RESPONSE TO PUBLIC COMMENTS

6/19/2014, v6.1

A methodology for ***Greenhouse Gas Emissions Reductions from Compost Additions to Grazed Grasslands*** was developed by Terra Global Capital, with support from the Environmental Defense Fund, Silver Lab at the University of California - Berkeley, and the Marin Carbon Project, and submitted to ACR for approval through the public consultation and scientific peer review process.

The methodology was formally submitted to ACR on October 18, 2013. ACR conducted its standard internal methodology screening and the authors submitted revised drafts on March 5 and April 11, 2014.

The methodology was then posted for public comment from April 15 – May 21, 2014. Public comments and responses by the authors are given below. ACR does not require all public comments be incorporated, but does require that a response to each public comment be documented.

Following public consultation, the methodology will be submitted to the peer review team - experts in the fields of grazing grasslands, compost and waste management, soil carbon science, and GHG offset methodologies - for a blind review. Peer review comments and responses are summarized in a separate document.

0. General

	Comment	Commenter	Response	Changes to Methodology
0.1	The protocol is very complex and difficult to understand unless you are a carbon scientist. If the protocol is to have appeal to rangeland and pasture managers it needs to be written in language they can understand. They generally are not conversant about carbon storage and carbon modelling. The protocol needs to be written by an extension person. If ranchers understand the protocol they can make input that can strengthen the protocol.	Melvin George, Plant Sciences Department, UC Davis	Concerns about the complexity and language of the protocol are certainly valid and the authors also wish to make the protocol as accessible to a wide audience as possible. However, the protocol must also be sufficiently detailed and scientifically rigorous in order to pass the peer review process. The protocol has also been written in accordance with standard carbon accounting practices and must be sufficiently detailed to be replicated by a wider range of proponents and verifiable by third parties.	
0.2	Ranchers can increase the viability of their operations by adopting management practices that compensate them for the ecosystem services that they provide as proposed by the protocol. The provision and flow of ecosystems from grasslands depends on complex biotic and abiotic interactions and ecological processes. Management actions to enhance the provision of a particular ecosystem service may affect other ecosystem services	Pelayo Alvarez, Agro-environmental Consultant	We fully agree with these comments which highlight the broad value of efforts to develop strategies for "payment for ecosystem services" in this case C sequestration. Our specific goal here was to develop a high quality protocol that provides ranchers with the opportunity to benefit financially from the adoption of practices that sequester C and mitigate GHG emissions. Thanks for voicing your support. As the commenter alluded to, we are aware that the adoption of new practices such as compost additions may affect other ecosystem services such as shifts in plant community composition. To minimize the risk of changing plant communities, the protocol does not support the grazing or application of compost to intact native	Section 6, Box 2 has been clarified as follows: Compost applications may lead to changes in the plant community (either positive or negative) due to impacts of compost on nutrient concentrations and hydrology of treated soils (Bremer, 2009). The protocol does not support application of compost to intact, healthy native plant communities. Species composition may also change where grazing is discontinued due to factors unrelated to the project

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			communities. Sites with intact native stands are thus omitted from the protocol. Please see Section 6, Box 2. We also fully agree that monitoring potential plant community changes is of vital importance. Consequently in the monitoring requirements stipulated in the protocol, project proponents must also have a qualified expert conduct periodic land assessments that include an evaluation of forage quality, species type, community composition, percent cover of native species, and problems related to invasive weeds. (see Section 10).	activity, such as extended periods of drought. To reduce this risk, validation of the GHG project plan will include a review of the criteria used by the Qualified Expert to ensure that annual Project Stocking Rates will not contribute to erosion or otherwise negatively impact plant species composition. Changes to the annual Stocking Rate will be assessed during each subsequent verification to ensure changes were implemented in consultation with a Qualified Expert. The minimum Stocking Rate shall be set to ensure that plant community species composition is not negatively affected in response to soil quality improvement following compost application."
0.3	This protocol could provide an opportunity for ranchers to diversify their income and allow them to stay in business ensuring the provision of important ecosystem services in addition to carbon sequestration. The potential impacts of the addition	Pelayo Alvarez, Agro-environmental Consultant	See detailed response to comments directly above.	

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	of compost to the plant community need to be monitored.			
0.4	Overall, I encourage the protocol to refer closely to peer-reviewed scientific research, and avoid making extrapolations that encourage poorly supported but costly interventions in grazing practices. Fences, for example, are not pleasing to the eye, and convert semi-natural ecosystems like open range into a more farm-like landscape that has fewer ecosystem services to offer. While they are of course a primary range management tool, unnecessary fencing should be avoided.	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management, University of California, Berkeley	We agree that a foundation of peer-reviewed research is very important and that is how this protocol was developed. More than four years of scientific research has gone into studying the impacts of compost application to rangelands. Unfortunately, in most cases C offset protocols do not contain detailed literature reviews covering all of the relevant research. To allay this concern we have now added several brief paragraphs to the "Introduction" (Section 2) reviewing the relevant literature on compost additions to grazing lands and the documented impacts on soil C and plant growth. Hopefully this summary strikes the right balance.	We have now added several brief paragraphs to the "Introduction" (Section 2) reviewing the relevant literature on compost additions to grazing lands and the documented impacts on soil C and plant growth.
0.5	In addition to a carbon life-cycle analysis, a financial accounting is absolutely crucial to the prospects for this treatment on California ranches.	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management, University of California, Berkeley	While we agree that there is a need for this system to be evaluated using various financial and lifecycle assessment methods, such studies are beyond the scope of the present methodology. An economic analysis of the practices has been developed and can be made available upon request. In response to the commenter's inquiry regarding relevant lifecycle assessments, I recommend that they examine a recent peer-reviewed lifecycle assessment examining compost applications to grasslands. At link to	

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			this citation can be found below and is already cited in our protocol: http://link.springer.com/article/10.1007/s10021-013-9660-5	
0.6	Consultation with a broader range of people, including ranchers and California range scientists, would lead to a better document.	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management, University of California, Berkeley	We recognize the great value of external consultation with a wide range of stakeholders. Consequently, throughout the development of the protocol we have made a concerted effort to solicit feedback and input from stakeholders and the scientific community. The public comments provided here are also proving extremely valuable in shaping and revising the protocol.	
0.7	The exact purpose of the protocol is not entirely clear to me, and that would also influence my comments.	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management, University of California, Berkeley	The purpose of the protocol is to develop a methodology to quantify and verify carbon sequestration and avoided GHG emissions related to a rangeland management activity of applying compost additions to grazed grasslands, following specifications by the American Carbon Registry (ACR).	
0.8	I am also worried that this protocol, which is largely untested, might have an influence on policy before the effects are adequately assessed.	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management, University of	The untested nature of this protocol and its possible impacts on ecosystems and government policies is a valid concern. Carbon offset protocols, by their nature, focus on emerging practices that do not yet have widespread adoption. In order to expand this protocol, sampling and analysis of the impacts of compost addition to grazed grasslands is required. Also,	

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		California, Berkeley	bear in mind that this is a voluntary C offset protocol, and that agricultural producers in all US states (including CA) are not required to participate. As such the policy risks are minimal. That said, in the introduction we encourage users of the protocol to help us to evaluate feasibility and impacts of the methodology so that it may be further refined and improved.	

