Defining Climate-Smart Agriculture

Kerri Steenwerth, USDA Agricultural Research Service

With special thanks to Chris Swanston, USDA Forest Service

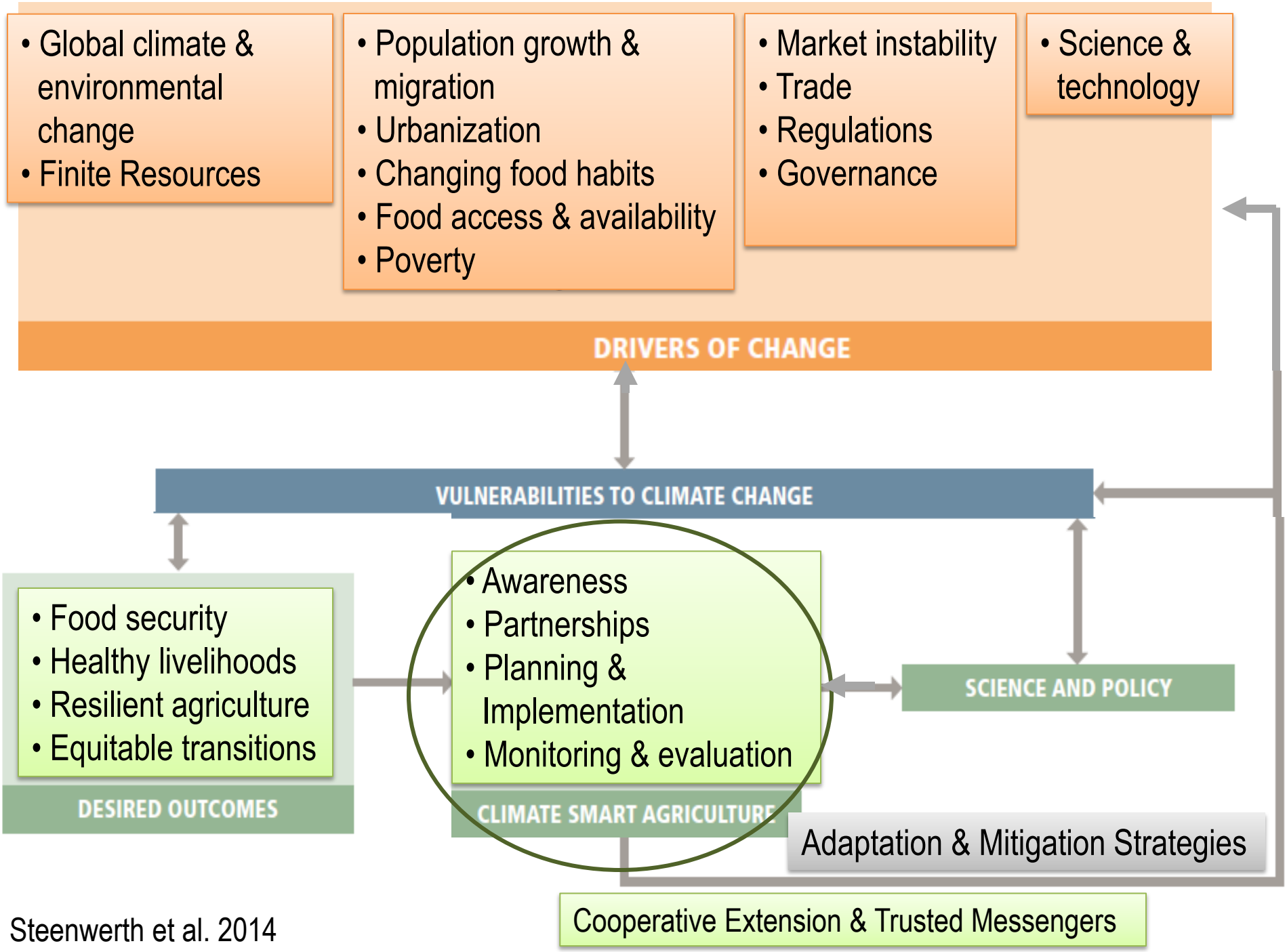

Rangeland
Fisheries
Livestock
Forestry
Photos: USDA FS, NRCS, ARS

Climate-Smart Agriculture

- Meet the growing demand for food, fiber and fuel, despite the changing climate and fewer opportunities for agricultural expansion onto additional lands
- Contribute to economic development, poverty reduction and food security
- Maintain and enhance productivity and resilience of natural and agricultural ecosystem functions, thus building natural capital
- Develop adaptation and mitigation approaches
- Reduce tradeoffs encountered in the pursuit of these goals

