Alliance is currently being managed by the Food Alliance. In time, it will be established as an independent entity. As more NGOs formally join the coalition, they will form the general assembly. A board of directors, comprised of representatives of those groups, will be elected. Permanent multi-stakeholder committees will be formed to guide standards development and technical operations, and a secretariat will be staffed.

The SAN is similarly structured and has proven effective. This architecture allows the SAN to quickly and thoughtfully make changes, adapt, evolve, incorporate the latest and best science, resolve internal conflicts, collaborate, and integrate government, corporate and other initiatives. The Grasslands Alliance will be equally agile and efficient. The coalition of NGOs will illustrate independence, command credibility, and stay true to its mission.

At the same time, the Grasslands Alliance will be a multi-stakeholder initiative, both in spirit (eager to learn, to hear different perspectives and opinions, to incorporate new ideas and science) and in function (organization, protocols for stakeholder consultations, governance).

The Grasslands Alliance's Theory of Change[1]

The Grasslands Alliance Theory of Change articulates the organization's beliefs about what change is needed and how its strategies will bring about the desired change over time. The theory will help the Grasslands Alliance identify the key support strategies required to achieve the desired impacts as well as the beliefs and assumptions guiding the activities. It is a dynamic model that will be continuously improved as learning is generated, captured, and disseminated, creating a feedback loop that fosters a culture of learning, adaptive management and continuous improvement of the Grasslands Alliance's programs.

[1] Adapted with permission from the SAN

The Theory of Change model in Annex 2 includes the following core pillars and proposes the causal relationships among them, including underlying assumptions, influencing factors and possible unintended results:

1) *Actors*: who are the actors or partners relevant to achieving desired results?
2) *Support Strategies*: what support strategies are needed at the level of each actor to accomplish desired results?
3) *Outputs*: what are the immediate results of the support strategies?
4) *Outcomes*: what are the short-term changes in knowledge, behavior, practices, or policies resulting from the outputs and what are the medium-term effects of those changes?
5) *Impacts*: what is the long-term environmental and socio-economic change we want to achieve?

The Theory of Change outlines how the Grasslands Alliance's technical and financial support programs will facilitate access to capacity building resources and expertise that enable ranchers and farmers to achieve positive outcomes by improving and sharing practices, management systems, and knowledge. These, in turn, contribute to improved wildlife habitat and biodiversity conservation, natural resource conservation, livelihoods and wellbeing for workers and rural communities, and the welfare of farm animals, while contributing to climate change solutions that boost productivity, cut input costs, and increase resilience to drought and unexpected events. When these sustainability benefits are magnified across many ranches and farms, in synergy with the activities of other partners and stakeholders, the result is to advance the Grasslands Alliance's broader goals of creating and maintaining sustainable, resilient rural landscapes, communities, and natural areas and the valuable ecosystem services that they provide to society.

The Grasslands Alliance Supports Climate Smart Agriculture

The Grasslands Alliance recognizes the challenges already being posed by climate change and seeks to address these challenges by actively promoting climate smart ranching and farming and improving the resilience of ranches, farms and ranching communities. This is accomplished by protecting native ecosystems and on-ranch biodiversity, maintaining soil and vegetation health, safely and efficiently managing nutrients and animal manure, sustaining water resources, and guiding ranchers and farmers to select and adopt other locally appropriate climate-smart practices. Additionally, the Grasslands Alliance standard seeks to reduce the greenhouse gas emissions of cattle ranching and farming associated with the use of energy, fertilizers, pesticides, and methane and nitrous oxide emissions – while maintaining or enhancing carbon stocks in soils, plant communities, and other on-ranch vegetation. As such, the Grasslands Alliance standard promotes all three pillars of Climate Smart Agriculture: 1) sustainably increasing ranch/farm productivity and incomes; 2) adapting and building resilience to climate change; and 3) reducing or removing greenhouse gas emissions, where possible.

GRASSLANDS ALLIANCE STANDARD STRUCTURE

PRINCIPLES: A Grasslands Alliance principle is a set of thematically related requirements designed to achieve a particular set of outcomes. This set of outcomes is explained in the introduction of each principle. Each principle is composed of specific criteria that advance the principle's desired outcomes**.** The

Grasslands Alliance standard principles are organized into six impact areas and contain 98 criteria for sustainable ranch and farm management (not all criteria are applicable to every operation).

- Principle 1: **Effective Planning and Management System** (*with 7 criteria*). This principle supports the delivery of all other impact areas (wildlife habitat and biodiversity conservation, natural resource conservation, improved livelihoods and wellbeing, healthy and humane animal care, and climate smart ranching). The separate, principle-specific planning requirements of Criteria 2.1, 3.1.1, 3.2.1, 3.5.1, and 6.1 constitute the operation's resource management plan.
- Principle 2: **Wildlife Habitat and Biodiversity Conservation** *(with 9 criteria)*
- Principle 3: **Natural Resources Conservation** *(with 40 criteria among the following Sub-Principles):*
  - 3.1 Productivity and Management of Rangeland Vegetation, Pasture Forage, and Feed Crops *(with 8 criteria)*
  - 3.2 Soil Health *(with 4 criteria)*
  - 3.3 Water Conservation and Water Quality *(with 2 criteria)*
  - 3.4 Integrated Pest Management *(IPM, with 16 criteria)*
  - 3.5 Nutrient Management *(with 6 criteria)*
  - 3.6 Waste Management *(with 4 criteria)*
- Principle 4: **Improved Livelihoods and Wellbeing** *(with 20 criteria)*
- Principle 5: **Healthy and Humane Animal Care** *(with 13 criteria)*
- Principle 6*:* **Climate Smart Ranching and Farming and Reduction of Operation's Carbon Footprint** (*with 9 criteria)*

The authorized uses of this version of the standard are for stakeholder review (including public consultation) and field-testing. A version of the Grasslands Alliance Standard that is binding for audits will be issued following the completion of the public consultation, expected to be in December 2016.

CRITERIA, INDICATORS, & GUIDANCE

The standard consists of Criteria (left-hand column) and Indicators (right-hand column):

- **Criteria:** Each principle is made up of several **criteria** that form the basis of assessing compliance with the Grasslands Alliance scoring system. ISEAL defines this component of standards as the conditions on the ground (i.e., desired outcomes) that need to be met to achieve a principle. Criteria add meaning and functionality to a principle without themselves being direct measures of performance.
- **Indicators:** The right-hand column provides **indicators** that further clarify the specific auditable requirements and application of each criterion in the left column. This column contains objective means of verifying performance against the criterion (i.e., auditable, outcome-based observations and documentation that serve as indicators of when the criterion has been achieved). For some criteria, the Grasslands Alliance includes both general indicators (that apply to all operations) and indicators that apply only to specific operation types or regions, defined below. For sub-principle 3.4, Integrated Pest Management, indicators also include selected BMPs that reflect risk management protocols for safe application and storage of hazardous chemicals.

Guidance

Producer Guidance: To enable producers to meet one or more criteria in a manner appropriate to their location, operation, and/or management style, the Alliance is developing a guidance manual. It will include a menu of BMP options that reflects the latest and best scientific and practitioner recommendations for different regions and operation types, and will be continually updated as new approaches become

commercially viable. This "outcomes-based" approach is designed to offer producers the flexibility they need to meet the standard in a way that works best for their particular circumstances.

Auditor guidance: An additional *Interpretation Guide* for the Grasslands Alliance Standard will provide instructions for auditors about the applicability of criteria and indicators in specific situations (e.g., on specific operation types, in specific eco-regions). This guide will serve as a tool for auditors to clarify standard intent and to calibrate scoring.

Terms and Definitions: Throughout the Standard, underlined terms carry a specific Grasslands Alliance definition, which is provided in Annex 1 – Terms and Definitions. These definitions are fundamental for the correct interpretation of criteria.

Operation Types and U.S. Regions – Flexibility of Requirements: During 2016-2017, the Grasslands Alliance will collaborate with partners across the U.S. to develop additional local requirements for key regions with certified and continuously improving operations. These documents will be binding for the local audit processes of the Grasslands Alliance's accredited certification bodies and authorized auditors, with emphasis on local legislation for some of the Grasslands Alliance's key criteria**.** These requirements will apply to the operation types and regions described below.

Operation types (See Annex 1 for more detailed definitions): The Grasslands Alliance standard applies to any one or combination of the following rangeland and/or pasture-based and mixed-farming systems:

(a) **Rangeland:** Native and naturalized grassland, shrubland, savannah, woodland, wetland, and desert ecosystems that are grazed by domestic livestock or wild animals, but where rainfall is too low or erratic for growing crops. Rangelands are concentrated in the drier Western United States and are managed using ecological principles – as native ecosystems with few or no inputs.
(b) **Improved pasture**: Irrigated, fertilized, and/or planted pasture managed based on agronomic principles; "farming with grass" to graze the forage crop(s).
(c) **Unimproved pasture**: Land used for pasture that includes forage species, but has not been recently seeded, fertilized or irrigated;
(d) **Marginal lands**: Lands on the edges of cropland or hay fields with low potential for cultivation, but that may be useful for grazing native and introduced forage.
(e) **Cropland**: Grazed croplands planted to pasture in rotation with crops, grazed cover crops, grazed crop residues, and feed crop fields.

Regions

The Grasslands Alliance recognizes that issues of concern facing livestock managers vary considerably among U.S. eco-regions, depending on climate, topography, soil type, plant communities (including local invasive species challenges and thresholds), land management and land use history, and the diversity and conservation status of local native plants and wildlife. The Grasslands Alliance Interpretation Guide and Producer Guidance Manual will offer guidelines regarding how to take these variations into account when implementing the Grasslands Alliance's programs.

THE GRASSLANDS ALLIANCE SCORING SYSTEM

Scoring Requirements for Certification

The scoring system for Grasslands Alliance certification ensures that all operations comply with key strategic requirements at the first certification audit of the initial 3-year audit cycle, and that operations achieve continuous improvement toward greater compliance in the second and third certification cycles.

The scoring system for Grasslands Alliance certification is composed of three criteria categories:

1. **Critical Criterion CC:** highlighted as *Critical Criterion* in the left "Criteria" column. These criteria contain those requirements that are most essential to support the Grasslands Alliance mission and desired outcomes. Full compliance with critical criteria is required to obtain or maintain certification. Partial compliance or non-compliance will lead to the denial or withdrawal of certification for the audited organization. A critical criterion is scored as follows:

Scoring Category	Critical Criterion score	*Conditions*
Fully compliant	1 point	*Audited organization complies fully with all criterion components*
Zero compliance	0 points	*None or not all of the criterion's components are complied with*
Not applicable	Does not affect score	*Subject of evaluation is not present within the audit scope*

2. **Critical Criterion CC+3:** highlighted as *Critical Criterion CC+3* in the left "Criteria" column. To further ensure that other key strategic requirements are prioritized, a second category of critical criterion will be scored by auditors as a normal (continuous improvement) criterion during the first 3-year audit cycle, and then scored as a **Critical Criterion CC** (i.e., required) starting with the certification audit during the second 3-year audit cycle and thereafter. These criteria are considered very high priority, but may require a transition period for operations to plan, finance, and implement any required improvements. Starting with the second certification audit, partial or non-compliance of these **Critical Criteria CC+3** will lead to the denial or withdrawal of certification for the audited organization.

3. **Continuous Improvement Criterion:** Continuous Improvement criteria leave space for flexibility to plan corrective actions and comply with criteria at a later point in time – after the first and additional certification audits. Zero compliance or partial compliance with a continuous improvement criterion does not prevent an operation from obtaining certification. The following table illustrates the scoring system for continuous improvement criteria:

Scoring Category	Continuous Improvement Criterion score	*Conditions*
Fully compliant	1 point	*Audited organization complies fully with all criterion components*
Partially compliant	0.5 points	*Some, but not all the criterion's components are complied with*
Zero compliance	0 points	*None of the criterion's components are complied with*
Not applicable	Does not affect score	*Subject of evaluation is not present within the audit scope*

In order to obtain certification based on this Grasslands Alliance standard, an operation has to comply with two general requirements:

1. Comply fully with all applicable critical criteria;
2. Comply with a minimum percentage obtained by compliance with applicable criteria as follows:

a. Year 0 or 1st Certification Audit: full compliance with 60% of all applicable criteria;
b. Year 3 or 2nd regular Certification Audit (all Critical Criteria CC+3 become requirements): full compliance with 81% of all applicable criteria.
c. Year 6 or 3rd regular Certification Audit: 85% of applicable criteria.

The total percentage score of all Criteria is calculated according to the following formula:

Total No. of points / Applicable points	**x 100**	**=**	**Overall percentage score**

Applicability

Criteria are implemented by all types and sizes of operations. Policies related to producer groups such as cooperatives and ranching conservation associations will be detailed in the Grasslands Alliance Policies and Procedures Manual.

Program Scope

The initial Grasslands Alliance standard will support certification and stepwise continuous improvement programs (and customized applications such as internal sourcing guidelines and supply chain benchmarking) for U.S. and Canada-based beef cattle ranch and farm grazing operations (cow-calf, backgrounder, stocker, grass-finishing operations), including on-property feed crop lands and small animal feeding facilities such as backgrounding and winter-feeding lots. As with other schemes, the "unit of primary production" (the operation, including all owned and leased lands utilized for beef production) is certified, not the producing company or the product.

For operations that purchase animals from outside herds, animals must have (1) spent their entire life on a Grasslands Alliance certified operation(s) or (2) spent the last 12 months of their life on a Grasslands Alliance-certified operation in order to qualify for continuous improvement and certification.

The Grasslands Alliance's programs cover all owned and leased lands utilized by grazing operations for beef production. Policies related to program implementation on leased private lands, state trust lands, and federal public lands will be detailed in the Alliance's Policies and Procedures Manual.

LIST OF GRASSLANDS ALLIANCE CRITICAL CRITERIA

The following list summarizes the topics covered by **Critical Criteria** CC and **Critical Criteria CC+3** of this standard:

Principle	Topic	Criterion No.	Critical Criterion	Critical Criterion CC+3
Effective Planning and Management System	1. Baseline assessment	1.1	X	
	2. Operations plan to optimize productivity, including contingency plan and land conversion plan	1.2		X
	3. IPM plan	1.3		X
	4. Herd Health Plan	1.4		X

	5. Monitoring & Up-to-date records of production practices	1.5		X
	6. Collected data are analyzed	1.6		X
	Principle I - Total Critical Criteria and CC+3		**1**	**5**
Wildlife Habitat & Biodiversity Conservation	7. Conservation Plan	2.1		X
	8. Management conserves natural ecosystems and ecosystem Processes, Overgrazing is Prevented (Land Mgt)	2.2		X
	9. Conservation of Rare, Threatened and Endangered Species and Communities (RTESC) and their Habitats	2.4		X
	10. Non-lethal strategies for managing predators	2.5		X
	11. All natural ecosystems and HCV areas are identified and conserved (Land Use) AND no conversion/destruction of HCV areas or natural ecosystems (NE) 5 years prior to certification	2.7	X	
	12. Riparian conservation	2.8		X
	Principle 2 - Total Critical Criteria and CC+3		**1**	**5**
Natural Resource Conservation	13. Grazing and Pasture Management Plan	3.1.1		X
	14. Prevent, control, minimize extent of Invasive Plants	3.1.3		X
	15. Forage enhancements maintain ecological integrity	3.1.7		X
	16. Grazing and other management avoids or minimizes erosion	3.2.3		X
	17. Water use optimized	3.3.1		X
	18. Water quality – no water pollution	3.3.2	X	
	19. Operation implements IPM Plan	3.4.1		X
	20. Only pesticides legally registered in U.S. for animal/crop are used	3.4.2	X	
	21. GA prohibited pesticides not applied	3.4.3	X	
	22. GA restricted pesticides having risks to aquatic life are only used if non-application zones enforced, and if GA-required application equipment and weather conditions fulfilled at time of application.	3.4.5	X	
	23. GA restricted substances listed for wildlife risk mitigation are only applied if wildlife risk mitigation activities are implemented.	3.4.6	X	
	24. GA restricted substances having risks to pollinators can only be used if target plants not flowering, or during the night	3.4.7	X	
	25. The storage of Grasslands Alliance prohibited pesticides listed in Annex 1 of this standard is prohibited.	3.4.14	X	
	26. Animals covered by GA scope do not consist of GMOs and are not repackaged or processed with GMO products	3.4.16	X	
	27. Nutrient & Manure Management Plan	3.5.1		X
	Principle 3 - Total Critical Criteria and CC+3		**8**	**7**
Improved Livelihoods and Wellbeing	28. Communication of labor policies and grievance mechanisms	4.1	X	
	29. No forced labor	4.2	X	
	30. No discrimination	4.3	X	
	31. Freedom of Association with worker organizations and collective bargaining	4.4	X	
	32. Minimum wage payment	4.5	X	
	33. No practices to avoid legal pay or benefits	4.9	X	
	34. No worst forms of child labor	4.14	X	

	35. No commercial agriculture work under 15 years of age	4.15	X	
	36. Personal Protection Equipment (PPE)	4.17	X	
	Principle 4 - Total Critical Criteria and CC+3		**9**	**0**
Healthy & Humane Treatment of Animals	37. Animal identification system / traceability	5.1	X	
	38. Animals are raised on Grasslands Alliance certified grazing operations – time requirements	5.2		X
	39. Cloned animals not permitted	5.3	X	
	40. Mistreatment or abuse of animals prohibited	5.4	X	
	41. Herd Health Plan effectively implemented	5.6		X
	42. Consumable water	5.8	X	
	43. Feed cannot contain antibiotics, hormones, beta-agonists, byproducts, excrement	5.10	X	
	44. No administration of substances prohibited by GA (including non-therapeutic antibiotics, beta agonists, hormones used for growth promotion, and other substances)	5.11	X	
	Principle 5 - Total Critical Criteria and CC+3		**6**	**2**
Climate Smart Ranch	45. Climate smart ranching plan	6.1		X
	Principle 6 - Total Critical Criteria and CC+3		**0**	**1**
	Grasslands Alliance Standard – Total Critical Criteria and CC+3		**25**	**20**

GRASSLANDS ALLIANCE STANDARD

Supporting Sustainability in Beef Cattle and Bison Grazing Operations in North America

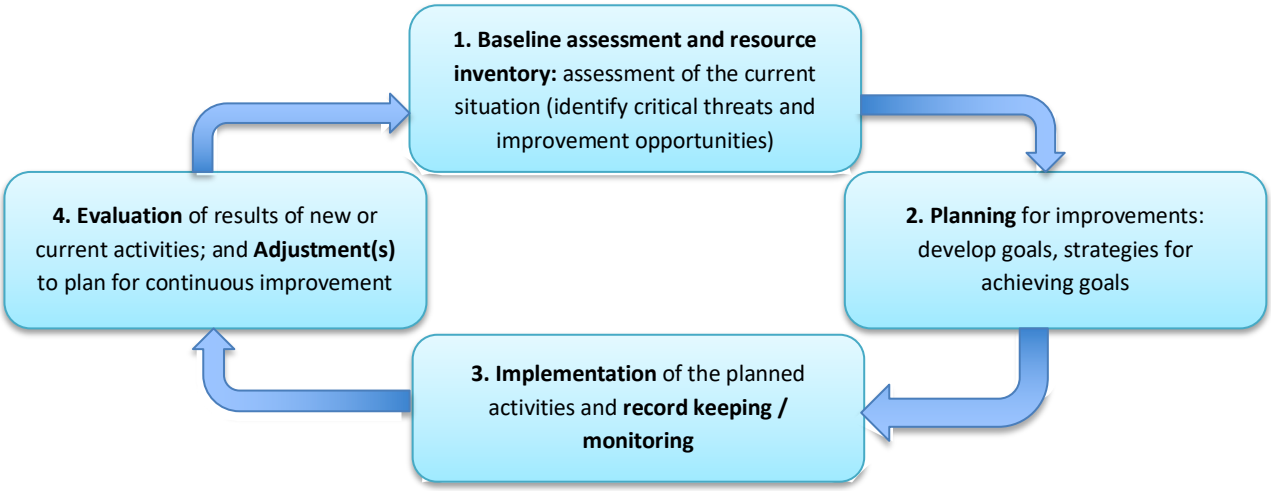
(Cow-Calf, Backgrounder, Stocker, Grass-Finishing Operations, including on-property feed crop lands and small animal-feeding facilities)

"By starting with the land, and seeking first to understand its functions and services, we can then ask how best do animals fit here, or do they even fit at all? Thus we might tune the livestock to the land, not the land to the livestock…The 'place' lens: Before you can know how to best manage livestock you need to first look to see where you are." – H.H. Janzen[3]

Principle 1: Effective Planning & Management System

Beef production is based on an integrated ranch/farm management plan that is completed, implemented, monitored, and updated to address the environmental, economic and social risks associated with current and future production, appropriate to the scale of the operation.

Objectives and outcomes of Principle 1: To establish a continuous improvement management cycle on the operation, an integrated ranch/farm planning and management system is implemented with the below four components:



The planning process follows a logical sequence in which an assessment of current conditions and conservation targets is completed and compared to historic conditions in order to understand the short and long-term impacts and benefits of management, and to determine where management improvements and/or restoration may be warranted. Management approaches are then developed, implemented, monitored and, where needed, adjusted to minimize and mitigate these impacts. All operations are required to implement this adaptive management planning cycle based on the requirements specified in Criteria 1.1 through 1.8. This will result in increased productivity and efficiencies of input use, reductions in

environmental impacts and greenhouse gas emissions, and proactive adaptation to climate change by specifying options of better management practices (BMPs) to achieve goals.

Meeting Principle I by demonstrating effective planning and adaptive management is designed to produce triple bottom line benefits that enable operations to realize the full ecological and economic potential of their land and water resources[4]. For example, many sustainable ranching success stories have shown that planning and implementation of grazing management at the ranch scale is critical for maintaining the natural resource base, habitat quality and biodiversity required to sustain both livestock production and other valuable ecosystem services, including opportunities to generate revenues through agritourism and other outdoor recreation-based opportunities[5]. In addition, demonstrating that beef is produced by verified well-managed operations is rapidly becoming important in the marketing of "sustainable", "grass-fed" and "natural" products and can help boost an operation's brand reputation and sales in these growing market sectors[6].

Criteria	*Indicators*

1.1 A baseline assessment for the operation is documented. The baseline assessment is used to document existing conditions, and to provide a benchmark for use in measuring progress on improvements to the operation. It is reviewed annually, with new information added as relevant. The baseline assessment includes:
• A ranch/farm map or sketch;
• Information on each production area.
• Additional site-specific information and resources pertaining to compliance with Grasslands Alliance standards, including:
  • Risks to ranch/farm from production (identified issues of concern);
  • Improvement opportunities / corrective actions planned and/or implemented to address issues of concern;
Critical Criterion
	a) The assessment and resource inventory compiles and evaluates baseline information on existing conditions within all owned and leased lands of the operation proposed for continuous improvement and/or certification.
	b) The ranch/farm map or sketch indicates the following:
	1) Location of each management unit, roads, buildings, infrastructure, fences and cropland;
	2) Streams, water bodies and water sources;
	3) Natural ecosystems, management designation for all natural ecosystems (strict preservation, restoration, or sustainable management), and High Conservation Value areas;
	4) Grazing management areas;
	5) Marginal lands
	6) Abutting land uses, including protected areas; and
	7) The total ranch/farm area, including of acreage of grazing management areas and pastures, croplands, and natural ecosystems on all owned and leased lands.
	c) The written assessment includes:
	1) Forage inventory - pasture and crop production records that are covered by the Grassland Alliance scope for the next production cycle
	2) Current pasture/rangeland condition
	3) Herd description
	4) Ecological description (physical and biological characteristics) of the operation, including:
	i. Climate
	ii. Altitude range
	iii. Soil description: Soil survey conducted at the appropriate property and management unit(s) proposed, including use of data from soils maps where available and recent soil test results for croplands.

	iv. Existing wildlife habitats and aquatic ecosystems; v. Plant communities including natural vegetation cover/plant communities; vi. Rare species and communities; 5) The Ecological Site Description(s) (ESD) and/or Forage Suitability Group Description(s) (FSGD) covering the operation (where available); 6) Condition of structural improvements such as fences and water developments (including seasonal availability and quality of watering sites); and 7) Past and current land and water conservation activities, including land use history relevant to current issues of concern. d) For improved pasture, grazed croplands, and on-farm feed cropland, crop information (per management unit, as indicated in the map) including: 1) Type of forage and/or crop(s); 2) Crop varieties and density; 3) Crop age or renovation stage for perennial crops; 4) Rotation cycle for all crops. e) Additions to the original baseline assessment may include: 1) Documented implementation of science-based conservation practices and safeguards related to beef producing operations, or other proven-effective practices. 2) Results on Rangeland Health Assessments and/or Pasture Condition Scoring and other recent assessments accepted by Grasslands Alliance and conducted within the past two years.
1.2 An Operations Plan is developed and implemented, and updated annually. The plan aims to achieve positive outcomes for the triple bottom line, and documents steps to optimize productivity, input use efficiency, and compliance with Grasslands Alliance standards • The producer/manager identifies priorities (goals) and describes management objectives or options for the operation proposed for continuous improvement and/or certification, based upon the results of the baseline (and if available, most recent) assessment.	a) The Operation Plan includes the following: 1) Herd description including number and class of animals and pasture and crop production records that are covered by the Grassland Alliance scope for the next production cycle; 2) Planned water use, energy consumption, and labor requirements; 3) Additional defined planning and corrective actions to address non-compliances with each Critical Criterion CC+3 of this Grasslands Alliance standard; and 4) Timeline and resources for each proposed action, and the personnel responsible for their implementation. b) For the contingency plan: 1) The operation can demonstrate a plan to maximize resilience to potential risks, including: climate change, extreme weather (e.g., severe drought, flooding, extreme cold or heat) and unexpected events (e.g., wildfire, insects, pests, floods). The plan describes potential weather-related risks and impacts to forage and water resources, and outlines alternative management that would be instituted if these conditions occur. 2) The forage-animal balance contains a buffer adequate to meet feed requirements in the face of unexpected events.

