Agriculture and Forestry in a Changing Climate

Adaptation Recommendations

April 17, 2013

Webinar Objectives

- Review 25x'25's Recent Work in Addressing Adaptation Challenges
- Recap What Science is Telling Us
- Share 25x'25's Adaptation Recommendations
- Review 25x'25's Adaptation Engagement Plan

Session Leaders

- **Ernie Shea** – 25x'25 Project Coordinator, Moderator
- **Fred Yoder** - Chairman of the Adaptation Work Group and Past President of the National Corn Growers Association
- **Gene Takle** - Iowa State Climate Science Program Director
- **Tom Richard**- Director, Penn State Institutes of Energy and the Environment and Professor of Agricultural and Biological Engineering
- **Ray Gaesser** - Iowa Grain Farmer and First Vice President of the American Soybean Association

Webinar Procedures

- Lines will be muted during presentations to minimize background noise
- For presenters and Q&A, un-mute by pressing *6
- Will take questions at the end of the presentations
- To ask a question, either press *6 to un-mute or use the comment feature to submit a written question

FRED YODER

Chairman of the Adaptation Work Group and Past President of the National Corn Growers Association

25x'25 Vision

"By 2025, America's farms, forests and ranches will provide 25 percent of the total energy consumed in the United States, while continuing to produce safe, abundant, and affordable food, feed, and fiber."

Adaptation Mission

"To explore the impacts of a changing climate on the agriculture and forestry sectors and make consensus-based recommendations on the best ways to mitigate negative outcomes and take advantage of new opportunities."

Progress to Date

1. Assembled a diverse work group to lead the project

Work Group Representation

Farmers

Ranchers

Foresters

Academia

Conservation

Industry

NATIONAL
CORN GROWERS
ASSOCIATION

Conserving Natural Resources for Our Future
National Association of
Conservation Districts

