

Enabling An Energy Transformation Through Drop-In Alternative Fuels

Navy Energy Forum
October 12, 2010
Washington, D.C.

Jeffrey J. Steiner, Ph.D.
Office of National Programs
USDA-Agricultural Research Service

A Few Thoughts for Today's Panel

Policy and Biofuels

Limitations on Regional Production Systems

Integrating Bioenergy into Existing Agricultural and Forestry Systems



Growing America's Fuels Strategy



The next 21 billion gallons:

- 38.8 million acres
- *Represents 0.2-12% of total regional crop and pastureland production areas*
- 527 new advanced bio-refineries at a cost of \$168-billion

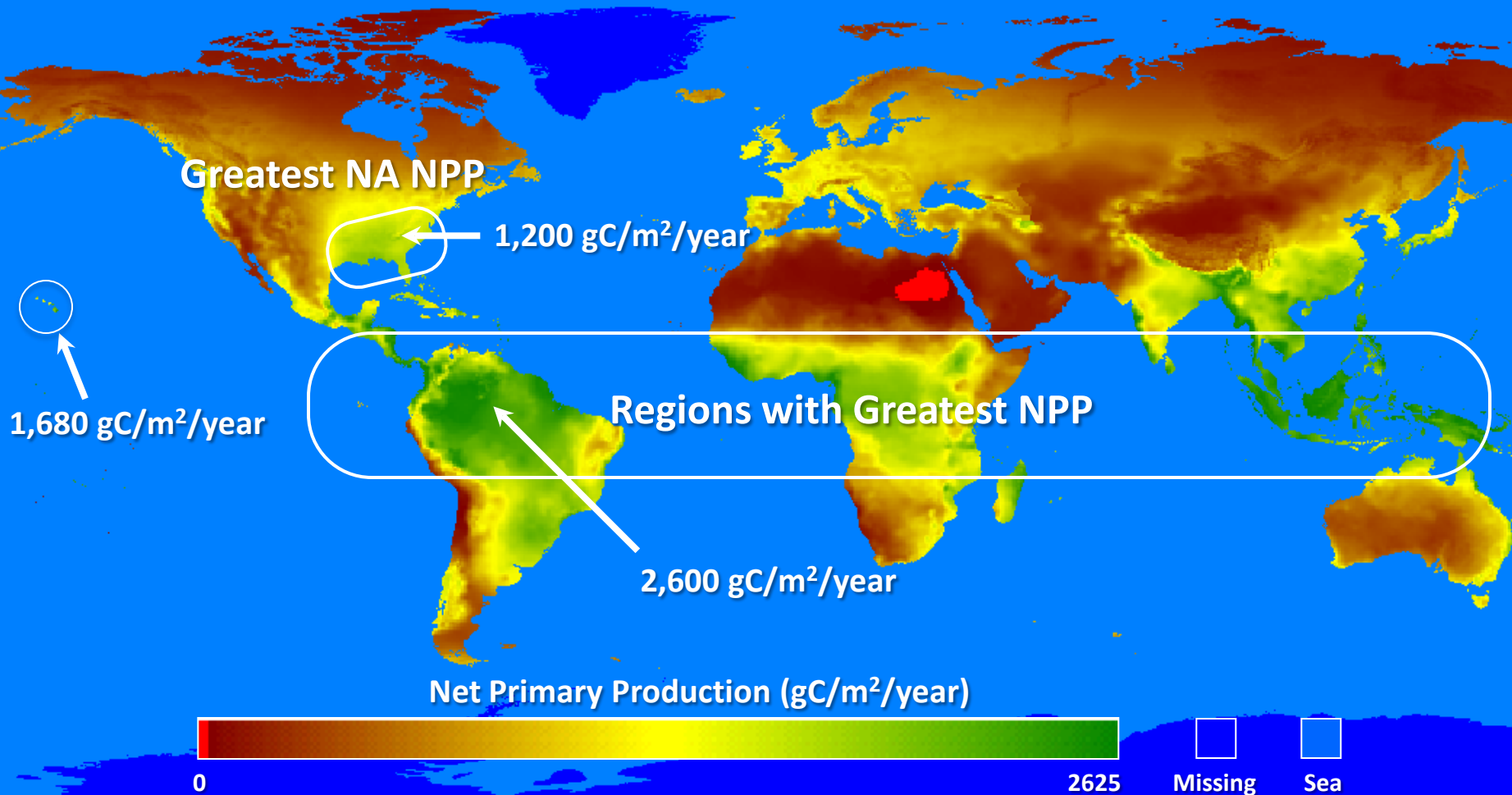
Biofuels Strategic Production Report – A USDA Roadmap to Meeting the Biofuels Goals of the Renewable Fuels Standard by 2022, June 23, 2010