A contingency plan details potential risks to production and serves as a guide for adjusting the operation management plan to maximize resilience, and minimize impacts and resource degradation due to unexpected events, including adaptations for reducing impacts of climate change. When the operation initiates any major conversion of grasslands and other natural ecosystems, new planting, or any major new farm infrastructure development, an independent environmental and social assessment is conducted prior to the development or when required by applicable laws. *Critical Criterion CC+3*	3) A technical assistance specialist has assisted with identifying and developing locally appropriate strategies for optimizing the resistance and resilience of the operation to extreme weather and climate change risks and other potential problems. c) For land conversion assessments, the assessment is conducted in accordance with applicable laws, or, in their absence, based on technically recognized methods, and addresses at least the following topics: biodiversity, water, ecosystem services, soils, resulting greenhouse gas emissions and other air pollutants (e.g., dust), waste, land and resource rights, tenure and conflicts, food security, and other adverse impacts on local communities. *1)* The assessment includes written plans and procedures for: i) Minimizing and mitigating any negative impacts; ii) Enhancing positive impacts (I.e., benefits); iii) Implementing and monitoring the specified environmental and social management measures during the installation and operation phases of the new development.
1.3 An integrated pest management plan (IPM) that prioritizes pest prevention and reduction of the use of pesticides is documented and updated at least once per year. *Critical Criterion CC+3* NOTE: Compliance with 1.3 is met when filling out all information required by the "Grasslands Alliance Integrated Pest Management Plan template".	a) The IPM plan is specific to the ranch, its relevant rangeland vegetation and/or pasture forage crops, pests & location. b) The IPM plan identifies: 1) Monitoring and recordkeeping activities, including i. Monitoring of pests to identify their presence during periods of crop susceptibility, assess trends and risks associated with climate change, and determine pest management steps; ii. Monitoring vegetation and forage health; iii. Identification of economically and ecologically acceptable pest, disease, weed and invasive species incidence thresholds, and pest control measures are defined based on these thresholds. 2) Pest prevention activities, including i. Non-chemical pest prevention means for limiting pest introduction to the operation, to avoid favoring pests, to prevent pest spread between pastures and fields and into neighboring natural areas, and to prevent pest reservoirs from developing; ii. Avoidance of pest-susceptible crops for annual systems, as these plants are more attractive or susceptible to pests ii) A combination of management interventions to avoid reliance solely on pesticides, where pest risks are evident from monitoring: a. Cultural practices that suppress pest growth; b. Physical practices that damage or remove the pest; c. Biological practices that increase pest mortality from predators, parasites or pathogens; or d. Low risk chemical practices.

	3) Activities to protect and conserve wild and domesticated crop pollinators and the parasites and predators of crop pests.
1.4 A Cattle Herd Health Plan is established and implemented to prevent and minimize disease. Alternatively, the operation can demonstrate participation in a GA accredited herd health program (with appropriate records). *Critical Criterion CC+3*	a) The plan identifies potential problems (relevant and site-specific disease and health risks) and specific steps taken to mitigate these risks (e.g., immunizations, good animal husbandry, sanitation, nutrition and other relevant practices). b) Records are kept documenting health history of each animal. c) Records are kept of casualty euthanasia incidences and causes. d) Vaccinations include the ones required by animal health regulatory authorities. e) Animal diseases are monitored, controlled and treated by veterinarians or trained personnel. f) Where calves are raised, the plan includes means for reducing stress and pain associated with weaning and castration, and dehorning/disbudding if practiced. g) All medications are registered and: 1) Are prescribed by veterinarians and approved by national animal health regulatory authorities; 2) Administered strictly according to label instructions, including withdrawal periods and expiration dates; 3) Dosage variations are permitted only when approved by veterinarians or authorized veterinary service providers; 4) Are stored safely to minimize risk to human health and the environment and in compliance with label instructions. h) Sick or injured animals are treated, and isolated where appropriate. Cattle with an illness or infection for which antibiotic treatment is indicated must be treated. i) Dead animals are disposed of promptly to eliminate the risk of environmental contamination, the spread of disease, and the risk of attracting predators.
1.5 The operation regularly monitors and keeps up-to-date records of natural resource conditions, inputs, operations, and product quality. *Critical Criterion CC+3*	a) For each principle and sub-principle, monitoring records document the effectiveness of current practices in meeting objectives and in addressing identified issues of concern / improvement opportunities; b) Monitoring records include a site-appropriate suite of complementary short-term (measured multiple times per year) to longer-term indicators (measured every 2+ years). c) Monitoring utilizes measures relevant to the site, and to the objectives, scope, and scale of the operation. 1) Monitoring measures are appropriate indicators for evaluating progress toward achieving continuous improvement goals; d) Recordkeeping is sufficient to document compliance with the Grasslands Alliance standard, including triple bottom line outcomes as described in the operations plan.
1.6 Collected monitoring data are analyzed at least annually to	a) Data are analyzed relative to the targets and actions identified in management plans;

evaluate continuous improvement in the achievement of objectives, and to update objectives, targets, and management actions to improve operation performance in the next planning cycle. *Critical Criterion CC+3*	b) The operation must be able to demonstrate implementation of a complete adaptive management cycle, including specific examples of how it uses assessment and monitoring records and other available information to: 1) Identify and address problems; 2) Adjust management practices; 3) Achieve objectives and 1 year, 3 year, and 5 year continuous improvement goals.
1.7 Technical assistance and continuing education provide BMPs and improved management systems that are implemented as part of an ongoing continuous improvement program.	a) The producer/manager can demonstrate having received technical assistance from an accredited technical assistance specialist from university extension, NRCS, or a private consultant on the development and/or implementation of the operation management plan, including by providing contact information for the providing organization, agency or company; or b) The producer/manager can document completion of continuing education courses related to the planning and management system requirements of this standard, and can demonstrate implementation of management systems and practices recommended in completed courses.

Principle 2: Wildlife Habitat and Biodiversity Conservation

Beef production contributes to the maintenance or enhancement of native wildlife and plant biological diversity.

"Adding wildlife income to a New Mexico ranch contributes 2.5 times more to ranchland market value than does a similar amount of livestock income." – John Tanaka and colleagues[7]

Objectives and outcomes of Principle 2: This principle contributes to the protection of biological diversity, natural ecosystems, and their values on and around certified and continually improving operations. Ranches and farms protect natural ecosystems and do not contribute to overgrazing, deforestation, and other forms of habitat degradation and land conversion. Additionally, operations conserve or restore the diversity of native grass, shrub, and tree species and communities, thus providing wildlife habitats and ensuring the delivery of ecosystem services. Ranches and farms also contribute to conservation in the broader landscape by maintaining wildlife corridors, riparian habitats and aquatic ecosystems, by collaborating with neighbors, agencies and other organizations implementing regional conservation activities, and by avoiding negative impacts to surrounding natural ecosystems and protected areas. Operations support the protection of rare, threatened and endangered species and other native flora and fauna by sustainably managing natural ecosystems, by taking proactive steps to minimize conflicts with predators and other native wildlife, and by carefully implementing integrated pest management (IPM) activities to avoid unintended consequences for native wildlife and plants. Activities and policies of the operation comply with local/state/regional/federal regulations and management plans. Principle 2 recognizes the important role of well-managed ranches and farms in conserving America's natural heritage of wildlife habitats and biodiversity[8].

Good and continuously improving management of wildlife habitat and biodiversity can offer ranches and farms opportunities to diversify revenue streams, adding to those generated by beef and other cattle products[9]. For example, compliance with Principle 2 provides for fish and game species and watchable wildlife, which can be the foundation for economically viable tourism and outdoor recreation programs. In addition, it enables ranches and farms to minimize business risks by keeping ahead of environmental regulations and associated risks, and to build a reputation as a responsible business, boosting brand reputation and sales.

Within the scope of Principle 2 are issues and concepts about which there remains considerable uncertainty. In cases of uncertainty, the use of a *precautionary approach* is present both implicitly and explicitly in several aspects of the Principle because mitigation, repair and restoration are often difficult, more costly, and sometimes impossible[10].

Criterion	***Indicators***
2.1 A Wildlife Habitat and Biodiversity Conservation Plan is developed as part of the Resource	a) The Wildlife Habitat and Biodiversity Conservation Plan includes:[11] 1) Conservation targets: Identifies the regionally important species and vegetation types that occur in the planning area, including:

Management Plan. The Wildlife Habitat and Biodiversity Conservation Plan identifies and maps natural ecosystems, and conserves rare, threatened, and endangered species and communities (RTESC), vegetation cover types, and important wildlife species (IWS) on all owned and leased lands utilized for beef production. *Critical Criterion CC+3*	(1) known occurrences of RTESC and important native plant and wildlife species and their habitats; and (2) occurrences of local and regional priority invasive species within the operation, as well as potential threats in the surrounding area; 2) Current status of targets: Describes the current condition or status of the conservation target(s); 3) Goals for each target: Establishes operation-specific goals to achieve for the plants, animals and vegetation types identified as targets (e.g., maintain and protect or increase and restore); 4) Threats/hurdles: Identifies the conditions or issues of concern that need to be addressed to achieve goals. Reviews the potential impacts of current operation management practices on RTESC, IWS and invasive species at the appropriate pasture, ranch, or landscape level; 5) Strategies to achieve goals: Using the findings above, develops the most appropriate or feasible strategies, BMPs or activities that can be implemented to address identified issues of concern; 6) Monitoring: Develops a monitoring strategy to regularly evaluate the effectiveness of strategies, practices and activities for achieving goals of having successfully conserved or restored the identified target(s); 7) Evaluate and adjust: Describes how the producer/manager uses monitoring records to determine management decisions.
2.2 Grazing and ranch management practices maintain, enhance, and/or restore natural ecosystems and ecosystem processes. Rangelands and pastures are managed to achieve desired wildlife habitat and structural conditions and to prevent degradation. *Critical Criterion CC+3*	a) Natural ecosystems are conserved through strict preservation, restoration, or sustainable management. b) Natural disturbance regimes important to productivity and local biodiversity are maintained and restored, and are allowed to operate in natural areas. c) Management activities (e.g., the timing, intensity and duration of grazing; timing of hay harvesting; hunting and fishing management) minimize negative impacts to natural ecosystems and ecosystem processes, and provide structural habitat that supports the biodiversity goals described in the Conservation Plan.
2.3 Grazing and ranch management practices maintain and/or enhance important native wildlife species and their habitats.	a) Grazing and other resource management practices minimize impacts on important wildlife species (IWS) identified in the conservation plan, especially during critical reproduction and migratory periods (e.g., nesting, calving, fawning, and brood-rearing seasons). b) Wildlife-friendly infrastructure is installed to achieve management goals for species identified as targets in the conservation plan. 1) If stock ponds include wildlife or natural habitat, those resources are managed to maintain or enhance habitat. c) Implementation of a forage-animal balance ensures that forage produced or available meets forage demands of both livestock and native wildlife.

	d) Non-predatory wildlife is allowed to co-exist with livestock except where shared diseases are a concern documented by scientific consensus. 1) Where management is required to protect crops or livestock from wildlife damage or disease, non-lethal practices are proactively used. 2) Where lethal control of species is necessary, it is used only as a measure of last resort and in compliance with local, state and federal regulations. e) Species identified as targets in the conservation plan, including keystone species, are not harmed. f) Aquatic ecosystems and species on the operation are protected from contamination by farm operations, and fish passage is maintained or enhanced.
2.4 Grazing and ranch management practices conserve rare, threatened and endangered species/communities (RTESC) and their habitats. *Critical Criterion CC+3*	a) The operation can document: 1) Protection of RTESC that are state or federally listed under an endangered species law or identified under a state wildlife action plan (SWAP). Conservation actions to maintain, restore or enhance the extent, quality and viability of the identified species and their habitats are documented in the Conservation Plan. 2) Natural ecosystems are managed to benefit the specific needs of threatened or endangered species that occur locally. 3) Grazing schedules and stocking rates are designed to meet the habitat requirements of RTESC identified as targets. 4) Monitoring data verifies that RTESC and other High Conservation Value targets identified in the Conservation Plan are trending toward goals established in the conservation plan. 5) Cooperation with RTESC inventories and surveys. The landowner has the discretion to keep the specific location(s) of RTESC occurrence(s) confidential.
2.5 Non-lethal strategies are used for managing, controlling and coexisting with predators. • Killing of individual predators that have killed livestock is rare, and occurs only after co-existence and non-lethal approaches have failed, and predator damage has been established by trained professionals. • Where lethal control of predator species is necessary, it is executed in compliance with local, state and federal	a) The operation uses non-lethal coexistence practices to protect livestock from predators. b) The operation recognizes the importance of native predators to the local ecosystem. c) If livestock are lost due to predator species, then: 1) Management of predator species is addressed in the operation's resource management plan; 2) Workers are trained in procedures and emergency responses for addressing predator attacks or livestock losses to predators; 3) Under no circumstance are toxic substances (including toxic baiting of carcasses) used for controlling predators.

regulations and the animal is euthanized as quickly and painlessly as possible. *Critical Criterion CC+3*	
2.6 Grazing and ranch management maintains and/or improves habitat connectivity, natural habitat diversity and heterogeneity at the ranch and/or landscape scale.	a) Infrastructure, fencing, and wildlife corridors are designed and sited to minimize human-wildlife conflict, and allow wildlife species to migrate between habitats with minimal restriction or hazard of injury. b) The operation has made on-farm habitat improvements on their own, or involved with other landowners, conservation organizations or state/federal agencies to link individual on-farm actions/activities to larger landscape activities. c) The operation can document improvements to habitat connectivity. d) Observed natural habitat diversity and heterogeneity includes successional stages and plant community types required to support goals identified in the conservation plan.
2.7 Natural ecosystems and high conservation value areas are protected from land conversion and degradation. • All natural ecosystems and High Conservation Value areas present on the operation are identified and conserved. • In the five-year period prior to the date of initial application for Grasslands Alliance certification, there has been no destruction of natural ecosystems or High Conservation Value (HCV) areas. *Critical Criterion*	a) The operation can document that no conversion or degradation of identified natural ecosystems or High Conservation Value areas has occurred in the five-year period prior to the date of initial application for Grasslands Alliance certification. 1) Exceptions will be considered for operations that have changed management or ownership on a case-by-case basis. Specific documentation requirements can be found in the Policies and Procedures Manual. b) The producer/manager can document research to identify high conservation value areas present on the operation, and results of that research; c) The producer/manager can document steps to conserve natural ecosystems and high conservation value areas present on the operation. Please refer to the Guidance Manual for options accepted by GA.
2.8 Riparian zone structure and function is maintained or progressively restored around all naturally occurring flowing and still water bodies and other wetlands to conserve terrestrial and aquatic biodiversity. • Riparian buffers exist and are maintained. Buffer size and composition is appropriate to site and environmental conditions necessary to achieve	a) The written grazing plan specifically considers riparian areas and wetlands and their enhancement or maintenance in good or improving condition as documented by assessment or monitoring data. 1) The grazing schedule is designed to minimize degradation of riparian areas and wetlands. 2) Off-stream water and/or other management practices help to minimize degradation of riparian zone and wetland vegetation. b) Riparian habitats are in good condition as documented by a passing score on a Proper Functioning Condition (PFC) assessment or equivalent rapid stream assessment. c) Riparian buffers are maintained and functional.

goals established in the conservation plan. *Critical Criterion CC+3*	1) Buffer width is appropriate to site and environmental conditions and is adequate to minimize overland flow. 2) If fencing is used to keep livestock out of the riparian area, fencing is adequately maintained. 3) Where there is direct livestock access to stream watering sites, access is controlled/limited so that little or no damage is done to riparian areas. Stream bank and channel morphology and water quality for livestock, fish and wildlife are maintained or enhanced. d) Where due to degradation, the required riparian zones do not exist or exist only partially, a six-year plan for their full establishment to meet site potential is defined and implemented on schedule.
2.9 IPM activities prevent, control and manage invasive species while avoiding and minimizing impacts to native wildlife and plants. • Management activities avoid causing or increasing the introduction and spread of invasive species identified as threats to local biodiversity.	a) Steps taken to eradicate invasive species in natural areas do not harm the habitat and populations of native plant and wildlife species. b) Monitoring records document the effectiveness of invasive species management at avoiding their impacts to biodiversity. c) Invasive species or their parts are not disposed in riparian zones or waterways, and riparian zones are kept free from invasive species.

Principle 3: Natural Resource Conservation

Objectives and outcomes of Principle 3: This principle helps to ensure that beef operations conserve the natural resources that are the basis of sustainable cattle ranching and farming, optimize efficiencies of natural resource and input use, and minimize environmental pollution. Resource-specific objectives and outcomes are described for each sub-principle below.

Sub-Principle 3.1 – Productivity and Management of Rangeland Vegetation, Pasture Forage, and Feed Crops

Grazing, forage improvement, and feed crop management practices maintain or enhance the productivity and resilience of native rangeland and pasture forage plant species.

"Well-managed pasture systems combine vigorous perennial vegetation cover, reduced pesticide and fertilizer inputs, and lower costs of production using ecological approaches to generate ecosystem services for society, as well as economic sustainability for the producer." –Alan Franzluebbers and Colleagues[12]

Objectives and outcomes of Sub-Principle 3.1: Ranches and farms that meet this principle are implementing grazing management and forage enhancement practices that maintain or improve rangeland health, pasture condition, and (where applicable) feed crop productivity, resulting in healthy, deep-rooted plants. Both grazing and vegetation management practices (e.g., forage enhancements that utilize tools such as prescribed fire, brush removal, and/or IPM applications) are carefully planned to avoid unintended consequences, maintain or improve ecological integrity, and cut input costs. Efforts to prevent and control invasive plants maintain rangeland health, pasture condition, and feed crop productivity, and minimize the need for herbicides, which are not only economically costly, but can pose risks to the health of ranching families, workers, communities, and ecosystems[13]. Feed crops are produced in a manner that reflects Grasslands Alliance principles, using sustainability as a lens to identify opportunities to improve efficiencies of input application and reduce risks associated with nutrient and pesticide pollution. Together, the result of these outcomes is an operation that supports locally appropriate levels of plant cover and diversity and in turn water infiltration, which can help to raise the water table, further benefiting forage productivity. Another benefit is to increase the resilience of the operation to drought and other forms of extreme weather-related events[14]. Thus, meeting this sub-principle can help producers extend the growing season, reduce supplemental feed costs, improve livestock weight gain and sales prices, and mitigate risks to forage and feed supplies.

Criterion	*Indicators*
3.1.1 A Grazing and Pasture Management Plan is developed and implemented as part of the resource management plan. The Grazing and Pasture Management Plan optimizes forage and cattle	1. For the Grazing and Pasture Management Plan: a) The Grazing and Pasture Management Plan addresses management actions, including corrective actions and land-based action plans, for each production area (including all owned and leased lands) proposed for continuous improvement and/or certification. The plan includes a

productivity while promoting ecological goals through adaptive resource management. • The resilience of rangeland vegetation and pasture forage to drought, extreme weather, and other unexpected events is maintained or enhanced. *Critical Criterion CC+3*	timeline for implementation and monitoring to ensure management objectives are accomplished. b) The Grazing and Pasture Management Plan is based on an ecological assessment and includes goals addressing economic opportunities, natural resources health, wildlife habitat and biodiversity, and livestock health and welfare. It includes: 1) A forage inventory of the expected forage quality, quantity and species in each management unit; 2) A forage-animal balance that ensures forage produced or available meets the nutritional demands of livestock and/or wildlife; 3) A calculation of carrying capacity and stocking rates for each production area, and use of result to evaluate of how periods of grazing, deferment, rest and other treatments balance with the land's ecological potential and the climate year. Stocking rates and grazing periods are adjusted according to this evaluation; 4) A monitoring plan for pasture and herd health; and 5) A contingency plan for preventing long-term damage and maximizing resilience / potential for post-drought recovery. 6) As part of the Grazing and Pasture Management Plan, a written long-term Vegetation Management Plan documents rangeland and pasture histories, assesses the identity and condition of desirable major forage species and undesirable (e.g., invasive, toxic, unpalatable) plant species, and addresses identified issues of concern to vegetation and/or forage productivity. c) Introduced Forage species are selected considering agro-ecological conditions, production rates, nutritional value, non-invasiveness, and resistance to pests or adverse climatic conditions; d) Forage quantity, quality and growth conditions are evaluated periodically to optimize pasture recovery periods for forage growth, dormant season forage supply, and drought reserve. e) Grazing and other operation management practices maximize resilience by maintaining healthy, deep-rooted, diverse vegetation and forage bases.
3.1.2 Grazing management maintains or improves the productivity, diversity, and reproductive capability of key native and forage species.	a) Stocking rates are established and implemented that maintain or improve productivity of rangeland vegetation and/or pasture forage, and address identified issues of concern. b) Stocking rates are based on the forage inventory and animal demand balance (i.e., forage-animal balance). Methods to calculate stocking rates consider utilization levels, harvesting efficiencies, and adjustment factors such as distance from water and slope. c) Monitoring records demonstrate that results are within acceptable parameters for the rangeland vegetation and/or pasture forage crop(s) produced, considering external factors such as recent growing conditions. d) If the productivity, diversity, and/or reproductive capability of plants are below parameters expected according to the Ecological Site

	Description (ESD), Forage Suitability Group Description, or equivalent benchmark, the operation must develop and implement corrective actions.
3.1.3 Grazing, pasture, IPM, and other operation management practices prevent, control and minimize the extent of invasive and other undesirable plant species. • Invasive plant species are not intentionally introduced and already present invasive plant species are progressively reduced or controlled. • The introduction or production of forage crops that are invasive in the target region and that may disrupt biodiversity on an eco-regional scale is prohibited. *Critical Criterion CC+3*	Where invasive plant species are present or have been identified in the surrounding area: a) Areas on the operation infested with (and/or vulnerable to infestation by) invasive plant species are regularly monitored and weed populations are tracked over time. b) Where noxious weeds listed by federal, state, or local invasive assessment programs[15] are present, the extent of infestations is documented and management practices are developed and implemented that minimize the risk of spread, eradicate early-stage infestations, and control and manage identified infestations. c) Prescribed grazing and/or other locally appropriate conservation practices are developed and implemented that prevent, control and minimize the extent of invasive and other undesirable plant species. d) Invasive plant species, including noxious and nuisance weeds, are controlled using IPM, including by limiting invasions from off-site. e) Locally produced or imported hay and/or forage is weed-free. f) Selection of introduced forage species and cultivars considers invasiveness and does not utilize those that pose a risk to native species or ecosystem processes. g) The producer/manager monitors the effectiveness of management in preventing or controlling invasive plant species. h) Records indicate that invasive plant management extends beyond the ranch property, and considers community and regional strategies. i) A technical assistance specialist has helped identify locally appropriate practices to prevent, control and manage priority invasive plant species.
3.1.4 Forage species and cultivars are selected considering agro-ecological conditions, production rates, nutritional value, and resistance to pests or adverse climatic conditions.	**1. Rangelands** a) Native species suited to the site are selected for planting and replanting whenever available and ecological conditions will support their growth. b) Where ecological conditions do not allow for successful seeding of native plant species, non-native forage species that (1) are not invasive and (2) otherwise do not pose threats to biodiversity may be used. c) A local source of known provenance is used when available and when the local source is equivalent in terms of quality, price and productivity to maintain local genetic diversity and ecosystem function and to protect native biodiversity. d) The use of non-local sources may be justified in situations such as where other management objectives (e.g., fire resistance or adapting to climate change) are best served by non-local sources or where availability of locally adapted plant materials is limited.

	2. Improved pasture a) Legumes are a key functional group, and a target of 20 to 30% of forage yield (on an annual basis) is ideal[16]. b) When reseeding, seedbed preparation practices are selected that maintain or enhance soil health.
3.1.5 Operations that produce on-farm feed crops for storage utilize agronomic practices that take into account agro-ecological conditions, production rates, nutritional value, and resistance to pests or adverse climatic conditions.	a) Producer/manager can document that feed was produced using a production system or verification program aligned with Grasslands Alliance principles, or that otherwise effectively addresses feed production impacts and demonstrates a commitment to continuous improvement.
3.1.6 Where stored feed is brought in from off-farm, it is produced in accordance with Grasslands Alliance standards or those of a sustainable production program accepted by Grasslands Alliance.	a) If stored feed is brought in from off-farm, feed is produced in accordance with Grasslands Alliance criteria for feed crop and hay production (Principles 3-4 and Criteria 1.4, 1.6-1.7, 2.7, 2.9, 6.1, 6.5-6.9) or documentation of compliance/verification/certification of a sustainable production program accepted by Grasslands Alliance. For options of qualifying programs, see the Guidance manual.
3.1.7 Forage enhancements maintain ecological integrity and native habitat, and reduce and minimize net greenhouse gas emissions. *Critical Criterion CC+3*	b) The use of fire for pasture management is permitted as part of a planned process to enhance forage and avoid negative impacts to native species, and where fire is the option of less environmental impact in comparison with other pest, weed, and invasive plant control measures. c) To avoid and minimize unintended consequences in light of identified regional, local, and on-ranch resource concerns, all operations conducting forage improvement treatments such as brush removal, prescribed fire, and aerial herbicide applications either: 1) can document that a technical assistance specialist has advised the planning and execution of treatments , or 2) follow the recommendations of extension, NRCS or equivalent management resources in planning and executing treatments.
3.1.8 Intensive use areas near ranch facilities including corrals and sorting, feeding and calving pens/pastures are actively managed to prevent resources degradation and monitored for impacts on adjacent uplands and riparian areas.	

Sub-Principle 3.2 – Soil Conservation and Soil Health

Beef production maintains or improves soil health by minimizing erosion and compaction, maintaining or enhancing soil fertility at appropriate levels, and promoting healthy biological systems and chemical and physical properties.