Farmers
Union

USDA

ASA
American Soybean
Association

National Association of Wheat Growers

OAK
RIDGE
National Laboratory

American Farmland Trust

The Nature
Conservancy

GILLS ONIONS

Farm
Foundation

IOWA STATE
UNIVERSITY

THE
OHIO
STATE
UNIVERSITY

NORTH CAROLINA STATE UNIVERSITY

Duke
NICHOLAS INSTITUTE
FOR ENVIRONMENTAL POLICY SOLUTIONS

THE PENNSYLVANIA STATE UNIVERSITY
1855

GEORGIA
FORESTRY
COMMISSION

SUSTAINABLE
CORN.ORG
CROPS, CLIMATE, CULTURE AND CHANGE

PINEMAP

Southeast
ClimateConsortium

dtn
The
PROGRESSIVE
FARMER.
A TELVENT Brand

RockTenn

pork

25x25
AMERICA'S
ENERGY FUTURE

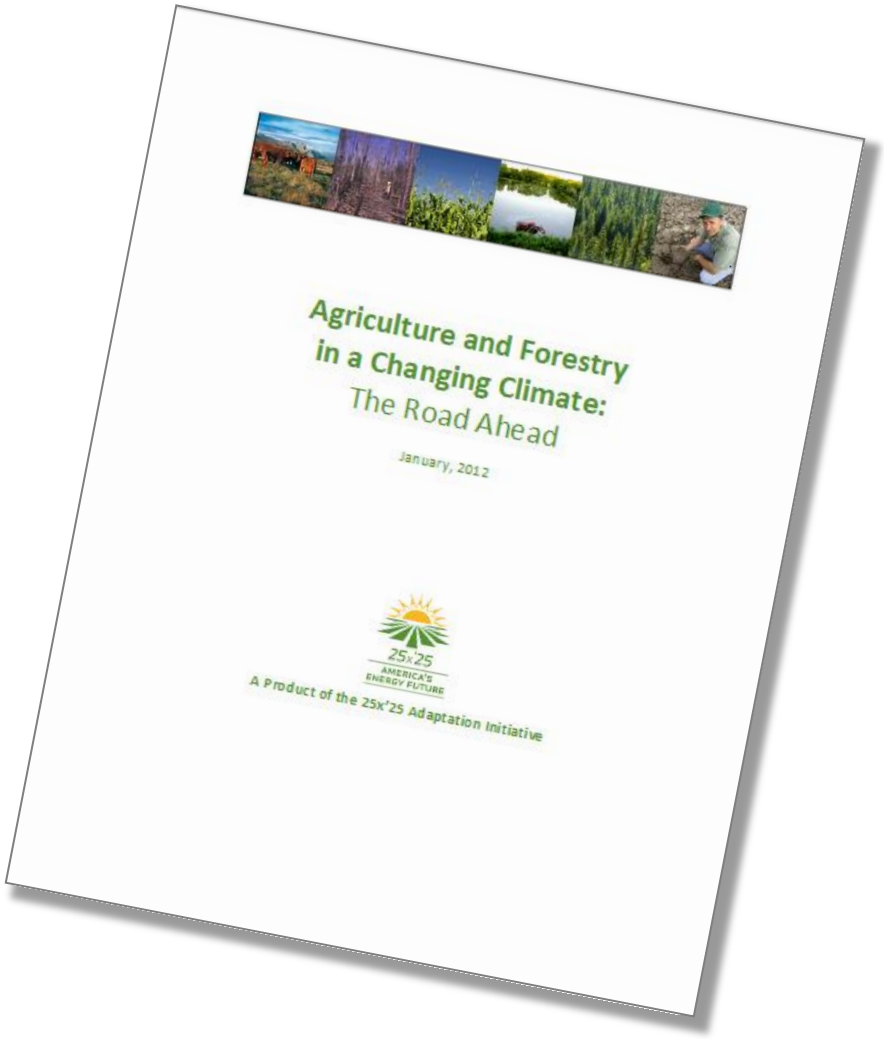
Progress to Date

1. Assembled a diverse work group to lead the project
2. Examined the anticipated changes and their potential impacts

Climate Impacts

Agriculture and Forestry in a Changing Climate: The Road Ahead

January 2012

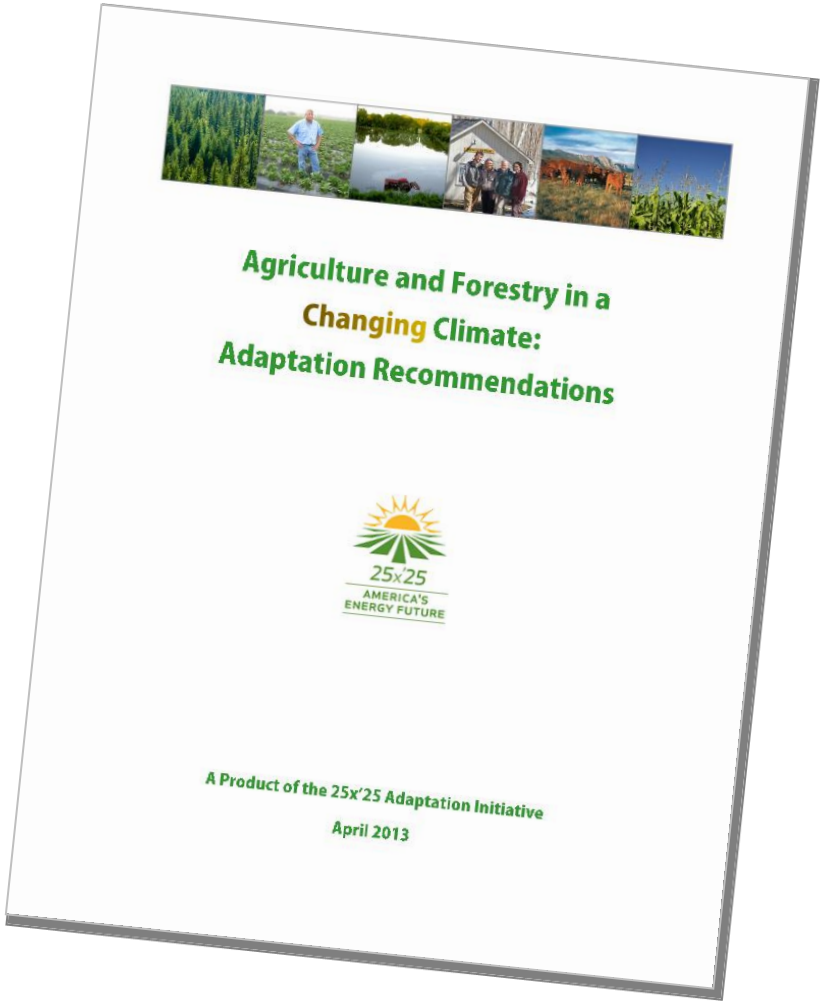


Progress to Date

1. Assembled a diverse work group to lead the project
2. Examined the anticipated changes and their potential impacts
3. Developed a series of recommendations to reduce negative outcomes and seize new opportunities

Adaptation Recommendations

Agriculture and Forestry in a Changing Climate: Adaptation Recommendations



Recommendation Targets

Producers

Policymakers

Agencies

Universities

Researchers

Business

Adaptation Strategies

1. Actions to increase *resistance* to changes in climate in order to maintain existing practices
2. Actions to improve *resilience* by investing in steps that preempt disasters and restore systems in the wake of them
3. Actions to *transform* operations

Recommendation Topics

Crops

Livestock

Pollinators

Pests

Invasives

Disease

Infrastructure

Water

Soil

Biodiversity

Insurance

Forecasting

IOWA STATE UNIVERSITY
Climate Science Program

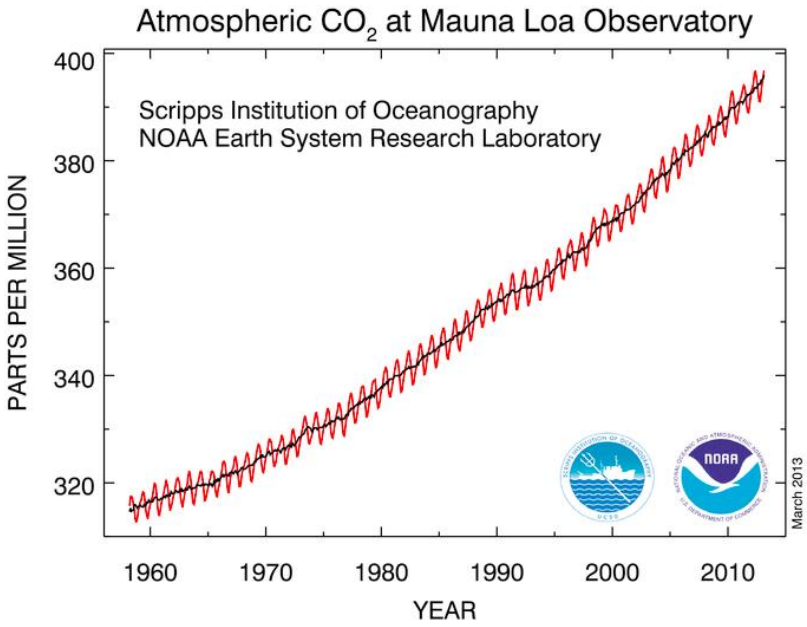
Climate Change of Importance to Agriculture:

What Does the Science Say?

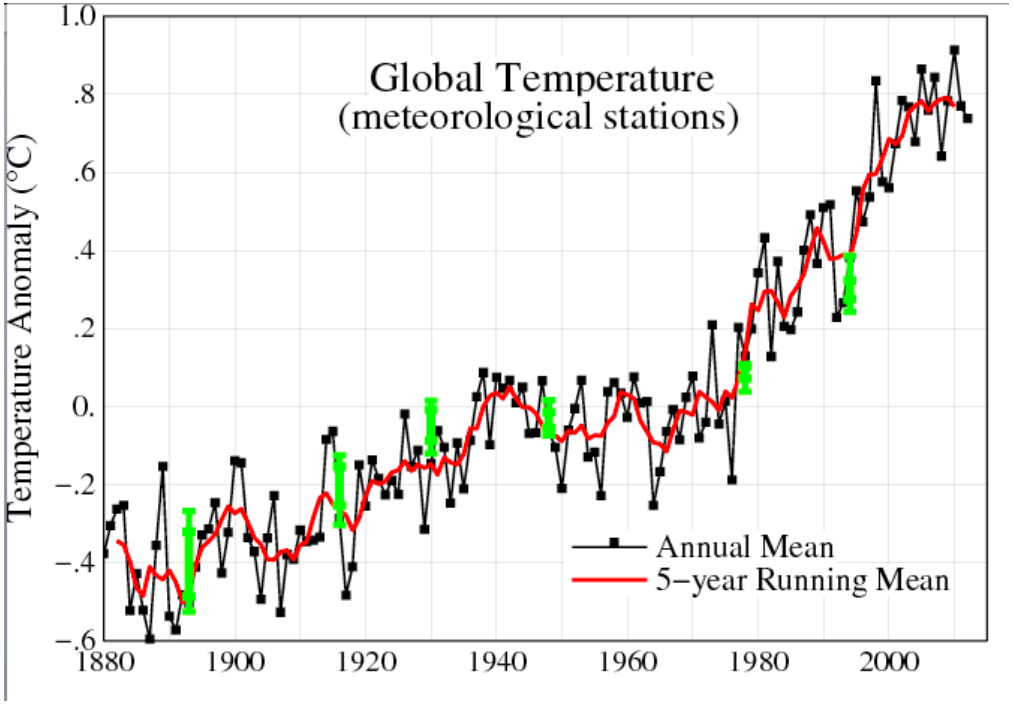
Eugene S. Takle
Professor
Department of Agronomy
Department of Geological and Atmospheric Science
Director, Climate Science Program
Iowa State University
Ames, IA 50011