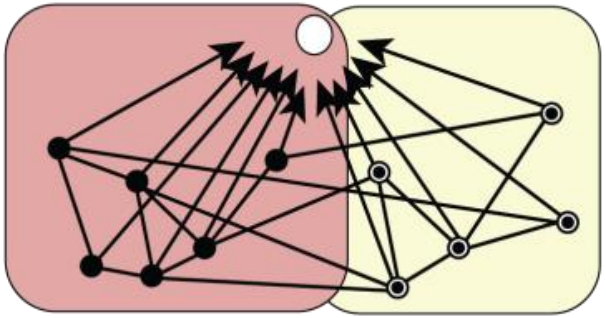
Science-based actions are part of Climate-Smart Agriculture's transdisciplinary approach

Steenwerth et al. 2014



Steenwerth et al. 2014

CSA needs a transdisciplinary approach.



Transdisciplinary

- Crosses disciplinary and sectorial boundaries
- Common goal setting
- Develops integrated knowledge for science and society

Morton, L.W., S. Eigenbrode, and T. Martin. (under review) The Architecture of Adaptive Integration: Coordinated Agricultural Projects.

Convening | Translation | Collaboration | Mediation

Bringing
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Key to link science with action, develop knowledge networks, and form adaptive capacity

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Cash et al. 2006

Building blocks of CSA already exist

USDA-FS Northern Institute of Applied Climate Science (NIACS)

- Provides practical information, resources, and technical assistance related to forests and climate change
- Supports the integration of climate change information into natural resource management

--Thank you to Chris Swanston, USDA-FS, for sharing these slides. --

and 100+ partners…

Climate Change Response Framework

www.forestadaptation.org

Climate Change Resource Center

www.fs.usda.gov/ccrc

Addressing the Climate Uncertainty Paralysis

Programmatic adaptation to recurring feedback

- Climate change is too big and too complex
- Climate information is not specific and relevant enough
- Adaptation doesn't help accomplish landowner needs
- Lack of real-world examples
- Do not use 'Climate-Smart'; use 'Climate-Informed'

