

September 21, 2021

Re: Comments on FEMA's Community Ratings System Program from the Council for Healthy Food Systems

The Council for Healthy Food Systems is a nonprofit that promotes diversified local and regional foods systems that are healthy, safe, economically sound, and environmentally sustainable.

We appreciate the opportunity to provide comments on the Community Rating System Program. The CRS program is an important and valuable program -- and adding provisions that promote healthy soil management would result in significant improvements in preventing and alleviating flood damage, along with other benefits for the communities and our entire country. Specifically, FEMA should add points to the CRS for the use of soil health-building practices on farms and ranches, including: cover-crops, chemical-free no-till and reduced till, use of soil amendments that improve soil microbiology (such as compost and compost teas), and managed rotational grazing.

It's well accepted that maintaining natural spaces like open land and wetlands can decrease flood losses.¹ And there's growing evidence that how the land is managed can make a major difference. During a rainfall event, healthy soil management is the difference between infiltration of 1 inch of rain taking over 31 minutes (regularly tilled cropland) versus 7 minutes (regular "open space" pasture land) versus **10.1 seconds** in rotationally grazed (healthy soil) land. (*video demonstration*)²

Healthy soils not only absorb water quickly, they can absorb a lot more of it. Every one percent increase in organic matter results in as much as 25,000 gallons of available soil water per acre. With 126.5 million acres in agricultural production in Texas,³ healthy soil management practices could result in as much as 3.1 **trillion** gallons of additional stored water for every one percent increase in organic matter. Some of this stored water will gradually recharge aquifers, and the rest is held in healthy soil and available to keep plants growing and providing cover to protect the soil.

Several studies in Texas and other states help demonstrate the high value of healthy soils. For example:

- One 2015 Texas A&M study on ranches in North-Central Texas, showed that managed rotational grazing led to a 49% reduction in surface runoff, a 27% reduction in streamflow, and a 29% increase in infiltration.⁴

¹ <https://today.tamu.edu/wp-content/uploads/sites/4/2018/11/Urban-flooding-report-online.pdf>

² <https://www.youtube.com/watch?v=IqB4z7IGzsg&feature=youtu.be>

³ https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=TEXAS

⁴ Park, Jong-Yoon, et al. *Evaluating the ranch and watershed scale impacts of using traditional and adaptive multi-paddock grazing on runoff, sediment and nutrient losses in North Texas*. USA. Agriculture, Ecosystems & Environment 240: 32-44 (2017).

- A 2015 report by the Harris County Flood Control District found that 2 acres of upstream native prairie would entirely offset the increased runoff from 1 acre of a new subdivision and reduce runoff from a 100-Year flood event by 35%.⁵
- A 2019 study estimated that healthy soils on the Katy Prairie provided hydrological ecosystems services to the Houston area valued at \$331-\$647 million for reduction in impact of 10- to 50-year flood events – mostly due to reduced costs for downstream engineered reservoirs and corridors.⁶
- A modeling study of a watershed in Minnesota estimated that, in an extreme rain event, the use of cover crops reduced the amount of runoff by 30% during the off-season when a crop is not in the field.⁷
- A modeling study of Iowa soils found that cover crops or other perennial covers would reduce the runoff from fields by 9 to 15 percent.

A Texas farmer provided this testimony to the Texas House Agriculture Committee following Hurricane Harvey:

In August 2018, Laughing Frog Farm got over 50 inches of rain over the course of three days from Hurricane Harvey. For 16 years, the farm has used intensive organic practices to increase the organic matter in our soil. As a result, our soil has an excellent structure for capturing and holding water. Below is a picture taken on August 28, 2018, the day after Hurricane Harvey’s rains stopped:



Compare that to this picture of a nearby A&M test farm, taken the same day:

⁵ “Final Study Report: Cypress Creek Overflow Report.” Harris County Flood Control District (Aug 2015).

⁶ Apfelbaum, S., et. al. *Ecosystem Services Valuation for the Katy Prairie Conservancy and Adjacent Lands: Waller & Harris Counties, Texas* Special Report by Applied Ecological Services, Brodhead, WI (April 2019).

⁷ Can Cover Crops Reduce Flooding? Murtada, Salaam, Floodplain Hydrologist, DNR Floodplain Program, https://content.govdelivery.com/accounts/MNDNR/bulletins/2496c1e#link_5



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In managing our farm, we try to mimic natural prairie soil management. We use no synthetic chemicals, we do not plow, and we leave living roots in the ground 12 months a year. We try to never leave the soil uncovered. Seasonally we rotate livestock into the gardens.”

Had Houston been ringed with farms such as this, the flooding experienced would undoubtedly have been far less severe.

It’s worth noting that the same farming and ranching methods that help capture floodwaters and reduce the impact of flooding also serve to increase drought resilience and support aquifer recharge. For example, in the Texas Panhandle, Dr. Chris Grotegut saw remarkable results when he began transitioning his 11,000 acres of row crops to native grass pastures. Over the course of six years, the 14 wells on his property **rose** an average of more than a foot per year. During this same period, the other wells being monitored on neighboring farms **dropped** in excess of 1 foot, some up to 3 feet each year. He has calculated that his acreage is capturing close to 1.5 million gallons of water a day, enough to provide water for a small city.⁸ These methods also serve to sequester carbon in the soil, providing long-term benefits in reducing climate change and the associated severe flooding events.⁹

⁸ Pandhandle farmer recharges the Ogallala: <https://civileats.com/2019/11/18/high-plains-farmers-race-to-save-the-ogallala-aquifer/>.

⁹ Ecological Society of America. 2000. Available at: (<https://www.esa.org/esa/wp-content/uploads/2012/12/carbonsequestrationinsoils.pdf>); Jeff Schahczenski, Holly Hill, *Agriculture, Climate Change and Carbon Sequestration*. (2009) (page 6,7). Available at https://climatechange.lta.org/wp-content/uploads/cct/2019/03/nrcs141p2_002437.pdf

Adding community rating points for the use of healthy soils management techniques – including on-farm cover cropping, no-till and conservation tillage, natural soil amendments that improve soil microbiology (such as compost and compost teas), and managed livestock grazing – could significantly reduce flooding and increase the resilience of numerous rural, peri-urban, and urban communities. Compared to many other tactics for addressing flooding, these methods are relatively low cost and thus can provide extremely cost-effective ways to prevent the severe losses, in both economic and human terms, that flooding causes in our country each year.

Respectfully submitted,

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Council for Healthy Food Systems