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Iowa UrbanFEWS
Food-Energy-Water Systems Integration

UrbanFEWS in the News

INSIDE THIS ISSUE:

We're on the Web!

https://iowa-urbanfews.cber.iastate.edu/

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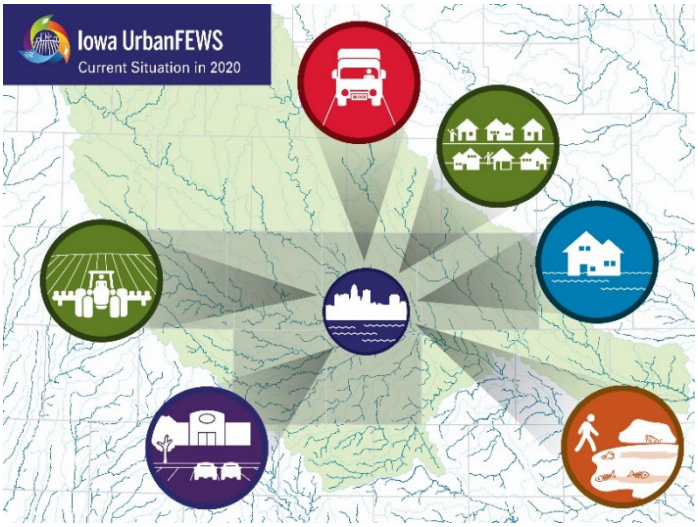
One Year In: The Iowa UrbanFEWS Project



Most people in the world live in urban areas, and their high population densities, heavy reliance on external sources of food, energy, and water, and relatively large waste production can result in severe and cumulative negative environmental effects on the local environment (see image at right). Integrated study of urban areas requires an especially broad and flexible framework that includes both social and biophysical data. Our research will involve integrated urban food, energy, and water system (FEWS) analyses, and will use a novel co-simulation approach for assessment of current and future conditions, with particular focus on local food production. We will be able to create a comprehensive analysis that includes climate dynamics, changes in land cover, built forms, and energy uses, and their related impacts as well as outcomes. We will identify a set of factors that could drive system changes related to policies, crop management methods, social interactions, changing technologies, and market forces affecting food production. Our goals are to enhance understanding of the urban FEWS nexus to improve system functions, increase resilience, and at the same time enhance sustainability. We plan to publish this newsletter two to three times each year to share our progress and to provide information on the project and our findings for residents, civic officials, members and leaders of local NGOs, as well as other stakeholders in our study area in and near the City of Des Moines, Iowa.

An Early Effort: Producer and Consumer Surveys

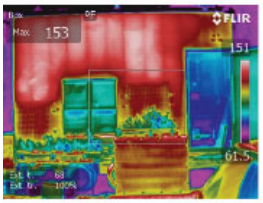
In spring 2020, our team conducted focus groups to develop our framework and to identify a set of "what if?" scenarios that could lead to more sustainable local food systems for Des Moines. Using input from these meetings, mail and online surveys for both agricultural producers and consumers are now underway. We will use survey results to inform our models about food production, energy use, associated environmental outcomes and related policies that would apply to Des Moines as well as a large number of similar cities that are located in rain-fed agricultural areas. We thank all of these recent Des Moines area project participants for their knowledge and insights!

Ask Our SWAT Team: What is a SWAT Model?

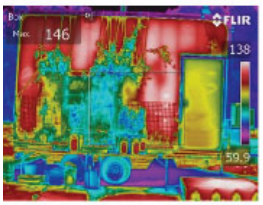
The Soil and Water Assessment Tool (SWAT) is an eco-hydrological model that we are using to quantify crop growth, hydrological cycling, nutrient transport, erosion processes, sediment transport, and transport of pesticides/pathogens associated with cropping systems and other land management practices. We include inputs for climate, topography, soil, land cover and crop management systems to generate outputs including streamflow rates, evapotranspiration, subsurface tile drainage flow, as well as nitrate, phosphorus, and sediment loads to characterize current conditions for watersheds linked to the Des Moines area. To allow detection of upstream and within-metro effects on water quality, our SWAT models include the North and South Raccoon River, North and South Skunk, the Middle Des Moines River, and the Lake Red Rock watersheds. Together, these watersheds are part of a large system that drains to and through the Des Moines area. Our SWAT expert, Dr. Phil Gassman and a post-doctoral scholar, Tássia Brighenti, are using data from the past 10 years or more to calibrate the initial models that will be used to create 'what if?' scenarios for the future.

In the News: Sweet Tooth Farm

Monika Owczarski of Sweet Tooth Farm is one of the Des Moines Register's "15 People to Watch" in 2021. She has already turned a run-down city park into an urban farm, and is now working to turn her Des Moines neighborhood into a place where nobody ever goes hungry. She grows many vegetables that are nutritious and culturally significant to the residents of the River Bend neighborhood, many of whom are immigrants with children who attend Moulton Elementary (where students speak 30 different languages!). She prices her produce according to the amount each person can afford, accepts food stamps, and is happy to barter when people need to. This month, she helped launch the city's first community fridge and pantry. It's stuffed full daily with free staple foods and is nearly empty each night. She is also steadily growing her network and her knowledge of what she calls "collective farming," a movement to share tools and tractors as well as labor and marketing to eliminate barriers and make everyone's lives easier. The full story was featured in the Des Moines Register newspaper on December 24th, 2020.



MDL, May 2020



MDL, August 2020

New Data Collected Using Mobile Diagnostics Lab

Team member Professor Ulrike Passe, and undergraduate researcher Tobi Fagbule conducted experiments to measure potential for reduced heat transfer to buildings through shading from nearby food and non-food plants. They placed vegetation near the Mobile Diagnostics Lab (or "MDL," a one-room trailer) to measure the effect of shade that blocks radiation and provides evaporative air cooling. They gathered thermal data during summer 2020. The team placed tomato, two species of shrubs, and wisteria plants in front of the south façade of the MDL, parked in an area receiving direct sunlight. Based on infrared camera data (images at left), the area behind the plants was 10-30 °C cooler (blue) than were surfaces directly exposed to the sun (red). This year they are growing a number of vegetables to understand their impact on surface temperature of the MDL.