Much is Expected from Rural Lands

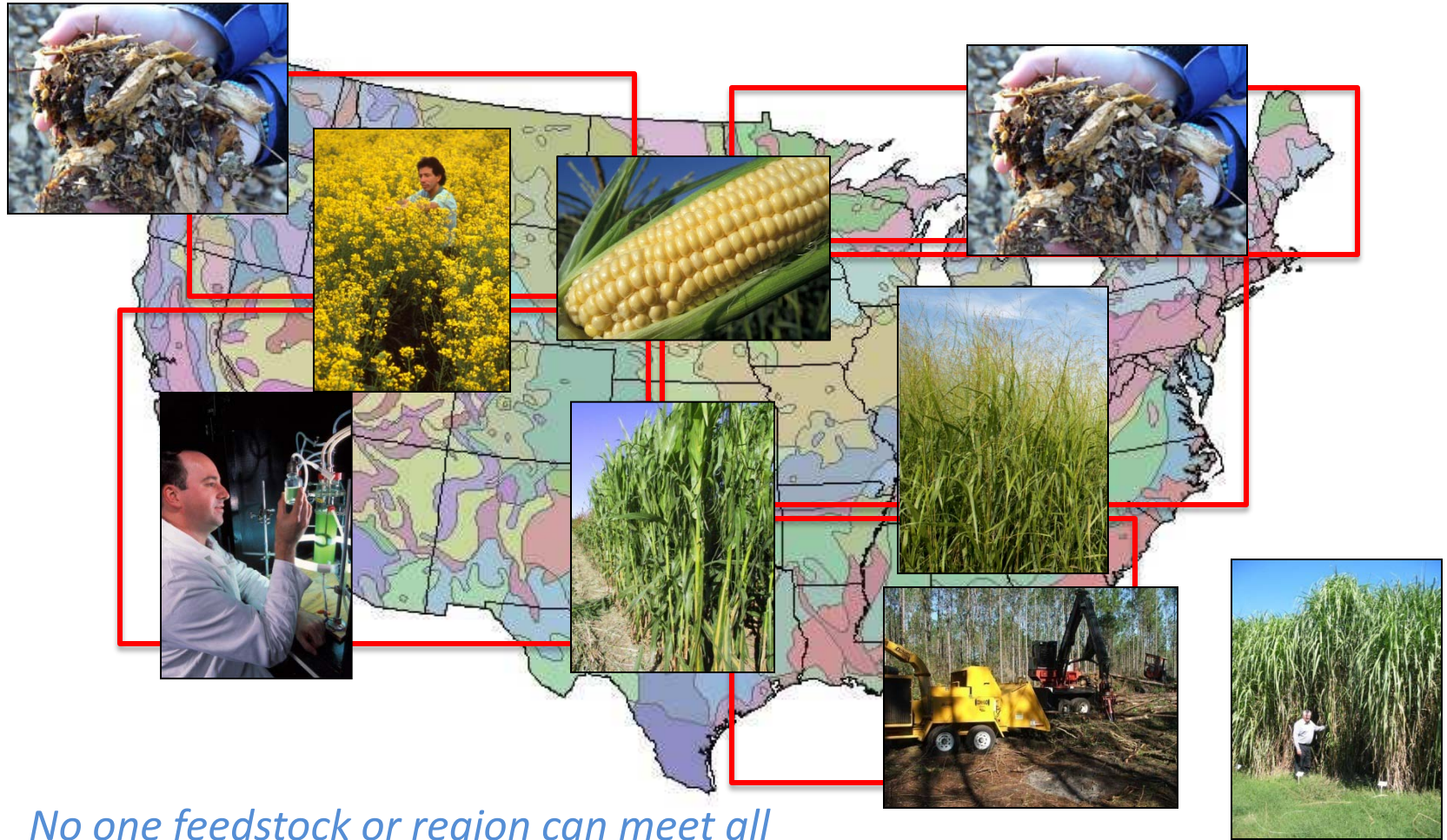
- Ecosystem services: water, air, wildlife habitat & C-sequestration
- Income derived from farms and forests that supports rural communities
- High quality, nutritious, and safe food products
- New bio-based consumer products, including bioenergy



Natural Biophysical Limitations



Regionally Adapted Bioenergy Feedstocks



No one feedstock or region can meet all of the nation's needs

Not All Feedstocks Are Equal

Energy Crop	Ethanol yield	Drop-in fuel yield
	gallons/acre	gallons/acre
Energy cane	1900	950
Woody biomass	1040	520
Perennial grasses	480	240
Biomass sorghum	480	240
Corn grain starch	430	215
Oil seed crops	0	70
Algae oil	0	1,000-100,000*