Forest Ownership

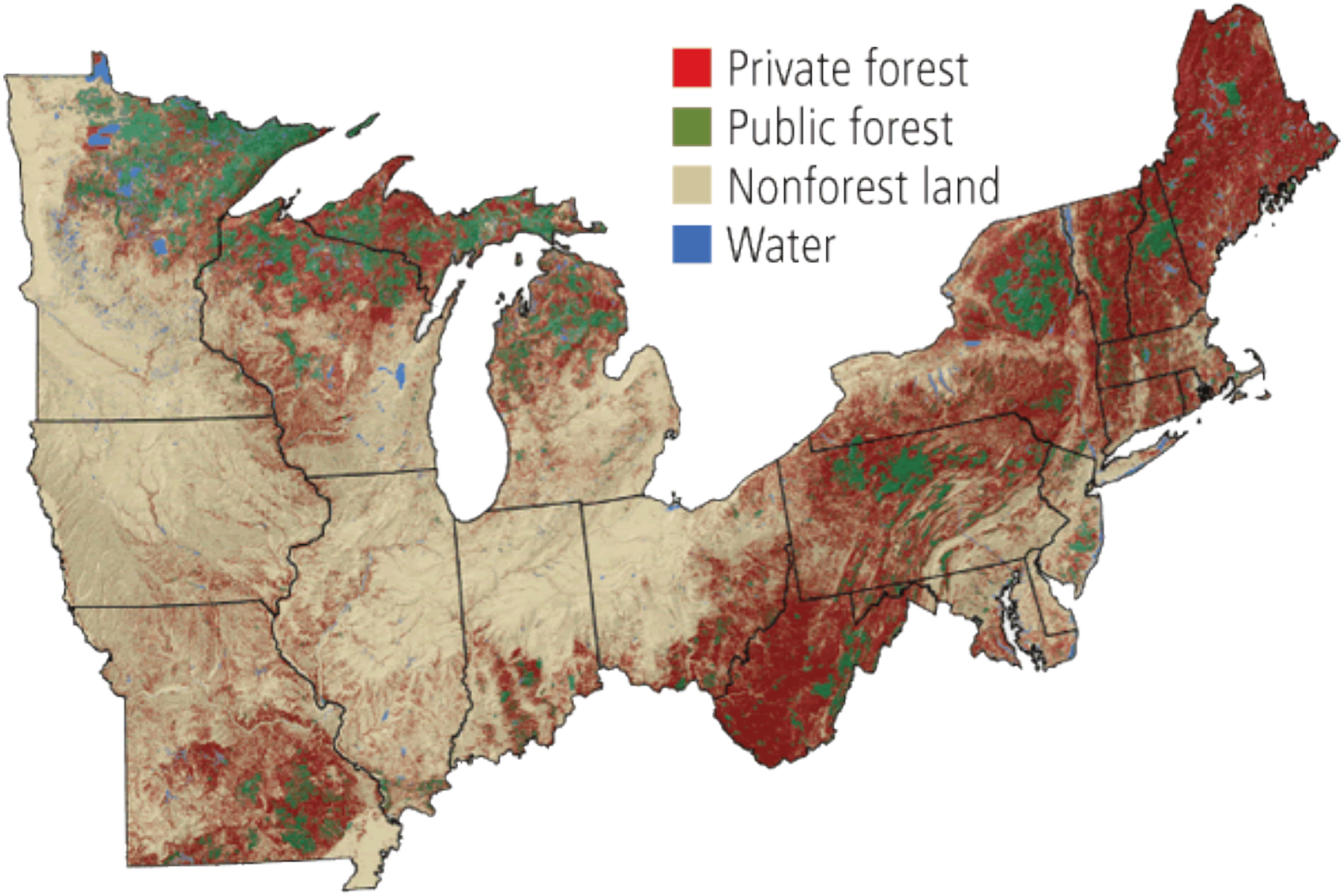
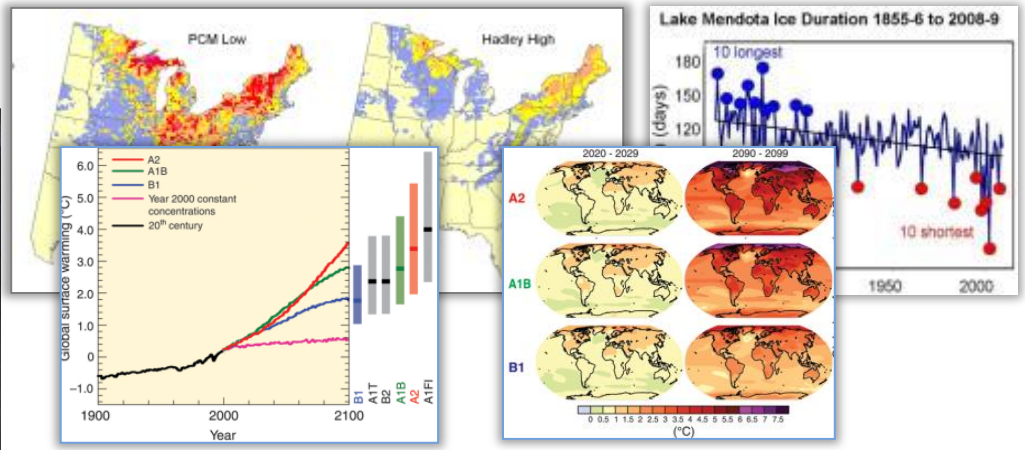
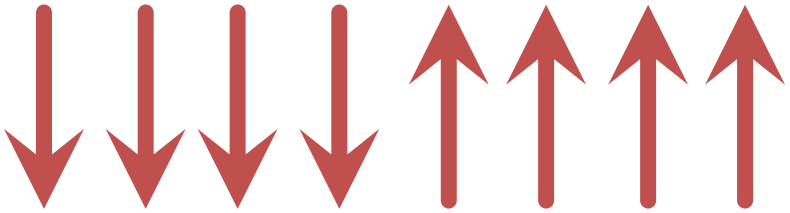