1. Abbreviations

	Comment	Commenter	Response	Changes to Methodology

2. Introduction

	Comment	Commenter	Response	Changes to Methodology
2.1	[In regards to avoided emission related to the anaerobic decomposition of organic waste material in landfills…] Where is the quantitative evidence for avoidance of CH4 emissions? Will it not depend on organic source material and environmental conditions of a landfill in a particular region? Can the methane from a landfill be quantitatively separated into	Alan Franzluebbers, USDA Agriculture Research Service	There is growing body of peer-reviewed research documenting the avoidance of CH4 emissions by minimizing the disposal of organic waste materials in landfills, which forms the basis for its recognition as a valid GHG mitigation strategy by the IPCC and the UN Clean Development Mechanism. The following references	

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	the sources of input to the landfill?		are examples which provide evidence of its validity as well as the possible tradeoffs: Bogner, Jean, Riitta Pipatti, Seiji Hashimoto, Cristobal Diaz, Katarina Mareckova, Luis Diaz, Peter Kjeldsen, *et al.* "Mitigation of Global Greenhouse Gas Emissions from Waste: Conclusions and Strategies from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report. Working Group III (Mitigation)." *Waste Management & Research* 26, no. 1 (February 1, 2008): 11–32. doi:10.1177/0734242X07088433. Rogger, Cyrill, Francois Beaurain, and Tobias S. Schmidt. "Composting Projects under the Clean Development Mechanism: Sustainable Contribution to Mitigate Climate Change. "*Waste Management* 31, no. 1 (January 2011): 138–46. doi:10.1016/j.wasman.2010.09.007. Consequently, in this protocol we recommend using the Clean Development Mechanism (CDM) tool to determine Methane emissions avoided from disposal of dumping waste at a solid waste disposal site. The tool is available at:	

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			http://cdm.unfccc.int/EB/041/eb41_repan10.pdf	
2.2	Curious that a GHG offset protocol could be based on one study conducted over a short period. Most scientific evidence requires repeating experiments in different environments and at least some strong evidence of long-term stabilization and avoidance of emissions - these criteria seem to be lacking in the rationale for this protocol.	Alan Franzluebbers, USDA Agriculture Research Service	This protocol is based on more than just one peer-reviewed study. To make this more apparent to the reader we have now added several brief paragraphs to the "Introduction" (Section 2) reviewing the relevant literature on compost additions to grazing lands and the documented impacts on soil C and plant growth. While carbon offset standards and protocols must be based on adequate scientific literature, they typically do not contain extensive reviews of the all relevant peer reviewed papers. Thus our addition of this brief literature summary is an attempt to strike the right balance.	See additions to Section 2 (Introduction).
2.3	Three years of data from two atypical sites is not enough to support a protocol that will be used to affect public policy and to make economic decisions.	Melvin George, Plant Sciences Department, UC Davis	This protocol is based on more than just one peer-reviewed study. To make this more apparent to the reader we have now added several brief paragraphs to the "Introduction" (Section 2) reviewing the relevant literature on compost additions to grazing lands and the documented impacts on soil C and plant growth. While carbon offset standards and protocols must be based on adequate scientific literature, they typically do	See additions to Section 2 (Introduction).

	Comment	Commenter	Response	Changes to Methodology
			not contain extensive reviews of the all relevant peer reviewed papers. Thus our addition of this brief literature summary is an attempt to strike the right balance. In addition, in order to expand this protocol, sampling and analysis of the impacts of compost addition to grazed grasslands is required.	
2.4	The idea that a half inch of compost can increase forage production, water holding capacity, and carbon sequestration seems to hold great promise for rangelands that are accessible to roads and not hugely steep, etc. I don't think we yet understand the relationship to rainfall so I think the long term time frame, and testing in a number of areas, is essential. With California's heterogenous soils, it will also be valuable to learn the response of different soil types. I hope that all sites will be categorized according to NRCS ecological site descriptions, so that this aspect can be followed.	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management University of California, Berkeley	This idea is a very good one. We already have a requirement that a Qualified Expert must conduct a land assessment report as part of the regular monitoring requirements (Section 10). In response, we have now edited the protocol to stipulate that the assessment report must be prepared according to NRCS ecological site descriptions. We have also included a link to the NRCS website which provides detailed information. http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/	See text added to Section 10 on Monitoring.

3. Sources

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4. Summary Description of the Methodology

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4.1	"The portion of the compost carbon that will remain in the stable pools is likely to be greater than the portion that would be stabilized under baseline conditions" - This is an undocumented assumption that underpins this methodology without sufficient scientific support.	Alan Franzluebbers, USDA Agriculture Research Service	Current research demonstrates that this is likely true. (Trumbore 1997; http://www.epa.nsw.gov.au/resources/warr/110171SRmitCC.PDF) The paper (Ryals et al. Ecological Applications, in press) addresses this with the DayCent model. Also, see Ryals et al. 2014 Soil Biology and Biochemistry. These data show evidence of compost C signatures in the occluded light fractions that do not show up in the controls. Additionally, there is evidence of more C in this fraction.	
4.2	"…only stable carbon pools that are predicted to remain after 40 years after compost addition can be counted" - Where is the evidence for this 40-year duration? The studies on which this methodology are based were only conducted for a 3-year period.	Alan Franzluebbers, USDA Agriculture Research Service	The two literature reviews listed (Trumbore 1997 and Adams et al.) provide a conceptual framework that allows the methodology to use the 40 year project period. The Century and DayCent models have been used to project the soil carbon sequestration potential from a single compost	

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			addition. These simulation results are included in a paper (Ryals, R., M. Hartmann, W.J. Parton, M.S. DeLonge, and W.L. Silver. Simulating soil carbon and greenhouse gas dynamics in grasslands amended with compost, in preparation). The DayCent paper (Ryals et. al in Ecological Application) addresses this and projects storage for 100 years.	
4.3	"The N and P content of the compost, as well as the improved soil water holding capacity of soil amended with compost, lead to an indirect increase in SOC content through an increase in primary productivity (NPP)." - This will be difficult to document and there is little evidence for actual reduction in C equivalence emitted to the atmosphere from compost application, since a full life-cycle assessment was not made on source of compost as well as long-term C balance of such grasslands.	Alan Franzluebbers, USDA Agriculture Research Service	We have modified the sentence in question as follows: "The N and P content of the compost, as well as the improved soil water holding capacity of soil amended with compost, ***may in some cases*** lead to an indirect increase in SOC content through an increase in primary productivity (NPP)." In response to the commenter's inquiry regarding relevant lifecycle assessments, I recommend that they examine a recent peer-reviewed lifecycle assessment examining compost applications to grasslands. The link to this citation can be found below and is already cited in our protocol: http://link.springer.com/article/10.1007/s10021-013-9660-5	

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4.4	How will the validity of the model for the explicit purpose outlined in this protocol be assured?	Alan Franzluebbers, USDA Agriculture Research Service	In Section 9 we document the specific process for selecting and validating process based models and Tier 2 empirical models for the particular conditions of each project.	