25 x 25 Alliance
Media Presentation
2 April 2013

Global CO_2 and Mean Temperature



NOAA



NASA

Recent climate changes have been both favorable and unfavorable to agriculture

Lengthening of the growing season
- Higher yields of commodity crops

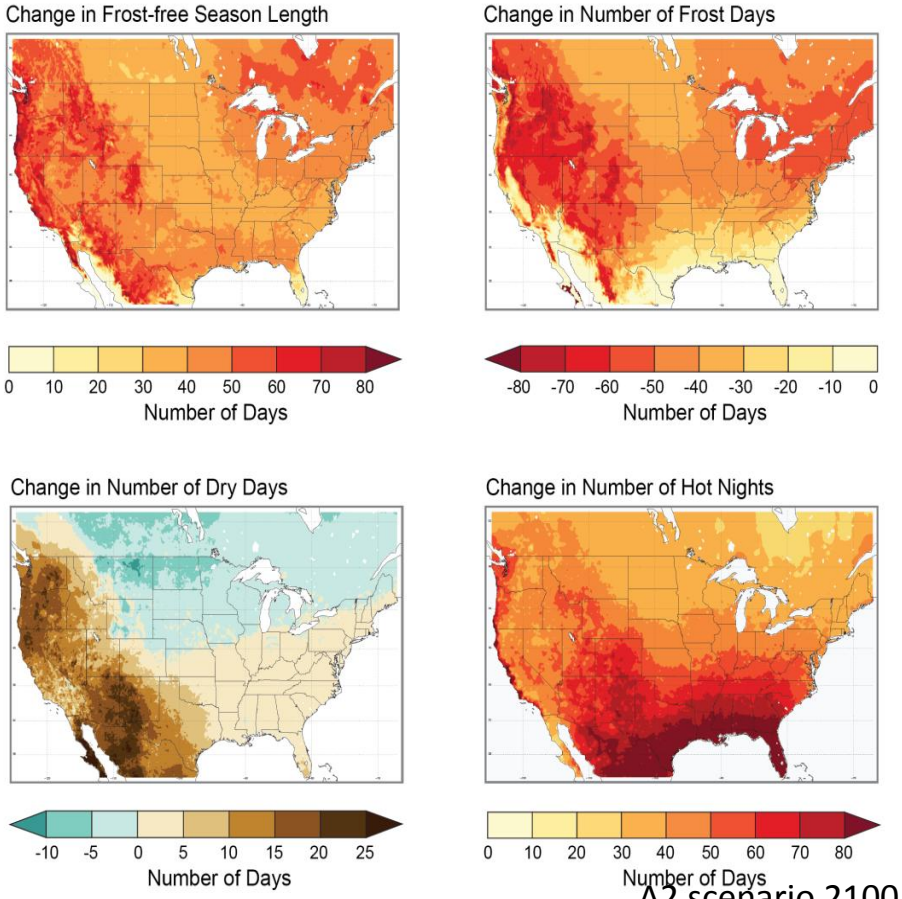
Reduction in number of frost days
- Reduced chilling hours for fruit crops in CA
- Reduced frost damage to some crops

Number of dry days
- increases in east, west and south
  - Increased moisture stress
  - Increased frequency/intensity of heat waves
- decreases in north
  - Fewer days for field work
  - More humidity, pests and pathogens

Increase in number of hot nights
- reduced grain weight
- reduced weight gain in meat animals

Future conditions will challenge agriculture's ability to adapt

Climate Variables Affecting Agriculture



A2 scenario 2100

National Climate Assessment draft Agriculture Chapter

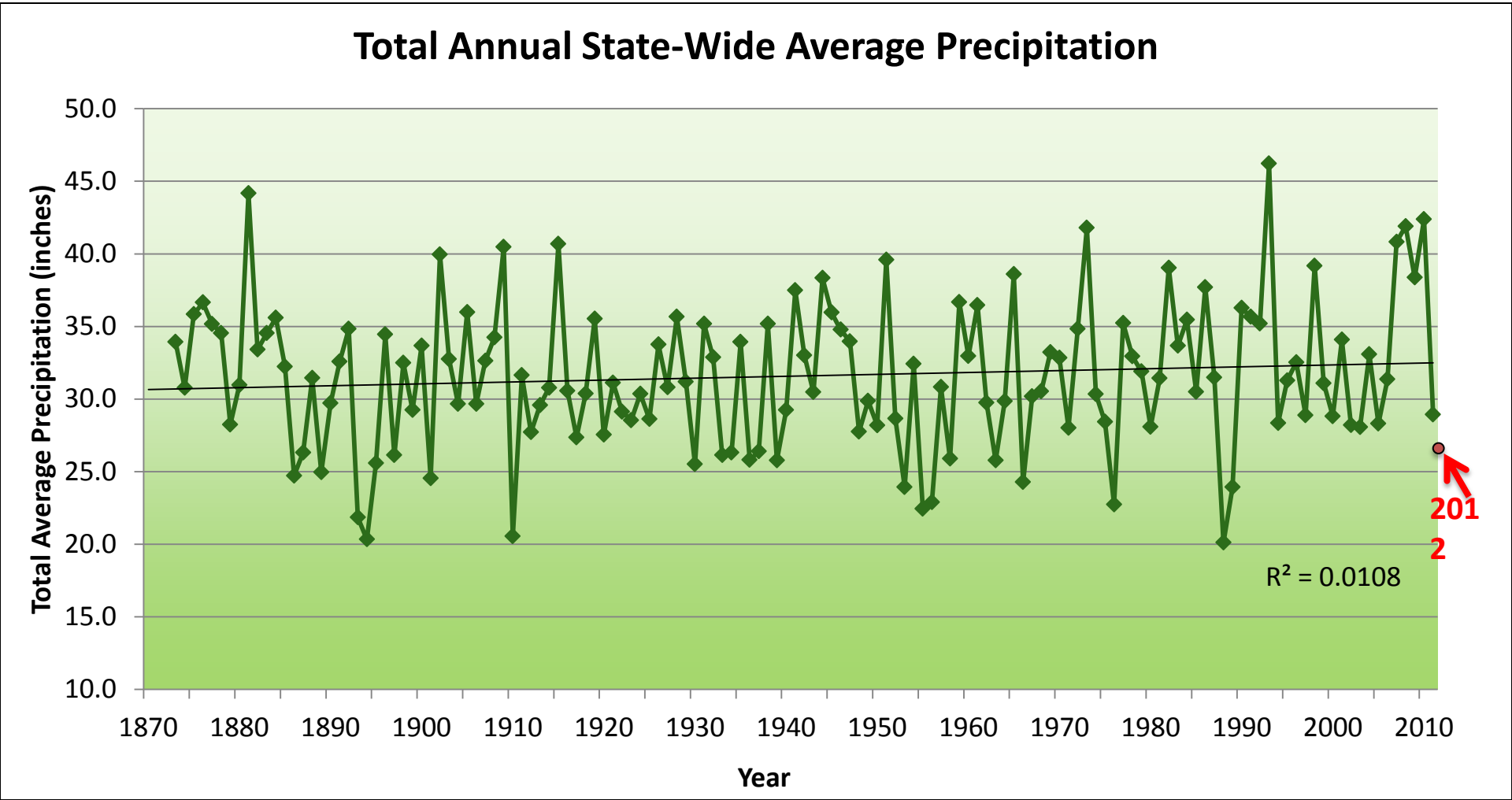
Key Messages from the National Climate Assessment Agriculture Chapter

Climate disruptions to agricultural production have increased in the recent past and are projected to increase further over the next 25 years. By mid-century and beyond, these impacts will be increasingly negative on most crops and livestock.