Figure: http://www.nrs.fs.fed.us/futures/current_conditions/biodiversity/

Forest Values

Applied Climate Science





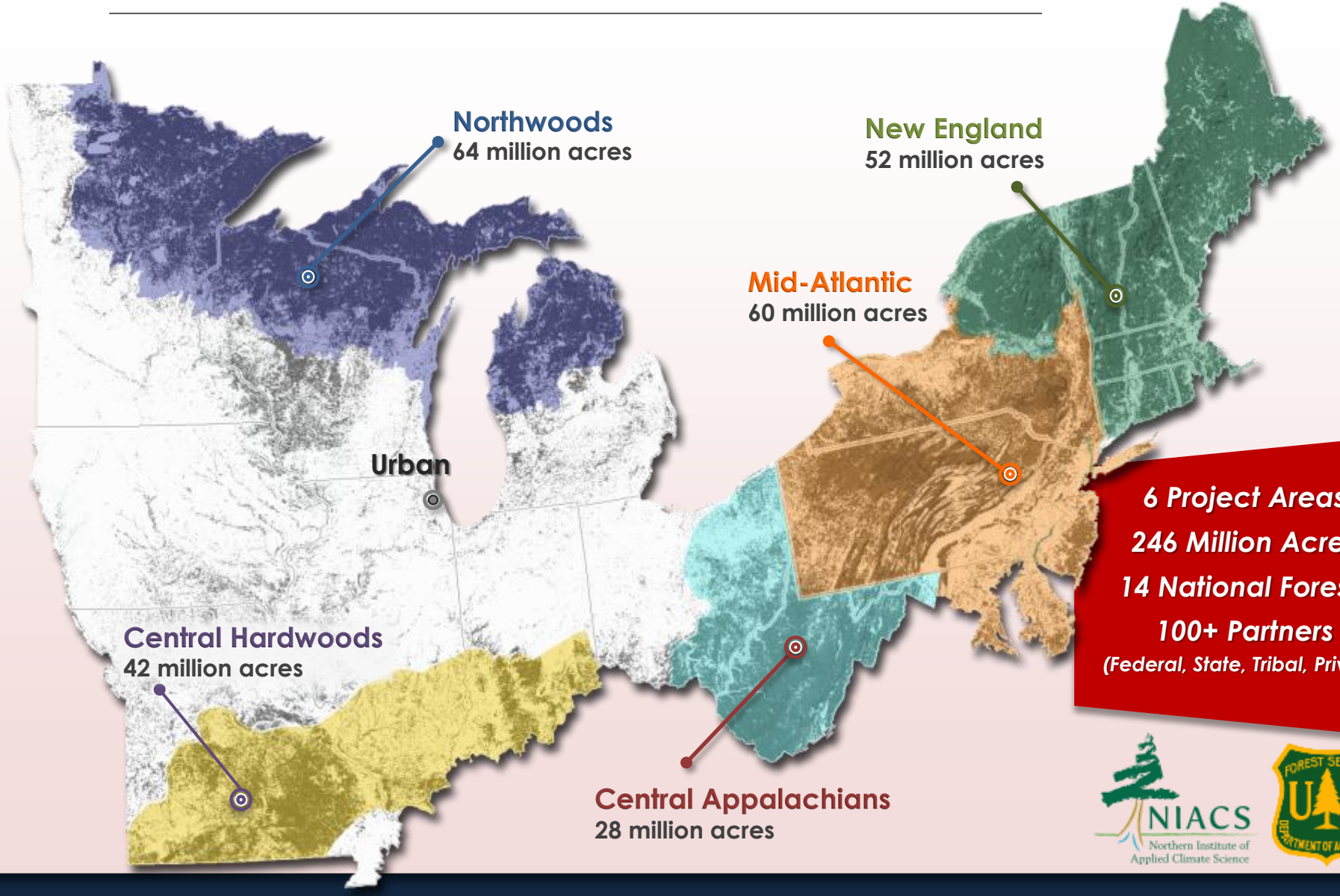
Climate Change Response Framework

* Structured, process oriented, works on multiple scales

* Identify location, ecosystems and time frame

Components:	Progress:
Partnerships	100+ partner organizations (and counting)
Vulnerability Assessment	5 published assessments, 1 in press, 2 in prep
Forest Adaptation Resources	Published in 2012, updated and online versions in prep
Adaptation Demonstrations	60+ demonstrations underway