5. Definitions

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5.1	Is compost application the same as biosolid application or urban waste application. Is carbon application to grasslands just a euphemism for dump site?	Melvin George, Plant Sciences Department, UC Davis	The Methodology follows the definitions for compost used by CalRecycle which include certain types of composted biosolids and urban waste materials provided that they meet the definitions and standards stipulated by the California Integrated Waste Management Act of 1989. See link below for details. http://www.calrecycle.ca.gov/Laws/Regulations/Title14/ch31.htm	
5.2	The document stipulates that a native grassland is a grassland composed primarily of native plants. Does that mean in terms of biomass? Cover? Species? Density? In terms of sheer number of species, there is such diversity in our non-native plant populations that it seems like it would be rare to find a predominance of native species in the grassland, for example, this might occur	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management University of California,	The commenter raises some interesting thoughts regarding how best to define a native grassland. Clearly there are multiple ways to define native grasslands (biomass, % cover, # species, density, etc.) and thus our definition was not specific enough. We have therefore revised our definition to make it more precise based on relevant literature. This	We have changed the definition of native grassland to read as follows: A grassland where native plant species comprise greater than 10 percent of the total relative cover (Stromberg *et al.* 2007). This definition was drawn from: Stromberg, Mark R., Jeffrey D. Corbin, and Carla Marie D'Antonio,

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	on a serpentine outcrop. There are places with relatively high numbers of native plants, particularly by cover or density, and many places with some native plants—in fact that is typical—and if this treatment is suspected of being harmful to native plants perhaps a better description of places to be excluded for this reason is warranted than simply "composed primarily." Even a grassland where native grass seems dominant may have more non-native species growing in it.	Berkeley	definition, while useful for this protocol, is by no means the only way one could define native grasslands. Additionally, parameters like those listed above will be a key part of the land assessment conducted by a Qualified Expert (see Section 10).	eds. *California grasslands: ecology and management*. Univ of California Press, 2007.

6. Applicability Conditions

	Comment	Commenter	Response	Changes to Methodology
6.1	This [plus or minus 3% of the baseline Stocking Rate] seems too restrictive, since greater production will allow greater SR with time and extended drought could lead to a dramatically reduced SR.	Alan Franzluebbers, USDA Agriculture Research Service	"Year-to-year" variation in stocking rates may occur as ranchers adapt their management to many external factors (e.g. rainfall, forage production, market variations). The protocol places no set limit on the year to year variability in stocking rate. Leakage does not need to be accounted for since there is not a strong relationship between the project activity and stocking rates. However, the annual stocking rate, as well as minimum and maximum stocking rates, still have to be determined in consultation with a	We have modified section 6 on page 8 to improve the clarity of the Stocking Rate requirements. It now reads as follows: "The annual, minimum and maximum Stocking Rate shall be determined via consultation with a Qualified Expert (see definitions – a Certified Rangeland Manager, NRCS Soil Conservationist or Qualified Extension Agent) and duly justified by the Project Proponent. Justification for the annual Stocking Rate should include a calculation of

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			Qualified Expert to eliminate the risk of overgrazing, erosion and reversals.	the historical Stocking Rate averaged over a 10 year period prior to the start of the Project, and an assessment of whether or not the forage productivity and quality of the parcel can sustainably support the historical Stocking Rate.[2] In some cases the conditions of the parcel will justify using the historical Stocking Rate as the annual, while in other cases the Qualified Expert may set an annual Stocking Rate that differs from the historical Stocking Rate. Validation of the GHG project plan will include a review of the criteria used by the Qualified Expert to ensure annual Stocking Rates during the Project lifetime are sustainable, and will not lead to erosion or negatively affect species composition; subsequent verifications will review changes to the annual Stocking Rate and ensure that a Qualified Expert was properly consulted. The maximum Stocking Rate shall be set so that rangeland utilization remains sustainable, taking into account an increase in forage production and any changes in the

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				percentage of grazer feed coming from purchased sources after the start of the crediting period.[3] The minimum Stocking Rate shall be set to ensure that plant community species composition does not change toward a less desirable plant community in response to soil quality improvement following compost application." Additionally, references to leakage accounting (+/- 3% of the baseline stocking rate) have been removed in Section 9.5 – Leakage. The protocol now reads as follows: "Available field research suggests that the addition of compost to grasslands will generally increase soil carbon and the production of forage for livestock. As such, it is highly unlikely that project activities will lead directly to emissions leakage via reduced annual Stocking Rates on the parcel and increased grazing intensity beyond the project boundaries. Examples of common unrelated circumstances that may cause a proponent to

[3] This approach is fully compatible with a rotational grazing strategy.

	Comment	Commenter	Response	Changes to Methodology
				temporarily reduce Stocking Rates are the occurrence of multi-year drought or unfavorable market conditions for the livestock industry."
6.2	"The protocol does not support application of compost to intact, healthy native plant communities" - How can this be isolated and monitored? What is the rationale for this qualitative determination?	Alan Franzluebbers, USDA Agriculture Research Service	We agree that our previous definition of native grasslands was not sufficiently precise. As such we have revised the definition to be more specific (Section 5). Monitoring plant communities in Project parcels to detect possible changes is also important and a key component of the land assessment report that the protocol stipulates must be conducted for each crediting period. See description of land assessment requirement in Section 10 (Monitoring).	See updated definition of native grasslands in Section 5 (Definitions).
6.3	What is the source of the materials? Cow manure? Cal Trans clippings? Heated and purified waste? As I understand it, Johne's Disease in cows is highly contagious and many dairies have it here in California. Only Wisconsin and Minnesota test for this disease to eradicate this incurable gut wasting disease. A study in England indicated the disease survives pasteurization in milk, and though it does not jump species, if a human has a genetic disposition for this disease, it	Ione Conlan, Conlan Ranches California	The Methodology follows the definitions for compost used by CalRecycle which meet the definitions and standards stipulated by the California Integrated Waste Management Act of 1989. See link below for details. http://www.calrecycle.ca.gov/Laws/Regulations/Title14/ch31.htm We do not think that the pathogenicity of John's Disease and Crohns disease described in the	

