Effect of Volcanic Activity on Hawaii Livestock Operations

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The recent volcanic activity on the Big Island poses several immediate threats to Livestock production on the southern side of the island. These include in order of concern:

1. Vog – contains gasses including hydrogen sulfide, sulfur dioxide, hydrogen fluoride, hydrogen chloride, and carbon dioxide (among others).
2. Volcanic Ash – composed of pulverized rock, mineral and volcanic glass. Of the various mineral components of ash, fluorine concentration is the most significant for livestock health concerns.
3. Seismic activity –earthquakes as a part of the volcanic activity pose some threat to livestock and ranch infrastructure.
4. Lava – livestock and ranch infrastructure in the vicinity of the volcanic activity are in immediate danger, while this threat becomes minimal moving a way from the volcano.

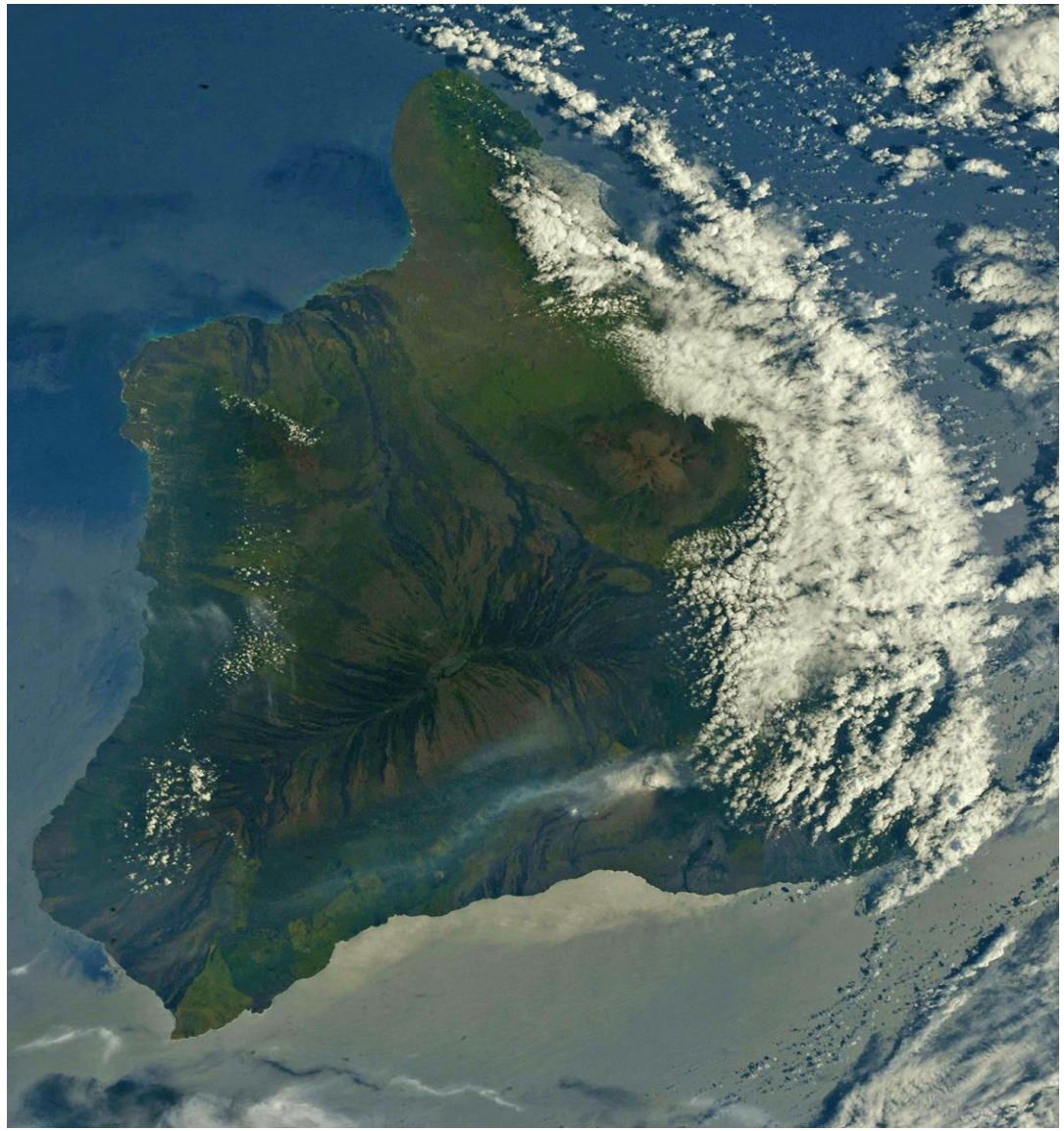


Image of Vog from May 2018 volcanic activity (space.com)

Vog

Vog poses the most significant threat to livestock health and ranch infrastructure (for those not in the immediate vicinity of the volcano)

Ranches along the southern coast of the Big Island have been dealing with Vog since the 2008 eruption of Halemaumau.

Hydrogen Fluoride is a component of Vog that is readily absorbed by grasses, incorporated into their tissue, and when consumed by livestock, cause health concerns.