"Our soil teems with a multitude of organisms, which provide the necessary work for healthy plants to grow free from disease, pests, and infertility. These interconnected interactions and feeding relationships (quite literally, "who eats who") help determine the types of nutrients present in the soil, its depth and pH, and even the types of plants which can grow." – SoilFoodWeb.com

"Positive relationships have been observed between SOC (soil organic carbon) and plant productivity, water infiltration, and soil biodiversity. Increasing SOC can also limit soil loss, water and nutrient runoff and net greenhouse gas emissions." – Alan Franzluebbers and colleagues[17]

"If soil is depleted or degraded, the amount of energy flowing into the ecosystem will diminish." – H.H. Janzen[18]

Objectives and outcomes of Sub-Principle 3.2: Good stewardship of soil health is the foundation of well-managed cattle ranching and farming. This principle recognizes operations that manage grazing lands in a way that maintains and improves soil health, minimizes soil erosion and compaction, and maintains soil fertility at locally appropriate levels. The outcome of meeting this sub-principle is an operation with a grazing regime appropriate to local soil conditions and that strategically places water sources and attractants to optimize livestock distribution, minimizing erosion and compaction, evenly distributing deposited nutrients, and maintaining a level of forage productivity that meets or exceeds site potential. Since soils that absorb more rainfall slow runoff, the operation reduces erosion and sediment pollution of waterways and associated risks. Ranches and farms that utilize improved pasture and/or cropland apply nutrients at appropriate agronomic rates, which not only optimizes soil health, but also helps cut fertilizer costs and pollution-related risks. Together, these strategies for maintaining appropriate levels of soil fertility, soil stability, and water infiltration benefit forage health, and thus livestock weight gain and sale prices.

Criterion	*Indicators*
3.2.1 A Soil Health Plan is developed and implemented as part of the Resource Management Plan. The Soil Health Plan maintains and improves soil quality, includes soil conservation goals, and addresses soil fertility.	a) The Soil Health Plan identifies issues of concern and selects locally appropriate corrective actions to improve soil health**.** b) Locally appropriate BMPs are in place to maintain and restore soil health, including steps to optimize soil productivity/fertility, reduce and minimize soil erosion and compaction, and minimize adverse impacts of soil surface disturbances and input applications to soil biota. c) Soil monitoring records verify achievement of soil health objectives. d) Advanced soil quality indicators related to nutrient retention and uptake, infiltration, and water holding capacity (e.g., organic matter

	content, soil aggregation) are monitored and improvements documented.
3.2.2 Soil fertility is maintained at or restored to locally appropriate levels through well-managed grazing. • On improved pasture or cropland, nutrients are managed to protect soil fertility and biota through precise selection and application of organic and mineral fertilizers.	a) Assessment results and/or monitoring records indicate locally appropriate levels of soil fertility. b) % cover by bare ground, % litter, and soil organic matter are at locally appropriate levels; c) Plant growth is vigorous; forage productivity reflects the potential for the site and climate year. d) Plant community composition is appropriate in relation to potential. e) Dung distribution (evenness across a pasture) and breakdown rates are managed with herd movements and mechanical means where appropriate, and indicate healthy nutrient cycles.
3.2.3. Grazing and other operation management practices avoid or minimize erosion, and enhance soil health. • If a mixed crop system is used, soil preparation and crop production avoids or minimizes negative impacts of soils, including erosion. *Critical Criterion CC+3*	**1. All Operations:** a) Assessment results and/or monitoring records indicate locally appropriate levels of soil erosion and/or stability. b) The % cover by bare ground, plant cover and litter in pasture areas are at locally appropriate levels. c) Erosion control objectives are met, including protection of soil and water quality. d) Operations management prevents and minimizes erosion caused by soil preparation, forage production, high use areas (e.g., corrals, backgrounding lots), road construction and maintenance, oil and gas extraction, off road vehicle (ORV) use, and other management activities that mechanically disturb soils. e) The operation map identifies areas of the operation vulnerable to wind and water erosion, and appropriate management techniques reduce erosion and maintain or improve soil stability in these areas. f) Grazing management protects sites sensitive to erosion as conditions warrant: e.g., seasonal or permanent exclusion of animals from steep slopes (>30%), highly erodible soils, riparian habitats (stream banks), and other sensitive soils to prevent and minimize erosion. **2. Additionally, for rangeland:** a) Where biological soil crusts naturally occur, they are intact or otherwise in good condition relative to potential for the site. **3. Additionally, for improved pasture and/or cropland:** a) Where operations utilize tillage, it is implemented judiciously as a tool. Examples include: 1) The tillage system conserves soil (lessens soil erosion) and/or improves soil health; 2) Non-inversion tillage methods result in crop residue left on the soil surface during critical erosion periods (e.g. conservation tillage); 3) The producer/manager conducts periodic monitoring to verify that any tillage systems minimize erosion and runoff.

	b) Cover crops/ground cover are planted and maintained in production areas where this does not compete with crops for water or nutrients. 1) Cover crops are planted to improve drainage and increase the tilth of the soil; 2) All areas with existing ground cover and areas planned for planting ground cover are indicated on maps. c) The operation obtains a score less than or equal to T, or equivalent, for the current Revised Universal Soil Loss Equations. d) Traffic on the operation is effectively controlled to avoid and minimize erosion (e.g. use of field borders, tractor paths and lanes within fields for machinery).
3.2.4. Land management practices including grazing and pasture management, soil preparation, and on-farm crop production practices avoid or minimize soil compaction and related impacts on soils, and enhance soil health. • Where soil compaction has been identified as an issue of concern, corrective actions are implemented to reduce its impacts.	a) The grazing management system prevents and minimizes soil compaction due to livestock production. b) Soil compaction is periodically assessed and does not negatively impact soil health. Monitoring records show locally appropriate or decreasing levels of soil compaction. c) Pastures contain few or no areas of impervious surfaces; evidence of compacted soils is minimal and limited to intensive management areas. d) The producer/manager provides recent Rangeland Health Assessment or Pasture Condition Scoring results or equivalent monitoring records that document locally appropriate levels of soil compaction. e) Stocking rates and timing of grazing are designed to prevent and minimize soil compaction. f) Pastures containing clay soils are managed to minimize pugging and compaction. g) Heavy equipment is not used when soils are wet or saturated. h) Where tillage is used, tillage practices conserve soil, lessen soil compaction and/or improve soil health.

SUB-PRINCIPLE 3.3 – Water Conservation & Water Quality

Beef production practices efficiently use and do not deplete the quantity of surface or ground water, and maintain or improve surface and groundwater quality.

"With use of off-stream water and salt to improve livestock distribution and reduce negative impacts to riparian habitats and water quality, cattle were distributed more evenly, consumed more upland forage before maximum riparian utilization was reached, gained more weight, and resulted in a positive return on investment (ROI)." – Stillings and Colleagues[19]

"Rural areas of the U.S., as well as the general public, depend on water yields for their water supply. One of the factors determining the yield in these areas is the condition of the grazing lands where precipitation falls. Lands with sufficient vegetative cover reduce erosion and the possibility of flooding by slowing and more evenly distributing surface waters while promoting percolation of precipitation to recharge groundwater aquifers." – Grazing Lands Conservation Initiative[20]

Objectives and outcomes of Sub-Principle 3.3: The Water Conservation section of this sub-principle addresses both efficiency of water use and prevention of fresh water depletion. Compliance demonstrates that ranches and farms manage water consumption to ensure that water is efficiently delivered to the animals and crops, and to prevent depletion of fresh water ecosystems and aquifers by using the minimum quantity of water necessary for production. The operation uses efficient practices (e.g., timing of water applications) and equipment technologies that optimize the quantity and duration of fresh water from various sources available for livestock and other animal species, as well as for locally important aquatic ecosystem values[21]. Optimizing water use efficiency generates cost savings on both irrigation water and energy use for irrigation pumping, and is likely to provide benefits to water quality, vegetation health, and biodiversity where it reduces withdrawals from streams and raises the water table. In addition, meeting this sub-principle increases the resilience of the operation to drought.

The Water Quality section of this sub-principle verifies that beef operations minimize water pollution through well-managed grazing, IPM (that avoids pesticide runoff), and precise nutrient and manure management that prevents runoff into surface and ground waters. There is no evidence of contamination of on-ranch water resources by pollutants such as sediment, nutrients and pathogens from manure (either in or next to water bodies), pesticides, fertilizer, garbage, and oil from vehicles and equipment. As a result, water leaving the ranch and entering public waterways is clean, maintaining the health of aquatic ecosystems and minimizing the health, business, and environmental risks posed by nutrient, pathogen, pesticide, sediment, and other forms of water pollution. In addition, by helping to minimize risks of pathogens reaching waterways, this sub-principle provides valuable health safeguards to workers and communities, and helps operations keep ahead of regulations pertaining to water pollution.

Criterion	*Indicators*
3.3.1 Water consumption is monitored and analyzed.	a) Current and future water consumption is calculated for irrigated pastures, crop production, and processing operations in order to

Systems are implemented to reduce or optimize water use, increase or optimize water use efficiency, and prevent fresh water depletion. • Rights to water use can be documented, e.g. irrigation district membership, etc. *Critical Criterion CC+3*	detect areas of excessive consumption and opportunities for conservation. b) Monitoring records confirm water consumption is reduced to local potential given climate conditions. c) Water distribution systems conserve water, and foster the efficient use and replenishment of existing water sources. d) Water distribution and irrigation systems are maintained to prevent water losses. e) Livestock access to natural water sources is managed to avoid contamination of natural water bodies. f) Water applications to pastures containing freshly deposited manure are timed to avoid contaminating water bodies with pathogens. g) Efficient technologies and practices (e.g. timing and scheduling of irrigation) minimize water loss or overuse. h) Irrigation systems are designed, operated and calibrated to optimize forage and/or crop productivity while avoiding excessive water application, erosion, salinization, or fresh water depletion. i) Irrigation withdrawals do not deplete surface water levels in natural water bodies to an extent that impairs aquatic ecosystems and/or biodiversity. j) Irrigation diversions are properly screened and otherwise maintained to minimize impacts to aquatic species.
3.3.2 Ranch activities do not contribute to water pollution. *Critical Criterion*	a) Runoff from operation activities does not carry sediment, nutrient runoff, agrochemicals, pathogens or other pollutants into surface water bodies, including rivers, streams, lakes, wetlands, ponds and irrigation ditches. b) Runoff from operation activities does not carry nutrient runoff, agrochemical or other pollutants into ground water systems. c) Where water quality is an issue of concern, the Operations Plan (see 1.3) includes corrective actions. d) Waste water from processing or other on-site operations used for irrigation: 1) meets relevant water quality standards, including nitrogen, nitrate, phosphorus, total suspended solids and pathogens; 2) nutrient load of waste water is factored into nutrient management; 3) Waste water from industrial sources is prohibited.

SUB-PRINCIPLE 3.4 – Integrated Pest Management (IPM) and Invasive Species

Beef operations use an IPM approach to prevent, control and manage introductions of invasive plants and outbreaks of pests while minimizing impacts to human health and the environment.

Objectives and outcomes of Sub-Principle 3.4: This sub-principle focuses on the effective control of invasive weeds, pests affecting animals, and, where applicable, crop pests. Compliance documents that the operation uses an IPM approach to prevent, control and manage introductions of invasive plants and outbreaks of pests while minimizing impacts to human health and the environment. The Grasslands Alliance requires an IPM approach that emphasizes the full range of pest tactics: prevention, avoidance, monitoring and, where necessary, suppression. Suppression tactics involve an appropriate balance of biological, mechanical and chemical control agents to minimize damage to native rangeland and pasture forage vegetation, wildlife, and ecosystem processes while controlling weeds and other pests. Pesticides are only used when shown to be necessary. Specific threats to human health and our environment associated with pesticide use are minimized through the implementation of required risk management practices.

Since invasive species may cause substantial degradation to rangelands and pastures, preventing and controlling their spread is critical for maintaining vegetation health, and for minimizing the use of herbicides, which are not only economically costly, but can pose risks to the health of ranching families, workers, communities and ecosystems[22]. Pests affecting livestock can negatively impact animal health, reduce livestock productivity, and in some cases impact food safety. Such pests must be managed using appropriate IPM tactics to ensure animal health and wellbeing.

Criterion	*Indicators and required risk management practices*
3.4.1 The operation implements the IPM plan. *Critical Criterion CC+3*	a) Activities identified in the IPM plan are executed. b) Monitoring data and recordkeeping demonstrate implementation.
3.4.2 Only pesticides that are legally registered in the U.S. for the animal/crop and pest combination are used. *Critical Criterion*	
3.4.3 The use of GA prohibited pesticides listed in Annex 1 of this standard is prohibited. The five nematicides cadusafos, ethoprop, fenamiphos, oxamyl and terbufos may only be used	a) GA nematicide risk management requirements are: 1) Use is part of the IPM plan and justified by the pest-specific thresholds defined for pest monitoring; and 2) Lower toxicity nematicides are used as part of the nematicides resistance management rotation; and 3) Application methods place the product precisely within the plant root zone or use tree injection; and 4) Re-entry intervals are enforced; and

under GA nematicide risk management requirements listed in Annex 3. The nine rodenticides brodifacoum, bromadiolone, bromethalin, chlorophacinone, difethialone, diphacinone, strychnine, warfarin and zinc phosphide may only be used under GA rodenticide risk management requirements. *Critical Criterion*	5) Daily maximum application time is limited to 4h per pesticide applicator; and 6) Personal protective equipment (PPE) provides the strictest level of protection; and 7) Medical monitoring of applicator health is provided *(criterion 4.24)*. b) GA rodenticide risk management requirements are: 1) Only formulated rodenticides baited traps classified as moderately toxic (blue label) or slightly toxic (green label) are used; 2) Baited traps with rodenticides are only used, if rodent monitoring proofs that mechanical traps for indoor control do not reduce the rodent population; 3) Signs of rodent activity (droppings, tracks, gnaw marks, burrows, etc.) are monitored and premises and traps are inspected weekly; 4) Bait stations with rodenticide are only used outside buildings, but not in open spaces or crop production plots, and no more than 30 meters from food packing facilities; 5) Bait stations are tamper-resistant, anchored, and constructed in such a manner and size as to only permit the entrance of rodents; 6) Food sources attracting rodents and debris is eliminated; 7) Rodent carcasses are handled with gloves and buried in locations that do not pose risk to human health or water contamination; 8) Bait stations are removed and the amount of stations diminished when there are no longer signs of rodent feeding or there is evidence of use by non-target *wildlife.*
3.4.4 Substances listed in Annex 2 as having inhalation risks are only used if restricted entry intervals are enforced and Personal Protection Equipment (PPE) is used.	a) Workers not handling pesticides adhere to restricted entry intervals after application of these substances as specified in criterion 4.18. b) Pesticide applicators of these substances comply fully with criterion 4.25, and in addition, they must use respirators with an organic vapor (OV) cartridge or canister with any N, R, P, or 100 series pre-filter.
3.4.5 Substances listed in Annex 2 as having risk to aquatic life are only used if non-application zones are enforced, and GA application equipment and weather conditions at the time of application are fulfilled. *Critical Criterion*	a) Minimum widths of non-application zones are: 1) Five meters, if applied by backpack sprayers; 2) 10-20 meters, if applied by motorized sprayers or *spray booms* depending on the equipment's technical specifications; 3) 30 meters, if applied by helicopter or airplanes. b) GA application equipment conditions are: 1) The application equipment height above the crop is minimized; 2) Equipment for mixing and applying agrochemicals is maintained on a regular schedule and maintenance is recorded; 3) Liquid agrochemicals can be applied by ***spray boom***, spray plane or helicopter only if wind speeds are less than 10 miles per hour (mph), and greater than 2.5 mph, and only if inversion conditions are avoided; c) GA weather conditions for application are: 1) Application before 9 a.m. at cooler temperatures to avoid vapor drift or transport of small spray drops on convection currents;

	2) Windsocks or other wind direction indicators are used to avoid spraying when the wind is blowing towards natural ecosystems, housing areas or public roads.
3.4.6 Substances listed in Annex 2 for *wildlife* risk mitigation are only applied if sufficient *wildlife* risk mitigation activities are implemented. *Critical Criterion*	
3.4.7 Substances listed in Annex 2 as having risks to pollinators can only be used if target plants are not flowering, or during the night only. *Critical Criterion*	
3.4.8 The introduction and spread of invasive plants are prevented, controlled and managed, and native rangeland and/or pasture forage plant communities are established and conserved.	a) Surveys are conducted and an inventory of invasive species establishes the scope of the problem. b) Invasive plant threats are prioritized, and weeds that are present on state or regional noxious weeds list are identified c) Lowest risk management options are identified, including prevention practices, opportunities for restoration or revegetation, biological weed control, controlled burning, physical removal, herbicides and other tactics. d) Actions are monitored and results are evaluated to determine efficacy of actions. e) A policy or protocol prevents the establishment and spread of priority invasive species (e.g., use of EDRR or EBIPM strategies), not just control of invasive species as problems arise.
3.4.9 Flies and gnat (horn, face and stable) populations are managed below action threshold densities through a low risk, integrated monitoring and management program.	a) Flies are managed primarily by prevention practices such as sanitation, removal of spilled feed and soiled bedding, and composting of manure. b) Avoidance practices are used, including movement of feeding sites. c) Animals, enclosed areas where animals are housed, and fly breeding sites are monitored for the presence of flies. d) Low risk suppression tactics are used, including biological control with range chickens & dung beetles, and physical controls, including walk-through traps. e) Where chemical controls are used, they are triggered by monitoring and employ-least toxic materials (never pesticides labeled 'Danger' or 'Warning'). f) Insecticide dust bags or oilers are located to avoid contamination of steams, wells and other water sources.

3.4.10 External parasite and heel flies (cattle grub) populations are treated and eliminated through a low risk, integrated monitoring and management program.	a) Prevention practices are employed including treatment of feeder stock or breeder animals before introduction to the herd, animal movement, sanitation and composting of manure. b) Avoidance practices are employed, including pasture management that allows for selection of location such as windy areas or wallows, and segregation of affected animals. c) Animals are monitored regularly and any external parasites are diagnosed to determine the course of treatment. d) Pesticide or pharmaceutical treatments take place in response to monitoring and diagnosis.
3.4.11 Rodents, their damage, and health risks associated with rodents are managed below levels of concern, and problems prevented through a low risk, integrated monitoring and management program.	a) Preventive measures such as exclusion and sanitation are used as primary management measures. b) Monitoring data from properly placed and serviced bait stations are recorded, and used to identify incursions and guide management decisions that reflect an understanding of risks. c) Suppressive measures, including predators and rodenticides, are used in response to trapping data and when levels of concern are exceeded. d) Traps are checked daily, and injured rodents are humanely killed. e) Tamper-resistant bait stations secured to posts, walls, or floors are used to enclose rodenticides. f) Broadcast rodenticide use is avoided. g) Rodenticides labeled 'Danger' or 'Warning' are not used.
3.4.12 Vegetative buffer areas around fields and treated weed patches reduce drift and protect adjacent natural areas and human health. Buffers comply with local regulations or Grasslands Alliance parameters, whichever are more stringent	a) Grasslands Alliance parameters are: 1) minimum barrier height is 1.5 times the crop height. 2) Barriers are composed of plants that maintain their foliage all year, but which are permeable to airflow, allowing the barrier to capture pesticide drops. 3) Preference is given to native species.
3.4.13 Pesticide and fertilizer application equipment is maintained and calibrated, and rate is appropriate to crop and pest. Lowest recommended rate is used, weather is monitored and conditions are selected to reduce *spray drift* and volatilization.	a) Equipment for mixing and applying agrochemicals is maintained and calibrated on a regular schedule and maintenance activities are recorded; b) The application equipment height above the crop is minimized according to the product types and mix, nozzle type, application rates and volumes; c) Application equipment is equipped with spray shields or curtains at the crop edge; d) Liquid pesticides and fertilizers are applied by *spray boom*, plane or helicopter only if wind speeds are less than 10 mph and greater than 2.5 mph, and only if inversion conditions are avoided; e) Application takes place before 9 a.m. at cooler temperatures to avoid vapor drift or transport of small spray drops on convection currents;

	f) Windsocks or other wind direction indicators are used to avoid spraying when the wind is blowing towards natural ecosystems, housing areas, or public roads.
3.4.14 The storage of Grasslands Alliance prohibited pesticides listed in Annex 1 of this standard is prohibited. *Critical Criterion*	g) Annex 1 Grasslands Alliance Prohibited Pesticides that were in use before farms apply for certification are returned to the supplier; or h) Annex 1 Grasslands Alliance Prohibited Pesticides are labeled and stored separately from other products until disposed of safely.
3.4.15 Persons or communities affected by pesticide use are identified, alerted, warned by signs, and prevented from access to application areas.	a) Visitors and neighboring communities at risk for pesticide exposure are identified. b) Operations have communicated to community members the dangers of being present on farms during applications, and the precautions to take. c) Persons and communities affected by pesticide use are alerted in advance about application areas, dates, and time periods of restricted access. d) Warning signs with symbols or other clear safety indications are placed at determined control points to prevent unauthorized persons from accessing affected areas.
3.4.16 Animals covered by the GA certificate scope do not consist of genetically modified organisms (GMOs) and are not repackaged or processed with GMO products. *Critical Criterion*	

*Templates for planning and record keeping will be provided

SUB-PRINCIPLE 3.5 – Nutrient Management

Nutrients from fertilizers, animal manure, and compost are safely stored and efficiently applied to prevent and minimize impacts to surface and groundwater quality, air quality, and soil health.

Objectives and outcomes of Sub-Principle 3.5: This sub-principle applies to operations that apply fertilizer or animal manure to pasture and/or croplands, and/or that store or process manure produced on small animal feeding facilities (e.g., backgrounding and winter-feeding lots, composting). It focuses on developing and implementing a nutrient management plan that details how the operation recycles nutrients, and balances nutrient inputs with nutrient use. Manure storage and processing facilities and practices, as well as applications of synthetic fertilizers and manure, are designed and implemented to minimize impacts to surface and groundwater quality, air quality (including greenhouse gas emissions), soil health, and the health of animals, workers and communities. Application equipment is well maintained and calibrated to ensure appropriate application rates. Before biosolids from external sources are applied to pastures or crop fields, they are screened for contaminants that may pose risks to ecosystems, natural resources, public health and animal welfare.

Well-designed and effectively implemented nutrient and manure management plans generate valuable environmental, economic, and public health benefits. Utilizing soil and leaf testing to apply fertilizer and animal manure at appropriate agronomic rates creates an optimum nutrient climate for plant growth, reducing business and environmental risks associated with air, surface and groundwater pollution, thus improving water and air quality, and reducing fertilizer costs[23]. Effective nutrient and manure management also mitigates the external costs of pollution caused by poorly managed storage and field-application of manure, which are estimated to total $1.16 billion per year in the U.S.[24]

Criterion	*Indicators*
3.5.1 A Nutrient Management Plan is developed and implemented as part of the Resource Management Plan. The Nutrient Management Plan describes and documents how nutrients are recycled, and how nutrient inputs from applications of manure, compost and synthetic fertilizers are balanced with nutrient use. • Monitoring records demonstrate locally appropriate indicators of successful nutrient management. *Critical Criterion CC+3*	a) The Nutrient Management Plan and associated records demonstrates how nutrients from fertilizers (synthetic and non-synthetic) and manure are applied at appropriate agronomic rates, times, or other practices to optimize effectiveness and address local issues of concern including negative impacts to surface and ground water quality, soil health, and air quality. b) Records are maintained of fertilizer and manure applications, and of natural resource monitoring results relevant to identified issues of concern**.** c) For improved pasture operations that store and/or apply animal manure to pastures or cropland, the plan documents the generation, collection, treatment, storage and agronomic use of all manure, and includes a mass nutrient balance for the major crop nutrients (Nitrogen, Phosphorus, Potassium – N,P,K) that takes into account inputs from water, soil amendments, nitrogen-fixing crops, existing soil and plant tissue. 1) Annual soil and/or plant tissue testing informs agronomic application rates, with all pastures and fields tested within a 3 year period.