Agriculture has been able to adapt to recent changes in climate; however, increased innovation will be needed to ensure the rate of adaptation of agriculture and the associated socioeconomic system can keep pace with future climate change.

National Climate Assessment draft Agriculture Chapter

Iowa State-Wide Average Data



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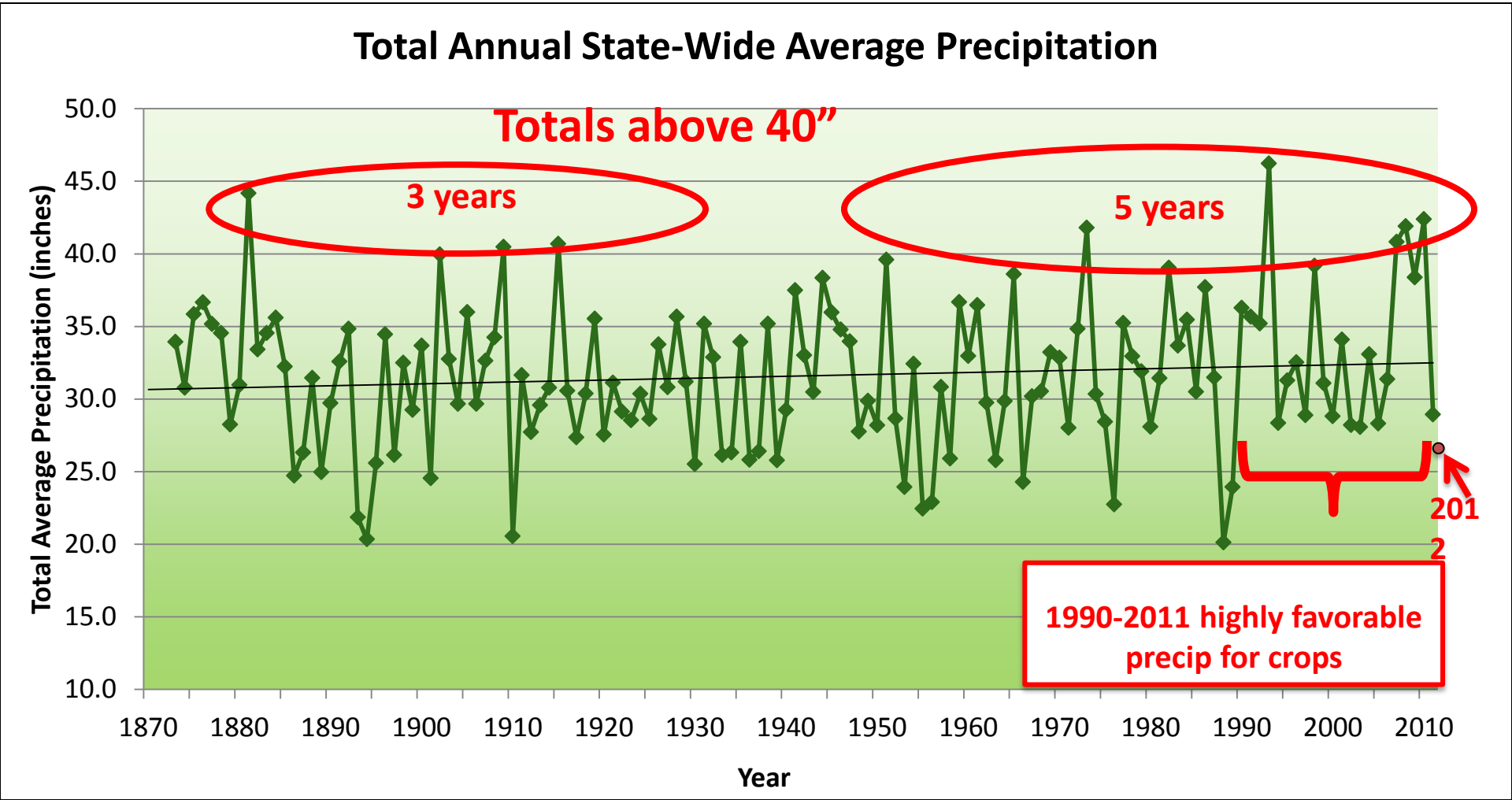

