State Greenhouse Gas Sequestration Task Force

MINUTES

Wednesday, November 17, 2021
1:30 PM
Zoom Virtual Meeting Room

ATTENDANCE

Members Present (13):

1. Mary Alice Evans, Director, Office of Planning and Sustainable Development as Chair of the Greenhouse Gas Sequestration Task Force
2. Earl Yamamoto, Department of Agriculture on behalf of the Chair, Board of Agriculture
3. Christian Giardina, U.S. Forest Service on behalf of the Chair, Board of Land and Natural Resources
4. Pradip Pant, Statewide Transportation Planning Office on behalf of the Director, Department of Transportation
5. Michael Madsen, DOH Clean Air Branch on behalf of Deputy Director, Department of Health, Environmental Health Administration
6. Danielle Bass, State Sustainability Coordinator
7. David Forman, Director, Environmental Law Program, University of Hawai‘i at Mānoa, WSR School of Law
8. Leah Laramee on behalf of Administrator, Division of Forestry and Wildlife, DLNR
9. Justine Nihipali as a Member of the Hawai‘i Climate Change Mitigation and Adaptation Commission
10. Benjamin Sullivan as the Mayor’s Representative, City and County of Honolulu
11. Riley Saito as the Mayor’s Representative, County of Hawai‘i
12. Ashley Lukens of the Frost Family Foundation as the Legislative Representative, Environmental Non-Profit
13. Alan Gottlieb of the Hawai‘i Cattlemen’s Council as the Legislative Representative, Agriculture/Ranching Association

Members Absent (6):

1. Susan Crow as researcher from College of Tropical Agriculture and Human Resources, University of Hawai‘i at Mānoa
2. Jonathan Deenik as extension agent from College of Tropical Agriculture and Human Resources, University of Hawai‘i at Mānoa
3. Vacant, Mayor’s Representative, County of Kaua‘i
4. Vacant, Mayor’s Representative, County of Maui
5. Melissa Miyashiro of the Blue Planet Foundation as the Legislative Representative, Environmental Non-Profit
6. Bobby Farias of Hawai‘i Meats as the Legislative Representative, Agriculture/Ranching Association

Office of Planning and Sustainable Development Staff Present (1): Brittaney Key, Climate Research Adaptation Specialist, AmeriCorps VISTA Member.

Public Attendees (26):

Hawai‘i State Representative Lisa Marten; Coby Chock, Office of Hawai‘i State Senator Glenn Wakai; Corinne Gallardo, Office of Hawai‘i State Senator Mike Gabbard; Matt Prellberg, Office of Hawai‘i State Senator Chris Lee; Aldric Ulep, Hawai‘i State House of Representatives Finance Committee; David Rodriguez, State of Hawai‘i Department of Transportation; Nicole Galase, Hawai‘i Cattlemen’s Council; Nick Krueger, University of Hawai‘i- Hilo; Todd Low, State of Hawai‘i Department of Agriculture (HDOA) Aquaculture Development Program; Liz Akina, HDOA-Aquaculture and Livestock Support Services Branch; Krista, HDOA—Animal Industry Division (full attendee name not identified at meeting); Cody Brooks, RTOInsider; Henry Curtis, Life of the Land; Jill Edelman, architect in private practice; Kevin Hachey, City and County of Honolulu OCCSR AmeriCorps VISTA; Kalisi Mausio, Hawai‘i Farm Trails; Tatum Okamoto, Hawai‘i Farm Trails; Mawae Morton, MA‘O Organic Farms; Karlotta Rieve, HATCH; Christopher Sabine, UH Mānoa School of Ocean and Earth Science and Technology; Meredith Steven, Center for Food Safety; Leah Volak, State of Hawai‘i DLNR—Division of Forestry and Wildlife; Evelyn Wight, The Nature Conservancy; Zoe Wong, Duke University Nicholas School of the Environment; Carolyn “Revere” Wood, Hawai‘i State Energy Office AmeriCorps VISTA; R. Wong (Zoom username; full attendee name not identified at meeting).