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	becomes Crohn's disease in humans. I am in the cow/calf production and since this disease causes abortion in cows, I have been very carefully schooled by Vets from UC Davis, to not allow manure on my lands unless I am assured that the cows from whence it came were Johne's free.		comment are completely accurate. See the following Q & A from the USDA: http://www.aphis.usda.gov/publications/animal_health/content/printable_version/faq_johnes_disease08.pdf "Q. Can humans get Johne's disease? A. The organism that causes Johne's disease is not currently known to cause disease in humans, but it has been detected in humans with Crohn's disease, as have numerous other bacteria and viruses. The symptoms of Crohn's disease in humans are similar to the signs of Johne's disease in ruminants. However, no definitive evidence is available proving MAP causes Crohn's disease. A few publications have shown MAP to be an opportunistic pathogen in people with compromised immune systems. Research from the U.S. Department of Agriculture's (USDA) Agricultural Research Service indicates that commercial pasteurization inactivates MAP bacteria in milk. However, some researchers still have concerns about MAP in undercooked meat, unpasteurized milk products, and water as potential sources of exposure.	

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			While MAP remains largely an animal health issue, the risk of human exposure through contaminated food sources creates a quality assurance concern in milk and meat products."	
6.4	This protocol appears to be based on a study at two sites in northern California. These two sites are on the wetter end of grasslands in California while most California grasslands are drier. Many receive less than 20 inches of rainfall annually. These two sites are in a Mediterranean climate which is not the climate pattern of the rest of the U.S. If this protocol is to be applied nationally it needs to be tested by carbon and rangeland/pasture scientists on wet and dry sites within each of the major grassland and pasture types in the U.S. This protocol appears to apply to all grasslands in the U.S. including eastern pastures.	Melvin George, Plant Sciences Department, UC Davis	This protocol is based on more than just one peer-reviewed study examining two sites. To make this more apparent to the reader we have now added several brief paragraphs to the "Introduction" (Section 2) reviewing the relevant literature on compost additions to grazing lands and the documented impacts on soil C and plant growth. We also agree that regional variations climate and rainfall will play a large role in determining plant productivity and the rate of soil C decomposition. This is why the protocol requires that the process based models be validated for local environmental conditions and why periodic monitoring of soil C at the site is required (see Section 9.2 (Quantification) and Section 10 (Monitoring).	See additions to Section 2 (Introduction).
6.5	How do we know that every [compost] load is free of heavy metals and other toxic substances? Are we going to pay	Melvin George, Plant Sciences Department,	In Section 6 we describe the specifications for the compost applied	

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	ranchers to take this stuff? Do they want it?	UC Davis	to project parcels. Specifically the protocol requires that the compost be tested for heavy metals and contaminants prior to application and that it must not exceed the US EPA limits stipulated under 40 CFR 503. Under EPA regulations, managers must maintain records on the cumulative loading of trace elements only when bulk biosolids and compost do not meet EPA Exceptional Quality Standards for trace elements. For a brief summary of the EPA's 40 CFR 503 Rule please see: http://water.epa.gov/scitech/wastetech/biosolids/503pe_index.cfm	
6.6 a	How will this material be applied and incorporated into soil?	Melvin George, Plant Sciences Department, UC Davis	The protocol does not permit any tillage of the soil on project parcels. The compost must therefore be surface applied.	
6.6 b	What are the slope limitations of application?	Melvin George, Plant Sciences Department, UC Davis	These will be determined in consultation with the Qualified Expert during the land assessment report.	
6.6 c	Will compost increase soil OM in low rainfall grasslands?	Melvin George, Plant Sciences Department, UC Davis	Geographic and temporal variability in rainfall is likely to impact C sequestration in rangelands, by influencing the rates of soil C decomposition and plant growth	

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			following compost application. Research indicates that arid grasslands generally accumulate C at a slower rate than grasslands in more humid climates (Derner and Schuman 2007; Conant and Paustian 2002). That said, a studies also suggest that C from infrequent compost applications can still persist in arid grassland soils for many years (Ippolito et al. 2010). This is why the protocol requires that the process based models be validated for local environmental conditions and why monitoring of soil C is required (see Section 92.2 (Quantification) and Section 10 (Monitoring). Citations listed above: Derner, J. D., and G. E. Schuman. Journal of Soil and Water Conservation 62, no. 2 (March 1, 2007): 77–85. Conant, Richard T., and Keith Paustian. Global Biogeochemical Cycles 16, no. 4 (December 1, 2002): 1143. doi:10.1029/2001GB001661. Ippolito, J. A., K. A. Barbarick, M. W. Paschke, and R. B. Brobst. Journal of Environmental Management 91, no. 5 (May 2010): 1123–30. doi:10.1016/j.jenvman.2010.01.004.	

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6.6 d	What effect will application or presence of the compost have on water quality, fish and wildlife (especially endangered species), and native and introduced plant species? Will the nutrients in the compost stimulate weed production in the grassland?	Melvin George, Plant Sciences Department, UC Davis	Nutrients in the compost may influence plant community composition. Monitoring potential changes in plant community is therefore of vital importance. Consequently in the monitoring requirements of the protocol we stipulated that project proponents must have a Qualified Expert conduct periodic land assessments that include an evaluation of forage quality, species type, community composition, percent cover of native species, and problems related to invasive weeds. (See Section 10). The outcome of the land assessment could help determine the potential and/or ongoing impacts on water quality, wildlife and plant communities. With regard to water quality specifically, one can expect some or all of the following as a result of compost application: "Compost used as a soil amendment can improve soil structure, reduce compaction, and increase water infiltration, thereby decreasing soil erosion and the runoff of both soluble and particulate materials. Compost increases soil nutrient holding	

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			22capacity, reduces the need for commercial fertilizers, and can bind heavy metals and degrade volatile organic compounds and complex organics. These attributes of compost application can help prevent water quality degradation.“ http://www.mawaterquality.org/publications/documents/MAWQPCompostingResourceDirectory_revSep2010.pdf	
6.6 e	What does California's Regional Water Quality and Air Quality Control Boards think of large scale compost application?	Melvin George, Plant Sciences Department, UC Davis	Compostable materials make up about 30% of California’s disposed waste. The CalRecycle has set the goal of composting or recycling 75% of California’s disposed waste by 2020, and this goal has been integrated into the California Air Resources Board’s (CARB) Scoping Plan Update. In addition, members of our protocol development team have held public dialogs with multiple regional air quality control boards and the Bay Area Air Quality Management District will be taking this protocol through the GHG Exchange protocol approval process for consideration by all air boards in California. We do not know the official views of California DWR on the matter.	
6.6	How much carbon will be expended to apply compost to grasslands?	Melvin George, Plant Sciences	The fossil fuel emissions are required to be calculated and deducted from	