CLIMATE CHANGE **RESPONSE** FRAMEWORK



Climate-Informed
Conservation and Forest Management

forestadaptation.org

Partnerships

Effective partnerships multiply capacity

- Federal agencies
- State agencies
- Conservation orgs.
  - TNC, TPL, conservancies, many others…
- Municipalities
- Universities
- Consulting foresters
- Private landowners

Vulnerability Assessment

Ensure relevance through user participation

Ecoregional Vulnerability Assessments

Audience: Land managers

Scope: Forest ecosystems

Vulnerability of:

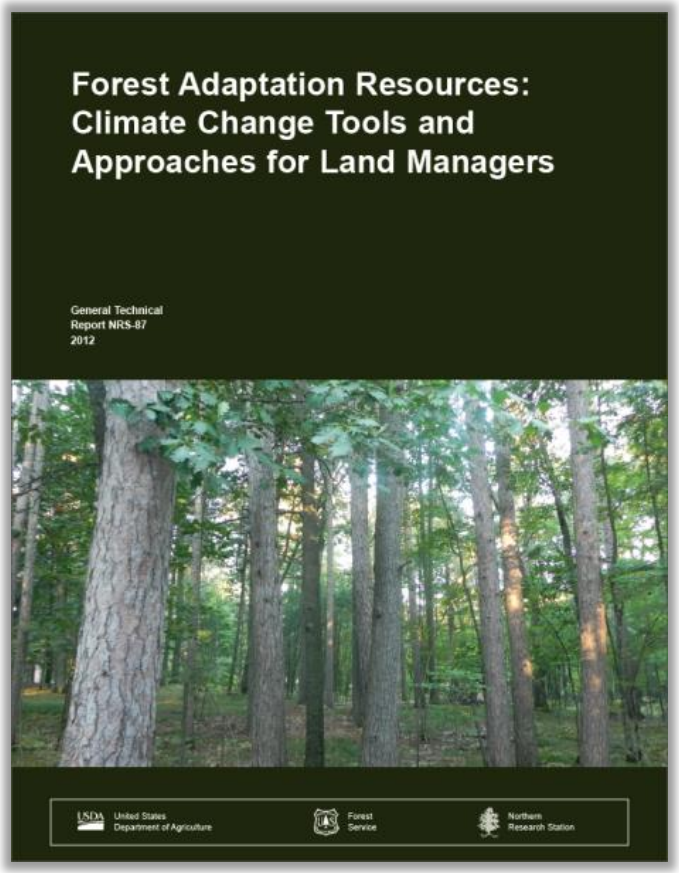
- Tree species
- Forest/natural communities

Place based, model-informed, expert-driven, transparent, incorporates local knowledge & values