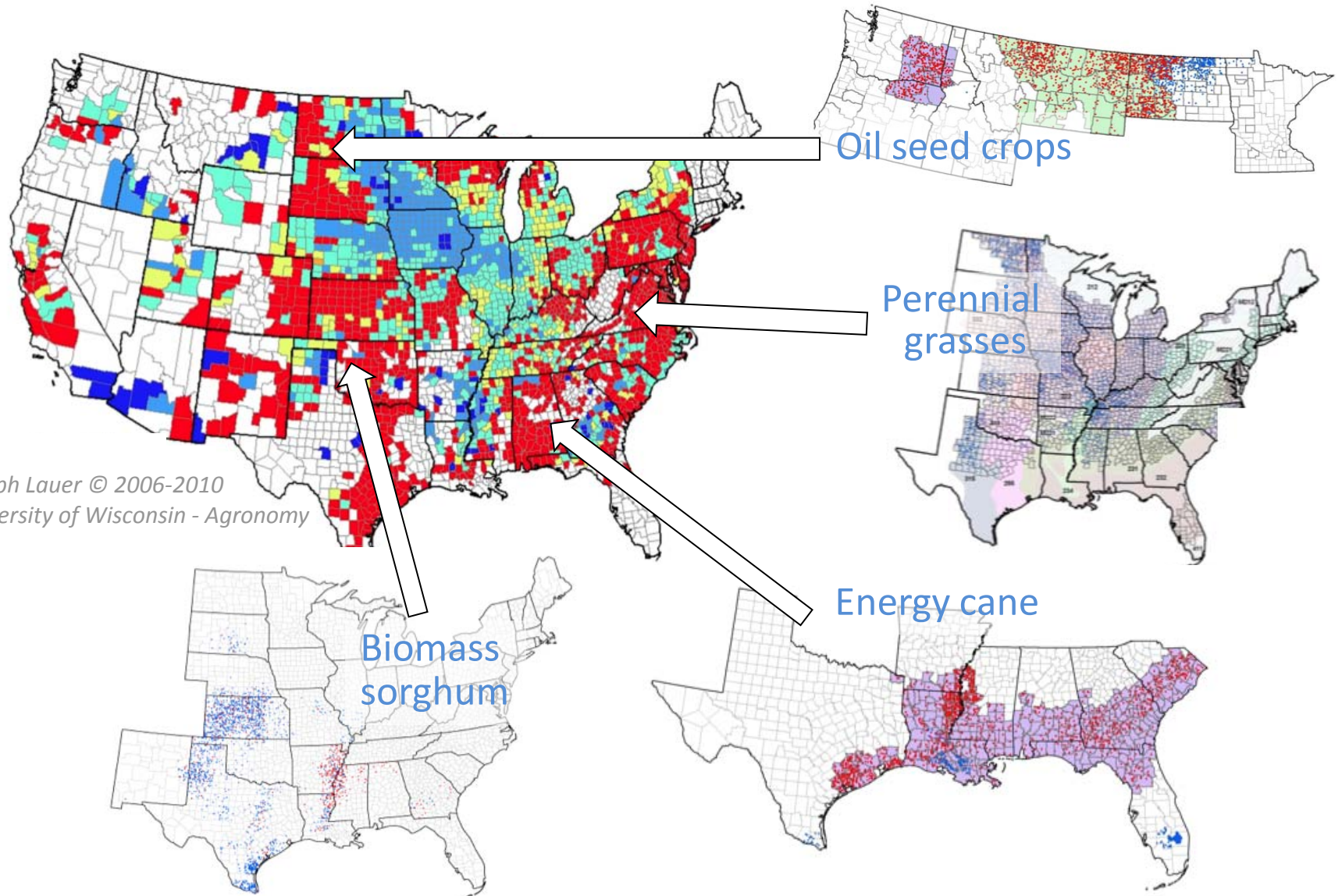
** Algae yields have not been demonstrated at scale*

