

# Water Availability for Biorefineries in the Contiguous United States and the Implications for Bioenergy Production Distribution

## Background/objective

The renewal fuel standard (RFS) mandated 16 billion gallons per year (BGY) cellulosic biofuel production by 2022. Water availability is one significant factor that must be better understood to increase production from the current 0.59 BGY and meet this target. Researchers developed a framework to better understand water availability constraints that may limit biorefinery development in different regions of the contiguous United States (CONUS).

## Approach

- ❖ Delineated 509 biorefinery planning boundaries (RPBs) considering feedstock availability, transportation cost, and refinery capacity required for cost-effectiveness.
- ❖ Proportionally allocated the RFS mandate to each RPB based on feedstock availability.
- ❖ Devised indicators and assessed impact of water use constraints on RFS realization.

## Results

- ❖ The Northern Plains, Lake States, and Corn Belt regions are projected to be the major biofuel production bases in the CONUS, contributing 94.4%, 86.1%, and 54.8% of the conventional, biodiesel, and cellulosic biofuel production, respectively, mandated by the RFS.
- ❖ Continued biorefinery development in the Great Plains and California would be projected to exacerbate local water-related concerns.
- ❖ Constraining biorefineries to use less than 10% of locally available water would impact up to 7% of planned cellulosic biofuel production in the CONUS.

## Significance

- ❖ While bioenergy development is a multifaceted challenge, local- and regional-scale considerations of water supply and security will be important determining factors in the growth and establishment of biorefineries in the CONUS. Future work will continue to assess water availability at finer scale and expand the current analysis, informing biorefinery distribution, water supply, and transportation infrastructure investments.