Forest Adaptation Resources

Address diverse needs with menu and workbook

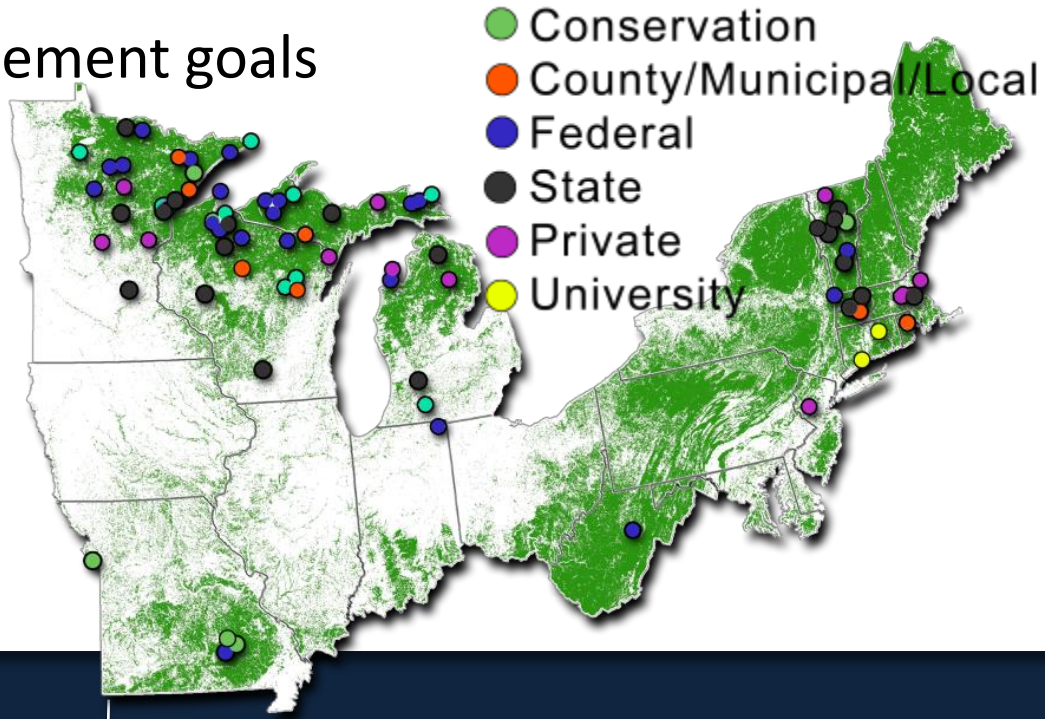
- Designed for a variety of land owners with **diverse goals and objectives**
- Tailored to **eastern forest types;** the first version is now in revision
- **Does not make recommendations**
- Menu of adaptation **strategies and approaches** for forest ecosystems
- Being **expanded** and developed into an **online workbook tool**!