3.5.2 Manure storage and on-operation management of stored manure avoids and minimizes impairment of surface and groundwater quality, air quality, soil health, and the health of livestock, workers and communities.	**NA:** No manure is stored on the operation. **1. All Operations** a) Manure storage capacity is adequate to contain all manure produced when uptake of application is inhibited or runoff is enhanced (e.g., frozen or saturated soils); b) Storage is designed so that runoff from the storage site is contained and utilized; c) Storage structures are monitored and inspected annually and maintenance action is taken to repair cracks and other faults that may lead to contamination of surface and/or ground water; d) Manure is stored at least 100 feet away from surface waters (farther where required by law/local ordinance), and not in areas subject to flooding, including within a 100 year flood plain; e) Setbacks, berms, or vegetated buffers separate manure pile(s) and waste storage areas from neighboring waterways and tile drain inlets within 100 feet (or as suitable given local soils, geology and topography). These may include grass or vegetated filter strips, terraces, manmade wetlands, or riparian buffers. f) Manure is stored downwind of sensitive areas. g) Excess manure, if any, is put to good use off-site. Records are kept documenting the amount of manure exported and the name and address of individuals receiving the manure. h) Runoff catchment basins are sited, designed and managed to prevent surface and groundwater pollution. **2. Additionally for operations that store solid manure:** a) A majority of the operation's stored manure is composted and used as fertilizer. 1) All manure and compost is stored on an impermeable surface; 2) Compost is actively managed, and a proper blend of Carbon and Nitrogen sources is available for microbial action; 3) In high rainfall areas, compost is covered to prevent runoff from the manure and over-saturation of composting manure. **3. Additionally for operations that store liquid and slurry manure:** a) Liquid manure storage facilities are designed and maintained utilizing infrastructure and practices to prevent leakage and breaches. b) Manure liquids are stored in impermeable lagoons, ponds or runoff catchment basins (made from synthetic material or earthen with plastic-liner) that are sited, designed and managed to prevent surface and groundwater pollution. 1) Liners and lagoon walls are well-maintained (e.g., no woody vegetation growing on them, herbaceous vegetation is well maintained; no other risks that could cause seepage or catastrophic breaching); 2) Storage capacity is adequate to contain all manure produced during periods when sprayfield application is not appropriate or possible (e.g. frozen or saturated soils, during rain events);

	3) Liquid waste storage and processing facilities are designed and maintained to withstand 100+ year/24 hour storm event; Lagoon floors are above the high water table c) Manure storage facilities are designed and managed to capture and/or limit emissions of methane, ammonia, VOC/odor, and other air pollutants identified as an issue of concern. d) Off-site disposal and use: 1) Liquid/Slurry is piped or hauled to a municipal wastewater treatment plant (or treated using waste management options such as aerated bioreactors or anaerobic digesters) 2) Records are kept documenting the amount of manure exported and name and address of recipients **4. For operations with permitted backgrounding and/or winterfeeding lots:** a) A plan is in place to prevent impairment of surface and groundwater quality, soil health, and air quality by potentially toxic contaminants in manure: pathogens, heavy metals, pesticides, pharmaceuticals, estrogenic hormones; b) Operation aims for net zero discharge, including by converting waste into fertilizer, compost, and/or bioenergy utilized by the operation and neighboring farms. c) Annual and post-storm event (intensity TBD) third party monitoring of <u>surface waters</u> immediately upstream of and downstream from manure storage and land application areas enables early detection and rapid response to surface water contamination by discharges and minimize adverse impacts/associated costs: BOD, TSS/electrical conductivity, fecal coliforms, specified pesticides, additional measures as per identified risks. d) Where issues of concern are identified, annual monitoring of <u>groundwater</u> immediately upstream of and downstream from manure storage and land application areas (at least annually at stockpile and surface impoundments) enables early detection and rapid response to groundwater contamination and minimizes adverse impacts and associated costs: NO3, metals (arsenic), specified pesticides, additional measures as per identified risks.
3.5.3 Applications of <u>non-synthetic inputs</u> (e.g. manure, compost, green manures) do not impair surface and groundwater quality, air quality, or soil health. • Records are kept of dates, locations, amounts, and rates of application.	a) All non-synthetic inputs used on the farm are applied in accordance with the Nutrient Management Plan. b) Application techniques for non-synthetic inputs minimize the risk of contamination to aquatic ecosystems, groundwater, the atmosphere, soil health, or other crops. c) Non-synthetic inputs are not applied when uptake of application is inhibited and/or runoff is enhanced. d) Buffers are appropriate to protect surface waters, tile drains, domestic water supply wells and natural habitats from runoff of non-synthetic inputs, given local climatic and environmental conditions. e) Applications of non-synthetic inputs are monitored closely to avoid odor nuisance issues with neighbors.

	f) Winter pastures and feeding areas are harrowed in the spring after soils dry to incorporate non-synthetic inputs. g) Off-farm applications of manure are under the control of a manure agreement that guides applications through accompanied manure, soil, and/or plant tissue test results.
3.5.4 Applications of synthetic fertilizers to improved pastures, grazed croplands and crops do not impair surface and groundwater quality, air quality, or soil health. • Records are kept of dates, locations, amounts, and rates of applications.	a) Synthetic fertilizer application techniques minimize the risk of contamination to aquatic ecosystems, groundwater, the atmosphere, soil health, or other crops. Where appropriate, synthetic fertilizers are incorporated or injected into the soil, rather than broadcasted, to prevent nutrient runoff, groundwater pollution, or volatilization; b) Fertilizers are selected and applied in accordance with crop needs and soil characteristics, based on an assessment of soils or plant nutrient status: 1) Fertilizer quantity is matched to the needed amount, in accordance with the crop and foliar assessment or in accordance with the recommendation of national crop specific authorities; 2) Fertilizer application rates are determined by soil and/or plant tissue tests; 3) Fertilizer application is timed to make nutrients available only when the crops need them; 4) Slow release fertilizers are utilized whenever available and economically feasible. c) Records show that use of synthetic fertilizers is gradually being reduced, with Nitrogen (N), Phosphorus (P) and/or Potassium (K) met through use of non-synthetic inputs.
3.5.5. Application equipment is well-maintained and is calibrated before and during fertilizer application to ensure accurate application rates for given nutrient amendments. • Records are kept for application equipment maintenance and calibrations.	a) Application equipment is calibrated to deliver desired amount of material; 1) Inspection of manure management and spraying equipment for leaks occurs annually or per identified issues of concern; b) Application equipment is designed and maintained to prevent spillage. c) Filling sites are designed and maintained to allow effective spill cleanup. Spills are cleaned promptly. d) Fertilizers and manures are not applied through overhead sprinklers or big guns. Splash plates are located no higher than four feet above the ground; e) All application equipment running on moist soils is fitted with tires designed to minimize soil compaction. f) Commercial fertilizers and animal manure is not tracked onto public ways by equipment.
3.5.6 Biosolids from external sources are screened for heavy metal, pathogen, pharmaceutical, and contaminants of local concern	**N/A:** no biosolids from external sources are applied a) Operations that apply biosolids from external sources to pasture and/or cropland must secure documentation of testing by the biosolids provider or test biosolids themselves for contaminants and maintain application records.

before application to pastures and/or crop fields.	b) A soil test must be completed and passed every 3 years that includes an assay for heavy metal, pathogen, pharmaceutical, and contaminants of local concern.

Sub-Principle 3.6 – Waste Management

Beef operations reduce and manage waste for disposal to avoid negative impacts to soils, water, biodiversity and human communities.

Objectives and outcomes of Sub-Principle 3.6: This sub-principle recognizes operations that minimize generation of solid waste through reducing, reusing, recycling and composting materials, and by sourcing materials and inputs that minimize waste byproducts (e.g., purchasing in bulk, products that utilize recyclable or reusable containers). Waste storage, treatment and disposal facilities (including septic systems, wastewater storage facilities, drain fields and seep pits) are sited, designed and maintained to prevent adverse impacts to ecosystems, workers and communities, and to mitigate pollution related risks. Operations are kept clean and free of litter, reducing related health, safety and environmental hazards.

Criterion	*Indicators*
3.6.1 Waste destined for disposal is reduced through recycling, reuse, and changes to farm management, production, and processing.	a) Types and amounts of waste are identified, including hazardous materials. b) Priority is given to product suppliers that minimize waste associated with their products, and that receive used packaging and containers for reuse or recycling. c) Information on waste generation and reduction efforts are analyzed at least annually. Improvements and corrective actions are incorporated into operations and production management plans, and implemented. d) Organic waste from processing areas is applied to production areas or grounds and/or processed in accordance with the nutrient management plan.
3.6.2 Waste storage, treatment and disposal mechanisms are sited, designed and managed to prevent or minimize impacts on communities and workers, natural ecosystems, and soils.	a) Impacts include those on natural ecosystems, soils, and housing and other areas of worker activity. b) No burning of household waste, plastics, recyclables, and other materials that release toxins or pose other health risks when burned.
3.6.3 Septic systems, seep pits, and drain fields receiving domestic wastewater from housing, lavatories, kitchens, and washing facilities are designed to avoid contamination, based on the waste water volume and soil characteristics.	a) Drain fields and seep pits are not used in soils with permanently or seasonally high water tables, in heavy clays or soils with other impermeable layers that impede drainage, or in sandy soils that may permit rapid percolation of wastewater into groundwater. b) Septic systems are sited to protect flowing and still water bodies and wetlands. c) Wastewater with toxic components, such as pesticide application equipment wash water, is not treated in underground septic systems, seep pits or drain fields.
3.6.4 Properties are kept clean and free of litter or waste accumulations outside of	a) Identified receptacles for disposal of waste and recyclable/compostable materials are available in areas of human activity, and are emptied on a regular basis.

designated storage and disposal sites.	b) Waste from processing plants is removed to designated areas away from the processing plant on a daily basis and is not left overnight. c) Metal and plastic scrap materials that can feasibly be reused in the future are maintained in designated areas away from processing plants and housing, and access to them is controlled.

PRINCIPLE 4 – Improved Livelihoods and Well Being

Beef operations develop and implement employment policies that promote safe and fair working conditions and establish open channels for communicating with employees about issues such as workplace safety and job satisfaction. They provide incentives and opportunities for the development of employee skills and incorporate quality of life issues into daily decision making for their employees and local communities.

Objectives and outcomes of Principle 4: This Principle ensures the livelihoods, safety and well-being of employees and their communities, above and beyond those protections granted by law. Discrimination is prohibited and labor policies are clearly communicated. Compulsory and child labor are both prohibited, although children may participate in tasks and chores appropriate to their age and the scope of the operation. Careful storage of agrochemicals protects workers from unintentional exposure. Where appropriate, PPE is provided for workers. All restricted entry intervals, quarantine and pre-harvest periods are observed. Response plans are developed for possible emergencies such as extreme weather events, natural catastrophes (lightning strikes, earthquakes, storms, and floods), or fire, and personnel are trained to implement those plans.

Criterion	*Indicators*
4.1 Labor policies are written, posted and communicated to all workers and complaints or grievance mechanisms to protect workers' rights are implemented. *Critical Criterion*	a) All workplace policies and job expectations are clearly communicated to employees at time of hire. b) Where the operation employs more than 5 employees, a written employee manual is maintained, updated as necessary, and distributed to all employees. c) Complaints or grievance mechanisms for workers include a system to file complaints and document responses, and a periodic evaluation of its effectiveness. d) Workers who file complaints are protected from retaliation. e) A uniform disciplinary process is in place and is communicated clearly to workers, including a stepped progressive disciplinary process leading to termination of employment for cause.
4.2 All forms of forced or compulsory labor are prohibited, including • Use of trafficked labor • All forms of verbal, physical or psychological abuse, violence or measures that include sexual abuse or harassment • Use of extortion, debt, threats, monetary fines or penalties • Labor by prisoners. *Critical Criterion* According to ILO Forced Labor Convention (No. 29) and Abolition of Forced Labor Convention (No. 105))*3*	Forced or compulsory labor includes: a) Forcing workers to work or stay at the workplace, preventing them from being hired or from continuing to work, including for poor performance or for violating company rules, regulations, and policies; b) Control of worker access to food, water, toilets, canteens, medical care or health clinics as a means to discipline or reward workers; c) Withholding workers' salaries, documents, IDs, benefits, property or any rights acquired in the course or due to the status of work or stipulated by law; d) Restricting the workers' freedom of movement to and from their employer-provided housing, unless such movement would compromise the residents' security; e) Labor by prisoners or those working under the regimen of imprisonment, even when permitted by local regulations or other laws.

4.3 All forms of discrimination in labor, hiring, training, task assignment, labor benefits, promotion policies and procedures, and other opportunities for better conditions or advancement are prohibited, including • Any distinction, exclusion or preference to invalidate or harm equality of opportunity or treatment in employment; • Different pay for work of the same or equivalent task; • Influencing opinions and convictions, views or affiliations of workers. *Critical Criterion* (According to ILO Conventions 100 and 111)	Includes discrimination based on: a) Race, color, sex, sexual orientation, gender, religion, political opinion, national extraction or social origin; b) Nationality or migratory status; c) Third party affiliation; d) Civil status; e) Medical condition or disability; f) Family condition, including pregnant women and parents with children, or any other protected status as included in national laws; g) Different pay for work of equal value; h) Unequal opportunities for gender when appointing management positions; i) Efforts to influence political, religious, social, sexual or cultural opinions and convictions, views or affiliations of workers.
4.4 Workers have the right to establish and join worker organizations of their own free choice without employer influence and interference. Worker organizations operate without interference or influence by farm management or owners. Workers have the right to voluntarily negotiate their working conditions in a collective manner and are protected against acts of discrimination or retaliation for reasons of affiliation. *Critical Criterion* (Freedom of Association according to ILO Convention 87, Collective Bargaining according to ILO Convention 98 concerning the Application of the Principles of the Right to Organize and to Bargain Collectively)	a) Worker organizations have the right to freely write their constitutions and rules, elect their representatives, organize their administration and activities and develop and implement their positions and programs; b) Worker organizations have the right to affiliate with international worker organizations; c) Full independence means being protected against any acts of interference in the worker organization's establishment, functioning or administration including: 1) Acts designed to promote the establishment of workers' organizations under the domination or interference of employers or employers' organizations; 2) Support worker organizations by financial or other means, with the object of placing such organizations under the control of employers or employers' organizations; 3) Workers' organization representatives have free access to the farm or related infrastructure for organizational activities and membership representation. d) Voluntary negotiation between workers and worker organizations is enabled by means of collective agreements with respect to regulation of terms and conditions of employment; e) In the case of employers with a number of employees less than the minimum required by the local legislation to create a worker organization, other effective communication mechanisms between workers and farm or group administrator management are implemented; f) Acts of discrimination for reasons of affiliation with worker organizations include dismissal of or prejudice against a worker by

	reason of worker organization membership, organizing or participating in worker organization activities.
4.5 All workers receive no less than the legal minimum wage or wages negotiated voluntarily and employers respect legal specifications about in-kind payment. Management-required training takes place during the normal workday and is fully compensated. *Critical Criterion*	a) The legal minimum wage corresponds to the highest official minimum wage defined and published by the government authority for a specific task or occupation defined at the national, regional, state or local level; b) For production, quota or piece work, the established pay rate allows workers to earn at least a minimum wage based on average working conditions and productivity. If under these conditions, the piecework rate does not meet the daily minimum wage, then it is upgraded to at least the daily minimum wage; c) If wages are negotiated by a voluntary negotiation between employers and workers' organizations, those negotiated wage amount(s) apply to all workers covered under the negotiation's agreement provided these wages are not below the legal minimum wage; d) If the law permits remuneration to be paid by in-kind payments, the worker may reject these payments and receive full remuneration in cash. In the case of in-kind payments, these reflect the market prices of in-kind items; e) Farms maintain a registry of all workers indicating worker name, gender, hire date, job type or description, number of regular working hours per period, and gross and net pay for regularly worked hours.
4.6 Payment policies and procedures guarantee the complete payment to workers of all of their wages due, on the date and in the place agreed upon in the labor contract, including overtime work. Workers have the right to object to their received payment and have their objections reviewed and decided with decisions being documented.	a) Upon being given an offer of employment, all workers are informed about all conditions and terms of work contained in the proposed labor contract or collective bargaining agreement; b) Workers receive a written detailed and comprehensive explanation of the wages paid and of any deductions made. In cases where the worker is unable to read this document, provision is also made to explain the document contents verbally; c) Worked hours and pay rates are recorded for each worker for the type of work performed. For piece rates or production work, workers' output or production in agreed upon units and the pay rate is recorded; d) Payment takes place at the workplace, or by another arrangement convenient to and agreed upon with the worker; e) Tools and equipment necessary for worker performance of their duties (including personal protective equipment) are provided by the employer free of charge to workers for use on the job; f) Migrant workers from other countries are only employed if they have a valid work permit issued by the official government agency.
4.7 The regular working hours of all workers do not exceed 48 hours in the week and eight hours in the	a) Workers have at least one full day of rest for every six consecutive days worked.

day[2] or, if lower, the maximum amount of hours specified by local regulation. Workers have daily meal and rest periods. All overtime is voluntary, not continuous and does not exceed 12 hours per week.	b) All workers have annual paid vacation leave equivalent to a minimum of one day earned for each month worked (12 days or 2 work weeks per year) or the equivalent for part-time workers. c) If there is no legally mandated overtime wage level applicable, all overtime hours are paid at a higher rate than regular working hours. d) Workers have minimum one meal period for every six hours worked.
4.8 Fully-paid maternity leave is at least 12 weeks and includes no less than a six week period after birth. Flexible working arrangements are offered to pregnant or nursing women. Pregnant women are not assigned to activities that involve exposure to pesticides.	a) If a worker's pregnancy indicates a different, more protective job assignment during her pregnancy, her remuneration is not reduced during that period.
4.9 Arrangements or practices in order to avoid legally mandated pay and benefit obligations are prohibited. *Critical Criterion*	a) Arrangements include different mechanisms to continually hire workers on a short-term basis for permanent tasks, such as tenant farm arrangements or the formation of professional service structures. b) Temporary workers are provided with legally mandated labor benefits.
4.10 Employer assists workers in gaining access to suitable housing and locating family support services.	a) Housing provided to workers and their families protects against the weather and is clean, safe, and not detrimental to dwellers' health. b) If the employer does not provide worker housing, employer refers workers to community resources for housing. c) Employer refers workers to community resources for health and welfare information.
4.11 Workers are encouraged to improve their skills and contribute to improving the operation.	a) Workers are recognized and supported for contributing input for workplace improvement. b) Workers are encouraged to pursue workforce development and training, as appropriate and where available.
4.12. For year-round workers, the employer provides benefits as suitable to the scale the operation.	a) Employer provides unemployment and/or workers compensation insurance. b) Employer provides other benefits, which may include but are not limited to: 1) Health, disability and/or life insurance 2) Subsidized or provided transportation for workers 3) Sick and/or vacation pay 4) Subsidized or reduced housing costs 5) Bonus wages for outstanding performance

[2] ILO Convention 30 concerning the Regulation of Hours of Work in Commerce and Offices

4.13 Non-employees are kept out of the workplace and off the grounds unless accompanied by operation manager or suitable employee.	a) An exemption may be made for family members; however children of the employer or worker families under 12 must be supervised when around the workplace area and grounds.
4.14 Exploitation of children is prohibited, including: • Work that harms the health, safety or morals of children, or is too physically hazardous for children • All forms of slavery or practices similar to slavery • Use, procuring or offering of a child for prostitution, for the production of pornography or for pornographic performances • Use, procuring or offering of a child for other illicit activities. *Critical Criterion*	a) Types of work too physically hazardous for children include: 1) Handling of pesticides, hazardous substances or residues; 2) Operating or assisting to operate power machinery or tools; 3) Activities requiring strong physical exertion, such as heavy lifting; 4) Work on steep slopes, near steep cliffs or drop-offs, on any high surface or in high places; 5) Work in storage areas, silos and construction sites; 6) Night work. b) Slavery comprises: 1) The sale and trafficking of children; 2) Debt bondage and serfdom; 3) Forced or compulsory labor, including forced or compulsory recruitment of children for use in armed conflict; c) Illicit activities cover the production and trafficking of drugs as defined in the relevant international treaties; d) Any type of paid or unpaid work by a child under the age of 12 years old is prohibited, except tasks that are traditional to ranch/farm families with children and local culture. e) Young workers do not work after nightfall, during school hours (if legally subject to compulsory schooling) or more than eight hours per day. In all circumstances, the total sum of young workers' work, school attendance and transportation hours does not exceed eight hours per day.
4.15 Young workers may work only if permitted by law and if not working during legally compulsory school hours. *Critical Criterion*	a) For each young worker, the following information is recorded: 1) First and last name; 2) Date and reliable proof of date of birth; 3) Parent(s) or legal guardian(s) first and last name and domicile or place of contact; 4) Parent(s) or legal guardian(s) consent and authorization for the young worker's employment; 5) Type of assigned work or tasks; 6) Number of daily and weekly working hours.
4.16 Workshops, storage and processing facilities are designed, equipped, and managed to reduce the risk of accidents and negative impacts on human health and the environment.	a) Worksites are designed and equipped in accordance with the type of substances and materials and have sufficient light and ventilation, and have equipment for fire-fighting and attending spills; b) Only authorized personnel have access to these areas; c) All hazards and hazardous areas are identified by warning signs that indicate the type of hazard and any necessary precautionary measures;

	d) Working emergency showers and eye-washing facilities are accessible for all workers that handle pesticides or other hazardous materials; e) Fuels and other flammable substances, personal protection equipment, or food are not stored with pesticides, fertilizers or other hazardous materials or residues; f) Chemical containers and application equipment are stored in dry, well ventilated conditions and protected from sunlight and extreme temperatures; g) Materials are stored safely and Material Safety Data Sheets (MSDS) for each stored chemical are kept in the storage facility
4.17 All farmers and workers mixing or handling pesticides, fertilizers or hazardous material, or operating or maintaining hazardous machinery or tools, use Personal Protection Equipment (PPE) in accordance with the product's MSDS, safety tag or instructions.	a) All equipment is replaced or repaired if damaged or worn; b) Gloves, boots, masks and respirators fit the user's body; c) All PPE and clothing for workers is washed and stored on the farm, and does not enter worker housing.
4.18 Restricted entry intervals, quarantine and pre-harvest periods for pesticides listed in Annex 2, or stipulated in the product's MSDS, label or security tag are implemented for pesticide applications.	a) When two products with different restricted entry or pre-harvest intervals are used at the same time, the longest interval and the strictest quarantine procedures are applied; b) In cases where PPE is not used, or unavailable, the intervals specified in Annex 2 apply; c) In cases where PPE is available and used, either the restricted entry interval stipulated in the product's MSDS, label, or security tag applies, or the WHO-recommended interval below, whichever is the longer; d) For pesticides without information about restricted entry periods, the following applies: 1) WHO class Ia: 72 hours 2) WHO class Ib: 48 hours 3) WHO class II: 24 hours 4) WHO class III and IV: 6 hours
4.19 Operation provides for sanitation, and general safety and welfare of workers.	a) Sheltered areas for food storage, rest and meal periods are provided. b) Safe drinking water is provided. c) Toilets with hand washing facilities are accessible. d) Employer provides workers with shower facilities with warm water. e) Safety training or educational materials are provided. f) Employer sets safety goals, tracks performance.
4.20 Possible emergency scenarios are identified and emergency procedures, training and equipment defined for each of these emergencies.	a) Possible emergencies include extreme weather events, natural catastrophes (lightning strikes, earthquakes, storms, and floods), civil unrest or fire; b) Personnel are trained and appointed as specialists in emergency response.

PRINCIPLE 5 – HEALTHY AND HUMANE TREATMENT OF ANIMALS

Beef operations treat livestock with care and respect, minimizing animal fear and stress during handling, transportation and slaughter. Livestock are provided fresh water, a healthy diet, shelter from extremes of temperature, adequate space and the opportunity to engage in natural behaviors, and have social contact with other animals.

Objectives and outcomes of Principle 5: This principle recognizes that healthy and humane treatment of livestock increases triple bottom line benefits for producers. Compliance with this principle ensures good animal health from birth to slaughter through record-keeping, proper nutrition, prompt resolution of health issues, low-stress handling, and overall good animal husbandry. Animals are not given non-therapeutic antibiotics (in feed or water), and do not receive beta-agonists or growth-promoting hormones. Producers practice responsible animal husbandry through animal welfare and herd health programs. Infrastructure and handling facilities are well-maintained, and ensure the safety of animals and handlers, and transportation to/from facilities is conducted safely and humanely.

Criterion	*Indicators*
5.1 An individual animal identification record system for cattle is established and applied from birth or arrival until sale or death. *Critical Criterion*	a. Identification records exist from birth or arrival on the property (with origin and date) until sale (with destination and date) or death, and enables identification of individual animals. b. Identification follows through sales and enables traceability throughout the animal's life. c. For purchased animals, past identification records are tracked and maintained for at least one year after sale or death.
5.2 Animals are raised on Grasslands Alliance certified grazing operations: • from birth to harvest, • from birth until removal from grazing operations, or • for the last one year (12 months) of their life. *Critical Criterion CC+3*	Verification documents should include: a. certification documentation b. bills of sale
5.3 Cloned animals or their progeny are not permitted. Genetically modified animals or their progeny are not permitted. *Critical Criterion*	
5.4 Mistreatment or abuse of cattle or working animals is prohibited.	a) No mistreatment or abuse covers: 1) No use of sharp objects on animals; 2) No misuse of irritating substances, including potash for branding;

Critical Criterion	3) Not moving animals in a pain-inflicting way; 4) No electrification of wire at voltage levels harmful to cattle or wildlife. b) Sick animals are provided necessary treatment, and cover if needed.
5.5 Animal handling and treatment activities are conducted by trained personnel and reduce fear, stress and pain. • Animals suffering from injuries or illnesses from which they are unlikely to recover are euthanized as quickly and painlessly as possible.	a) Animal handlers are well trained and understand the natural behaviors and factors that cause stress or injury to the livestock under his or her care. b) Animals do not show fear or stress, e.g., rushing to escape or running into each other during handling or transport operations, excessive vocalization, etc. c) Animal handlers show no evidence of raised voices or aggressive actions evident during inspection. d) Handling facilities are in good repair and show no evidence of fear or stressed behavior, such as bowed panels, smashed gates, etc.[25] e) If stock dogs are used to move cattle, the dogs are under control and do not cause injury or undue stress to the cattle. f) Farm operators, farm employees or other individuals conducting treatments and/or applying identifiers, including branding, are properly trained so as to avoid injuring animals or causing undue stress during the application process. g) Electric prods are not used, except when their use is the only option for ensuring the safety of animals and/or handlers, and this occurs on less than 2% of the animals handled. h) Treatment of sick, injured, dying animals: 1) Non-ambulatory, dying, diseased and disabled animals are provided shelter, food and water.[26] 2) Animals are rendered insensible to pain before being shackled, hoisted, thrown, cast away, or cut. 3) Insensibility must come from a single blow, gunshot or knife stroke, or an electrical, chemical or other means that is rapid and effective. 4) Non-ambulatory animals are never dragged to the kill area. i) Plans for carcass disposal are in place, and carcass disposal complies with all local regulations. Options provided by these laws may include burial, composting, or other techniques.
5.6 The herd health plan is implemented and proven effective through recordkeeping. • Livestock appear healthy and free of disease and/or severe problems with parasites.[27] There is no evidence of unresolved health issues. *Critical Criterion CC+3*	a) Animals are regularly monitored for injury, disease or abnormal behaviors. Any indications are addressed promptly and adequately, including through the use of isolation and/or professional veterinary assistance, and correction of causal factors when necessary. b) Facilities for isolating sick animals are available and adequate to allow normal movement. c) Animal identifiers (e.g., bands, tags, brands) are applied safely and carefully, and are checked regularly to avoid animal discomfort. If temporary markings are used, they must be non-toxic. d) Severe physical alterations are not allowed.

	e) Where calving is done on the operation, appropriate calving equipment is accessible and in good repair. Emergency information is easily accessible. Where calving is done in pens or pastures, the producer/manager can describe procedures to prevent stress to calves & transmission of disease. f) Castration is conducted at the earliest age possible to minimize stress and pain. Only surgical methods or banding are used for castration. Practices to ensure proper restraint, sanitation and administration of band or surgical castration are met. g) If flank spaying is necessary, the procedure is performed by a veterinarian or trained professional, and the animal is treated with pain relief medication during and after spaying. h) Calves are weaned no earlier than 6 months, using practices that minimize stress and ensure health. i) Dehorning/disbudding is done within 4 months of age using either chemical or hot iron processes, with pain relief supplied for older animals. Older calves and adult animals may have their horns tipped but cannot be dehorned/disbudded unless medically indicated.
5.7 Breeds are selected that maximize productivity and disease resistance in the local environment, and are adapted to local climate and geography. • Breeding cattle are selected for reproductive traits including low birth weight bulls, calving ease, milk production, calf protection and defense. • Records of reproduction periods, calving dates and other activities are kept, and substantiate reduction or elimination of negative genetic traits and negative impacts of inbreeding.	
5.8 Cattle are supplied with consumable water in sufficient quality and quantity to ensure health and wellbeing. *Critical Criterion*	a) Water is continuously available to animals in quantities sufficient to avoid symptoms of animal dehydration. b) Water accessible to animals for drinking does not contain amounts of contaminants, coliforms or chlorine detrimental to cattle health and well-being.
5.9 Nutritional needs of animals are met. Animals appear well fed with good body fitness (determined by using body condition score), as appropriate for the breed and life-	a) Feed and water stations are well maintained and clean water is freely available on a daily basis. b) Animals are supplied with adequate drinking water and feed to ensure animal health and well-being. c) No stress from competition for food or water is apparent.

stage of the animal, and for the level of production.	d) Appropriate mineral supplements (salt licks and/or loose minerals) are available if minerals are not otherwise provided.[28] e) Feed and water supplies are adjusted to meet age-specific needs and specific needs of breeding stock. f) Newborns are fed with colostrum and consume milk until their development allows for digestion of fodder. g) Records indicate breeding stock experience normal reproductive potential for the region. h) Operations Plan includes strategy for supplying cattle with feed and water in an emergency such as an extended storm or drought.
5.10 Feed, feed supplements, water, or other products containing the following substances are not supplied to cattle: • Animal by-products originating from mammals, birds, or fish • Animal or human excrement • Antibiotics, beta-agonists or hormones *Critical Criterion*	
5.11 Administration to cattle of substances prohibited by Grasslands Alliance is not permitted. *Critical Criterion*	a) Antibiotics cannot be used for purposes other than treatment of disease diagnosed by a licensed veterinarian, or, in limited circumstances, to control a disease outbreak in a herd. Use of antibiotics for feed efficiency, promotion or maintenance of growth, routine disease prevention, or reduction in number or incidence of liver abscesses is prohibited~~;~~ b) Use of the following antibiotics is prohibited: Avoparcin, Chloramphenicol, Fluoroquinolones, Polymyxins, Furazolidone, 4th generation Cephalosporins, or any other antibiotic not registered for use in the country where the animals are raised. c) Highest priority critically important antibiotics not explicitly prohibited under 5.11.b shall be administered only for systemic (by injection) treatment of individual cattle with a diagnosed disease after culture and susceptibility testing show no other antibiotic will work. d) The following additional substances are prohibited for use in beef cattle and bison production: 1) Organochlorinated substances; 2) Anabolics, including beta-agonists (used to promote muscle mass increase); 3) Hormones (used to stimulate higher production or growth promotion); 4) Clenbuterol, Diethylstilbestrol (DES), Dimetridazole, glycopeptide, Ipronidazole.