Distributed Material:

- Greenhouse Gas Sequestration Task Force (GHGSTF) meeting agenda for November 17, 2021
- Draft minutes for August 18, 2021 GHGSTF meeting
- “Accessing an Online Zoom Meeting” (instructions for downloading and using Zoom)
- Hawai‘i Cattlemen’s Council presentation slides
- Bremer et al. (2021) “Maintaining the Many Societal Benefits of Rangelands: The Case of Hawai‘i” academic paper (electronic version)
- HDOA Aquaculture Development Program presentation slides

I. Call to order, public notice, quorum

Chair Mary Alice Evans, Director of the Office of Planning and Sustainable Development (OPSD), called the meeting to order at 1:33pm. The Task Force's November 17, 2021 meeting notice was published on November 9, 2021. A quorum of 13 members was present of this 19-member task force.

AmeriCorps Member Brittaney Key reminded attendees of Zoom best practices before the meeting continued. A link to instructions for using Zoom is available on the GHGSTF's website, and the document was distributed via the Zoom chat. Ms. Key also informed those in attendance that they could direct message her or Task Force member Danielle Bass on Zoom if technical assistance was needed. Task Force members were asked to keep their cameras on for transparency.

The procedure for public comments was announced: Chair Evans would ask Task Force members for questions or comments first, and then discussion would be opened to comment from the public for each agenda item.

Task Force members were verbally introduced, and members of the public were invited to introduce themselves and their affiliation in the Zoom chat.

II. Review and approval of August 18, 2021 meeting minutes

The minutes were approved as circulated.

III. Presentations

Chair Evans reminded those in attendance that the Task Force has several mandates to fulfill, including identifying policies and mitigation options that encourage sequestration through agricultural and aquacultural practices, and today's presenters would be presenting on sequestration opportunities in both Hawai'i's land and marine environments. Chair Evans also emphasized the importance of the Task Force's work in light of the United Nations Climate Change Conference 26th Conference of the Parties (COP26) that was held in Glasgow, Scotland, UK in early November. Chair Evans introduced Task Force member David Forman, who recently attended COP26 as part of the University of Hawai'i delegation and agreed to report back with any relevant findings to the GHGSTF.

A. Presentation by Task Force member David Forman

Task Force member Forman explained that he was unable to attend the events that may have been of most interest to the GHGSTF due to limited accessibility at COP26 because of the ongoing COVID-19 global pandemic. However, he noted that several of the sessions were streamed online and recordings may be available for viewing. He also noted Hawai'i's relatively large presence at COP26. Task Force member Forman acknowledged both the public praise and criticism of outcomes from COP26 and noted the continued progress and commitments needed for climate efforts. He offered to connect people to resources or provide more detail on COP26 if there were any further questions.

Chair Evans thanked Task Force member Forman for his report and said that it helps to be reminded that the Task Force's work is part of a global effort.

B. Presentation by Nicole Galase representing the Hawai‘i Cattlemen’s Council

The Task Force welcomed Nicole Galase, managing director of Hawai‘i Cattlemen’s Council (HCC), for its next presentation. Ms. Galase would also be assisted by Nick Krueger of the University of Hawai‘i-Hilo. The Hawai‘i Cattlemen’s Council’s website is www.hicattle.org.

Ms. Galase was asked to present to the GHGSTF on the National Cattlemen’s Beef Association’s initiative for climate neutrality by 2040 and to expand on the role of ranching in promoting greenhouse gas sequestration, greenhouse gas emissions mitigation, healthy soils, and climate resiliency. A copy of the presentation slides was posted to the GHGSTF website and distributed electronically to members. The slides were also linked in the chat.

The Hawai‘i Cattlemen’s Council is a partner of the National Cattlemen’s Beef Association (NCBA) which recently released sustainability guidance for the cattle industry at large, including a commitment to demonstrate climate neutrality by 2040. Ms. Galase noted that the NCBA’s other commitments to economic, animal, and workforce well-being are also connected to reducing agriculture’s environmental footprint. The NCBA’s climate commitment helps emphasize the partnership that can exist between cattle ranching and climate mitigation efforts.

Emerging research in Hawai‘i and elsewhere shows promising results in the ability of seaweed-based cattle feed to reduce cattle’s methane emissions, and animal breeding research is looking to produce less methanogenic cattle. Ms. Galase also shared a peer-reviewed publication, “Maintaining the Many Societal Benefits of Rangelands: The Case of Hawai‘i,” a collaboration of eight Hawai‘i-based experts (including Mr. Krueger) across multiple fields to review the cultural and ecosystem services benefits of rangelands under paniolo stewardship. This paper was posted to the GHGSTF website and distributed electronically and in the Zoom chat.