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f		Department, UC Davis	the credits issued by the project as they are additional to the baseline. The emissions will depend on the amount of fuel used to transport and apply the compost to the parcel. The amount and type of fuel must be documented by the Project proponent and use to calculate emissions (see Table 1).	
6.6 g	How much compost is too much?	Melvin George, Plant Sciences Department, UC Davis	Because the costs to acquire, transport and apply compost are among the largest costs to implement a project, the amount of compost applied to the land will be minimized. It will be important to determine what minimum amount of compost will maximize the carbon sequestration potential.	
6.7	Management actions to enhance the provision of a particular ecosystem service may affect other ecosystem services. As it is stated in BOX 2 there is a potential to increase the dominance of certain plant species by adding nutrients to grasslands. The response of the plant community to the addition of compost will vary from site to site depending on multiple factors. Maintaining a specific stocking range may not prevent the changes in plant community that may result from the addition of compost if the dominant plant species are not palatable	Pelayo Alvarez, Agro-environmental Consultant	We also fully agree that monitoring potential plant community changes is of vital importance. Consequently in the monitoring requirements stipulated in the protocol, project proponents must also have a Qualified Expert conduct periodic land assessments that include an evaluation of forage quality, species type, community composition, percent cover of native species, and problems related to invasive weeds. (See Section 10).	

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	to livestock. To ensure that the addition of compost to grasslands will not favor non-desirable plant species it would be necessary to develop a rigorous and cost-effective monitoring method.			
6.8	Maintaining a specific stocking rate with the +- 3% approved range of variation might prove difficult to implement for private landowners trying to adjust to the year-to-year variability of forage production due to the variable weather patterns characteristic of Mediterranean grasslands. Ever-changing market conditions for livestock products may make this even more challenging for private landowners.	Pelayo Alvarez, Agro-environmental Consultant	"Year-to-year" variation in stocking rates may occur as ranchers adapt their management to many external factors (e.g. rainfall, forage production, market variations). The protocol places no set limit on the year to year variability in stocking rate. Leakage does not need to be accounted for since there is not a strong relationship between the project activity and stocking rates. However, the annual stocking rate, as well as minimum and maximum stocking rates, still have to be determined in consultation with a Qualified Expert to eliminate the risk of overgrazing, erosion and reversals.	We have modified section 6 on page 8 to improve the clarity of the Stocking Rate requirements. It now reads as follows: "The annual, minimum and maximum Stocking Rate shall be determined via consultation with a Qualified Expert (see definitions – a Certified Rangeland Manager, NRCS Soil Conservationist or Qualified Extension Agent) and duly justified by the Project Proponent. Justification for the annual Stocking Rate should include a calculation of the historical Stocking Rate averaged over a 10 year period prior to the start of the Project, and an assessment of whether or not the forage productivity and quality of the parcel can sustainably support the historical Stocking Rate[4]. In some cases the conditions of the parcel will justify using the historical Stocking Rate as the

	Comment	Commenter	Response	Changes to Methodology
				annual, while in other cases the Qualified Expert may set an annual Stocking Rate that differs from the historical Stocking Rate. Validation of the GHG project plan will include a review of the criteria used by the Qualified Expert to ensure annual Stocking Rates during the Project lifetime are sustainable, and will not lead to erosion or negatively affect species composition; subsequent verifications will review changes to the annual Stocking Rate and ensure that a Qualified Expert was properly consulted. The maximum Stocking Rate shall be set so that rangeland utilization remains sustainable, taking into account an increase in forage production and any changes in the percentage of grazer feed coming from purchased sources after the start of the crediting period.[5] The minimum Stocking Rate shall be set to ensure that plant community species composition does not change toward a less desirable plant community in response to soil quality improvement following compost application."

	Comment	Commenter	Response	Changes to Methodology
				Additionally, references to leakage accounting (+/- 3% of the baseline stocking rate) have been removed in Section 9.5 – Leakage. The protocol now reads as follows: "Available field research suggests that the addition of compost to grasslands will generally increase soil carbon and the production of forage for livestock. As such, it is highly unlikely that project activities will lead directly to emissions leakage via reduced annual Stocking Rates on the parcel and increased grazing intensity beyond the project boundaries. Examples of common unrelated circumstances that may cause a proponent to temporarily reduce Stocking Rates are the occurrence of multi-year drought or unfavorable market conditions for the livestock industry."
6.9	Why would the baseline stocking rate be adjusted within a crediting period? Also, wouldn't the baseline rate be a known amount - why would one need to consult a Qualified Expert to determine it? GLLM says the baseline rate is the average of the 5 previous years, or if that data is unavailable, common practice. This	ACR (outstanding comments from internal review)	"Year-to-year" variation in stocking rates may occur as ranchers adapt their management to many external factors (e.g. rainfall, forage production, market variations). The protocol places no set limit on the year to year variability in stocking rate. Leakage does not need to be	We have modified section 6 on page 8 to improve the clarity of the Stocking Rate requirements. It now reads as follows: "The annual, minimum and maximum Stocking Rate shall be determined via consultation with a

	Comment	Commenter	Response	Changes to Methodology
	prevents variations due to extreme weather events from affecting the project.		accounted for since there is not a strong relationship between the project activity and stocking rates. However, the annual stocking rate, as well as minimum and maximum stocking rates, still have to be determined in consultation with a Qualified Expert to eliminate the risk of overgrazing, erosion and reversals.	Qualified Expert (see definitions – a Certified Rangeland Manager, NRCS Soil Conservationist or Qualified Extension Agent) and duly justified by the Project Proponent. Justification for the annual Stocking Rate should include a calculation of the historical Stocking Rate averaged over a 10 year period prior to the start of the Project, and an assessment of whether or not the forage productivity and quality of the parcel can sustainably support the historical Stocking Rate[6]. In some cases the conditions of the parcel will justify using the historical Stocking Rate as the annual, while in other cases the Qualified Expert may set an annual Stocking Rate that differs from the historical Stocking Rate. Validation of the GHG project plan will include a review of the criteria used by the Qualified Expert to ensure annual Stocking Rates during the Project lifetime are sustainable, and will not lead to erosion or negatively affect species composition; subsequent verifications will review changes to the annual Stocking