ARS Science for Sustainable Biofuels

Integrating Bioenergy into Existing Agricultural-based Systems



Integrating Different Feedstocks into Existing Systems



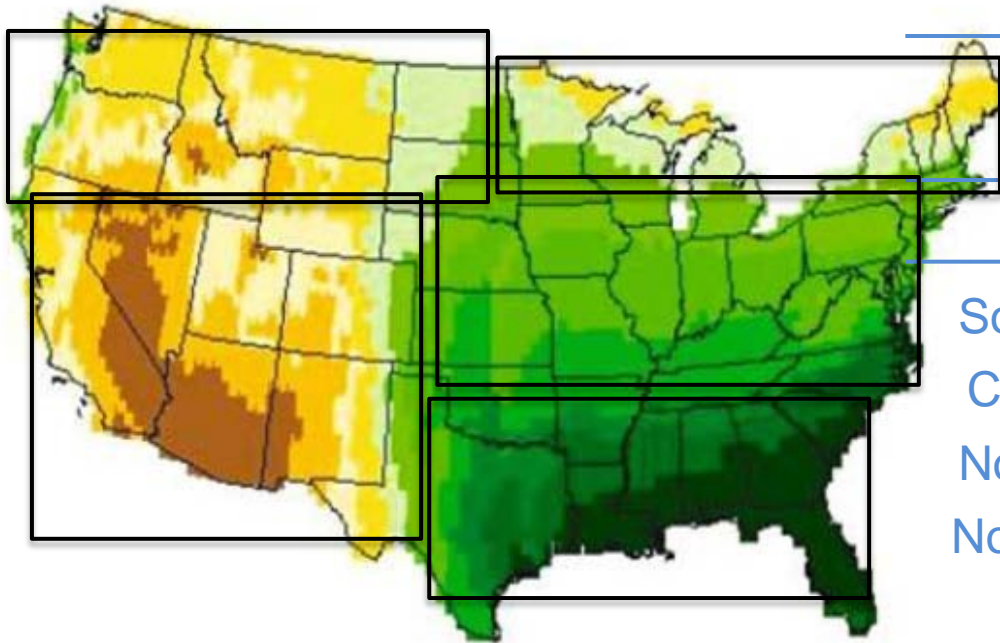
Joseph Lauer © 2006-2010
University of Wisconsin - Agronomy

Achieving the RFS2 Biofuels Mandate

Energy Crop	Annual biofuel production	Needed new area
	billion gallons	million acres
Dedicated biomass crops	13.4	21.2
Woody biomass	2.8	10.8
Oil seed	0.5	6.8
Crop residues	4.3	-
Corn grain starch	15.0	-
Total	36.0	38.8

Represents 0.2-12% of total regional crop and pastureland production areas

Achieving the Next 21 Billion Gallons



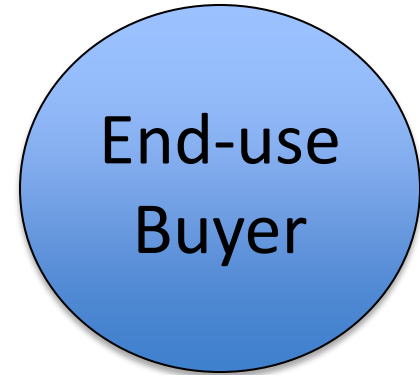
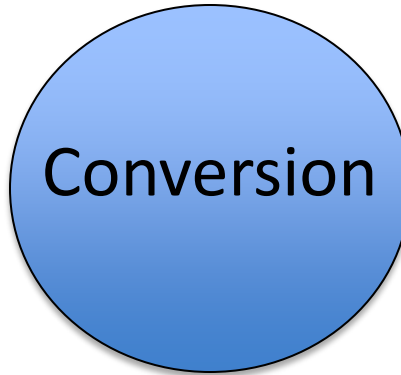
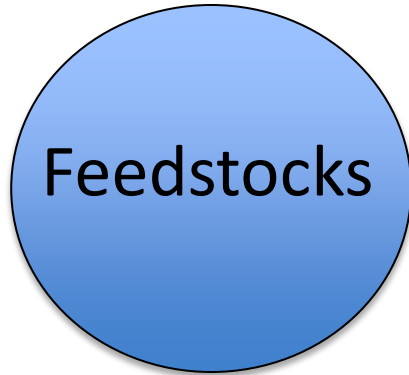
Region	Potential capacity Billion gallons	National contribution %
Southeastern	10.4	49.8
Central-East	9.1	43.3
Northwestern	1.0	4.6
Northern-East	0.4	2.0
Western	0.1	0.3

Net Primary Production (g Carbon/m²/yr)



Growing America's Fuels Strategy

A complete supply chain systems approach



A whole-government effort to accelerate commercial development of advanced biofuels

*USDA & DOE
research & grant
programs*

*USDA
conservation
programs*

*USDA biomass &
risk assistance
programs*

*DoD & DOE
research programs*

*USDA & DOE
commercial
programs*

*Fuel
purchase
guarantees*

Enabling An Energy Transformation Through Drop-In Alternative Fuels

Jeffrey J. Steiner

301-504-4644

jeffrey.steiner@ars.usda.gov

USDA Regional Biomass Research Centers

To accelerate the establishment of a commercial advanced biofuels industry