Mr. Krueger explained that many of Hawai‘i’s rangelands are on andisol soil, a high-carbon storage soil type. Under proper management (which can take many forms), grazing can increase soil carbon sequestration. Ms. Galase also noted the opportunities for rangeland and forestry management in conjunction through silvopasture.

Ms. Galase concluding by cautioning that achieving the State’s climate goals could not be accomplished solely through additional mandates. Research would be needed to better determine effective rangeland management strategies. There also needs to be external recognition of the opportunities in the cattle industry to act as a partner in climate mitigation efforts.

Chair Evans thanked Ms. Galase and Mr. Krueger for their presentation and opened the floor to questions. Task Force member Mike Madsen asked Mr. Krueger how much carbon was stored in mineral soils. Mr. Krueger noted that carbon storage differed from carbon absorption but replied that although the answer varies widely, when mineral soils did store carbon, they could store approximately 100-150 metric tons of carbon per hectare up to 1 meter deep. Task Force member Madsen remarked that the State’s greenhouse gas

emissions inventory only accounted for organic soil types and that mineral soils were missing from its assessment. Christopher Sabine added in the Zoom chat that carbon sequestration primarily occurs in organic soil types and generally, mineral soils are not considered a significant sink. Task Force member Christian Giardina also said in the chat that calculating the contributions of mineral soils in a greenhouse gas emissions inventory would be complicated since they are both a source and sink of carbon emissions. He referred to one of his studies on afforestation after sugar cane on Hawai'i Island as an example: https://www.fs.usda.gov/treesearch/pubs/11951. He also linked a similarly relevant paper that included Task Force member Susan Crow as an author: https://www.fs.usda.gov/treesearch/pubs/46423.

Task Force member Earl Yamamoto reminded the Task Force to be mindful of other pressures ranchers and other food producers may be subject to, including State food production initiatives and mandates to double local food production by 2030.

Task Force member Pradip Pant asked if there were any data or studies available on the full sequestration potential of Hawai'i's pasturelands. Ms. Galase clarified that the NCBA's climate neutrality goal consists of both reducing methane emissions and sequestering atmospheric carbon to reach its goal. Mr. Krueger stated that soil carbon saturation is still a research question under investigation, but from his knowledge, sequestration rates in pasturelands tend to range from 0.33 to 1 ton of soil carbon per hectare per year. Mr. Sabine also shared a link in the chat to the Global Methane Budget which includes data on emissions from agriculture: https://www.globalcarbonproject.org/methanebudget/.

Task Force member Ben Sullivan followed up to Task Force member Pant's question to note that sharing data, even rough approximations, would be helpful for the Task Force to visualize comparisons and relative sequestration capacity of the different environments and methods it has to review. Task Force member Sullivan also asked Ms. Galase if silvopasture represented the future direction of ranching, and how best to reach ranchers to assist in changing management practices. Ms. Galase first noted that Hawai'i Cattlemen's Council exists in part to help connect ranchers to developments in management best practices. Ms. Galase then said that while silvopasture would not work everywhere, Hawai'i Cattlemen's Council was focused on making silvopasture available as an option for ranchers to implement where possible. Mr. Krueger added that short lease durations hinder ranchers' ability to adopt new practices, to which Ms. Galase agreed and reiterated her earlier remarks on the importance of increasing ranchers' economic well-being to aid in achieving climate goals as well. Mr. Krueger also responded to Task Force member Sullivan's initial remarks by clarifying that the greatest change in sequestration capacity occurs in land use changes from degraded or poorly managed lands to well-managed lands, and added that most grasslands in the state are poorly managed.

Noting the greenhouse gas-intensive process of importing food to Hawai'i, Task Force member Giardina asked if there was any analysis available on the relative greenhouse gas benefits of local versus imported food. Ms. Galase shared that, based on survey data, most local ranchers would prefer to keep more of their cattle for consumption in Hawai'i. However, the Hawai'i Cattlemen's Council did an economic analysis that showed this is not

the most economically feasible option for ranchers currently because Hawai‘i lacks the economy of scale to reduce processing costs. She suggested that consumer education to understand this reason for the price disparity between local and imported beef could improve local demand. Task Force member Riley Saito added in the Zoom chat that the price of cattle feed is another major cost factor in local beef production.