5.12 Infrastructure is clean and safe for cattle, working animals and people. • Where shelters or housing are provided, facilities are clean and dry, and animals have sufficient and clean bedding, natural light and ventilation, and protection from climate conditions and events. • Feed storage protects the quality of feed and prevents environmental impacts from storage areas. • Manure collection and storage is separate from animal shelters and feed storage areas.	a) Chutes, alleys, and other restraining equipment and facilities are designed and maintained to reduce stress and injury. Hydraulic restraint systems are adjusted according to manufacturers' instructions to prevent excessive pressure during restraint. b) Operations Plan includes a regular schedule for cleaning and maintenance of all working parts. Recordkeeping documents maintenance. c) Facilities are checked regularly to maintain safe and healthy living conditions. d) Supplemental feed storage: 1) Preserves feed quality; 2) Prevents animal access or contamination by birds and vermin; 3) Prevents clean runoff from entering or leaving the storage site; 4) Maintains optimum freshness, palatability and nutritional value of feed; 5) Is never subject to flooding, or if flooding occurs, storage is designed to prevent contamination of water resources in the event of flooding.
5.13 Animal transport procedures ensure animal safety and wellbeing, while minimizing stress. Adverse impacts of cattle transportation on the environment are minimized.	a) Animals are declared fit by trained personnel before any travel. b) Except for emergencies and medical treatment, animals with the following conditions are not transported: 1) Sick or severely injured animals, including those with open surgical wounds; 2) Females that have given birth less than 48 hours ago; 3) Cows in the last month of pregnancy. c) Calves must be weaned and vaccinated at least 45 days prior to off-farm/ranch transport to confinement. d) Loading and unloading activities minimize stress. e) Vehicles transport cattle safely: 1) Vehicles and loading equipment are in good repair and prevent injury to animals, reduce stress caused by overcrowding or undercrowding, wind chill or overheating; 2) Animals are not contained in the vehicle for more than 24 hours continuously; 3) Where animals are to be transported for more than 24 hours, carrier must unload the livestock for rest, feed and water for at least 5 hours at a location that has all the facilities necessary for loading, unloading, resting, feeding, watering and inspecting the livestock. f) Written records are maintained for animal transportation to slaughter facilities, including dates, numbers of animals transported, and conditions.

Principle 6: Climate Smart Ranching and Farming and Reduction of Operation's Carbon Footprint

Beef operations progressively reduce and minimize net greenhouse gas emissions, carbon footprint, and emissions of other priority air pollutants.

"Ultimately, agriculture that is better adapted to climate variability and change, has a lower environmental footprint and GHG emissions intensity, and supports economic and societal aspirations of farmers, will generate greater and more reliable returns along the entire value chain, and help to ensure food security around the world." – Global Research Alliance on Agricultural Greenhouse Gases and SAI Platform[29]

"Practices and policies that encourage maintaining and improving soil carbon sequestration are consistently associated with improved soil and water quality; reductions in silt loads and sediments into streams, lakes and rivers; and improvements in air quality." – Lal and colleagues[30]

Objectives and outcomes of Principle 6: This Principle documents that the operation has optimized grazing, herd, land, and nutrient management to reduce and minimize the carbon footprint of the operation – net emissions of greenhouse gases (GHGs). Well-managed grazing and other management activities continuously reduce and minimize emissions of carbon dioxide (CO2), nitrous oxide, and methane, and increase carbon sequestration to the soil's potential. In addition, operations optimize feed and breed selection to reduce and minimize emissions of methane (both enteric methane emitted from cattle rumen and manure methane) and nitrous oxide (emitted from manure and nutrient management). Operations avoid or minimize conversion of natural ecosystems to croplands and other intensive uses, restore degraded lands and croplands to perennial pasture, and utilize conservation tillage or no-till practices (where applicable). The result is to reduce net CO2 emissions by preventing emissions associated with land conversion and by increasing the acreage of the operation that is managed to optimize carbon sequestration. Well-managed nutrient application and manure storage progressively reduces and minimizes emissions of methane and nitrous oxide. Ranches and farms have achieved additional minor emissions reductions – and realized associated cost savings – by increasing and maximizing energy efficiency, fuel efficiency, and use and generation of renewable energy, and by reducing and minimizing use of petroleum-based energy sources, fertilizers and pesticides. Since climate smart ranching strategies focus primarily on improving production efficiencies, management quality, and resilience to drought and other forms of extreme weather-related events, they offer economic opportunities to producers and help mitigate risks.

Criteria	*Indicators*
6.1 A Climate Smart Ranching Plan is developed and implemented as part of the Resource Management Plan. The Climate Smart Ranching Plan identifies issues of concern related to emissions of GHGs and	The plan considers the following sources of emissions and emissions reduction opportunities, as applicable to the operation: a) Carbon Dioxide (CO2): 1) Restore soil carbon pools on degraded lands and maintain existing soil carbon pools on healthy lands;

other air pollutants identified as issues of concern, and documents implementation and monitoring of corrective actions. *Critical Criterion CC+3*	2) Prevent land conversion, including sod-busting and swamp-busting; 3) Increase and maximize fuel efficiency of transport vehicles and farm equipment; 4) Increase and maximize energy efficiency and maximize use of renewable energy; 5) Reduce and minimize GHG emissions associated with production and application of inputs. b) Methane (CH4; enteric and manure): 1) Manage grazing to optimize forage quality and digestibility; 2) Select feed(s) to achieve emission reductions; 3) Select animal breed(s) to achieve emission reductions; and 4) Manage manure to reduce and minimize emissions, where applicable. c) Nitrous Oxide (N2O): 1) Manage grazing to prevent the formation of N hot spots by optimizing the spatial distribution of deposited nutrients; 2) Select feed to achieve emission reductions; 3) Manage nutrients and manure to reduce and minimize emissions, where applicable.
6.2 Grazing and pasture management optimize carbon sequestration, and reduce and minimize emissions of enteric and manure methane, nitrous oxide, carbon dioxide, and dust/particulates.	a) Grazing and pasture management is designed to (to potential given currently available technologies and practices, local climate and soils, and the scope of the operation): 1) Optimize soil carbon sequestration; 2) Reduce and minimize soil carbon losses; 3) Reduce and minimize lifecycle enteric methane emissions to current potential; and 4) Reduce and minimize nitrous oxide emissions.
6.3 Feed selection and production reduces and minimizes greenhouse gas emissions, including enteric and manure methane, nitrous oxide, and carbon dioxide.	a) Feed and forage are selected and produced to reduce GHG emissions, including by (as relevant to the scope of the operation): 1) optimizing forage and feed quality and digestibility; 2) optimizing use of legumes as forage, feed and/or cover crops; 3) utilizing feed additives and supplements that reduce enteric methane emissions, where applicable to the production system; 4) choosing crops and production systems documented to generate low or progressively decreasing GHG emissions (i.e., low GHG footprint feeds).
6.4 Choice of animal breeds and breeding practices contributes to reductions in lifecycle enteric methane emissions.	a) The operation's herd development and breeding program considers the capacity of cattle to adapt to the local climate and geography, resistance to parasites and diseases, and feed efficiency in a manner that enables them to reach sale/slaughter weight as quickly as possible given local conditions.
6.5 Land conversion and/or restoration activities reduce and minimize net GHG emissions.	a) Adverse impacts of land conversion and/or benefits of restoration activities are documented, with outcomes yielding positive or improving influences on net GHG emissions.

See also 2.7 Land Conversion	
6.6 Soil carbon/organic matter is at or increasing towards locally appropriate levels.	a) Records demonstrate that levels of soil carbon/organic matter are appropriate to or increasing towards the sequestration potential of local soils, taking into account recent climate conditions. b) Where identified as an issue of concern, corrective actions are in place to optimize soil carbon/organic matter levels.
6.7 GHGs and other air pollutant emissions identified as issues of concern from management activities related to manure and commercial fertilizers and other on-farm waste are reduced and minimized.	a) Management of pastures, crop fields and high-use areas (e.g., corrals, backgrounding lots, wintering facilities) reduces and minimizes nitrous oxide and methane emissions from animal manure and synthetic fertilizer. b) Where additional air pollutants are identified as an issue of concern related to manure management (e.g., VOC's, ammonia, pathogens), strategies are in place to reduce and minimize these emissions. c) Plastic trash or other items that emit toxins when burnt are recycled or taken to the transfer station.
6.8 GHG emissions from fossil fuel use are reduced by increasing energy and fuel efficiencies and use of renewable energy.	a) The beef operation can provide documentation that (to potential given currently available technologies): 1) Fuel efficiency and use of low-carbon fuels for transport and farm equipment is improving and maximized; 2) Energy and fuel efficiency of planting, tillage, and input application is increasing and maximized; 3) Electricity and heating energy efficiency and use of renewable energy are increased and maximized; 4) The GHG intensity of applied inputs is reduced and minimized.
6.9 Proactive adaptations to climate change found in the Contingency Plan are implemented to increase the resilience of the operation's resource base, and monitored to ensure effectiveness.	See 1.2.2 - Contingency Plan

APPENDIX

Annex 1: Grasslands Alliance Terms and Definitions

Active ingredient (ai): A pesticide consists of several substances. The active ingredient is the chemical that triggers in the treated organisms (e.g. fungi, insects, and mice) the specific toxic effect. The other substances can assist this effect, directly or indirectly.

Adaptations: management actions taken to improve resistance and resilience of the operation's natural resource base to climate change, extreme weather and unexpected events. Adaptations are based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve desired natural resource conditions.

Adaptive Management: a structured, iterative process of decision-making that uses systematic approach of monitoring and adjusting management strategies based upon changing financial, production and ecological conditions.

Agriculture: The science, art, or occupation concerned with cultivating land, raising crops, and feeding, breeding, and raising livestock; farming. For the purposes of this Grasslands Alliance standard, all facilities and equipment engaged in growing crops and raising animals.

Agricultural Lands: lands defined as "Existing Agricultural Land" in regulations implementing the Renewable Fuel Standard provisions of the Energy Independence and Security Act of 2007, 75 Fed. Reg. 14670, 14864-14865, § 80.1401. Specifically, existing agricultural land is cropland, pastureland, and land enrolled in the Conservation Reserve Program (administered by the U.S. Department of Agriculture's Farm Service Agency) that was cleared or cultivated prior to December 19, 2007, and that, on December 19, 2007, was: (1) Non-forested; and (2) Actively managed as agricultural land or fallow, as evidenced by records which must be traceable to the land in question. Records to demonstrate eligibility include: (1) Records of sales of planted crops, crop residue, or livestock, or records of purchases for land treatments such as fertilizer, weed control, or seeding; (2) a written management plan for agricultural purposes; (3) documented participation in an agricultural management program administered by a Federal, state, or local government agency; or (4) documented management in accordance with a certification program for agricultural products.

Agro-ecological conditions: the status of ecological processes that operate in agricultural production systems.

Agronomic rate(s): The agronomic application rate (AAR) is the annual amount of fertilizer (synthetic and/or non-synthetic) that supplies the key nutrient needs (typically N, P, and/or K) of the crop or vegetation for optimal growth without leaving excess nitrogen that may leach below the root zone to pollute groundwater or move by surface runoff to pollute surface waters. The key concept is to manage the nutrients, crops, and soils to achieve the desired goal.

Aquatic ecosystems: Lakes, lagoons, rivers, streams, brooks, swamps, marshes, bogs and other bodies of liquid water that exist naturally. Not included are artificial water reservoirs or drainage systems.

Assessment: a written evaluation to determine baseline conditions for establishing a structured approach to improving the performance regarding this Standard. The initial assessment involves both the Participant and the independent auditor.

Audit: an independent evaluation of the Participants' operation against the CSBP Standard; a systematic and independent process of obtaining evidence and evaluation to determine the extent that CSBP Standard Indicators and Criteria are fulfilled.

Auditor: the person, an employee of a certification body, conducting the audit of the Participants' operation.

Benchmark: Grasslands Alliance refers to benchmarks within the framework of ecological sites – that reflect potential plant communities, nutrient levels, and other conditions for a site; those that would be expected on sites that have been well managed. Comparing current conditions to benchmark systems relevant to beef cattle ranches and farms (e.g., ecological site descriptions, forage suitability group descriptions), or to equivalent measures that reflect a site's potential plant communities, soil quality measures, etc. yields data and information about the current status of ecological functions processes, and thus the effects of management or climate change.

Beta-agonist: a class of steroidal drugs including ractopamine (sold commercially as Optaflexx™) and Zilpaterol (sold commercially as Zilmax) that improves the efficiency of beef production by increasing muscle growth; cattle converts more of the feed it eats into beef, and does so more efficiently. With the use of beta agonists, cattle require less feed and water to produce the same amount of beef than if no beta agonists were used. However, an increasing number of studies have raised serious animal welfare and public health concerns regarding use of beta-agonists in meat production, including 75 to 90 percent greater incidence of death among cattle. As a result, beta-agonists used in beef production have been banned in many countries around the world, including the EU, Russia, and China, and also by U.S. based meatpackers.

Biological Diversity (Biodiversity): The variability among living organisms from all sources including, amongst others, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. The variety and abundance of life forms, processes, functions, and structures of plants, animals, and other living organisms, including the relative complexity of species, communities, gene pools, and ecosystems at spatial scales that range from local through regional to global.

Biosolids: treated sewage sludge that meets the U.S. EPA pollutant and pathogen requirements for land application and surface disposal.[3]

Body Condition Score (BCS): Body condition scores (BCS) describe the relative fatness or body condition of a cow through the use of a nine-point scale. A body condition score five (BCS 5) cow is in average flesh and represents a logical target for most cow herds. A BCS 1 cow is extremely thin while a BCS 9 cow is obese.

Carbon Sequestration: The process of increasing the carbon content of a *reservoir*/pool other than the *atmosphere* – here used to refer to increasing the carbon content of soils.

Casualty euthanasia: Ending the life of casualty (sick or injured) animals in a humane manner, with absent or minimal pain or distress.

Cattle: Animals of the family Bovidae, genus *Bos*, especially those of the domesticated species *B. taurus* and *B. taurus indicus* (zebu) raised in many breeds for meat and dairy production. Also included are domesticated American Bison (*Bison bison*)

Certification Body (CB): an independent third-party- auditing firm that to provides independent assessments of the Participant's operations regarding the compliance to this Standard.

Children: All persons under the age of 18 (ILO Worst Forms of Child Labour Convention, 1999 No. 182)

Climate Smart: a term used to describe strategies for greenhouse gas mitigation (reducing and minimizing greenhouse gas emissions) and/or adaptation (increasing resistance and resilience to climate change).

Cloned animals: Individuals born from the same cell; or with absolutely homogeneous cell lineage.

Colostrum: Milk produced by cows and sucked by calves during the first three days after their birth.

Community: People or group of people living in the same place or region and are affected or impacted by the existence or operation of a farm or group of farms. Rural workers, farm inhabitants, neighbors of farms, traditional and indigenous people, and inhabitants of villages or cities may be considered communities affected by a certain farm or group of farms.

Competent professional: An individual with demonstrated professional expertise, skills, experience and credentials in the specific area where advice is rendered.

Compost: a mixture of decayed and/or decaying organic matter (e.g., manure, crop and hay residues) used as plant fertilizer. Compost is usually made by gathering organic materials, such as manure, plant materials (leaves, crop residues, grass clippings), into a pile or bin and managing for aerobic decomposition (e.g. turning for aeration) by bacteria, fungi, and other organisms.

Conflict of interest: The situation where an individual or group's capacity for objectivity is put at risk or appears to be put at risk by financial or personal interests that are in conflict with their authorized interest in, e.g., conducting fair and impartial internal inspections or serving as the group administrator or on its staff.

Conservation: see conservation action, conservation practice, conserved.

Conservation Action: are measures designed to minimize and mitigate the effects of land management actions- to ensure that species will be conserved and to contribute to their recovery. These actions may take many forms, including, but not limited to, preservation of existing habitat; enhancement or restoration of degraded or a former habitat; establishment of buffer areas around existing habitats; modifications of land use practices, and restrictions on access. The appropriateness of an individual action is determined on a case by case basis, and is based upon the needs of the species and type of impacts anticipated.

Conservation Practice: an agricultural management practice that have been determined by the Natural Resource Conservation Service as an effective method to address resource concerns, either alone or in combination with other practices. Conservation practices are not equivalent to "best management practices." In many cases, there are multiple conservation practice options that ranchers might consider for development of a resource conservation system to address a resource concern.

Conserved: A natural ecosystem is considered to be conserved if it has been protected against significant direct or indirect human disturbance, including: a) conversion to agricultural fields, pastures, tree plantations, or any other land use; b) mining or soil removal; c) building construction or infrastructure development; d) dumping solid waste or other

refuse; e) intentional introduction of alien species; f) harvest of fish, wildlife, or plants in a manner or quantity that exceeds the regenerative capacity of such species; g) livestock grazing except as specified under "sustainable management" below; h) change in the depth or flow direction of a water course; i) drainage or drying of water bodies or wetlands through excessive water withdrawal or other means; j) severe pollution of water bodies or wetlands that substantially alters their chemistry or species composition; or k) application of herbicides, pesticides, or fire, except for restoration purposes pursuant to a restoration plan. Natural ecosystems may be conserved through any combination of the following management approaches:

1) Strict preservation: land that is set-aside by the farm or group to exclude human activities and facilitate natural ecological succession processes.
2) Restoration: land that is managed to assist the recovery of natural ecosystems that previously experienced destruction or degradation. Restoration management may include activities such as planting of native species, removal of non-native species, and active or passive facilitation of natural ecological succession.
3) Sustainable management: land that is used for economic purposes that do not substantially alter the composition, structure, or function of natural ecosystems. This may include harvest of non-endangered species (or their parts) in a manner and quantity that does not exceed the regenerative capacity of such species; sustainable livestock grazing within bush lands, savanna, or other non-forested ecosystems; or use of natural ecosystems for non-consumptive purposes such as recreation, education, or tourism.

Consumable Water: water safe enough for drinking and food preparation.

Continuous Improvement: a long-term, ongoing effort to use incremental changes in management systems practices to achieve incremental improvements in environmental, economic and social outcomes.

Contingency Plan: a plan that develops management actions to limit resource and economic damage caused by drought and other forms of extreme weather and unexpected events (e.g. flood, wildfire).

Contract: A legally binding agreement.

Conversion: see land conversion.

Corrective Action: action in response to non-conformities raised by the certification body's auditor.

Critical criterion: A Criterion that requires full compliance during the audit in order for the audited organization to obtain or maintain certification. Partial or non-compliance of a critical criterion will lead to the denial or withdrawal of certification for the audited organization.

Critical Habitat: the habitat necessary for the sustenance of a population within a specific locale.

Death: Irreversible loss of brain activity demonstrated by the loss of reflexes of the brain stem.

Degradation: see *Land Degradation*

Criterion: A specific provision that forms the basis of evaluation for conformity within a principle of GA standards. Throughout the standard, Criteria are identified by a second order number (1.1, etc.) or in the case of sub-principles 3.1 – 3.6, a third-order number (e.g., 3.1.1). The criterion (desired outcome) is what is actually scored and is specific enough to clarify the essence of the criterion. Indicators are added when necessary to clarify exactly what producers are expected to do, and auditors are expected to assess, in determining compliance.

Destruction: Conversion of a natural ecosystem (or portion thereof) to a different land use, or other deliberate activity that extensively alters a natural ecosystem's composition, structure, or function:

1) Conversion to agricultural land or tree plantations;
2) Large-scale logging or other vegetation harvest that reduces the ecosystem's aboveground biomass by 75% or more;
3) Development of buildings or infrastructure, except for small-scale construction that is incidental to the sustainable use of the ecosystem for purposes such as eco-tourism, education, research, or low-intensity harvest of timber or non-timber forest products;
4) Significant changes to the depth or direction of a water course;
5) Draining or drying of wetlands and water bodies.

De minimus alteration of natural ecosystems, defined as alteration in the above-described ways that affects a total of no more than 1% of the land area of the certificate scope, is not considered to be destruction for the purpose of this standard.

Disease control: Administration of an antimicrobial drug to group of animals containing sick and healthy individuals (presumed to be infected), to minimize or resolve clinical signs and to prevent further spread of the disease (OIE Definitions)

Disease prevention: The administration of an antimicrobial drug to animals, none of which are exhibiting clinical signs of disease, in a situation where disease is likely to occur if the drug is not administered. (Adapted from FDA GFI#209, page 21)

Disease treatment: To administer an antimicrobial drug to an individual or a group of animals showing clinical signs of an infectious disease. (OIE Definitions)

Document: Consists of information and its means of back-up. These means can be paper, sample, photographic, magnetically imaged, optical, digital or on electronic disc.

Domestic wastewater: The wastewater from residences and institutions, carrying body wastes (primarily feces, urine and semen), washing water, food preparation wastes, and laundry wastes.

Eco-region: a relatively large unit of land or water containing a distinct assemblage of natural communities sharing a large majority of species, dynamics, and environmental conditions.

Eco-regional scale: used to described outcomes or activities for an eco-region.

Ecological Site: Ecological Sites provide a consistent framework for classifying and describing rangeland and forestland soils and vegetation; thereby delineating land units that share similar capabilities to respond to management activities or disturbance

Ecological Site Description (ESD): report that provides detailed information about a particular kind of land – a distinctive ecological site. See http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/

Ecosystem processes: The physical, chemical and biological actions or events that link organisms and their environment. Ecosystem processes include decomposition, production [of plant matter], nutrient cycling, and fluxes of nutrients and energy.

Ecosystem services and resources: Ecosystem services are the benefits people obtain from ecosystems. These include *provisioning* services such as food and water; *regulating* services such as flood and disease control; *cultural* services such as spiritual, recreational, and cultural benefits; and *supporting* services, such as nutrient cycling, that maintain the conditions for life on Earth.

Emasculation: Emasculation is the removal of the testicles (castration) of a male by surgical methods, Burdizzo clamp or elastrator.

Endangered species: Species of plants, animals, and fungi designated as threatened or endangered by national laws or classification systems or listed as threatened by the IUCN Red List of Threatened Species™ and/or listed in Appendices I, II, or III of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Endangered Species Act: federally mandated requirements for the protection and recovery of imperiled species and ecosystems in the United States. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. Globally threatened species are species designated as critically endangered (G1), endangered (G2), or vulnerable (G3). State-listed threatened species are species designated as critically endangered (S1), endangered (S2), or vulnerable (S3). (See www.natureserve.org for additional details).

Enhance/enhanced: increased, improved. GA uses "enhanced" to describe outcomes pertaining to improved resource conditions. Where a criterion or indicator requires that a condition be "maintained or enhanced, "enhance" is required when current conditions to not meet the Criterion, while "maintain" is required when current conditions already meet the Criterion.

Enteric methane: methane emissions generated by ruminant livestock via a digestive process (enteric fermentation) in which carbohydrates (in forage and feed) are broken down by methane-producing microorganisms into forms that support animal growth.

Environment, Health and Safety (EHS): broad set of regulations or procedures to ensure acceptable working conditions.

Extent (of weed infestations): Size of an infestation in length or square feet or meters.

Euthanasia: Practice to end a life with no pain in order to avoid prolonged suffering.

Fair Labor Standards Act (FLSA): establishes minimum wage, overtime pay, recordkeeping, and youth employment standards affecting employees in the private sector and in Federal, State, and local governments.

Farm: A smallholder farm, farm, plantation or ranch production unit and legal unit of land, which may or may not be composed of several neighboring or geographically separate production plots, which is subject to certification or audits. Farms with the same owner but different owner-authorized operational management are not considered as a single farm.

Farm infrastructure: Farm roads; irrigation channels, ponds, and reservoirs; permanently installed farm machinery; and washing, processing, and packing areas or facilities:

- **Major new farm infrastructure:** Any new farm infrastructure that, in aggregate, affects or disturbs an area greater than two hectares; withdraws more than 500,000 m^3/yr of irrigation water; or discharges more than 10,000 m^3/yr of industrial or process wastewater. These thresholds may be locally modified as specified in GA local Indicators documents.