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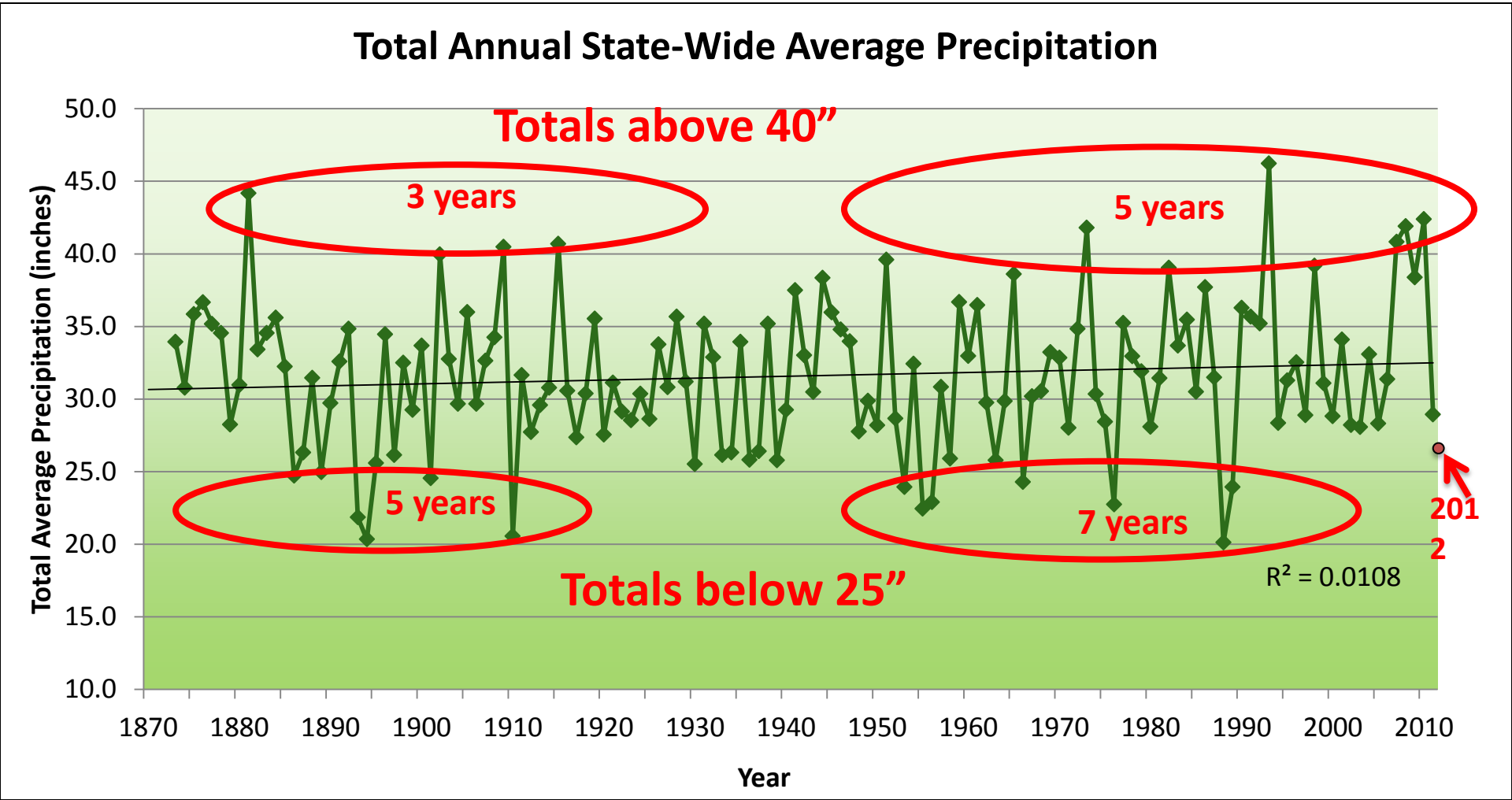
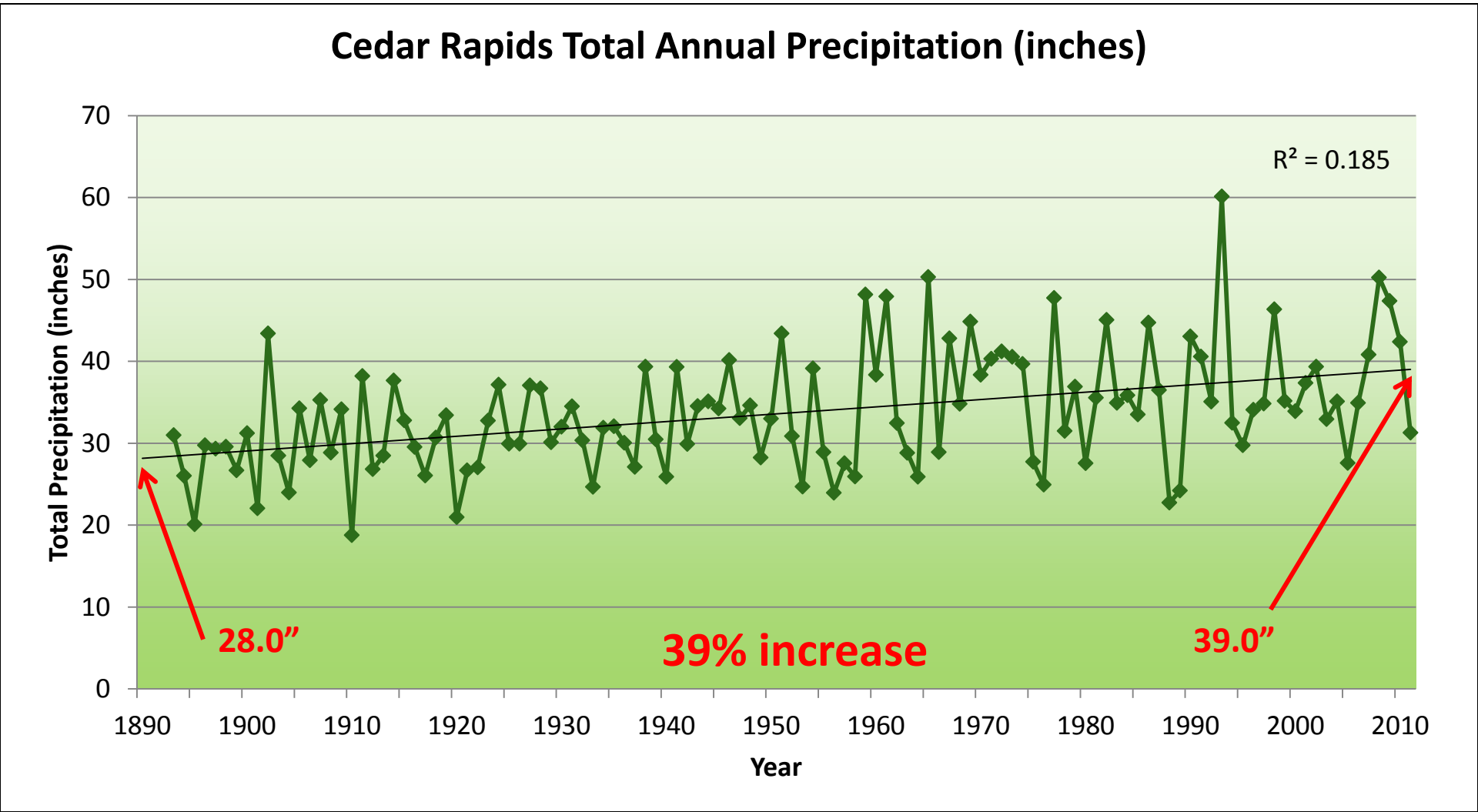


