

Subject: Re: Urgent Request for Your Expert Opinion  
From: [stevenson@hawaii.edu](mailto:stevenson@hawaii.edu)  
Date: Mon, 7 Apr 2014 13:28:01 -1000  
CC: [chinl@hawaii.edu](mailto:chinl@hawaii.edu); [thornem@hawaii.edu](mailto:thornem@hawaii.edu)  
To: [jackiehoban@outlook.com](mailto:jackiehoban@outlook.com)

Aloha,

Thank you for your interest in grazing management on Kauai. Thank you also for your patience as I feel a thoughtful response to your important questions would be of more value to you than my shooting from the hip. I have copied Dr. Mark Thorne, CTAHR Range Extension Specialist, as he is an expert on tropical forages and has worked with ranchers throughout the state and Pacific Basin. I am not familiar with a Professor Kranz and could not find one listed within the University of Hawaii system directory.

I am happy to address the five questions you outlined in your email. However, I do not feel it is appropriate for me to comment on specific concerns about HDF, or any other ranch/farm I work with, as I would not want to generalize or speculate about a client or potential client's specific operational details. As I mentioned previously, my role is to support livestock agricultural operations by providing science-based advice at their request. My opinions have no binding authority and I believe it is in the rancher's best interest to seek information from multiple sources before committing to a particular management decision. In short, my advice is worth what the rancher pays for it. I do believe there are some valid concerns expressed by individuals, but it is up to HDF themselves to address them directly. I am not in a regulatory capacity, so I can only defer to whatever decisions the appropriate agencies make regarding HDF plans to operate on private property, zoned ag, and further designated as Important Agricultural Lands.

I concur with what Dr. Lee has already shared regarding kikuyugrass in his email below dated April 4. I'll make some general observations about kikuyugrass based on my experience which is much less than that of Dr. Lee or Dr. Thorne. I have not worked much with kikuyugrass on Kauai as it simply is not very extensive here compared to the Big Island or Maui. The exceptions would be Kokee and the north and east shores at higher elevations (>500' above sea level) which receive more rain and tend to be cooler than the rest of the island. The most kikuyugrass I've seen on Kauai is at Kokee which is environmentally very similar to where it grows on Maui and the Big Island. Ranchers on Kauai have told me that it used to be much more extensive at lower elevations about 30 years ago, but they've noted a decline in that time. In that time yellow sugarcane aphid has impacted many forages statewide including Kauai. Guinea grass is more resistant to yellow sugarcane aphid, and perhaps this advantage has allowed its increase (see: [http://www.ctahr.hawaii.edu/forages/yellow\\_sugarcane\\_aphid.html](http://www.ctahr.hawaii.edu/forages/yellow_sugarcane_aphid.html)). Furthermore, it would depend on the specific cultivar, but Kauai's temperatures at lower elevations may be higher than is optimal for kikuyugrass. I think I think the invasive point is a non-issue as kikuyugrass is naturalized in Hawaii and is of great economic benefit to statewide, and worldwide, meat/protein production in the tropics.

In general, the ability of a forage plant to establish and persist under grazing will depend largely on the soil fertility, stocking rate (number of animals per area over time), and environmental

optimum (temperature, rainfall, soil density, etc) tolerated by that plant. My responses draw heavily on information from extensive scientific trials conducted by Australian researchers compiled at:

[http://www.tropicalforages.info/key/Forages/Media/Html/Pennisetum\\_clandestinum.htm](http://www.tropicalforages.info/key/Forages/Media/Html/Pennisetum_clandestinum.htm)

For more on stocking rate, grazing management planning, Hawaii forages, and other related material, please see:

<http://www.ctahr.hawaii.edu/site/PubList.aspx?key=Livestock%20Management>

<http://www.ctahr.hawaii.edu/site/PubList.aspx?key=Pasture%20and%20Range%20Management>

<http://www.ctahr.hawaii.edu/forages/index.html>

<http://globalrangelands.org/hawaii/>

For your specific questions:

1) I do not know of a forage than can tolerate repeated grazing every 6-7 days under optimal growing conditions. That's not to say there isn't one, especially under fertilization and irrigation, but research has shown that grazing before a plant can replace adequate leaf area will result in root death over time. Root death would open the door to weed encroachment and less likelihood of surviving pests or disease.