	Comment	Commenter	Response	Changes to Methodology
				Rate and ensure that a Qualified Expert was properly consulted. The maximum Stocking Rate shall be set so that rangeland utilization remains sustainable, taking into account an increase in forage production and any changes in the percentage of grazer feed coming from purchased sources after the start of the crediting period.[7] The minimum Stocking Rate shall be set to ensure that plant community species composition does not change toward a less desirable plant community in response to soil quality improvement following compost application." Additionally, references to leakage accounting (+/- 3% of the baseline stocking rate) have been removed in Section 9.5 – Leakage. The protocol now reads as follows: "Available field research suggests that the addition of compost to grasslands will generally increase soil carbon and the production of forage for livestock. As such, it is highly unlikely that project activities

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				will lead directly to emissions leakage via reduced annual Stocking Rates on the parcel and increased grazing intensity beyond the project boundaries. Examples of common unrelated circumstances that may cause a proponent to temporarily reduce Stocking Rates are the occurrence of multi-year drought or unfavorable market conditions for the livestock industry."
6.10	Please include a footnote or annex providing general guidelines and good practice for how stocking rates should be set.	ACR (outstanding comments from internal review)	We agree and have made this change.	Footnote 4 now reads as follows: Guidance on good practices for determining stocking rates can be found online at http://www.webpages.uidaho.edu/what-is-range/curriculum/MOD3/Stocking-rate-guidelines.pdf
6.11	Page 7, lines 173-190. *"After the start of the Project, the Stocking Rate per 10 year crediting period shall remain within pre-determined minimum and maximum Stocking Rate set at plus or minus 3% of the baseline Stocking Rate for each Project Parcel individually."* This requirement is Problematic: baseline will be based on current conditions, which may or may not be based on sound rangeland management principles.	Jeffrey A. Creque, Ph.D., Carbon Cycle Institute/Marin Carbon Project	"Year-to-year" variation in stocking rates may occur as ranchers adapt their management to many external factors (e.g. rainfall, forage production, market variations). The protocol places no set limit on the year to year variability in stocking rate. Leakage does not need to be accounted for since there is not a strong relationship between the project activity and stocking rates.	We have modified section 6 on page 8 to improve the clarity of the Stocking Rate requirements. It now reads as follows: "The annual, minimum and maximum Stocking Rate shall be determined via consultation with a Qualified Expert (see definitions – a Certified Rangeland Manager, NRCS Soil Conservationist or Qualified

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	Additionally, interannual NPP variation on rangelands can be much greater than 3% (50% or more). Further, research shows a 40-70% increase in forage production from compost application. The 3% rule removes a producer incentive for the project and ties the hands of the rangeland expert. It would be better to link stocking rate adjustments to assessment by a range professional than to an arbitrary percentage that inhibits response in drought and prevents economic benefit for the producer from enhanced production from the project. The 3% limit might be appropriate in cases where no professional assessment occurs, but such assessment should enable stocking rate adjustments up or down by whatever percentage is appropriate to sustain the resource and avoid reversals. Consider the implications of being unable to destock by more than 3% during drought, or to increase numbers in high biomass years.		However, the annual stocking rate, as well as minimum and maximum stocking rates, still have to be determined in consultation with a Qualified Expert to eliminate the risk of overgrazing, erosion and reversals.	Extension Agent) and duly justified by the Project Proponent. Justification for the annual Stocking Rate should include a calculation of the historical Stocking Rate averaged over a 10 year period prior to the start of the Project, and an assessment of whether or not the forage productivity and quality of the parcel can sustainably support the historical Stocking Rate[8]. In some cases the conditions of the parcel will justify using the historical Stocking Rate as the annual, while in other cases the Qualified Expert may set an annual Stocking Rate that differs from the historical Stocking Rate. Validation of the GHG project plan will include a review of the criteria used by the Qualified Expert to ensure annual Stocking Rates during the Project lifetime are sustainable, and will not lead to erosion or negatively affect species composition; subsequent verifications will review changes to the annual Stocking Rate and ensure that a Qualified Expert was properly consulted. The maximum Stocking Rate shall be set

	Comment	Commenter	Response	Changes to Methodology
				so that rangeland utilization remains sustainable, taking into account an increase in forage production and any changes in the percentage of grazer feed coming from purchased sources after the start of the crediting period.[9] The minimum Stocking Rate shall be set to ensure that plant community species composition does not change toward a less desirable plant community in response to soil quality improvement following compost application." Additionally, references to leakage accounting (+/- 3% of the baseline stocking rate) have been removed in Section 9.5 – Leakage. The protocol now reads as follows: "Available field research suggests that the addition of compost to grasslands will generally increase soil carbon and the production of forage for livestock. As such, it is highly unlikely that project activities will lead directly to emissions leakage via reduced annual Stocking Rates on the parcel and

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				increased grazing intensity beyond the project boundaries. Examples of common unrelated circumstances that may cause a proponent to temporarily reduce Stocking Rates are the occurrence of multi-year drought or unfavorable market conditions for the livestock industry."
6.12	P. 9, lines 205-206: "*The compost must be produced in accordance with Chapter 5 of EPA Part 503 Biosolids Rule.*" Add words, "process to Further Reduce Pathogens (PFRP)" at end of this sentence for clarity.	Jeffrey A. Creque, Ph.D., Carbon Cycle Institute/Marin Carbon Project	Good suggestion. We have made this change.	See Section 6. The sentence in question now reads "The compost must be produced in accordance with Chapter 5 of EPA Part 503 Biosolids Rule process to further reduce pathogens (PFRP) and other contaminants"
6.13	The most problematic part of the protocol is the stipulation of a plus or minus 3% set stocking rate over 40 years. In rangelands like those of Mediterranean California where it is typical for production to vary by orders of magnitude year to year, this would be irresponsible management. In some years, the same number of cattle per unit area would be eating bare dirt; while in others there would be a build up of dry material, unless the stocking rate is extraordinarily low. If the goal is to achieve somewhat consistent	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management University of California, Berkeley	"Year-to-year" variation in stocking rates may occur as ranchers adapt their management to many external factors (e.g. rainfall, forage production, market variations). The protocol places no set limit on the year to year variability in stocking rate. Leakage does not need to be accounted for since there is not a strong relationship between the project activity and stocking rates. However, the annual stocking rate, as well as minimum and maximum stocking rates, still have to be	We have modified section 6 on page 8 to improve the clarity of the Stocking Rate requirements. It now reads as follows: "The annual, minimum and maximum Stocking Rate shall be determined via consultation with a Qualified Expert (see definitions – a Certified Rangeland Manager, NRCS Soil Conservationist or Qualified Extension Agent) and duly justified by the Project Proponent. Justification for the annual Stocking