Feed Crops: crops grown or purchased to feed cattle (e.g., alfalfa, corn, soy and their byproducts).

Feed Supplements: materials of nutritional value fed to livestock to optimize their growth and/or health.

Fertilizer: Natural materials and synthetic compounds, including manure and nitrogen, phosphorus, and potassium compounds, spread on or worked into soil or on leaves to increase their capacity to support plant growth.

Flowing and still water bodies: All naturally occurring streams, rivers, pools, ponds, lakes, and lagoons, as well as seasonal streams that flow continuously for at least two months in most years or flow intermittently (e.g., after strong rains) and are at least one meter wide in most places.

Forage-Animal Balance: a calculation to confirm that the total amount of available grazing forage and the addition of any supplemental feed (hay, silage, etc.) is -d with the amount consumed by the total number of livestock and wildlife to meet their daily consumption needs.

Forage Enhancement: management activities implemented to improve the amount and/or quality of forage available to livestock (e.g., brush removal, prescribed fire, herbicide applications).

Forage Suitability Group Description (FSGD): interpretive reports that provide a soil and plant science basis for conservation planning on livestock operations where forage crops are grown. More information: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1043493.pdf

Forced or compulsory labor: All work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered herself or himself voluntarily (Convention concerning Forced or Compulsory Labour (Entry into force: 01 May 1932); Adoption: Geneva, 14th ILC session (28 Jun 1930).

Forestland: lands generally undeveloped land covering a minimum area of one (1) acre upon which the primary vegetative species are trees, including land that formerly had such tree cover and that will be regenerated and tree plantations. Tree covered areas in intensive agricultural crop production settings, such as fruit orchards or tree-covered areas in urban settings such as city parks, are not considered forestlands.

Fossil Fuel: a fuel such as petroleum, coal or gas that was formed in the geological past from the remains of living organisms.

Free, Prior and Informed Consent (FPIC): A specific right for Indigenous Peoples as recognized in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). FPIC is also recognized as good practice in development projects. It can reduce the risk of conflict between the community and company if communities are actively involved in project decisions from the outset. Non-indigenous, project-affected peoples also have the right to consultation and negotiation in decision-making processes in ways that are consistent with the principles underlying the right to FPIC.

Fresh Water Depletion: long-term declines in surface water and/or ground water levels occurring when rates of surface water withdrawal and groundwater pumping exceed rates of replenishment and recharge.

Genetically Modified Organism (GMO): An organism whose genetic material has been altered using genetic engineering techniques, i.e., the direct manipulation of an organism's genome using biotechnology or genome-editing techniques.

GHG: see Greenhouse Gas.

Good Agricultural Practices: Good Agriculture Practices or GAP refers to an evolving set of principles and technical recommendations to address human health, environmental protection, and the improvement of workplace conditions. In the absence of well-vetted science and well established production practices for grazing operations and/or pasture crops; Participants draw from the techniques developed over time to provide sustainable pathways for their grazing operations. Sustainable agricultural can be obtained through Good Agriculture Practices and specific methodologies, such as integrated pest management, integrated fertilizer management, conservation agriculture and worker/family health and safety protocols.
The GAP recognized by the FAO (http://www.fao.org/prods/gap/ rely on four principles:

- Economically and efficiently produce sufficient crops and livestock, safe production techniques and using environmentally sound principles;
- Sustain and enhance natural resources;
- Maintain viable farming enterprises and contribute to sustainable livelihoods;

Meet cultural and social demands of society

Grazing Management Areas: see production plot/area.

Grazing periods: Timing and duration of cattle's presence on grazing areas.

Greenhouse gas (GHG)/Greenhouse gas emissions: releases of gases that trap heat in the atmosphere, contributing to climate change. These gases include carbon dioxide (CO2), methane (CH4) emissions from cattle rumen (see also enteric methane) and manure, nitrous oxide (N2O) and chlorofluorocarbons (CFSs). Greenhouse gases (GHGs) are often measured in equivalents to carbon dioxide (CO2-e) as CO2 is the most prevalent GHG.

Group administrator: The entity that signs the certification contract with the GA accredited certification body and takes responsibility for the development and implementation of the group's internal management system and all member farms' management systems. The group administrator assures member farms' compliance with all applicable criteria of GA standards.

Group certification: an arrangement by which grazing phase beef production units owned or managed by a number of distinct legal entities (group members) may be evaluated and subsequently certified within the scope of a single certificate.

Group member: The owner or responsible person of one or more member farms of a producer group.

Growth promoting hormones: An estimated 80 percent of all US feedlot cattle are injected with hormones to make them grow faster.F Although the USDA and FDA claim these hormones are safe, there is growing concern that hormone residues in meat and milk are harmful to human health, animal health, and the environment. For example, According to the European Union's Scientific Committee on Veterinary Measures Relating to Public Health (SCVPH),

the use of six natural and artificial growth hormones in beef production pose a potential risk to human health.F These six hormones include three that are naturally occurring – Oestradiol, Progesterone and Testosterone – and three that are synthetic – Zeranol, Trenbolone, and Melengestrol. When hormones are injected into cattle, some naturally occurring hormone levels increase 7 to 20 times. F The committee found that "no acceptable daily intake could be established for any of these hormones." F The Committee also questioned whether hormone residues in the meat of growth enhanced animals can disrupt human hormone balance, causing developmental problems, interfering with the reproductive system, and even leading to the development of breast, prostate and colon cancers. F
Children, pregnant women, and developing embryos are thought to be most susceptible to negative health effects from added hormones. For example, hormone residues in beef have been examined as a cause of lower sperm counts in boys. F Growth-promoting hormones not only remain in the meat we consume, but also pass through the cattle to be excreted in manure. Scientists are increasingly concerned about the environmental impacts of this hormone residue as it leaks from manure into the environment, contaminating soil, and surface and groundwater. F Aquatic ecosystems are particularly vulnerable to hormone residues. Recent studies have demonstrated that exposure to hormones has a substantial effect on the gender and reproductive capacity of fish.F Source: http://www.sustainabletable.org/258/hormones

Habitat connectivity: the degree to which the landscape facilitates animal movement and other ecological flows. Wildlife need to move – mobility is the key to survival for many wildlife species.

Habitat diversity: defined by Grasslands Alliance as the range of habitats present on an operation's owned and leased lands.

Habitat heterogeneity: the variety of qualities (e.g., of plant heights and successional stages) found on an operation's habitats.

Hazardous materials or residues: Used lead acid batteries, asbestos, energy saving mercury lamps, E-waste, electric transformers with POPs (PCBs), medical equipment, radioactive material, pesticides, expired human and veterinary medicines, used oils, bio infectious waste, disinfectants, animal parts and carcasses, and particles (ashes, dust, pesticide drifts).

Heavy metal: GA focuses on heavy metals sometimes used by beef operations as micronutrients to promote growth, such as zinc, arsenic, and copper. As contaminants in manure, they can pose water quality risks.

High Conservation Value area: A natural ecosystem that is of special conservation importance by virtue of providing or sustaining one or more of the following six values:

1) Important concentrations of biodiversity, including endemic species or threatened or endangered species;
2) Large, high quality ecosystems or ecosystem mosaics;
3) Rare natural ecosystems;
4) Critical ecosystem services (e.g. watershed protection, erosion control, or flood control) to specific local or downstream communities or enterprises;
5) Resources fundamental for satisfying basic necessities of local communities or indigenous peoples; or
6) Resources of high cultural, archaeological, historical, religious, or sacred importance.

Highest priority critically important antimicrobials (HPCIAs): Antibiotics for which management of the risks from antimicrobial resistance are needed most urgently based on importance to human medicine and evidence of transfer of resistance from animals to people. Source https://www.who.int/foodsafety/publications/antimicrobials-fifth/en/

Hot iron process: (1) **de-horning:** Process to impede the growth of the bovine horn's button (extremity that finishes in round tip) when beginning to develop. The hot iron dehorning is carried out in order to avoid animals injuring each other and to facilitate herd management; (2) **branding**: the term used to describe how a branding iron, when heated red hot, is pressed against the animal hide to mark animal ownership. Brands and brand location are registered by each state.

Hunting: The act of pursuing or killing a wild terrestrial animal by legal means, with a rifle, shotgun or bow and arrow. Hunting is controlled and regulated by each state.

Hypoxia: the condition in water bodies in which dissolved oxygen falls below the level necessary to sustain most animal life.

Important Species, Important Wildlife Species (IWS), Important Species and Vegetation Cover Types: "Important" refers to any native plant or wildlife species or vegetation type/plant community type identified in state, regional, or national conservation plans (e.g., State Wildlife Action Plan or others) or identified as economically important or significant and therefore considered in the Conservation Plan ***in addition to*** rare, threatened and endangered species and communities. Examples of "important" species include those identified by using NatureServe Explorer http://www.natureserve.org/explorer/ to (1) search by location to get a list of G1-G3 species by county or watershed, and (2) use the map viewer to quickly zoom in to the location(s) of an operation's owned and/or leased lands. G1-G3 species are defined at https://en.wikipedia.org/wiki/NatureServe_conservation_status#Commonly_encountered_ranks

Improved pasture: see Pasture.

Indigenous peoples: Peoples native to a particular place, often ethnic minorities who have been marginalized as their historical territories have become part of a state.

Illness: Functional or morphological alteration with clinical signs caused by biotic or abiotic agents that can be present in animals and vegetables and that produce modifications in its morphology or physiology.

Improvement opportunities: see Issues of Concern.

Internal Inspection: First or second party audit conducted by a person designated by a group administrator that checks compliance of member farms with applicable GA standards.

Integrated Pest Management (IPM): an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines (prevention, avoidance, monitoring, suppression; PAMS) and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment.

Integrated Pest Management Plan (IPM Plan): a plan written to guide integrated pest management (defined above), based on the PAMS approach (prevention, avoidance, monitoring and suppression).

Intensive use areas: corrals, winter feeding facilities, backgrounding lots, crop fields.

Internal Management System: A documented set of procedures and processes that a group implements to comply with GA standard and policy requirements. The existence of an Internal Management System allows the GA approved certification body to delegate inspection of all individual group members to the group administrator's internal inspectors.

Introduced forage: planted forage species that do not occur naturally on an operation's lands.

Invasive plant species: A plant species or subspecies that is not native to a given place, and whose presence or introduction in that place causes or is likely to cause economic harm, environmental harm, or harm to human health. Invasive plant species in each locality are those plant species identified in the Global Invasive Species Database (http://www.issg.org/database/welcome/) or U.S. invasive species database (http://agclass.nal.usda.gov/). For the purpose of this standard, crop species are not considered invasive plant species.

Invasive species: plants, animals, and microbes not native to a region, which when introduced either accidentally or intentionally cause economic or environmental harm or harm to human health.

Irritating substance: Substance that can cause physical discomfort or pain.

Issues of concern: instances of resource degradation and other non-compliances with the Grasslands Alliance standard identified as opportunities to improve management outcomes.

Land conversion: Conversion of non-cropped areas or pasture to annual or perennial crop agriculture. Conversion from one crop to a different crop, or rejuvenation of perennial crop plots, are not defined as land conversions.

- **Major land conversion:** Any land conversion (or set of land conversion activities under the same management or group organization) that has the potential to significantly affect soil, water, land, or social wellbeing, by virtue of its size. Major land conversions are presumed to be those exceeding 100 hectares.

Land Degradation: changes within an ecosystem that negatively affect the structure or function of the site, and thereby lower the capacity to supply products and/or ecosystem services.[3]

Landscape scale: referred to by Grasslands Alliance to action that covers a large spatial scale beyond the individual ranch or farm, usually addressing a range of habitats, ecosystem processes and land uses.

Lethal control: control of a pest or predator animal that results in its death.

Life cycle assessment (LCA): a suite of analytical techniques for compilation and evaluation of the inputs, outputs, and the potential environmental impacts of a product system throughout its life cycle. (ISO International Standard, 14040 Environmental Management – Life Cycle Assessment – Principles and Framework, 2006. 2nd Edition)

Life cycle emissions: refers to GHG emissions that occur over the life of an animal, from birth to death.

Live fence: Line of closely spaced shrubs and tree species planted in such a manner as to separate crop and pasture areas or to define property boundaries supporting barb or plain wire fencing. Live fences cannot consist of dead fence posts only.

[3] FAO (2001); Global Forest Resources Assessment FRA 2000 – Main report, Rome.

Living wage: Remuneration[4] received for a standard work week[5] by a worker in a particular place sufficient to afford a decent standard of living[6] for the worker and her or his family. Elements of a decent standard of living include food, housing, education, health care, water, transport, clothing, other essential needs including provision for emergencies and unexpected events (ISEAL Living Wage Working Group).

Loading: Transfer of animals onto a vehicle, ship or container.

Locally Appropriate: GA uses this term in two ways. (1) Locally appropriate practices are those that will work best in the region of an operation, or given its climate, soils, or topography, to achieve a Criterion. (2) Locally appropriate Criteria and Indicators (e.g., "bare ground is at locally appropriate levels") refers to instances in which the current status of an indicator (e.g., litter cover, bare ground) can mean different things in different ecoregions. For example, low levels of bare ground in many regions (e.g., the Great Plains, eastern pasture) can serve as a positive indicator of soil and vegetation health. In more arid regions, however, low levels of bare ground can serve as an indicator of degradation because such outcomes typically indicate invasions by non-native annual grasses.

Maintain: refers to maintaining *already positive* outcomes Where a criterion or indicator requires that a condition be "maintained or enhanced, "maintain" is required when current conditions already meet the Criterion, while "enhance" is required when current conditions to not meet the Criterion.

Major new farm infrastructure: see Farm Infrastructure.

Management component: a specific part of agricultural management, including: input management, field/stand management, harvest, incidental area treatment, carbon cost, and field/stand access.

Management objectives: the specific aims a landowner or manager seeks to achieve through management plans and practices.

Management options: different practices or programs that may be used to achieve management objectives. Management practices: specific activities, measures, courses of action, or treatments used to achieve management objectives.

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[4] The term ***remuneration*** is a broader term than 'wage'. It includes the ordinary, basic or minimum wage or salary and any additional emoluments or earnings whatsoever, however designated or calculated, payable directly or indirectly, whether in cash or in kind, to the worker and arising out of the worker's employment; it is capable of being expressed in terms of money and fixed by mutual agreement or by national laws or regulations, and payable in virtue of work done or to be done or for services rendered or to be rendered (see ILO Conventions No. 95 (Protection of Wages) and 100 (Equal Remuneration)). As used here, it applies to all work done, whatever the form of engagement – by employment, by contract, or by casual labor.

[5] Under ILO Conventions No. 1 and 30, the standard working-time schedule is a maximum of an eight hour day and a 48-hour week. Working time in a particular country may be less if provided for by national laws and regulations, or by collective agreement.

[6] Under the Universal Declaration of Human Rights, article 23, "Everyone who works has the right to just and favorable remuneration ensuring for himself and his family an existence worthy of human dignity, and supplemented, if necessary, by other means of social protection"; and under article 25, "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control". These rights are developed further in particular in the International Covenant on Economic, Social and Cultural Rights (article 7, which guarantees among other things, fair wages and a 'decent living for themselves and their families'). They are also elaborated in the instruments of the ILO: in particular the Decent Work Agenda enshrined in the 2008 Social Justice Declaration endorsing "policies in regard to wages and earnings, hours and other conditions of work, designed to ensure a just share of the fruits of progress to all and a minimum living wage to all employed and in need of (social) protection".

Manure methane: methane emissions generated by livestock manure management.

Marginal Lands / Incidental Areas: Lands on the edges of cultivated areas that are often difficult to grow crops on. Marginal lands are described in ecological terms as having low production potential due to steep topography, poor soils, and limited rainfall, but also are considered useful for grazing livestock. In economic terms, marginal lands have low potential for returned profits from any investment of inputs. Others define them as idle lands that are not used for forage or crop production immediately adjacent to (e.g., hedgerows) or within (e.g., watercourses, wetlands) beef production units.

Mass nutrient balance: A nutrient mass balance (NMB) is defined as the difference between the amount of N, P, and potassium (K) imported through purchased feed, fertilizer, animals and bedding or manure, and the amounts exported off the farm via milk, meat, crops, manure and/or compost. Such assessments can help identify management alternatives that can enhance whole farm nutrient use efficiency (and hence reduce nutrient losses) and increase farm profitability.

Member farm: Farm owned or managed by a group member that signed or marked an agreement with the group administrator.

Mineral supplements: See feed supplements.

Mitigation: 1. action taken to alleviate potential adverse effects of natural or human-caused disturbances 2. compensation for damage done – note in this usage, in-kind mitigation is replacement of a lost resource with one similar (stream for stream or species for species), while out-of-kind is replacement of one kind with another (lake for stream or one species for another).

Narrow spectrum pesticide: a selective pesticide that is toxic to one or a few species or species groups —synonym selective pesticide. Contrast with broad- spectrum pesticide (a nonselective pesticide - usually an insecticide -that is toxic to many species).

Native Natural Grasslands: undisturbed grassland ecosystems with a plant cover composed principally of undisturbed native grasses, grass-like plants, forbs, and suitable for grazing or browsing. (http://www.ers.usda.gov/AmberWaves/September11/Features/NativeGrassland.htm#box1. Grasslands are defined by land cover and use. Grasses are the dominant vegetation, but grasslands also include legumes, forbs, and other vegetation. Grassland use includes such activities as grazing, haying, and other forms of forage harvest. Native grasslands are also referred to as “native sod.” Native grasslands are usually classified as rangeland based on native vegetation)

Native Sod: lands on which the plant cover is composed principally of native grasses, grass-like plants, forbs, or shrubs suitable for grazing and browsing, and lands that have never been tilled for the production of an annual crop as of January 1, 2008.

Native species: Species, subspecies, or lower taxon occurring within its current natural range, i.e., the range it occupies without direct or indirect introduction or care by humans.

Natural disturbance regime: the pattern of disturbances that shape an ecosystem over a long time scale. A natural disturbance regime is distinguished from a single disturbance event because it describes a spatial disturbance pattern,

a frequency and intensity of disturbances, and a resulting ecological pattern over space and time. Natural disturbance regime is closely associated with the natural community in which it occurs.

Natural ecosystem: Ecosystems that substantially resemble – in terms of species composition, structure, and function – those that are or would be found in a given area in the absence of major human management impacts. Vegetation where ecological processes primarily determine species and site characteristics; that is, vegetation comprised of a largely spontaneously growing set of plant species that are shaped by both site and biotic processes. Natural vegetative forms recognizable physiognomic and floristic groupings that can be related to ecological site features. Human activities influence these interactions to varying degrees (e.g., logging, livestock grazing, fire, introduced pathogens), but do not eliminate or dominate the spontaneous processes. (www.NatureServe.org)
These include:

1. ***Flowing and still water bodies***: All naturally occurring streams, rivers, pools, ponds, lakes, and lagoons, as well as seasonal streams that flow continuously for at least two months in most years or flow intermittently (e.g., after strong rains) and are at least one meter wide in most places.
2. ***Other wetlands***: All naturally occurring wetlands, where the natural hydrological conditions result in either or both of the following conditions:
    a. Soils are waterlogged for the majority of the year.
    b. The land is periodically or permanently inundated by shallow water. This includes floodplains; wet areas bordering ponds, streams, or the ocean; and shallow depressions that fill with water seasonally.
3. ***Forests***: Forests include both humid forests (rainforest) and drier forests; lowland, montane, and cloud forests; and forests consisting of any combination of broadleaf, needle leaf, evergreen, and deciduous vegetation. Generally, forests are defined as tree-covered areas that:
    a. Are not occupied by agriculture or other specific non-forest land uses;
    b. Consist primarily of native plant species;
    c. Contain a vegetation structure that generally resembles that of a natural forest of the same age in the same area; and
    d. Have been regenerating for at least 10 years with minimal human disturbance and/or have an aboveground carbon stock at least 35 tons per hectare for lowland tropical forest, or, for other types of forest, an aboveground carbon stock of at least 25% of that of a mature second-growth forest of the same type found in the same area.
4. ***Other native terrestrial ecosystems***: These include: Woodlands, shrublands, grasslands, and páramo that are present in patches of at least one hectare in size, are not being used for cultivation or enclosed grazing, and have not been used in these ways for at least the past five years.
    - Localized areas of non-forest natural vegetation within forest biomes that are not covered in any of the preceding categories, regardless of their size.
    - Further details on the definition of natural ecosystems and the identification of such ecosystems in the field will be provided in the GA Audit Process Guide.

Natural Heritage programs: state-level programs that manage site-specific and species/ecosystem-specific information on priority species and ecosystems, Natural Heritage programs identify species and ecosystems are priorities for conservation effort; build and maintain a database for priority species and ecosystems; and share the information with others so that it can be used for environmental assessments and conservation planning purposes.

Natural Resources Conservation Service (NRCS): a program of the U.S. Department of Agriculture to help America's private land owners and managers conserve their soil, water, and other natural resources. NRCS provides technical and financial assistance for many conservation activities. (www.nrcs.usda.gov)

Natural Savannah: ecosystems with a continuous native grasses and forbs layer with scattered native trees or shrubs. There are five discrete types in North America: pinyon (Pinus cembroides, P. edulis, P. monophylla), juniper (Juniperus sp.), pine (e.g. Pinus ponderosa, P. palustris), oak (Quercus sp.), and mesquite (Prosopis sp.) types. Oak savannahs are divided into California, southwestern, and Midwestern oak savannahs.

NatureServe: a non-profit conservation organization whose mission is to provide the scientific basis for effective conservation action; represents an international network of biological inventories-known as natural heritage programs or conservation data centers-operating in all 50 U.S. states, Canada, Latin America, and the Caribbean. (www.natureserve.org)

Net Emissions: a measure of the direct and indirect total carbon and carbon equivalent emissions from across the operation (including feed production and land conversion), as well as accounting for carbon sequestration on land (pasture, rangeland etc.) used for beef production.

New Information Request (NIR): a written request by a certification body to provide additional information to determine compliance with specific requirements. It is possible that a new non-conformity may result from the evaluation of new information submitted.

Non-Conformity (NC): receiving a non-conformity means that the program is not compliant with a specific requirement of the CSBP Standard.

Non-Lethal Strategies: refers to predator management strategies that reduce the likelihood that predators will prey on livestock, but do not kill or injure predators.

Non-shade-tolerant crop: A crop that is not defined as a shade-tolerant crop.

Non-synthetic inputs: See http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5103308 for a USDA AMS decision tree used to distinguish synthetic from non-synthetic inputs**.**

Nutrient Management Plan: the overall conservation system that addresses all aspects of an animal feeding operation to help ensure that both agricultural production goals and natural resource concerns dealing with nutrient and organic by-products and their adverse impacts on water quality are achieved. A CNMP incorporates practices to utilize animal manure and organic by- products as a beneficial resource. (http://www.nrcs.usda.gov/technical/afo/pdf/CNMPFactSheet.pdf)

Off-site compensation area: An area of natural ecosystem located outside of the farm boundaries that the farm owner or group administrator designates, through legal or other effective means, to be *conserved* on a long-term basis. For the purpose of this standard, any off-site compensation must be additional to conservation management that is already taking place (or would take place in the absence of action on the part of the farm owner or group administrator), and must reflect full prior, informed consent of any existing owners or valid claimants to the area's land or resources.

Operation's Scale: the relative size and complexity of the operations considered for GA certification, including the use of technologies and sophistication when compared to similar Participants in the region.

Optimize: make the best or most effective use of a resource in a manner that avoids unintended trade-offs or consequences to ecosystem services. For example, Grasslands Alliance favors "optimizing" soil carbon levels to locally appropriate levels because "maximizing" soil carbon levels could justify practices such as irrigation and fertilization, which are associated with different production impacts – including to water quality, water quantity, and biodiversity.

Organic and mineral fertilizers: See synthetic and non-synthetic inputs.

Overgrazing: occurs when plants are re-grazed repeatedly prior to full recovery.

Participants: a grazing phase (cow-calf, stocker, grass finishing) beef producer who enrolls in the GA program to achieve third-party certification for meeting the Grasslands Alliance Standard for Beef Production.

Pasture: (1) Pasturelands (which occur primarily in the eastern and central U.S., as well as in western U.S. bottomlands) contain vegetation that consists mostly of introduced species adapted to higher rainfall or irrigated conditions, and typically are managed using *agronomic* principles (i.e., farmlands planted with grass to feed grazing livestock; "farming with grass"). Pasturelands are a distinct type of operation from rangelands (defined below), and are sometimes categorized by how it is managed:

Improved Pasture: pasture that receives inputs such as fertilizer, pesticides and tillage/seedbed preparation.
Irrigated Pasture: improved pasture that is irrigated.
Cropland/Cropland Pasture: Grazed croplands planted to pasture in rotation with crops; grazed cover crops; grazed crop residues; grazed feed crop fields, etc.
Unimproved pasture: Grazinglands that are not native or naturalized grassland, and are not fertilized, irrigated, or recently seeded. Land not fitted to profitable use, but that may be necessary for seasonal intensive uses such as sorting cattle, calving and winter feeding. Unimproved lands are cared for to prevent weed invasion and soil erosion, but inputs are minimal. Although ecological condition varies, lands are in stable condition.

(2) A grazing unit enclosed and separated from other areas by fencing or other barriers and devoted to the production of forage for harvest primarily by grazing.

Pasture Condition Score / Pasture Condition Scoring: Pasture condition scoring is a qualitative method for quickly assessing the overall condition of a ranch, farm or pasture with respect to grazing management via key indicators and causative factors. More information:
http://wiki.landscapetoolbox.org/doku.php/field_methods:pasture_condition_scoring

Pathogen: an organism that produces a disease. It is an organic pollution (biological hazard) and occurs from fecal contaminations. Fecal contaminations of water by beef cattle ranches and farms can introduce a variety of pathogens into waterways, including bacteria, viruses, protozoa and parasitic worms.

Peatland: ecosystems dominated by moss species, especially Sphagnum or Carex sp. as the principle life form, and in which the production of beef exceeds its decomposition resulting in the accumulation of organic matter from plant debris. Peatlands are areas with or without vegetation, with a naturally accumulated peat layer at the surface.

Pest (crop pest): An organism which is detrimental to humans or human concerns and most frequently causing economic damage, e.g. to crops or livestock. They include unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs.