2) I think what you're getting at with this question is animal impact. I don't have any experience with recovery periods for forages under the conditions you describe. You may want to research "ultra-high density grazing" or "management intensive grazing". Folks that practice those grazing methods claim that animal impact is minimal even under high stock density (i.e. number of animals per unit area at a moment in time), but that is contingent on an adequate rest period. Adequate rest is of course relative to the specific forage, degree or intensity, and timing or season of impact. In Hawaii, my colleagues and I have recommended 30-45 days rest from grazing for kikuyugrass depending on seasonal and environmental conditions.

3) This question is a little too broad for me to answer, and most of my experience is with beef cattle. "Collateral damage to the environment" should be defined to avoid subjective responses. Frankly, I think folks in areas even with extensive pasture based dairies would have difficulty answering this as it is an active area of research.

4) For the interest of space and simplicity, I will only look at this from a forage allocation perspective. I am heavily biased towards limiting inputs in the interest of profitability. So for a 580 acre farm raising dairy cattle I would work with what is present, in this case guinea grass, with minimal fertilization. Based on pasture fertilization trials conducted on former sugarcane land in Puhi by Dr. Thorne, guinea grass can produce between 7 to almost 8 tons per acre on a dry matter (DM, or water removed) basis. Depending on specific site conditions, it may not be appropriate to extrapolate this production rate to another area. A general recommendation for planning purposes is to allocate 50% of DM to support grazing, leaving 50% to protect the forage base. For the purposes of this exercise, a crude estimate of the DM intake of a dairy cow ranges from 2.5% to 4.5% of her body weight. So let's say you're using a small breed of dairy cow, 900 lbs, the daily forage demand would be 31.5 lbs (900 lbs x 3.5%, midpoint of range), or a yearly demand of roughly 11,500 lbs per animal. Of course a cow isn't in production

yearround and would have a lower demand when dry, but this is just a back of the envelope exercise anyway to address a hypothetical situation. So working backwards: 7.5 tons per acre divided by 2 = 7500 lbs/acre/year available for grazing. So 580 acres times 7500 lbs/ac = 4.35 million lbs available forage per year total assuming, unrealistically, uniform production, no droughts, and no pests/diseases. Thus working backwards, 4.35 million lbs forage per year divided by 11,500 lbs demand per animal per year = 378 lactating cows averaging 900 lbs body weight. This also assumes 100% of the diet from pasture. I offer this all as a demonstration on how to make a coarse estimate of stocking rate based on the hypothetical scenario you described. This is not a recommendation for any particular property.

5) See my response to number 4 above and references in the above links, especially "Stocking Rate: The Most Important Tool in the Toolbox" and "Foraging Behavior and Grazing Management Planning":

<http://www.ctahr.hawaii.edu/oc/freepubs/pdf/PRM-4.pdf>

<http://www.ctahr.hawaii.edu/oc/freepubs/pdf/PRM-2.pdf>

I apologize that this is a long email, but your apparent deep interest and the multi-layered complex process of grazing management planning warrant a thorough response in addition to what Dr. Lee has already touched on. I would emphasize that all the above reflect my biases and academic background with no skin in the game. If you haven't done so already, I highly recommend talking with farmers and ranchers who have extensive on-the-ground experience.

I hope this adequately addresses your questions. I offer the above comments with the understanding that this is for information purposes only based on what you asked me. I am not making, and am not willing to make at this point, a definitive public statement on what I think HDF should or should not do at that site. Personally, without knowing any details beyond what they've made public, I am very conservative in my approach and would hedge against miscalculations by either increasing the acreage or decreasing the number of animals they plan to run. But if you ask a dozen professionals you would probably get a dozen different answers, so I'm not willing to say "no can" about an approach outside my comfort zone. So for now, I am reserving judgement in the interest of maintaining neutrality. Also, I can only hope that whoever is directly involved in advising them about grazing management is spot on in their recommendations and that the regulatory processes function as they were designed to for preventing adverse environmental or health impacts. This is no different a standard to expect from any other business. Ultimately, what a person or entity does on private property, within the law, is up to them.

Regards,

Matt

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[www.ctahr.hawaii.edu/site/extprograms.aspx](http://www.ctahr.hawaii.edu/site/extprograms.aspx)

[rangelands.manoa.hawaii.edu/](http://rangelands.manoa.hawaii.edu/)

[www.ctahr.hawaii.edu/paniolo/](http://www.ctahr.hawaii.edu/paniolo/)

[www.ctahr.hawaii.edu/sustainag/NewFarmer/Animal.asp](http://www.ctahr.hawaii.edu/sustainag/NewFarmer/Animal.asp)

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