Henry Curtis stated that per his understanding, the amount of carbon stored in soil is greater than the combined amounts of carbon stored in biomass and the atmosphere, and he requested clarification on Mr. Krueger's ecosystem carbon storage slide (Slide 12). Mr. Krueger confirmed that Mr. Curtis was correct; carbon stored in the soil does outweigh the amount stored in biomass and the atmosphere. Slide 12 referred only to the relative ratio of carbon stored in biomass that is below- versus above ground (roots versus visible vegetation).

Mr. Curtis's second question raised concerns over the use of carbon offsets to achieve climate goals such as the NCBA's climate neutrality commitment. Task Force member Bass acknowledged Mr. Curtis's concerns and shared the link to OPSD's 2019 report on carbon offsets, *Feasibility and Implications of Establishing a Carbon Offset Program for the State of Hawai‘i*: https://files.hawaii.gov/dbedt/op/sustainability/feasibility_and_implications_of_establishing_a_carbon_offset_program_for_the_state_of_hawaii_finalweb.pdf. Task Force member Bass summarized the report's findings that, due to the State's Zero Emissions Clean Economy target (Hawai‘i Revised Statutes [HRS] §225P-5), it would be better suited to the State's climate interests to focus on reducing and sequestering greenhouse gas emissions instead of establishing a State-administered carbon offset market to sell credits from sequestration to third-party entities. In the chat, Task Force member Bass also offered to provide hard copies of the report to anyone interested.

Mr. Sabine asked if there any research on whether different grass types affect cattle methane production. Mr. Krueger responded that C4 grasses (tropical grasses like those most common in Hawai‘i) tend to produce more methane.

In the Zoom chat, Task Force member Sullivan expressed his support for the importance of supporting local purchase but also encouraged a data-based discussion. He shared the following link showing that current global cattle methane emissions outweigh global transportation emissions: https://ourworldindata.org/grapher/food-emissions-supply-chain?country=Beef+%28beef+herd%29~Cheese~Poultry+Meat~Milk~Eggs~Rice~Pig+Meat~Peas~Bananas~Wheat+%26+Rye~Fish+%28farmed%29~Lamb+%26+Mutton~Beef+%28dairy+herd%29~Shrimps+%28farmed%29~Tofu~Maize. Task Force member Giardina responded in the chat and asked for Task Force member Sullivan's thoughts on local versus imported products for a given food type, but the Chair ended the Q&A session by this time in order to progress to the next presentation.

C. Presentation by Todd Low representing the HDOA Aquaculture Development Program

The Task Force welcomed Todd Low, manager of the HDOA Aquaculture Development

Program (ADP) and Aquaculture and Livestock Support Services Branch. The ADP website is https://hdoa.hawaii.gov/ai/aquaculture-and-livestock-support-services-branch/.

Mr. Low was asked to present to the Task Force on opportunities within aquaculture for greenhouse gas sequestration and provide recommendations to promote sustainable aquaculture statewide. A copy of the presentation slides was posted to the GHGSTF website and distributed electronically to members. The slides were also linked in the chat.

Mr. Low opened with a brief overview of regenerative agriculture, of which restorative aquaculture is a subset. Restorative aquaculture focuses on combining positive environmental and economic drivers. In Hawai‘i, restorative aquaculture produces algae and oysters either separately or together, and there is interest in integrating these operations with fish farming. This setup is called integrative multitrophic aquaculture (IMTA), and IMTA innovation focuses on reducing the environmental and health impacts of commercial fish farming.

Mr. Low summarized current hatchery operations in Hawai‘i. One of the species currently raised in Hawai‘i is limu kohu, a species which was referenced earlier in Ms. Galase's presentation regarding its use as a cattle feed supplement to reduce methane emissions. Mr. Low also provided local examples of integrating aquaculture into coastal resilience, education and ecosystem restoration initiatives. New York's Billion Oyster Project was cited as an example of the scale Hawai‘i's current operations could be expanded to with proper capacity-building.