Fluoride also readily precipitates into water sources for livestock.

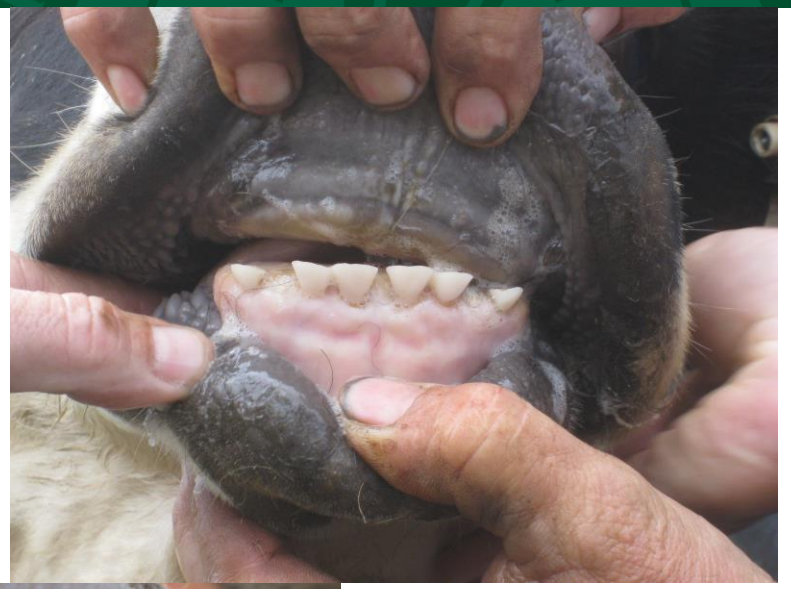
Fluorosis (Fluoride toxicity) results in the erosion of teeth, bone loss, and other growth deformities. The pictures at the right are of similarly aged cattle on the same ranch, but raised in two different locations relative to the prevailing vog cloud layer.

The upper picture shows the teeth of a young steer raised on pasture above the vog cloud, while the lower shows the mouth of a young heifer raised on pasture within the prevailing vog cloud.

Other components of vog, particularly Sulfur, also accumulate in the forage and water resources utilized by livestock.

This can lead to complications in copper absorption for ruminant animals and result in copper deficiency.

Normal Teeth in an young bovine.



Deformed/worn teeth in a young bovine of similar age to the one above.

Ranch infrastructure is severely impacted when sulfur dioxide and hydrogen sulfide precipitate out as rain or condensation/dew.

Many of the ranches down wind of the prevailing vog cloud have had to replace fences, gates, water lines, tanks, and other metal structures after only a few years in service when they should have lasted 10-15 years.

In addition, acidic precipitate from the vog causes burning of the vegetation, and if severe, death of the grasses, shrubs, and trees.

Volcanic Ash

Volcanic Ash presents many of the same concerns as vog with regard to the mineral content of the ash.

In addition though, the ash contains volcanic glass and particularized rock that can ware away teeth, accumulate in the rumen to cause digestive issues, and irritate eyes, nasal passages, and lungs when breathed in.

Seismic Activity and Lava

Earthquakes pose an obvious threat to ranch infrastructure. However, the increase in seismic activity can cause stress in animals including livestock. This will result in behavioral changes in how they handle, where they will stay and how they utilize pastures.

Lava poses a significant and obvious threat to those animals and operations within the immediate vicinity of the volcanic activity.

Recommendations

1. Livestock should be moved, as much as feasible, to safety from the lava flows, ash fall, and vog clouds. This may mean relocating livestock to another part of the island or moving them to a safe elevation above the vog cloud and lava flows.
2. Water sources should be analyzed and monitored for elevated sulfur and fluoride levels to prevent complications with copper absorption that can be brought on by too much sulfur in an animals diet, and Fluorosis (fluoride toxicity) as result of too much fluoride.
3. As much as possible, animals should be moved to pasture that is not affected by vog or ash fall.
4. Whether animals are moved from affected pasture areas, or they remain, they should be closely monitored for complications like bone loss in the nasal areas, worn/loss of teeth, respiratory problems, digestive issues (bloating, scours, weight loss), behavioral changes, and copper deficiency.
5. Producers in affected areas should consider supplementing cattle and goats with additional copper to mitigate the effect of high sulfur in the diet and Calcium and Vitamin D to help reduce the effects of Fluorosis. Sheep producers should consult with their cooperative extension agent or a veterinarian before providing additional copper as too much copper can be toxic to sheep.

6. Copper can be supplemented using Copper Sulfate ($CuSO_4$) provided either separately or mixed in with a premixed complete mineral or a Trace Mineral Salt.

7. Calcium can supplemented using dolomite [$CaMg(CO_3)_2$] mixed in with a premixed complete mineral or a Trace Mineral Salt. Vitamin D is most efficiently administered with an injection. Producers should work with their local veterinarian to determine dosage.

8. Questions and concerns for animal health and welfare can be directed to your local extension agent and/or local veterinarian.

Or Contact:
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