Swanston and Janowiak 2012; www.treesearch.fs.fed.us/pubs/40543

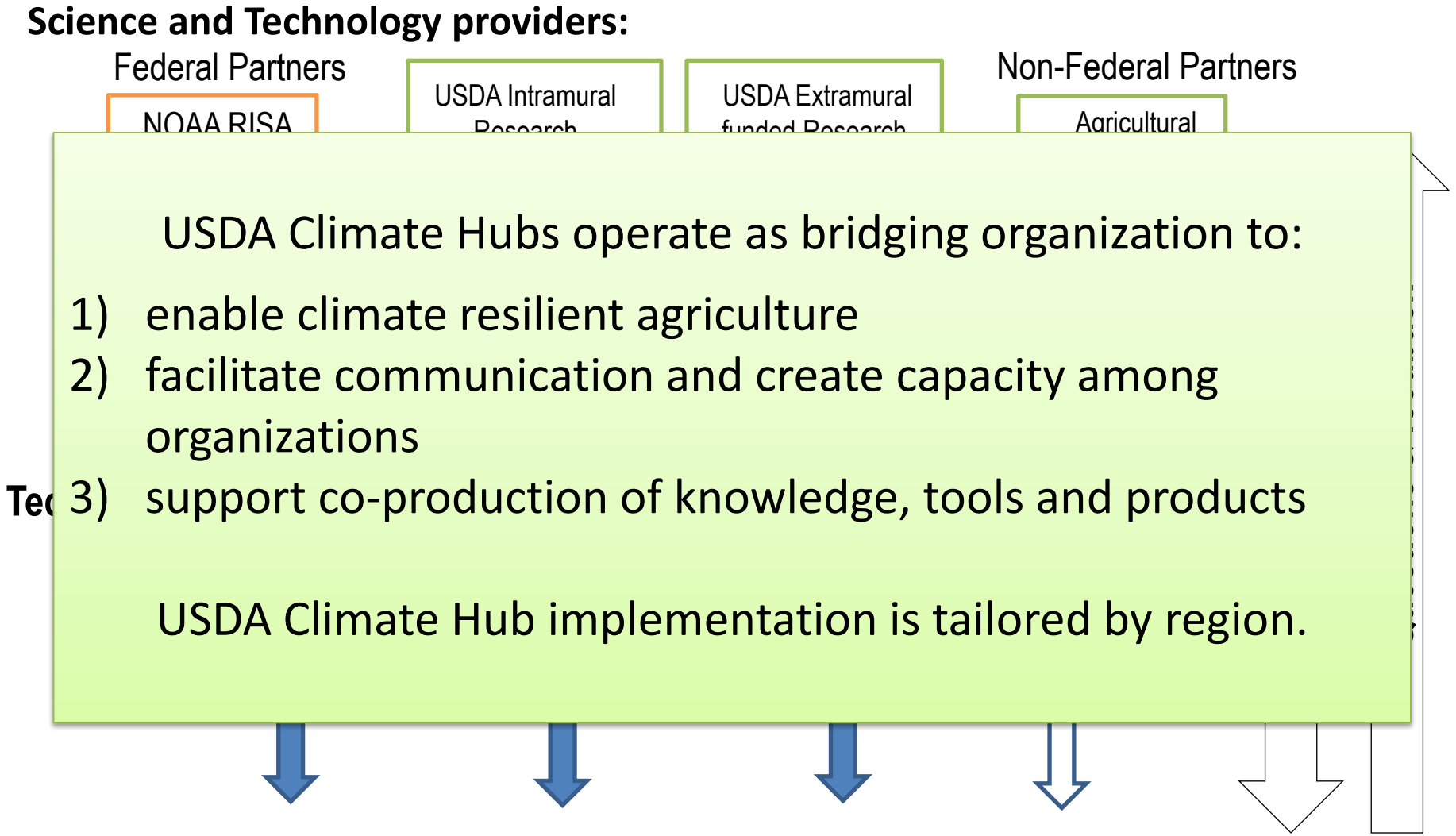
Adaptation Demonstrations

- Provide **real-world examples** of forest management activities that:
  - Enhance the ability of forests to cope with changing conditions
  - Achieve land owner management goals
- Foster **cross-ownership** dialogue and learning
- Illustrate **diverse goals** and approaches