Cedar Rapids, Iowa Data



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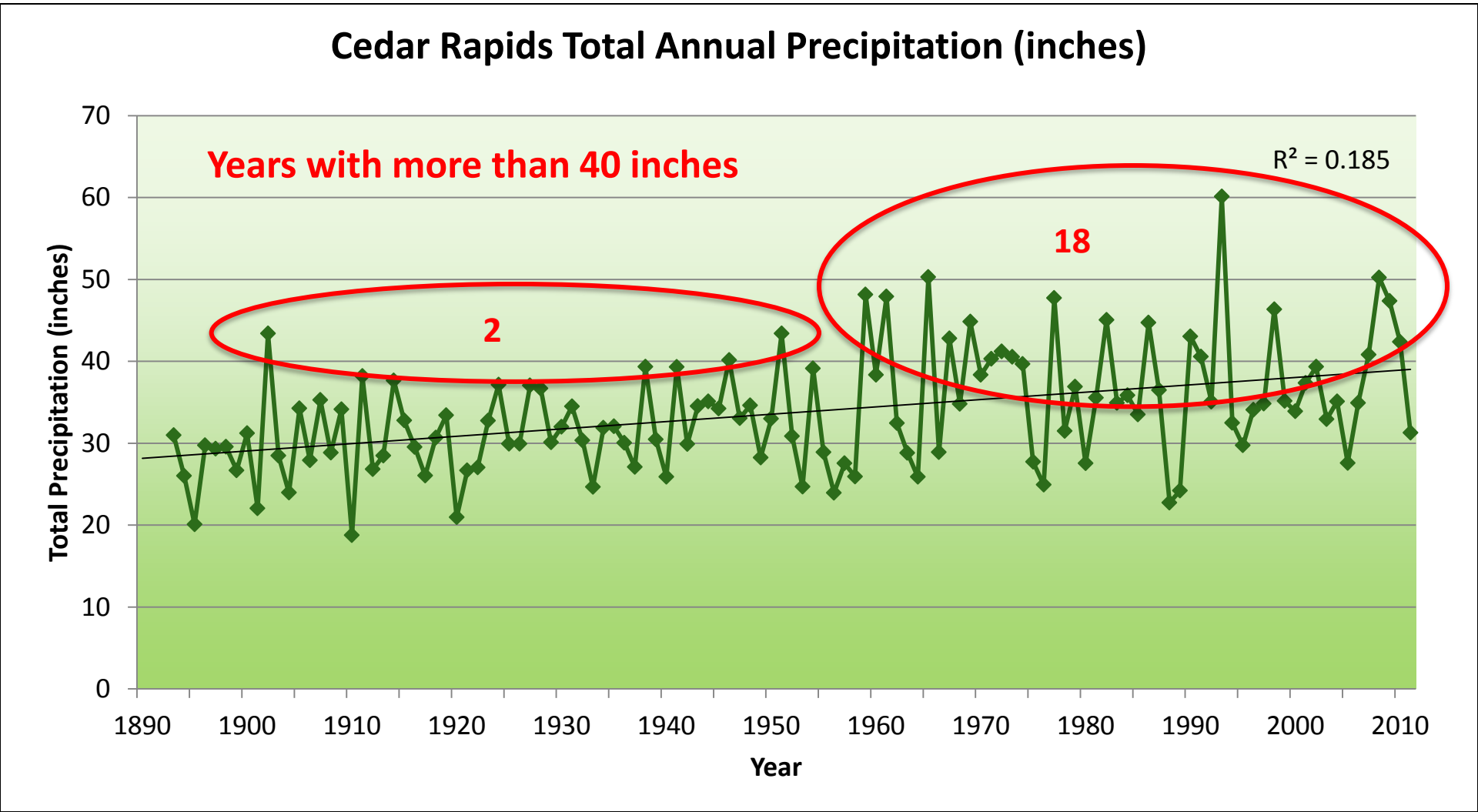

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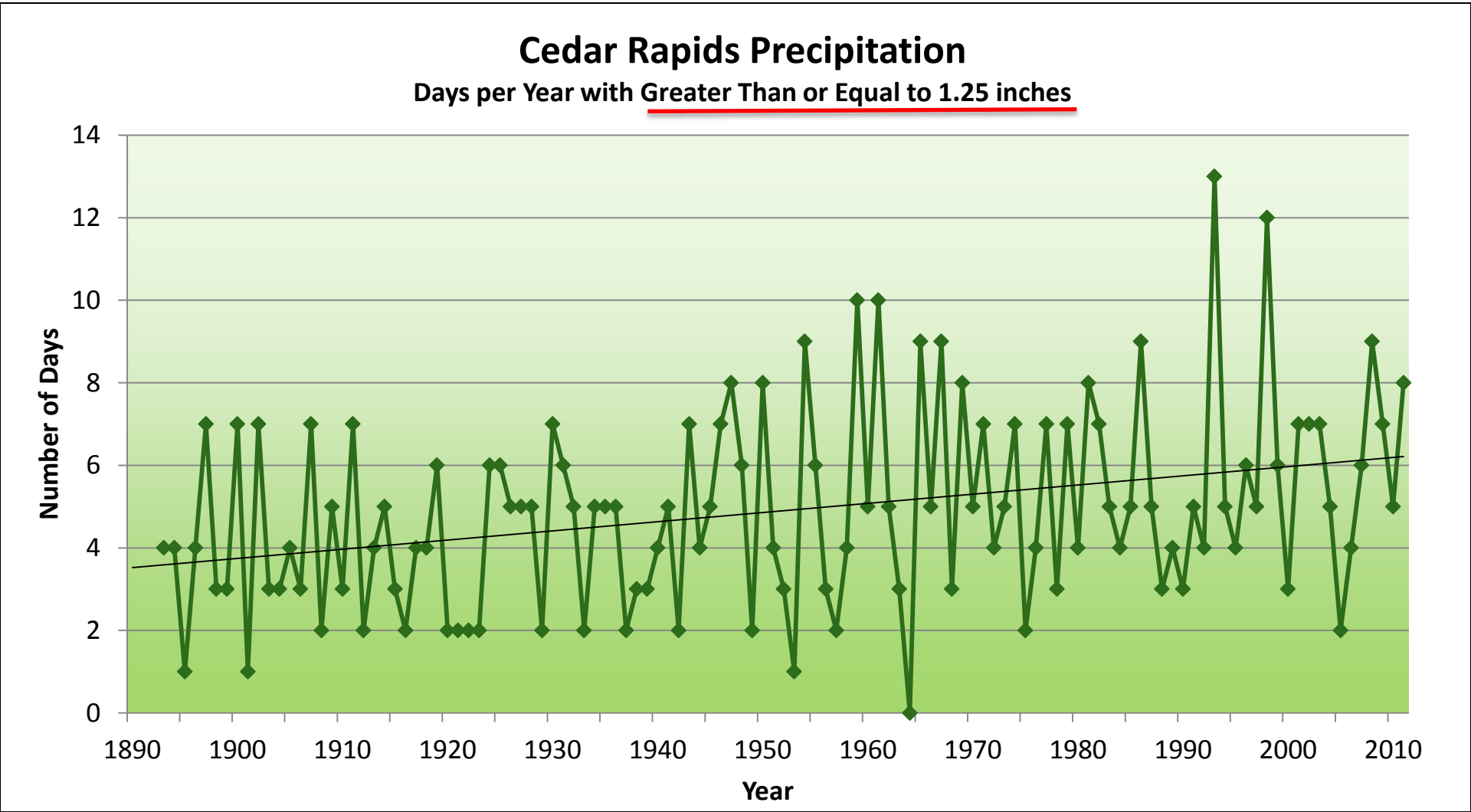