Regarding seaweed's ability to sequester carbon, Mr. Low informed the Task Force of an upcoming research report due in early 2022 from Oceans 2050 that will quantify seaweed's global sequestration capacity. However, additional research would be needed to confirm whether Hawai‘i's indigenous seaweed and oyster species match Oceans 2050's findings.

To conclude, Mr. Low recommended developing a framework and a scientific advisory body to assist subnational and organizational leadership in addressing cross-departmental issues such as regenerative aquaculture in an organized, systematic, and transparent manner. Mr. Low provided additional recommendations that are listed on Slides 30 and 31, with emphasis on his final recommendation of scalable pilot projects.

Because Mr. Low highlighted the need for aquaculture funding mechanisms, Task Force member Bass acknowledged that while the *Feasibility and Implications of Establishing a Carbon Offset Program for the State of Hawai‘i* report dissuaded the State's use of a carbon offset program, an alternative could be a carbon-positive incentive program to provide financial incentives to local farmers, foresters, and others that sequester carbon. She saw a potential space for aquaculture in this and recommended that the HDOA ADP consider entering ongoing conversations around developing a State carbon-positive incentive program.

Task Force member Forman mentioned that he recalled one of the outcomes from COP26 was the development of rules to prevent double-counting of carbon credits.

Task Force member Ashley Lukens raised concerns about whether offshore aquaculture infrastructure would be able to withstand climate impacts such as increased storm severity. She also shared that the federal government is in the process of developing a draft Environmental Impact Statement (EIS) to evaluate the environmental impacts of the expansion of offshore aquaculture in the Pacific Ocean, which she predicted would be significant for Hawai‘i to consider in its aquaculture endeavors. She encouraged the Task Force and HDOA's engagement with this EIS process, and she suggested that the HDOA could use the EIS's findings and consideration for stakeholder impacts to analyze the most appropriate implementation and expansion of industrial offshore aquaculture operations in Hawai‘i's waters. Chair Evans acknowledged Task Force member Lukens' concerns and welcomed further discussion as an agenda item at the next meeting in January. Task Force member Lukens later added in the chat that another concern for offshore aquaculture is that shellfish aquaculture can be very plastic-intensive.

Task Force member Madsen drew attention to a co-benefit of restorative aquaculture, restoring coastal wetlands, and reminded everyone that wetlands are a carbon sink. He recommended this be considered in evaluating the relative impacts of restorative aquaculture. Mawae Morton added in the Zoom chat that another co-benefit of algal aquaculture is its use to displace synthetic fertilizers as part of the transition to regenerative agriculture. She also said that as a local product, this can shorten supply chain carbon emissions and displace imports while creating local green jobs.

Mr. Curtis asked about the existence of baseline aquaculture data such algae's average carbon sequestration capacity and whether algal levels are increasing or decreasing. Task Force member Sullivan agreed with Mr. Curtis's question and requested that future presentations include sequestration estimates and impacts at the beginning so as to provide context from the start on where the presentation topic fits into the Task Force's portfolio of strategies it needs to evaluate. In the Zoom chat, Task Force member Giardina also agreed and said that it is difficult to integrate a talk without spatially explicit estimates done in a global warming potential framework.

Mr. Sabine informed those in attendance that the current post-presentation discussion fell under the umbrella of "blue carbon," which refers to restoration of sea grasses, mangroves, and salt marshes, and organisms like macroalgae and kelp. To Mr. Curtis's question, Mr. Sabine answered that the general trend for these organisms is decreasing populations, so blue carbon efforts are focused on restoration to increase their numbers and thus sequestration amounts. He added that globally, this includes a focus on the restoration of mangroves, although he acknowledged that mangroves are an invasive species in Hawai‘i. Chair Evans thanked Mr. Sabine for his input and reminded the Task Force that it is statutorily required to report on aquaculture and sequestration. Mr. Sabine added for context that, on a global scale, aquaculture is estimated to sequester teragrams of carbon (1 Tg= 1 million metric tons) versus the petagrams (1 Pg= 1 billion metric tons) needed to keep global temperature increases below 1.5 degrees Celsius.