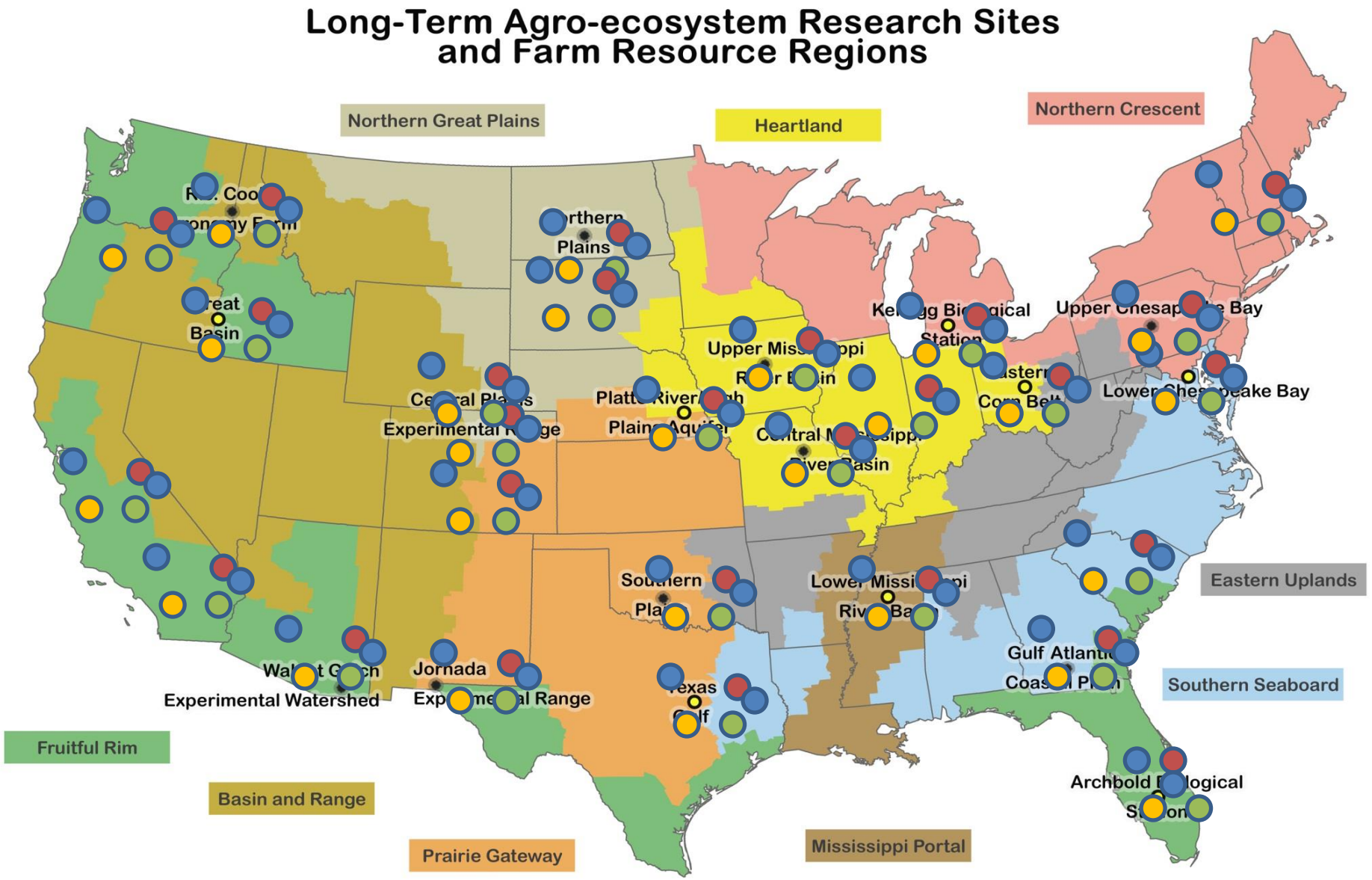


www.forestadaptation.org | *Click 'Demonstration Projects'*

USDA building blocks for CSA



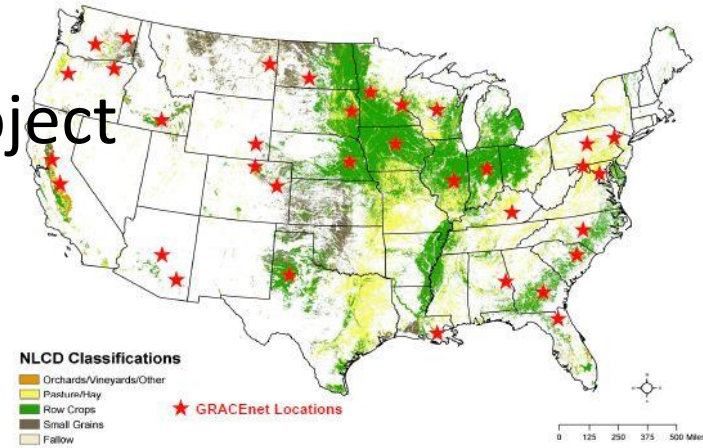
USDA building blocks for CSA



USDA building blocks for CSA

- ***GRACEnet***: Greenhouse gas Reduction through Agricultural Carbon Enhancement network, USDA-ARS
- ***REAP***: Renewable Energy Assessment Project, USDA-ARS
- ***COMET-FARM***: a whole farm and ranch carbon and greenhouse gas accounting system, USDA-NRCS & CSU
- ***AgMIP***: Agricultural Model Intercomparison & Improvement Project

"…links climate, crop, and economic modeling communities with cutting-edge information technology to produce improved crop and economic models and the next generation of climate impact projections for the agricultural sector."



These building blocks can inform…

Transdisciplinary Research for CSA

(1) models that include adaptation and transformation at either the farm or landscape level

(2) capacity approaches to examine multifunctional solutions for agronomic, ecological and socioeconomic challenges

(3) scenarios that are validated by direct evidence and metrics to support behaviors that foster resilience and natural capital

(4) reductions in the risk that can present formidable barriers for farmers during adoption of new technology and practices

(5) an understanding of how climate affects the rural labor force, land tenure and cultural integrity, and thus the stability of food production

Steenwerth and 24 other authors. 2014

FAO *Climate-Smart Agriculture Sourcebook*

Steenwerth and 24 other authors. 2014. *Climate-smart agriculture global research agenda: scientific basis for action.* agricultureandfoodsecurity.com/content/3/1/11

Global Science Conferences for Climate-Smart Agriculture: March 16-18, 2015 in Montpellier, FR

CGIAR Research program on Climate Change, Agriculture & Food Security (CCAFS)

--Thank you!--