Pesticide: Any substance or mixture of substances intended for preventing, destroying or controlling any pest, including vectors of human or animal disease. Pesticides include herbicides, insecticides, nematicides, rodenticides, bactericides, antimicrobials, and fungicides. They also include substances that may be administered to animals for the control of insects, arachnids or other pests in or on their bodies. The term includes substances intended for use as a plant growth regulator, defoliant, desiccant or agent for thinning fruit or preventing the premature fall of fruit. Pesticides are also used as substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport.

Policy: Global intentions and the farm's or group administrator's orientation with respect to the GA standard, national laws and their requirements.

Potential / To Potential: potential plant communities, levels of key soil quality indicators, and other conditions for a site; those that would be expected on sites that have been well managed. Comparing current conditions to potential (typically provided via benchmarks such as ecological site descriptions or NRCS soil survey data that reflect e.g., expected soil organic matter levels for a site) yields data and information about the current status of ecological functions processes, and thus the effects of management or climate change.
See also benchmark.

Prairie: native grasslands of North America. Prairies can be roughly divided into tallgrass, mixed-grass, and shortgrass prairie, based on height and species of grasses. (http://www.npwrc.usgs.gov/news)

Predator: refers to wildlife species known to prey upon livestock.

Preservation: see strict preservation

Principle: A GA principle is a set of thematically related outcomes. This set of outcomes is explained in the introduction of each principle. The elements that compose a principle and reflect its outcomes are Criteria ("Criteria" in our sister standard, the SAN). The set of Criteria of each principle addresses all its key outcomes.

Procedure: Specified way to carry out an activity or a process for the purpose of complying with GA standard and policy requirements.

Product quality: The product's ability to fulfill the expectations and needs of the end user.

Production plot/area: A contiguous area of a farm dedicated to the production of crops or livestock of any sort.

Productivity: A measure of production efficiency based on the ratio of production output to production inputs of land, capital, water, other natural resources, labor, energy, or other materials. Land productivity (tons of crop produced per hectare) is a partial measure of productivity.

Protected area: An area of land recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem assets and cultural values. This term generally refers to IUCN protected area categories Ia, Ib, II, III, and IV. It also includes zones within designated multi-use landscapes (e.g., IUCN category V and VI protected areas) that are zoned for nature conservation. Examples include national parks, wildlife refuges, forestry reserves, private reserves, and nature protection areas within UNESCO Man and the Biosphere reserves.

Rangeland: Rangelands are grasslands, shrublands, savannahs, woodlands, wetlands, and deserts that are grazed by domestic livestock or wild animals, but where rainfall is too low or erratic for growing crops. Types of rangelands include tallgrass and shortgrass prairies, desert grasslands and shrublands, woodlands, savannas, chaparrals, steppes, and tundras. Rangelands are concentrated in the drier Western United States and are managed using *ecological* principles – as native ecosystems with few or no inputs.

Rangeland Health / Rangeland Health Assessment: the degree to which the integrity of the soil, vegetation, water and air as well as the ecological processes of the rangeland ecosystem are balanced and sustained. Integrity is defined as the maintenance of the functional attributes characteristic of a locale, including normal variability. Rangeland Health Assessment is a scientific method of assessing the ecological status of rangelands. See (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/range/?cid=stelprdb1043629) for more information. For a version targeted to producers, see http://quiviracoalition.org/images/pdfs/5252-2013%2520Bullseye.pdf.

Rare, Threatened, and Endangered Species and Communities (RTESC): species that are federally listed (e.g. by the U.S. Fish and Wildlife Service or National Marine Fisheries Service) or state listed (e.g. by state agencies or natural heritage programs) as G1- G3 and S1-S2. S3 species or communities that are listed as candidates for federal or state listing are also included. Other S3 species or communities may be considered rare based on the assessment by the landowner or manager in consultation with the appropriate state fish and wildlife agency.

Renewable Energy: energy from a source that is not depleted when used, such as wind or solar power.

Resilience: The ability to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change.

Restoration: The process of assisting the recovery of a *natural ecosystem* that has experienced *destruction or degradation*, by progressively returning its composition, structure, and function to that of an *ecosystem* that would be found on the site in the absence of disturbance or human impact. Restoration may include management activities such as planting of native species, removal of alien species, and active or passive facilitation of natural ecological succession.

Restored lands, restored: lands that through human intervention or natural processes once again exhibit some or all natural ecosystem characteristics.

Restricted entry period: Minimum amount of time that must pass between the moment a pesticide was applied to an area or crop and the moment that people can enter that area without personal protective equipment.

Rights to water use: A water right is a legal entitlement authorizing water to be diverted from a specified source and put to beneficial, non-wasteful use. Water rights are property rights, but their holders do not own the water itself. They possess the right to use it.

Riparian buffer: a "buffer strip" of vegetation maintained by management near a stream. Riparian buffers are usually forested or containing dense shrub cover, which helps shade and partially protect a stream from the impact of adjacent land uses. Riparian buffers are implemented to maintain or enhance ecosystem services such as filtering runoff to increase water quality in associated streams, rivers, and lakes, thus providing environmental and economic benefits.

Riparian zone: the vegetated area near a stream, usually forested or containing dense shrub cover, which helps shade and partially protect a stream from the impact of adjacent land uses. It plays a key role in increasing water quality in associated streams, rivers, and lakes, thus providing environmental benefits.

Risk: actual or potential threat of adverse environmental, economic and/or social impacts effects caused by poor management that results in resource degradation, resource depletion, pollution, waste, etc., arising out of an operation's activities.

RUSLE2 (T score): Revised Universal Soil Loss Equation, which estimates soil loss from rill and interrill erosion caused by rainfall on cropland (rill and interrill erosion is the removal of layers from the land surface by the action of rainfall and runoff); used to predict the long-term average rate of rill and interrill erosion for several alternative combinations of crop system and management practices. T score refers to soil loss tolerance, the amount of soil that can be replenished annually through soil forming processes, and usually varies from 1-5 tons per acre per year, depending on the soil type. RUSLE2 calculates the average annual soil loss (A) based on factors of climate, soil, slope length, slope steepness, cover management and support practice. This value is compared with T to determine whether the system is sustainable from a soil loss perspective. (http://www.ia.nrcs.usda.gov/news/factsheets/RUSLE2FactShee t.html)

Safe drinking water: Free from micro-organisms, chemical substances and radiological hazards that constitute a threat to a person's health, of an acceptable color, odor and taste as defined by the local authorities' minimum safety parameters, or complies with the following WHO parameters:

Parameter	Value
Fecal Coliforms	No detection of coliforms[7]
Chlorine residue or residue from other treatment disinfectants	0.2 to 0.5 mg/L
Nitrates	Maximum 10 mg/L as nitrates
pH	6.5 to 8.5
Sodium	Maximum 20 mg/L
Sulphates	Maximum 250 mg/L

[7] ***Guidelines for drinking-water quality*, 4th ed., 2011 Vol. 2 *Health criteria and other supporting information***, 1996 (pp. 940-949) and **Addendum to Vol. 2** . 1998 (pp. 281-283) Geneva, World Health Organization:

Organisms	Guideline value
All water intended for drinking	
E. coli or thermotolerant coliform bacteria[a,b,c]	Must not be detectable in any 100-ml sample
Treated water entering the distribution system	
E. coli or thermotolerant coliform bacteria[b]	Must not be detectable in any 100-ml sample
Total coliform bacteria	Must not be detectable in any 100-ml sample
Treated water in the distribution system	
E. coli or thermotolerant coliform bacteria[b]	Must not be detectable in any 100-ml sample
Total coliform bacteria	Must not be detectable in any 100-ml sample. In the case of large supplies, where sufficient samples are examined, must not be present in 95% of samples taken throughout any 12-month period

[a] Immediate investigative action must be taken if *E. coli* are detected.

[b] Although *E. coli* is the more precise indicator of faecal pollution, the count of thermotolerant coliform bacteria is an acceptable alternative. If necessary, proper confirmatory tests must be carried out. Total coliform bacteria are not acceptable indicators of the sanitary quality of rural water supplies, particularly in tropical areas where many bacteria of no sanitary significance occur in almost all untreated supplies.

[c] It is recognized that, in the great majority of rural water supplies in developing countries, faecal contamination is widespread. Under these conditions, the national surveillance agency should set medium-term targets for the progressive improvement of water supplies, as recommended in Volume 3 of *Guidelines for drinking-water quality*.

Turbidity	Less than or equal to 5 NTU (Nephelometric Turbidity Unit)

Scientific consensus: refers to the Grasslands Alliance protocol of developing standards and related guidance and policies and procedures manuals to reflect the findings of the vast majority of related scientific studies (rather than just one or a few studies).

Self-assessment: an evaluation of management practices against a set of criteria and indicators conducted by the landowner or land manager.

Semi-natural vegetation/lands: typically encompasses vegetation types where the species composition and/or vegetative growth forms have been altered through anthropogenic disturbances such that no clear natural analogue is known, but they are a largely spontaneous set of plants shaped by ecological processes.

Shade-tolerant crop: A crop or livestock species that is adapted to live under full or partial shade. This includes, but is not necessarily limited to, cardamom, cinnamon, cocoa, coffee, macadamia, nutmeg, and vanilla.

Smallholder: A producer that primarily relies on family or household labor, or reciprocal workforce exchange with other members of the community. Temporary workers can be contracted during limited periods of the harvest season, but permanent labor is not contracted. The smallholding applies for certification only as part of a producer group, not as an individual farm.

Socio-economic well-being: the social and economic health, stability, and vitality of a community.

Sod busting: refers to breaking the sod of natural grasslands and other rangelands, including with a plow or with herbicide application, for use as cropland. The Sodbuster Provision of U.S. Farm Bill is designed to discourage the conversion of erosion prone grasslands for use as croplands.

Soil Health: the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans.

Soil organic matter / Soil carbon: soil organic matter (SOM) refers to the organic constituents in the soil (tissues from dead plants and animals, products produced as these decompose and the soil microbial biomass). Soil carbon (sometimes referred to as 'soil organic carbon') refers to the C occurring in the soil in SOM.

Spray boom: Structure mobilized by a tractor to apply agrochemicals consisting of two arms suspended over the crop and which apply agrochemicals through their nozzles in atomized or dusty form.

Spray drift: The quantity of applied product –representing an active ingredient of a pesticide- which is deflected from the treated area by the action of air currents during the application process.

State Wildlife Action Plan: One of the conservation planning documents written by a state, tribe, or territorial fish and wildlife agency (agency) to proactively conserve wildlife and their habitats to prevent wildlife from declining to the point of becoming endangered and more costly to protect. These plans assess the health of each state's wildlife and habitats, identify problems they face, and outline the actions that are needed to conserve them over the long term. While all SWAPs share a common framework of required elements, they are tailored to each state's circumstances, wildlife, habitats, and conservation needs. As such there is variability in scope, species lists, focus, habitats, actions,

risks, threats and needs among state plans. These plans are written with public participation and must be updated every 10 years, although may be updated more frequently.

Strict preservation: land that is set-aside by the farm or group to exclude human activities and facilitate natural ecological succession processes. See also conserved.

Surface waters: see water bodies.

Sustainability: Adopting practices and developing products that are environmentally, socially, and economically sound, and that can meet present needs without compromising the ability of future generations to meet their needs.

Swamp busting: refers to conversion and/or filling of wetlands for use as cropland. The Swampbuster Provision of U.S. Farm Bill is designed to discourage the conversion of wetlands for use as croplands.

Synthetic fertilizers: See http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5103308 for a USDA AMS decision tree used to distinguish synthetic from non-synthetic inputs.

System: A group of elements that are mutually related or that interact. For example, a management system is a system for establishing policies and objectives, and for attaining those objectives.

Terrestrial: of or pertaining to land-based ecosystems.

To potential: see potential.

Undesirable plant species: plant species that are classified as undesirable, noxious, exotic, injurious, or poisonous, pursuant to State or Federal law.

Unexpected events: refers forms of extreme weather (e.g., intense storms, heat , cold, wind) and rare events such as droughts, floods, wildfires, insect outbreaks, etc.

Untilled Prairie: prairie lands that has never been tilled, or the Participant cannot substantiate that the ground has ever been tilled for crop production.

Vegetation Category / Vegetation Cover Types: the determination of the primary type of vegetative cover present on beef acres. Examples of vegetation categories include annual crops, perennial crops, native natural grassland, established grassland, natural savannah, semi-natural savannah, native sod, pastureland, prairie, and woodlots.

Vegetative riparian zone: Plant habitats and communities along the margins and banks of a river or stream.

Vigorous: in botanical terms, vigor is a measure of the increase in plant growth or foliage volume through time after planting. Vigorous plants are characterized by rapid plant growth, and robust foliage volume and seed production.

Waste: Waste is an unwanted or undesired material or substance. It is also referred to as rubbish, trash, garbage, or junk depending upon the type of material and the regional terminology. Most waste is comprised of paper, plastic, metals, glass, food waste, organic material, feces and wood. Waste includes hazardous materials or residues.

Waste water: Any water that has been adversely affected in quality by anthropogenic influence. It comprises liquid waste discharged by domestic residences, commercial properties, industry, and/or agriculture and encompasses a wide range of potential contaminants and concentrations.

Water body/Water Bodies: A geographically defined portion of navigable waters, waters of the contiguous zone, and ocean waters under the jurisdiction of the United States, including segments of rivers, streams, lakes, wetlands, coastal waters and ocean waters. Grasslands Alliance also includes ponds and irrigation ditches. See also flowing and still waterbodies.

Water consumable for cattle: Drinkable water is of a pH of 6.5 to 8.5 and contains less than 4000 ppm (or mg/l) of Total Dissolved Solids, but less than 1,000 ppm of sulfate. Coliform counts must be below 50 per milliliter of water and chloride content of less than 1600 mg/l for dairy cattle and less than 4000 mg/l for beef cattle. Safe levels of potentially toxic nutrients and contaminants in water for livestock are for Aluminum 5.0 ppm, for Arsenic 0.2, Boron 5.0, Cadmium 0.05, Chromium 1.0, Cobalt 1.0, Copper 0.5, Fluorine 2.0, Lead 0.05, Mercury 0.01, Nickel 1.0, Nitrate-Nitrogen 100.0, Nitrite-Nitrogen 10.0, Selenium 0.05, Sulfate 1,000.0, Vanadium 0.1 and Zinc 25.0 respectively (based on: Greg Lardy and Charles Stoltenow, North Dakota State University 1999 / Greg Curran and Sarah Robson. 2007. Water for livestock: interpreting water quality tests. State of New South Wales through NSW Department of Primary Industries).

Wetland: lowland areas with hydric soils that are seasonally inundated or saturated sufficiently to support a prevalence of hydrophilic vegetation adapted for life in water-saturated soil conditions. (Food Security Act, as set forth in 7 C.F.R. Part 12, Section 12.2, 1985)

Wildlife: All terrestrial non-domesticated animals.

Wildlife habitat: The environment or natural home where a wild animal lives. Different wildlife species often require different environmental condition in which to live. To properly manage land for the benefit specific wildlife species, landowners must be aware of those characteristics in the environment (e.g., vegetation types, successional stages, disturbance regimes) that the species needs to survive and reproduce.

Worker: A person who works on a farm or for a group administrator, regardless of how much the person works and whether or how the person is compensated. This definition encompasses all types of workers, including permanent, temporary, documented, undocumented, migrant, transitory, and family members working in a family business. A person is considered as working on a farm if, during a short reference period such as a day or a week, he or she does any work (even for just one hour). Workers include persons temporarily absent (for such reasons as illness, parental leave, holiday, training, or industrial dispute) from a job or enterprise at which they recently worked.

Worker organization: A voluntary association of workers recognized and duly registered by the government and organized for occupational purposes with the aim of furthering and defending the interests and labor rights of workers or collective bargaining. *(Adapted from ILO Convention 87 concerning Freedom of Association and Protection of the Right to Organize)*

Young worker: The minimum age of a young worker shall not be less than the age of completion of compulsory schooling as defined by local authorities and, in any case, shall not be less than 15 years. (ILO Minimum Age Convention, 1973 (No. 138); Convention concerning Minimum Age for Admission to Employment; Geneva, 58th ILC session).

ANNEX 2. THEORY OF CHANGE INFOGRAPHIC

The following figure summarizes the basic cause-and-effect logic embodied in the Grasslands Alliance's Theory of Change:

SUPPORT STRATEGIES

Activities and Investments made to advance the Grasslands Alliance mission

- Establish & implement the Grasslands Alliance Standard (standard-setting, policies & systems)
- Increase consumer & market demand for certified products
- Provide training and support for ranchers, farmers & producer groups
- Facilitate access to technical and financial assistance, resources, tools, inputs & services to support more sustainable beef production

Support strategies contribute to the following outputs (direct results):

OUTPUTS

Short-term effects on ranch & farm practices and management systems

- Ranches & farms adopt better environmental, social & agronomic practices
- Producers have increased knowledge & capacity to ranch sustainably
- Ranchers, farmers and producer groups improve ranch and business management systems

Changes in production practices and management systems lead to sustainability improvements in six key outcome areas:

OUTCOMES

Environmental, economic (ranch/farm productivity), and social changes resulting from the support strategies and direct results

Ranch/farm WILDLIFE HABITAT & BIODIVERSITY are conserved

- Protect natural ecosystems, high conservation value areas, & ecosystem processes & increase the amount & diversity of native plants
- Grazing & ranch management practices protect rare, threatened & endangered species & communities & all native plants & wildlife are conserved
- Non-lethal strategies are used for managing & coexisting with predators
- Ranches/farms contribute to landscape-level conservation
- Riparian habitats are conserved or progressively restored
- IPM activities do not negatively impact native wildlife or plants

NATURAL RESOURCES are conserved

- Productivity & resilience of native rangeland vegetation, pasture forage, & feed crop species are maintained or enhanced
- Soil health is maintained & improved, erosion and compaction are minimized
- Water pollution is minimized
- Water use efficiency is optimized; ranch water consumption does not deplete surface or ground waters or harm ecosystems;
- IPM strategies prevent, control & manage invasive species while minimizing impacts to human health & the environment
- Nutrients from fertilizers, animal manure and compost are safely stored & efficiently applied to minimize impacts to water quality, soil health, and air quality.
- Management of waste for disposal avoids impacts to human health & the environment

Ranches increase PRODUCTIVITY and PROFITABILITY

- Ranches increase productivity of livestock & feed crops
- Ranches produce higher quality products
- Ranches use inputs more efficiently (including energy, water, fertilizer, pesticides, land and labor)
- Ranches realize higher profits
- Ranches realize new business and marketing opportunities
- Ranches are more resilient to changing conditions & extreme events

Ranchers, workers & families improve their LIVELIHOODS & WELLBEING

- Ranchers, workers, & families meet essential needs, food, housing, health care, education, transport, clothing, & savings
- Minors are not exposed to harmful labor conditions
- Worker rights are protected & a safe workplace is guaranteed
- Rancher groups support small family ranches & farms through effective & transparent management

- Ranches support rural communities & avoid harmful impacts to them

Ranches/farms maintain HEALTHY & HUMANE TREATMENT OF ANIMALS

- A herd health plan is effectively implemented, reflected by records & good body fitness
- Animals do not receive non-therapeutic antibiotics (used for preventative medication or promotion of higher production), beta-agonists, synthetic growth hormones, & other substances prohibited by the Grasslands Alliance.
- Mistreatment or abuse of animals is prohibited & infrastructure is clean & safe
- Animal handling & treatment activities reduce fear, stress and pain
- Feed does not contain animal by-products or excrement
- Animal identification system enables traceability of animals arriving at & removed from the operation
- Animal transport procedures ensure animal safety & wellbeing, while minimizing stress

Ranches/farms use CLIMATE SMART strategies to REDUCE GHG EMISSIONS and MAXIMIZE RESILIENCE to climate change.

- Ranches optimize grazing management, feed & breed selection to reduce & minimize GHG emissions & sequester carbon
- Land conversion & restoration activities reduce & minimize net GHG emissions
- GHGs & pollution from manure & fertilizer is prevented & minimized
- GHG emissions from fossil fuels are reduced by increasing energy & fuel efficiency & use of renewable energy
- Proactive adaptations to climate change increase resilience of the operation's resource base.

These outcomes are multiplied across many ranches/farms & supported by efforts of local communities, governments, and NGOs to sustainably manage & govern nearby areas – resulting in:

BROADER IMPACTS
Transformation of ranching and farming landscapes toward long-term sustainability

SUSTAINABLE, RESILIENT RURAL LANDSCAPES:
Landscapes that conserve native wildlife habitat, biodiversity & ecosystem services produce livestock & crops efficiently & profitably; equitably improve livelihoods for local communities; maintain high animal welfare; & are managed such that they reduce GHG emissions & can adapt effectively to changing conditions

Annex 3: Grasslands Alliance Prohibited Pesticides

Table 1: Grasslands Alliance Prohibited Pesticides

Pesticide	CAS number	WHO Ia	WHO Ib	GHS Cancer 1A 1B	GHS muta 1A 1B	GHS repro 1A 1B	Montreal Protocol	Rotter-dam Conven-tion	Stock-holm Conven-tion	High Inci-dence
1) **Acrolein**	107-02-8		✓							
2) **Alachlor**	15972-60-8							✓		
3) **Aldicarb**	116-06-3	✓						✓		
4) **alpha-BHC; alpha-HCH**	319-84-6								✓	
5) **Alpha-chlorohydrin**	96-24-2		✓							
6) **Anthracene oil**	90640-80-5			✓						
7) **Arsenic and its compounds**	7778-39-4			✓						
8) **Azafenidin**	68049-83-2					✓				
9) **Azinphos-ethyl**	2642-71-9		✓							
10) **Azinphos-methyl**	86-50-0		✓					✓		
11) **Benomyl**	17804-35-2				✓	✓		✓		
12) **Beta-cyfluthrin; Cyfluthrin**	68359-37-5		✓							
13) **beta-HCH; beta-BCH**	319-85-7								✓	
14) **Blasticidin-S**	2079-00-7		✓							
15) **Borax; disodium tetraborate decahydrate**	1303-96-4					✓				
16) **Boric acid**	10043-35-3					✓				
17) **Brodifacoum**	56073-10-0	✓								
18) **Bromadiolone**	28772-56-7	✓								
19) **Bromethalin**	63333-35-7	✓								
20) **Butoxycarboxim**	34681-23-7		✓							
21) **Cadusafos**	95465-99-9		✓							
22) **Captafol**	2425-06-1	✓		✓				✓		
23) **Carbendazim**	10605-21-7				✓	✓				
24) **Carbofuran**	1563-66-2		✓					✓		
25) **Chlordane**	57-74-9							✓	✓	
26) **Chlorethoxyphos**	54593-83-8	✓								
27) **Chlorfenvinphos**	470-90-6		✓							
28) **Chlormephos**	24934-91-6	✓								
29) **Chlorophacinone**	3691-35-8	✓								
30) **Clothianodin**	210880-92-5									✓
31) **Coumaphos**	56-72-4		✓							
32) **Coumatetralyl**	5836-29-3		✓							
33) **Creosote**	8001-58-9			✓						
34) **DDT**	50-29-3							✓	✓	
35) **Demeton-S-methyl**	919-86-8		✓							
36) **Dichlorvos; DDVP**	62-73-7		✓							

Pesticide	CAS number	WHO Ia	WHO Ib	GHS Cancer 1A 1B	GHS muta 1A 1B	GHS repro 1A 1B	Montreal Protocol	Rotter-dam Conven-tion	Stock-holm Conven-tion	High Inci-dence
37) **Dicrotophos**	141-66-2		✓							
38) **Difenacoum**	56073-07-5	✓								
39) **Difethialone**	104653-34-1	✓								
40) **Dinocap**	39300-45-3					✓				
41) **Dinoterb**	1420-07-1		✓			✓				
42) **Diphacinone**	82-66-6	✓								
43) **Disulfoton**	298-04-4	✓								
44) **Dimethyl sulfoxide (DMSO) treated mineral oils with a DMSO-extractable content > 3%**	64741-88-4 64741-89-5 64741-97-5 64742-46-7 64742-54-7 64742-55-8 64742-65-0 72623-86-0 97862-82-3			✓						
45) **DNOC and its salts**	534-52-1		✓					✓		
46) **Edifenphos**	17109-49-8		✓							
47) **Endosulfan**	115-29-7							✓	✓	
48) **E-Phosphamidon**	297-99-4	✓								
49) **Epichlorohydrin**	106-89-8			✓						
50) **EPN**	2104-64-5	✓								
51) **Epoxiconazole**	133855-98-8					✓				
52) **Ethiofencarb**	29973-13-5		✓							
53) **Ethoprophos; Ethoprop**	13194-48-4	✓								
54) **Ethylene dibromide; 1,2-dibromoethane**	106-93-4			✓				✓		
55) **Ethylene dichloride; 1,2-Dichloroethane**	107-06-2			✓				✓		
56) **Ethylene oxide**	75-21-8			✓	✓			✓		
57) **Ethylene thiourea**	96-45-7					✓				
58) **Famphur**	52-85-7		✓							
59) **Fenamiphos**	22224-92-6		✓							
60) **Fenchlorazole-ethyl**	103112-35-2			✓						
61) **Fipronil**	120068-37-3									✓
62) **Flocoumafen**	90035-08-8	✓								
63) **Fluazifop-butyl**	69806-50-4					✓				
64) **Flucythrinate**	70124-77-5		✓							
65) **Flumioxazin**	103361-09-7					✓				
66) **Fluoroacetamide**	640-19-7		✓					✓		
67) **Flusilazole**	85509-19-9					✓				
68) **Formetanate**	22259-30-9		✓							
69) **Furathiocarb**	65907-30-4		✓							
70) **Glufosinate-ammonium**	77182-82-2					✓				
71) **Heptenophos**	23560-59-0		✓							