Mr. Low also replied that there was existing research on the sequestration capacity of algae

and shared the following link in a post-meeting follow-up to provide that data: https://www.nature.com/articles/ngeo2790. However, he referred the Task Force to the pending Oceans 2050 report as setting the new baseline on algae sequestration data and said he would forward the report once it published. Mr. Sabine added that one challenge with these reports is they tend to look at growth potential of seaweed and therefore its carbon dioxide uptake, but in order to sequester carbon, the biomass must be preserved. Otherwise, when seaweed decomposes, the carbon is re-released back into the atmosphere, a challenge that is often overlooked. Karlotta Rieve responded that Oceans 2050's research is evaluating seaweed that sinks to the ocean floor in the aquacultural process and how it integrates into ocean sediment. However, she agreed with Mr. Sabine that it is important to evaluate what happens to harvested seaweed before counting it as carbon sequestration. Task Force member Giardina suggested in the chat one potential post-harvest use of seaweed is to use it to offset fossil fuel-sourced materials. Liz Akina also added that harvested seaweed is commonly converted into food products, cosmetics, fertilizers, and other uses, but demand outpaces supply.

Chair Evans acknowledged the great interest in aquaculture but ended the Q&A session to progress to the next agenda item.

IV. 2023 GHGSTF preliminary report to the State Legislature

A. Discussion of task force members' recommendations in marine use and aquaculture policies

Chair Evans reminded the Task Force that it is mandated by HRS §225P-4 to identify marine use policies and aquacultural policies that promote increased greenhouse gas sequestration and provide greenhouse gas benefits, and to include recommendations to achieve these objectives. The preliminary report is due to the legislature 20 days before the 2023 legislative session. Chair Evans asked if Task Force members had any policy recommendations to share for consideration to include in the report. No recommendations were provided, but Task Force member Lukens confirmed with Chair Evans regarding a presentation on aquaculture impacts at the January GHGSTF meeting. As such, Chair Evans moved the request for policy recommendations to January for further discussion after Task Force member Lukens' presentation.

B. OPSD's operating budget adjustment request

Chair Evans announced that OPSD will be including in its supplemental State Budget request a request for staffing for the GHGSTF. She welcomed any Task Force members to submit testimony in support of OPSD's supplemental budget request. Chair Evans also shared that this was Ms. Key's last GHGSTF meeting because her AmericCorps VISTA Member service would be ending in December, and she thanked the Hawai'i Climate Change Mitigation and Adaptation Commission for sponsoring Ms. Key. Chair Evans and Task Force members thanked Ms. Key for her support over the past year.

Referring back to Agenda Item IV.A., Task Force member Giardina asked about member roles and responsibilities, timelines, and expectations for drafting the preliminary report. Chair Evans explained that this was part of the impetus for OPSD's supplemental budget

request due to the predicted great difficult the GHGSTF would have in meeting its deadline without additional support. She reminded the Task Force that the 2023 deadline is for a preliminary report and that the final report is not due until 20 days prior to the 2024 legislative session. She also reminded the Task Force that it does not currently have a sunset date and will likely remain an important part of Hawai'i's climate response strategy.

Chair Evans added that while potential staff would address the administrative process of drafting the report, the Task Force will still look to its members for content. Task Force member Bass noted that much of the preliminary report content already exists through previous OPSD and GHGSTF-sponsored projects and presentations, and only needs to be aggregated into an outline as a baseline for GHGSTF members to build upon and edit.

V. Announcements

A. Meeting schedule for 2022

The next GHGSTF meeting will be held via Zoom on January 12, 2022 at 1:30pm. The tentative 2022 schedule is as follows (locations to be decided):

- January 12, 2022 at 1:30 pm;
- March 16, 2022 at 1:30 pm;
- May 18, 2022 at 1:30 pm;
- July 20, 2022 at 1:30 pm;
- September 21, 2022 at 1:30 pm; and
- November 16, 2022 at 1:30 pm

Task Force member Lukens requested to present together with local food hubs at the January meeting on food distribution systems. Chair Evans agreed to include this on the January agenda. Mr. Sabine also offered to present on blue carbon and ocean acidification in January. Chair Evans accepted his offer. In the Zoom chat, Jill Edelman offered a future presentation on greenhouse gas emissions associated with building materials and opportunities for sequestration in the built environment. Chair Evans agreed to follow up with Ms. Edelman on her offer.

VI. Adjournment

The meeting adjourned at 3:28pm.