	Comment	Commenter	Response	Changes to Methodology
	intensities of use, the protocol should stipulate a reasonable range of pounds of residual dry mass to be left on the range at the end of the grazing season in late August or September. Consultation with the range management literature for grazing management in California, and Marin County Cooperative Extension, should lead to a reasonable stipulation. Instead of or in addition to "drought planning," as it now says in the document, the grazier should have alternative areas for grazing when production is low (drought occurs about half the time, it seems, depending on your definition), or secure alternative feed supplies, and ways to move additional stock in when production is above average—and it can be greatly above average in some years. In my opinion, beyond regular residue management guidelines, or management for some special purpose, the particulars of grazing management (rotational, deferred, year round) make		determined in consultation with a Qualified Expert to eliminate the risk of overgrazing, erosion and reversals.	Rate should include a calculation of the historical Stocking Rate averaged over a 10 year period prior to the start of the Project, and an assessment of whether or not the forage productivity and quality of the parcel can sustainably support the historical Stocking Rate[10]. In some cases the conditions of the parcel will justify using the historical Stocking Rate as the annual, while in other cases the Qualified Expert may set an annual Stocking Rate that differs from the historical Stocking Rate. Validation of the GHG project plan will include a review of the criteria used by the Qualified Expert to ensure annual Stocking Rates during the Project lifetime are sustainable, and will not lead to erosion or negatively affect species composition; subsequent verifications will review changes to the annual Stocking Rate and ensure that a Qualified Expert was properly consulted. The maximum Stocking Rate shall be set so that rangeland utilization remains sustainable, taking into account an increase in forage

	Comment	Commenter	Response	Changes to Methodology
	little to no difference overall, and I have not seen research results for these grasslands that convince me otherwise. The perceived differences that some have observed in outcomes from these strategies can be thought to be desirable or undesirable depending on management goal—and I can see no reason that carbon sequestration would be influenced on annual range.			production and any changes in the percentage of grazer feed coming from purchased sources after the start of the crediting period.[11] The minimum Stocking Rate shall be set to ensure that plant community species composition does not change toward a less desirable plant community in response to soil quality improvement following compost application." Additionally, references to leakage accounting (+/- 3% of the baseline stocking rate) have been removed in Section 9.5 – Leakage. The protocol now reads as follows: "Available field research suggests that the addition of compost to grasslands will generally increase soil carbon and the production of forage for livestock. As such, it is highly unlikely that project activities will lead directly to emissions leakage via reduced annual Stocking Rates on the parcel and increased grazing intensity beyond the project boundaries. Examples of common unrelated circumstances

	Comment	Commenter	Response	Changes to Methodology
				that may cause a proponent to temporarily reduce Stocking Rates are the occurrence of multi-year drought or unfavorable market conditions for the livestock industry."
6.14	In recent years in California we have learned a lot about how grazing can benefit a variety of wildlife species, in particular rare species. The protocol should be evaluated in terms of its impacts of wildlife habitat, species composition, and the structural diversity of the grassland. In other words, a continuously grazed grassland offers a diverse array of habitats, including areas with short grass and areas with long grass, diverse species, etc. It may also be useful in controlling some invasive species. Hopefully this is not lost with a uniform application of compost. In recent studies, for example Weiss' study of the checkerspot butterfly, increased fertility was implicated as a cause of habitat loss for the butterfly. Refugia for native plants often seem to be on poor soils where non-natives cannot grow well.	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management University of California, Berkeley	We recognize the potential for compost applications to enhance fertility and possibly result in shifts in plant communities. Consequently in the monitoring requirements stipulated in the protocol, project proponents must also have a Qualified Expert conduct periodic land assessments that includes an evaluation of forage quality, species type, community composition, percent cover of native species, and problems related to invasive weeds. (See Section 10).	

7. Project Boundary

	Comment	Commenter	Response	Changes to Methodology

	Comment	Commenter	Response	Changes to Methodology
7.1	Line 306 has a footnote that is not included at the bottom of the page.	ACR (outstanding comments from internal review)	Updated with footnote	Updated with footnote
7.2	P. 9, Footnote 10 should read: "Chapter 5 focuses on Pathogen and Vector Attraction Reduction Requirements. *On page 116, the Process to Further Reduce Pathogens is defined as…*"		We agree and have made this change.	See modification to Footnote 10 (In the current draft it is now footnote 11).
7.3	P 13. Line 294, Table 1. Suggest removing CO2 and N2O from Project scenario accounting as these GHGs will be emitted by aerobically decomposing organic material used to make compost with or without the project.		We agree and have made this change.	See Table 1, page 13.
7.4	P15, Line 296, Table 2. Above-ground non-tree biomass; change language to read: "A major pool affected by project activities. An increase in forage production is expected as a result of compost additions. Note that the amount of standing biomass at the end of the season will depend on Stocking Rate *and environmental factors, particularly annual precipitation* and might not change after compost addition."		We agree and have made this change.	The rationale for above-ground non-tree biomass in Table 2 now reads as follows: "A major pool affected by project activities. An increase in forage production is expected as a result of compost additions. Note that the amount of standing biomass at the end of the season will depend on Stocking Rate and environmental factors such as annual precipitation and might not change after compost addition.

8. Procedure for Determining the Baseline Scenario and Demonstrating Additionality

	Comment	Commenter	Response	Changes to Methodology
8.1	P. 17, lines 369-370: change language to: "Therefore, *a project developer using compost derived from biosolids must demonstrate that the specific source* of the biosolids, i.e., the biosolids of a specific municipality, have been landfilled in the past."	Jeffrey A. Creque, Ph.D., Carbon Cycle Institute/Marin Carbon Project	We agree and have made this change.	The sentence in question now reads: "Therefore, a project developer using compost derived from biosolids must demonstrate that the specific source of the biosolids, i.e., the biosolids of a specific municipality, have been landfilled in the past."
8.2	P. 18, lines 371-373: Change language to: "The biosolids from sources that are already land-applied (currently 54 %) *are not compost* and not considered additional under this methodology. However, these biosolids could potentially be co-composted by blending it with carbonaceous material such as paper diverted from landfills."	Jeffrey A. Creque, Ph.D., Carbon Cycle Institute/Marin Carbon Project	We agree and have made this change.	The sentence in question now reads: "The biosolids from sources that are already land-applied (currently 54 %) are not compost and not considered additional under this methodology. However, these biosolids could potentially be co-composted by blending it with carbonaceous material such as paper diverted from landfills."

9. Quantification of GHG Emission Reduction and Removals

	Comment	Commenter	Response	Changes to Methodology
9.1	Page 18, Line 390. "The remainder of this section contains general 390 requirements related to the use of Tier-2 Empirical Models, or PBMs."	Jeffrey A. Creque, Ph.D., Carbon Cycle Institute/Marin	We agree and have made this change.	It now reads "Tier-2 Empirical Models and PBMs."