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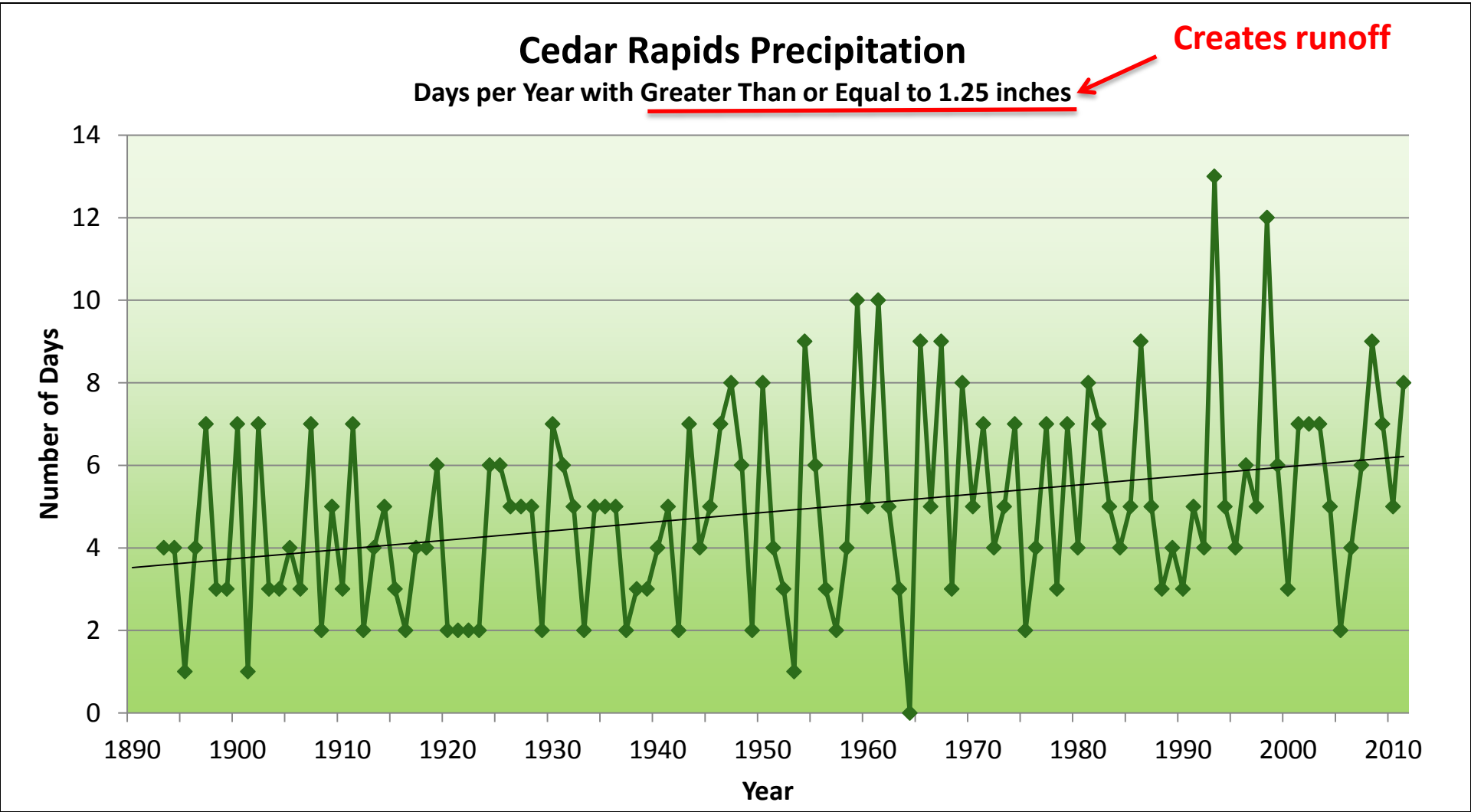

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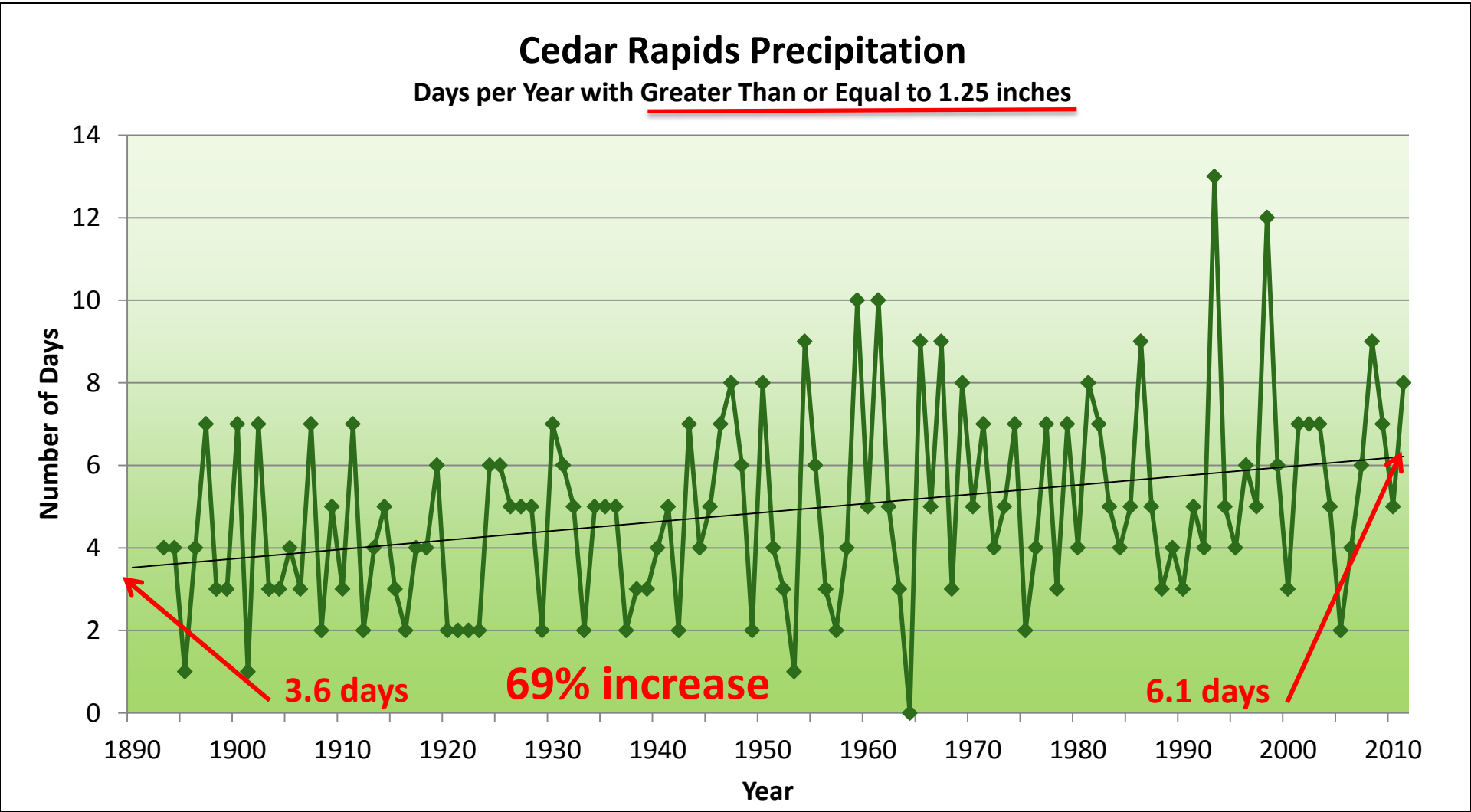