Pesticide	CAS number	WHO Ia	WHO Ib	GHS Cancer 1A 1B	GHS muta 1A 1B	GHS repro 1A 1B	Montreal Protocol	Rotter-dam Conven-tion	Stock-holm Conven-tion	High Inci-dence
72) **Hexachlorobenzene**	118-74-1	✓		✓				✓	✓	
73) **Hexchlorocyclohexane; BHC mixed isomers**	608-73-1							✓		
74) **Imidacloprid**	138261-41-3									✓
75) **Isoxathion**	18854-01-8		✓							
76) **Lindane**	58-89-9							✓	✓	
77) **Linuron**	330-55-2					✓				
78) **Mecarbam**	2595-54-2		✓							
79) **Mercury and its compounds**	7439-97-6							✓		
80) **Methamidophos**	10265-92-6		✓					✓		
81) **Methidathion**	950-37-8		✓							
82) **Methiocarb**	2032-65-7		✓							
83) **Methomyl**	16752-77-5		✓							
84) **Methyl bromide**	74-83-9						✓			
85) **Mevinphos**	7786-34-7	✓								
86) **Monocrotophos**	6923-22-4		✓					✓		
87) **Nicotine**	54-11-5		✓							
88) **Nitrobenzene**	98-95-3					✓				
89) **Omethoate**	1113-02-6		✓							
90) **Oxamyl**	23135-22-0		✓							
91) **Oxydemeton-methyl**	301-12-2		✓							
92) **Paraquat dichloride**	1910-42-5									✓
93) **Parathion**	56-38-2	✓						✓		
94) **Parathion-methyl**	298-00-0	✓						✓		
95) **PCP; Pentachlorphenol**	87-86-5		✓					✓		
96) **Pentachlorobenzene**	608-93-5			✓						
97) **Phorate**	298-02-2	✓								
98) **Phosphamidon**	13171-21-6	✓						✓		
99) **Propetamphos**	31218-83-4		✓							
100) **Propylene oxide, Oxirane**	75-56-9			✓	✓					
101) **Quizalofop-p-tefuryl**	119738-06-6					✓				
102) **Silafluofen**	105024-66-6					✓				
103) **Sodium fluoroacetate (1080)**	62-74-8	✓								
104) **Strychnine**	57-24-9		✓							
105) **Sulfotep**	3689-24-5	✓								
106) **Tebupirimifos**	96182-53-5	✓								
107) **Tefluthrin**	79538-32-2		✓							
108) **Terbufos**	13071-79-9	✓								
109) **Thiamethoxam**	153719-23-4									✓
110) **Thiofanox**	39196-18-4		✓							
111) **Thiometon**	640-15-3		✓							

Pesticide	CAS number	WHO Ia	WHO Ib	GHS Cancer 1A 1B	GHS muta 1A 1B	GHS repro 1A 1B	Montreal Protocol	Rotter-dam Conven-tion	Stock-holm Conven-tion	High Inci-dence
112) **Thiram in formulations with benomyl and carbofuran only**	137-26-8							✓		
113) **Triazophos**	24017-47-8		✓							
114) **Tridemorph**	81412-43-3					✓				
115) **Vamidothion**	2275-23-2		✓							
116) **Vinclozolin**	50471-44-8					✓				
117) **Warfarin**	81-81-2		✓			✓				
118) **zeta-Cypermethrin**	52315-07-8z		✓							
119) **Zinc phosphide**	1314-84-7		✓							
120) **Z-Phosphamidon**	23783-98-4	✓								

Table 2: Grasslands Alliance Obsolete and No Longer Used Substances

Pesticide	CAS Number	Reason
121) **2,4,5-T**	93-76-5	Obsolete
122) **2,4,5-TCP**	35471-43-3	No longer used
123) **2,3,4,5-Bistetrahydro-2-furaldehyde**	126-15-8	No longer used
124) **Aldrin**	309-00-2	Obsolete
125) **Binapacryl**	485-31-4	Obsolete
126) **Chloranil**	118-75-2	Obsolete
127) **Chlordecone (kepone)**	143-50-0	Obsolete
128) **Chlordimeform**	6164-98-3	Obsolete
129) **Chlorobenzilate**	510-15-6	Obsolete
130) **DBCP**	96-12-8	Obsolete
131) **Dieldrin**	60-57-1	Obsolete
132) **Dinoseb and its salts**	88-85-7	Obsolete
133) **Endrin**	72-20-8	Obsolete
134) **Heptachlor**	76-44-8	Obsolete
135) **Leptophos**	21609-90-5	Obsolete
136) **Mirex**	2385-85-5	Obsolete
137) **Nitrofen (TOK)**	1836-75-5	Obsolete
138) **Octamethylpyrophosphoramide (OMPA)**	152-16-9	Obsolete

139) **Safrole**	94-59-7	No longer used
140) **Silvex**	93-72-1	Obsolete
141) **Strobane; Terpene polychlorinates**	8001-50-1	No longer used
142) **TDE**	72-54-8	Obsolete
143) **Thallium sulfate**	7446-18-6	No longer used
144) **Toxaphene (camphechlor)**	8001-35-2	Obsolete

Annex 4: Grasslands Alliance List of Pesticides for Use with Risk Mitigation

The Grasslands Alliance requires producers to mitigate the risks of 177 pesticides listed in the below table to human bystanders, aquatic life, wildlife and pollinators for products used on farms and through specific technical requirements. The analysis of these 177 substances is based on the Oregon State University Integrated Plant Protection Center state-of-the-science risk assessment tool ipmPRiME and a risk model that yields moderate to high (10% or greater) risk:

1. Inhalation risk subject to the mitigation requirements of critical criterion 4.13:
   Inhalation risk to bystanders was calculated using the ipmPRiME model for inhalation toxicity (Jepson et al., 2014[8]) calculated on the basis of child exposure and susceptibility. This index is protective for workers who may enter fields during or after application.
2. Risk to aquatic life subject to the mitigation requirement 3.D.4:
   Pesticides qualified for this risk category if one or more ipmPRiME aquatic risk models (aquatic algae, aquatic invertebrates, or fish chronic risk) exhibited high risk at a typical application rate.
3. Risk to wildlife subject to the mitigation requirement 3.D.4:
   Pesticides qualified for this risk category if one or more ipmPRiME terrestrial risk models (avian reproductive, avian acute, or small mammal risk) exhibited high risk at a typical application rate.
4. Risk to pollinators subject to the mitigation requirement 3.D.5:
   Pesticides were selected based on a widely-used hazard quotient (HQ) resulting of pesticide application rate (AR) in g a.i./ha, and contact LD50 for the honey bee (*Apis mellifera*). Values of HQ<50 have been validated as low risk in the European Union, and monitoring indicates that products with an HQ>2,500 are associated with a high risk of hive loss. The HQ value used by SAN is >350, corresponding to a 10% risk of hive loss.

	Pesticide	CAS number	Inhalation risk *(4.13)*	Risk to Aquatic life *(3.D.4)*	Risk to Wildlife *(3.D.4)*	Risk to Pollinators *(3.D.5)*
1)	1,3-Dichloropropene	542-75-6	✓	✓	✓	✓
2)	2,4-D, 2-ethylhexyl ester	1928-43-4		✓		
3)	2,4-D, isooctyl ester	53404-37-8		✓		
4)	Acephate	30560-19-1			✓	✓
5)	Acequinocyl	57960-19-7		✓		
6)	Acetamiprid	135410-20-7		✓		
7)	Acifluorfen, sodium salt	62476-59-9			✓	
8)	Aluminum phosphide	20859-73-8				✓

[8] Jepson, P.C., Guzy, M., Blaustein, K., Sow, M., Sarr, M., Mineau, P., Kegley, S. (2014) Measuring pesticide ecological and health risks in West African agriculture to establish an enabling environment for sustainable intensification. Philosophical Transactions of the Royal Society B, http://dx.doi.org/10.1098/rstb.2013.0491

9)	Amitraz	33089-61-1	✓				
10)	Amitrole	61-82-5	✓			✓	
11)	Anilazine	101-05-3			✓		
12)	Avermectin	71751-41-2			✓		✓
13)	Azoxystrobin	131860-33-8			✓		
14)	Bendiocarb	22781-23-3	✓		✓	✓	✓
15)	Benfluralin	1861-40-1				✓	
16)	Bensulide	741-58-2	✓		✓	✓	
17)	Bentazon, sodium salt	50723-80-3				✓	
18)	Bifenthrin	82657-04-3	✓		✓		✓
19)	Bromacil	314-40-9			✓		
20)	Bromoxynil heptanoate	56634-95-8			✓		
21)	Bromoxynil octanoate	1689-99-2			✓		
22)	Captan	133-06-2					✓
23)	Carbaryl	63-25-2			✓	✓	✓
24)	Chlorine dioxide	10049-04-4					
25)	Chlormequat chloride	999-81-5	✓			✓	
26)	Chloropicrin	76-06-2	✓		✓	✓	
27)	Chlorothalonil	1897-45-6			✓	✓	
28)	Chlorpyrifos	2921-88-2	✓		✓	✓	✓
29)	Chlorpyrifos-methyl	5598-13-0					
30)	Clothianodin	210880-92-5					✓
31)	Copper hydroxide	20427-59-2	✓			✓	
32)	Copper oxide (ic)	1317-38-0			✓		
33)	Copper oxide (ous)	1317-39-1					✓
34)	Copper oxychloride	1332-40-7				✓	✓
35)	Copper oxychloride sulfate	8012-69-9					✓
36)	Copper sulfate (anhydrous)	7758-98-7			✓		
37)	Copper sulfate (pentahydrate)	7758-99-8			✓	✓	✓
38)	Cube extracts						
39)	Cyanazine	21725-46-2	✓			✓	
40)	Cycloate	1134-23-2					
41)	Cyhalothrin, gamma	76703-62-3	✓		✓		
42)	Cyhalothrin, lambda	91465-08-6			✓		✓
43)	Cypermethrin	52315-07-8			✓		✓
44)	Cypermethrin, beta	65731-84-2			✓		✓
45)	Cypermethrin, zeta	52315-07-8			✓		✓
46)	Dazomet	533-74-4			✓	✓	✓
47)	Deltamethrin	52918-63-5			✓		✓
48)	Diazinon	333-41-5	✓		✓	✓	✓
49)	Dichlobenil	1194-65-6				✓	
50)	Dichloran	99-30-9				✓	
51)	Diclofop-methyl	51338-27-3	✓			✓	
52)	Dicofol	115-32-2				✓	
53)	Difenzoquat methyl sulfate	43222-48-6	✓			✓	

54)	Diflubenzuron	35367-38-5			✓	✓	
55)	Dimethoate	60-51-5	✓		✓	✓	✓
56)	Dinoseb	88-85-7				✓	✓
57)	Dinotefuran	165252-70-0			✓		✓
58)	Diphenylamine	122-39-4			✓		
59)	Diquat dibromide	85-00-7				✓	
60)	Diquat ion	2764-72-9	✓			✓	
61)	Diuron	330-54-1				✓	
62)	Dodine	2439-10-3			✓	✓	✓
63)	D-trans Allethrin (Bioallethrin)	584-79-2					
64)	Emamectin benzoate	137512-74-4	✓		✓		✓
65)	Endosulfan I (alpha)	959-98-8			✓	✓	
66)	Endrin	72-20-8			✓	✓	✓
67)	EPTC	759-94-4	✓			✓	✓
68)	Esfenvalerate	66230-04-4			✓		✓
69)	Ethalfluralin	55283-68-6			✓		
70)	Ethion	563-12-2	✓		✓	✓	✓
71)	Etoxazole	153233-91-1			✓		
72)	Famoxadone	131807-57-3			✓	✓	
73)	Fenbutatin-oxide	13356-08-6			✓	✓	
74)	Fenitrothion	122-14-5				✓	
75)	Fenoxycarb	79127-80-3			✓		
76)	Fenpropathrin	39515-41-8			✓	✓	✓
77)	Fenpyroximate	134098-61-6			✓	✓	
78)	Fentin hydroxide	76-87-9			✓	✓	
79)	Ferbam	14484-64-1	✓		✓		✓
80)	Fipronil	120068-37-3					✓
81)	Fluazinam	79622-59-6					
82)	Flufenacet	142459-58-3	✓		✓		
83)	Fluopyram	658066-35-4				✓	
84)	Folpet	133-07-3			✓		
85)	Fomesafen sodium	108731-70-0					
86)	Formaldehyde	50-00-0	✓		✓	✓	
87)	Formetanate hydrochloride	23422-53-9			✓	✓	✓
88)	Glyphosate, isopropylamine salt	38641-94-0	✓			✓	
89)	Glyphosate-trimesium	81591-81-3				✓	
90)	Hexazinone	51235-04-2			✓	✓	
91)	Hydrogen cyanamide	420-04-2	✓		✓	✓	✓
92)	Indoxacarb, S-isomer	173584-44-6					✓
93)	Iodosulfuron methyl, sodium salt	144550-36-7			✓		
94)	Isoxaben	82558-50-7				✓	
95)	Imidacloprid	138261-41-3					✓
96)	Lenacil	2164-08-1			✓		
97)	Lime-sulfur	1344-81-6				✓	
98)	Magnesium phosphide	12057-74-8					

99) Malathion	121-75-5	✓				✓
100) Maleic hydrazide, potassium salt	28382-15-2					
101) Mancozeb	8018-01-7	✓			✓	
102) Maneb	12427-38-2				✓	✓
103) MCPA, 2-ethyl hexyl ester	29450-45-1	✓	✓			
104) MCPA, isooctyl ester	26544-20-7		✓			
105) Metalaxyl	57837-19-1				✓	
106) Metam potassium	137-41-7		✓		✓	
107) Metconazole	125116-23-6				✓	
108) Methoprene	40596-69-8		✓		✓	
109) Methoxychlor	72-43-5		✓			
110) Methyl iodide	74-88-4	✓	✓		✓	
111) Methyl isothiocyanate	556-61-6		✓			
112) Metiram	9006-42-2	✓			✓	
113) Metolachlor	51218-45-2	✓			✓	
114) Metolachlor, (S)	87392-12-9		✓			
115) Metribuzin	21087-64-9				✓	
116) Mineral oil, refined	8042-47-5		✓			
117) Myclobutanil	88671-89-0				✓	
118) Nabam	142-59-6				✓	✓
119) Naled	300-76-5	✓	✓		✓	✓
120) Napropamide	15299-99-7				✓	
121) Norflurazon	27314-13-2		✓		✓	
122) Novaluron	116714-46-6		✓			
123) Ortho-phenylphenol	90-43-7		✓			
124) Ortho-phenylphenol, sodium salt	132-27-4					
125) Oryzalin	19044-88-3	✓	✓		✓	
126) Oxadiazon	19666-30-9		✓		✓	
127) Oxycarboxin	5259-88-1					✓
128) Oxyfluorfen	42874-03-3		✓		✓	
129) Oxythioquinox	2439-01-2		✓		✓	
130) PCNB	82-68-8	✓	✓			✓
131) Pendimethalin	40487-42-1	✓			✓	
132) Permethrin	52645-53-1		✓		✓	✓
133) Phosalone	2310-17-0		✓		✓	
134) Phosmet	732-11-6		✓		✓	✓
135) Phosphine	7803-51-2					
136) Pirimicarb	23103-98-2		✓		✓	✓
137) Prometryn	7287-19-6	✓	✓		✓	
138) Propamocarb hydrochloride	25606-41-1					✓
139) Propanil	709-98-8		✓		✓	
140) Propargite	2312-35-8				✓	
141) Propoxur	114-26-1	✓	✓		✓	✓
142) Prosulfuron	94125-34-5		✓			
143) Pyraclostrobin	175013-18-0		✓			

144) Pyrethrins	8003-34-7				✓
145) Pyridaben	96489-71-3		✓		✓
146) Resmethrin	10453-86-8		✓	✓	✓
147) Rotenone	83-79-4				
148) S-Dimethenamid	163515-14-8	✓	✓		
149) Simazine	122-34-9			✓	
150) Sodium chlorate	7775-09-9			✓	
151) Sodium dimethyl dithio carbamate	128-04-1			✓	
152) Sodium hypochlorite	7681-52-9	✓	✓		
153) Sodium tetrathiocarbonate	7345-69-9			✓	
154) Spinetoram (XDE-175-J)	187166-40-1				✓
155) Spinosad (mixture of Factors A & D)	131929-60-7				✓
156) Spirodiclofen	148477-71-8		✓		
157) Sulfentrazone	122836-35-5			✓	
158) Terrazole	2593-15-9			✓	
159) Tetrachlorvinphos, Z-isomer	22248-79-9		✓	✓	✓
160) Tetraconazole	112281-77-3	✓		✓	
161) Thiabendazole	148-79-8		✓	✓	✓
162) Thiacloprid	111988-49-9		✓	✓	
163) Thiamethoxam	153719-23-4				✓
164) Thiobencarb	28249-77-6		✓	✓	
165) Thiodicarb	59669-26-0	✓	✓	✓	✓
166) Thiophanate-methyl	23564-05-8			✓	
167) Tolfenpyrad	129558-76-5		✓		
168) Triadimenol	55219-65-3			✓	
169) Triallate	2303-17-5		✓	✓	
170) Trichlorfon	52-68-6		✓	✓	✓
171) Triclopyr, triethylamine salt	57213-69-1			✓	
172) Ziram	137-30-4		✓	✓	✓
173) Trifloxystrobin	141517-21-7		✓		
174) Trifluralin	1582-09-8			✓	
175) Triforine	26644-46-2				✓
176) Triticonazole	131983-72-7			✓	
177) Zineb	12122-67-7				✓

END NOTES

[1] Sustainable Agriculture Network (SAN) Sustainable Agriculture Standard: http://www.rainforest-alliance.org/publications/sustainable-agriculture-standard
[2] Food Alliance Sustainability Standard for Livestock Operations - http://foodalliance.org/livestock/livestockops
[3] H.H. Janzen (2011)
[4] GLCI 2010
[5] Bestelmeyer et al. 2011; Briske et al. 2011a; Teague et al. 2009; SRR 2008; Gelbard 2003; Noss and Cooperrider 1994
[6] Work et al. 2009
[7] Tanaka and colleagues (2011)
[8] Derner et al. 2009; Work et al. 2009
[9] Work et al 2009
[10] FSC 2010
[11] This section adopted from the 2013 GRASS standard developed by The Nature Conservancy, Ovis XXI and Patagonia, Inc.
[12] Franzluebbers et al. (2012)
[13] Baskin 1998, Mack et al. 2000; Mooney and Hobbs 2000, Gelbard 2003
[14] Joyce et al. 2013; Shaw et al. 2011; Gelbard 2003
[15] Examples of such programs include the National Invasive Species Council, the various State Invasive Plant Councils, relevant Agricultural Departments and plant management societies, and local Early Detection Networks.
[16] Matt Sanderson, USDA ARS, Personal Communication
[17] Franzluebbers et al. (2012)
[18] Janzen (2014)
[19] Stillings et al. (2003)
[20] Grazing Lands Conservation Initiative (2010)
[21] SRR 2010
[22] Baskin 1998, Mack et al. 2000; Mooney and Hobbs 2000, Gelbard 2003
[23] NRC 2010
[24] Gurian-Sherman 2008
[25] This damage will occur even with quiet animals if a predator (bear, cougar, etc) gets near the herd when they are in the facilities and the animals panic and try to escape, or if two aggressive animals are penned next to each other. Inspector MUST give allowance for these extreme behaviors that are not under the manager's control.
[26] A "covered" pen may not be a reasonable facility in some types of weather conditions. Cover may increase discomfort by isolating animals in the dark.
[27] A rough coat/poor grooming dull eyes, lethargy/sluggish movement, poor appetite, over-stretching of the neck, hunching the back, kicking the belly area (indicating abdominal pain), grinding teeth, star-gazing are indicators of poor health.
[28] Vitamin supplements, per se, are usually not appropriate for ruminants. Some vitamins may be included in a trace mineral mixture rather than provided independently, but this practice depends on geography and other nutritional factors.
[29] Andeweg and Reisinger 2014
[30] Lal et al. (2003)

Bibliography

Baskin, Y. 1998. Winners and losers in a changing world: global changes may promote invasions and alter the fate of invasive species. Bioscience 48(10): 788-792.

Andeweg, K. and A. Reisinger. 2014. Reducing greenhouse gas emissions from livestock: Best practice and emerging options. Global Research Alliance on Agricultural Greenhouse Gases and Sustainable Agriculture Initiative (SAI) Platform. http://www.saiplatform.org/uploads/Modules/Library/lrg-sai-livestock-mitigation_web2.pdf

Bestelmeyer, B.T., J.R. Brown, S.D. Fuhlendorf, G.A. Fults, and X.B. Wu. 2011. A landscape approach to rangeland conservation practices. Chapter 8 in. Briske, D.D., editor. Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps. United States Department of Agriculture, Natural Resources Conservation Service.

Briske, D.D., Editor. 2011. Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps. A report of the Conservation Effects Assessment Program (CEAP). United States Department of Agriculture, Natural Resources Conservation Service.

Briske, D., J. Derner, D. Milchunas and K. Tate. 2011a. An evidence-based assessment of prescribed grazing practices. Chapter 1 in Briske, D.D., editor. Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps. United States Department of Agriculture, Natural Resources Conservation Service.

Derner, J., D. Augustine, and B. Lauenroth. 2009. Conservation Grazing Management. CowCountry. Winter 2009: 10-11.

Forest Stewardship Council (FSC) 2010. FSC-US Forest Management Standard (v1.0) (complete with Family Forest Indicators and Guidance). Recommended by FSC-US Board, May 25, 2010, Approved by FSC-IC, July 8, 2010. Franzluebbers, AJ, LK Paine, JR Winsten, M Krome, MA Sanderson, K Ogles, and D Thompson. 2012. Well-managed grazing systems: a forgotten hero of conservation. Journal of Soil and Water Conservation 67:100A-104A.

Franzluebbers, AJ, LK Paine, JR Winsten, M Krome, MA Sanderson, K Ogles, and D Thompson. 2012. Well-managed grazing systems: a forgotten hero of conservation. Journal of Soil and Water Conservation 67:100A-104A.

Friend, G. 2009. The Truth About Green Business. Truth 17: Creating Strong Ecolabels. FT Press, Upper Saddle River, NJ.

Gelbard, J. L. 2003. Grasslands at a crossroads: protecting and enhancing resilience to climate change. Pages 13-40 in Hanson L. J., J. L. Biringer, and J. R. Hoffman (editors). Buying time: a user's manual for building resistance and resilience to climate change in natural systems. World Wildlife Fund. Washington D.C. 242 Pages.

Grazing Lands Conservation Initiative (GLCI) 2010. Sustainable grazing lands providing a healthy environment: grazing lands conservation initiative strategic plan 2010-2015. USDA Natural Resources Conservation Service.

Gurian-Sherman, D. 2011. Raising the Steaks: Global warming and pasture-raised beef production in the United States. Union of Concerned Scientists, Cambridge, MA.

Janzen, H.H. 2014. Beyond carbon sequestration. Soil as a conduit of solar energy. European Journal of Soil Science 2014. Doi:10.1111/ejss.12194

Janzen, H.H. 2011. What place for livestock on a re-greening earth? Animal Feed Science and Technology 166-167:783-796.

Joyce, L.A., D.D. Briske, J.R. Brown, H.W. Polley, B.A. McCarl, and D.W. Bailey. 2013. Climate change and North American Rangelands: Assessment of Mitigation and Adaptation Strategies. Rangeland Ecology and Management 66: 512-528.

Lal, R., R.F. Follet and J.M. Kimble. 2003. Achieving soil carbon sequestration in the United States: a challenge to policy makers. Soil Science 168:827–845.

Mack, R. N., D. Simberloff, W. M. Lonsdale, H. Evans, M. Clout, and F. A. Bazzaz. 2000. Biotic invasions: causes, epidemiology, global consequences, and control. Ecological Applications 10:689-710.

Milchunas, D.G. and W.K. Lauenroth. 1993. Quantitative effects of grazing on vegetation and soils over a global range of environments. Ecological Monographs 63:327-366.

Mooney, H. A. and R. J. Hobbs. 2000. Invasive species in a changing world. Island Press, Washington D. C. 457 Pages.

National Research Council (NRC) 2010. Toward sustainable agricultural systems in the 21st Century. Report from the committee on twenty-first century systems agriculture. The National Academies Press, Washington D.C. 598 pages.

Nelson, C.J. (ed.) 2012. Conservation Outcomes from Pastureland and Hayland Practices: Assessment, Recommendations, and Knowledge Gaps. Allen Press, Lawrence, Kansas.

Noss, R.F. and A.Y. Cooperrider. 1994. Saving Nature's Legacy: protecting and restoring biodiversity. Island Press, Washington D.C.

Shaw, M.R., L. Pendleton, D. R. Cameron, B. Morris, D. Bachelet, K. Klausmeyer, J. MacKenzie, D.R. Conklin , G.N. Bratman, J. Lenihan, E. Haunreiter, C. Daly and P. R. Roehrdanz. 2011. The Impact of Climate Change on California's Ecosystem Services. Climatic Change.

Stillings, A. M., J. A. Tanaka, N. R. Rimbey, T. Delcurto, P. A. Momont, and M. L. Porath. 2003. Economic implications of of-stream water developments to improve riparian grazing. Journal of Range Management 56:418–424

Sustainable Rangelands Roundtable (SRR) 2010. Ranch Sustainability: Monitoring and Assessment for Business Planning. http://sustainablerangelands.org/pdf/RSAHandout5.pdf Viewed August 29, 2012.

Tanaka, J.A., M. Brunson, and L.A. Torrel. 2011. A social and economic assessment of rangeland conservation practices. Chapter 9 in. Briske, D.D., editor. Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps. United States Department of Agriculture, Natural Resources Conservation Service.

Teague, W. R., U. P. Kreuter, W. E. Grant, H. Diaz-Solis, and M. M. Kothmann. 2009. Economic implications of maintaining rangeland ecosystem health in a semi-arid savanna. Ecological Economics 68:1417–1429.

Teague, W. R., F. Provenza, B. Norton, T. Steffens, M. Barnes, M. Kothmann, AND R. Roath. 2008. Benefits of multi-paddock grazing management on rangelands: limitations of experimental grazing research and knowledge gaps. In: H. Schroeder [ED.]. Grasslands: ecology, management and restoration. Hauppauge, NY, USA: Nova Science Publishers. p. 41–80.

Work, G., C. Garrison, K. Kester, R Larson, A Lazanoff, C Pritchard, S Sinton, K Striby, B Tietje, J Varian and J Zingo. 2009. The Ranching Sustainability Self-Assessment Project v.3.09. Sponsored by the San Luis Obispo County Oak Woodland Stewardship Program and the San Luis Obispo County Cooperative Extension Office.