	Comment	Commenter	Response	Changes to Methodology
	Should this read Tier-2 Empirical Models, **and** PBMs	Carbon Project		
9.2	P. 20, line 433: Change to: "*If avoided emissions are claimed by the project*, the emissions of the waste material when deposited in a landfill must be calculated for each project…"	Jeffrey A. Creque, Ph.D., Carbon Cycle Institute/Marin Carbon Project	We agree and have made this change.	It now reads "If avoided emissions are claimed by the project, the emissions of the waste material when deposited in a landfill must be calculated for each project…"
9.3	P. 23, line 458: $PE_{\Delta SOC}(y,i)$; generation of CO2 would occur from the aerobic decomposition of compost raw materials without the project; this factor is therefore not additional and should not be ascribed to the project. $CE_{N20}(y,i)$; similarly, generation of N2O would occur from the aerobic decomposition of compost raw materials without the project and therefore this factor should not be ascribed to the project.	Jeffrey A. Creque, Ph.D., Carbon Cycle Institute/Marin Carbon Project	We agree and have made this change.	Please see changes on page 23, as well as changes to Table 1 on page 13.
9.4	P. 25, lines 492-494*: "If for any reason average Stocking Rates in a Project Parcel for a given 10 year crediting period fall below 97% or above 103% of the baseline then the proponent will not be permitted to claim ERTs on the parcel in question during that crediting period."* This should be based on an assessment by a rangeland management professional; if so approved, stocking	Jeffrey A. Creque, Ph.D., Carbon Cycle Institute/Marin Carbon Project	"Year-to-year" variation in stocking rates may occur as ranchers adapt their management to many external factors (e.g. rainfall, forage production, market variations). The protocol places no set limit on the year to year variability in stocking rate. Leakage does not need to be accounted for since there is not a strong relationship between the	We have modified section 6 on page 8 to improve the clarity of the Stocking Rate requirements. It now reads as follows: "The annual, minimum and maximum Stocking Rate shall be determined via consultation with a Qualified Expert (see definitions – a Certified Rangeland Manager, NRCS

	Comment	Commenter	Response	Changes to Methodology
	rate adjustments should be permitted without loss of ERT credits. Animal unit increases > 10% could require enteric emission factor adjustment.		project activity and stocking rates. However, the annual stocking rate, as well as minimum and maximum stocking rates, still have to be determined in consultation with a Qualified Expert to eliminate the risk of overgrazing, erosion and reversals.	Soil Conservationist or Qualified Extension Agent) and duly justified by the Project Proponent. Justification for the annual Stocking Rate should include a calculation of the historical Stocking Rate averaged over a 10 year period prior to the start of the Project, and an assessment of whether or not the forage productivity and quality of the parcel can sustainably support the historical Stocking Rate.[12] In some cases the conditions of the parcel will justify using the historical Stocking Rate as the annual, while in other cases the Qualified Expert may set an annual Stocking Rate that differs from the historical Stocking Rate. Validation of the GHG project plan will include a review of the criteria used by the Qualified Expert to ensure annual Stocking Rates during the Project lifetime are sustainable, and will not lead to erosion or negatively affect species composition; subsequent verifications will review changes to the annual Stocking Rate and ensure that a Qualified Expert was properly consulted. The

	Comment	Commenter	Response	Changes to Methodology
				maximum Stocking Rate shall be set so that rangeland utilization remains sustainable, taking into account an increase in forage production and any changes in the percentage of grazer feed coming from purchased sources after the start of the crediting period.[13] The minimum Stocking Rate shall be set to ensure that plant community species composition does not change toward a less desirable plant community in response to soil quality improvement following compost application." Additionally, references to leakage accounting (+/- 3% of the baseline stocking rate) have been removed in Section 9.5 – Leakage. The protocol now reads as follows: "Available field research suggests that the addition of compost to grasslands will generally increase soil carbon and the production of forage for livestock. As such, it is highly unlikely that project activities will lead directly to emissions leakage via reduced annual

	Comment	Commenter	Response	Changes to Methodology
				Stocking Rates on the parcel and increased grazing intensity beyond the project boundaries. Examples of common unrelated circumstances that may cause a proponent to temporarily reduce Stocking Rates are the occurrence of multi-year drought or unfavorable market conditions for the livestock industry."

10. Monitoring

	Comment	Commenter	Response	Changes to Methodology
10.1	P 27, line 560: should read: "Broadcast rate (tons/ha) *and rationale and source of recommendation for rate*.**"**	Jeffrey A. Creque, Ph.D., Carbon Cycle Institute/Marin Carbon Project	We agree and have incorporated this suggestion	The following bullet point was added to the list in question. • Rationale for application procedure and reference source if available
10.2	It would be of great use to monitor changes in species composition over the protocol period, as well as productivity. This can be done with movable cages that exclude grazing in small patches that can then be clipped and weighed to assess pounds of production at the end of the grazing season. Species composition can be evaluated using a variety of fairly	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management University of California,	We also fully agree that monitoring potential plant community changes is of vital importance. Consequently in the monitoring requirements stipulated in the protocol, project proponents must also have a qualified expert conduct periodic land assessments that include an evaluation of forage production,	

	Comment	Commenter	Response	Changes to Methodology
	simple techniques. Above all this initiative should not encourage a return to single purpose management.	Berkeley	forage quality, species type, community composition, percent cover of native species, and problems related to invasive weeds. (See Page 26).	

11. Permanence

	Comment	Commenter	Response	Changes to Methodology
11.1	May want to mention that ERTs from this project or purchased from other ACR projects could be used for buffer contribution.	ACR (outstanding comments from internal review)	We agree and have incorporated this suggestion	The following sentence has now been inserted into Section 11. "For instance, ERTs contributed from the Project or those purchased from other Projects may be used to satisfy this buffer pool requirement."

12. References

	Comment	Commenter	Response	Changes to Methodology
12.1	I have included two documents useful in managing grazing in annual rangelands typical of much of California. (Note – these documents are: Weiss, 1999, Cars, Cows, and Checkerspot Butterflies: Nitrogen Deposition and Management of Nutrient-Poor Grasslands for a Threatened Species; Bartolome et. al, 2002, Guidelines for	Lynn Huntsinger, Professor of Environmental Science, Policy, and Management University of California,	Thank you for these documents. They are very useful in highlighting the possible effects of increased fertility on native biodiversity.	

	Comment	Commenter	Response	Changes to Methodology
	Residual Dry Matter on Coastal and Foothill Rangelands in California; George et. al., 2001, Annual Range Forage Production. ACR can pass copies of these documents along at the author's request.)	Berkeley		