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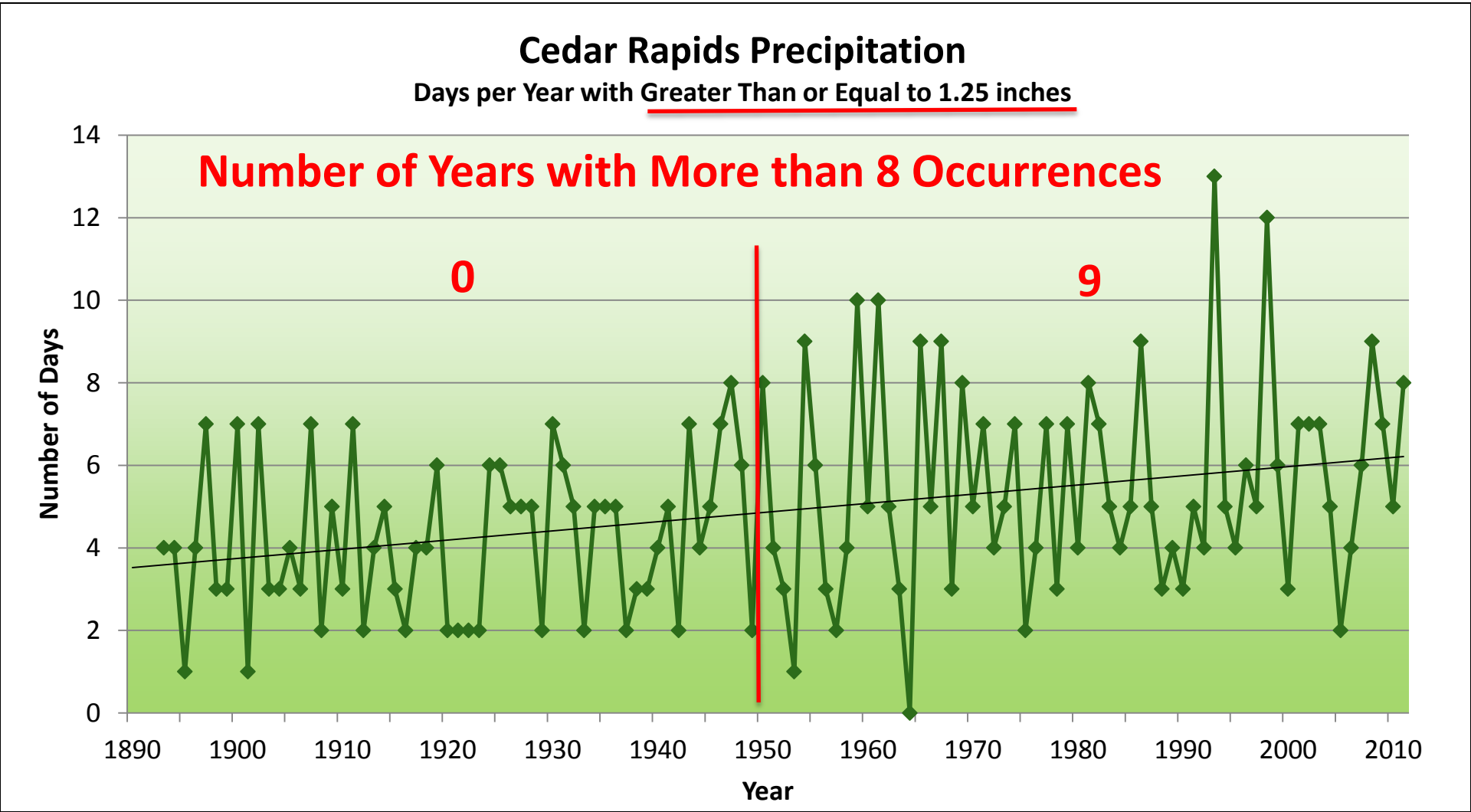
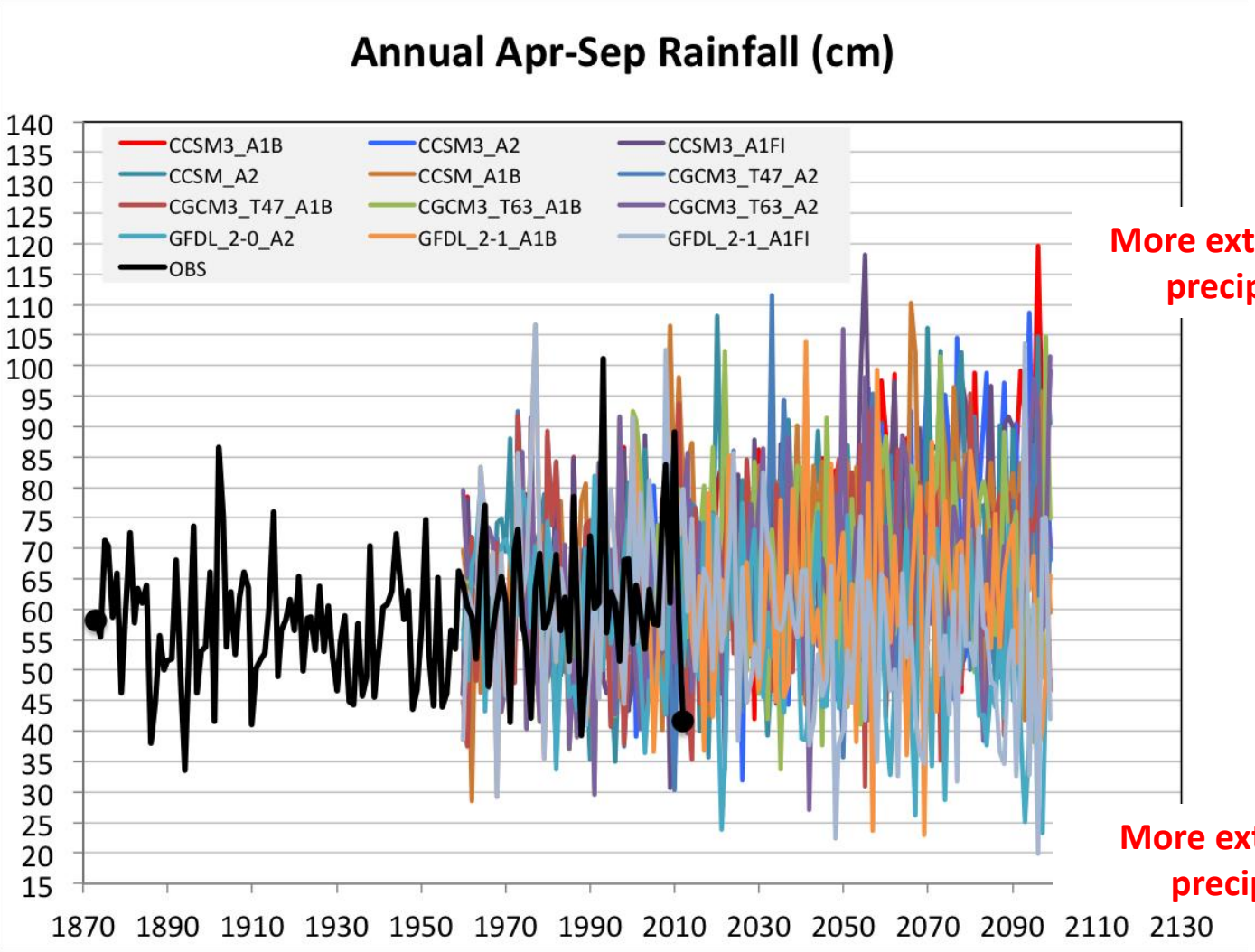


Projected Future Variability in Growing Season Precipitation for Iowa

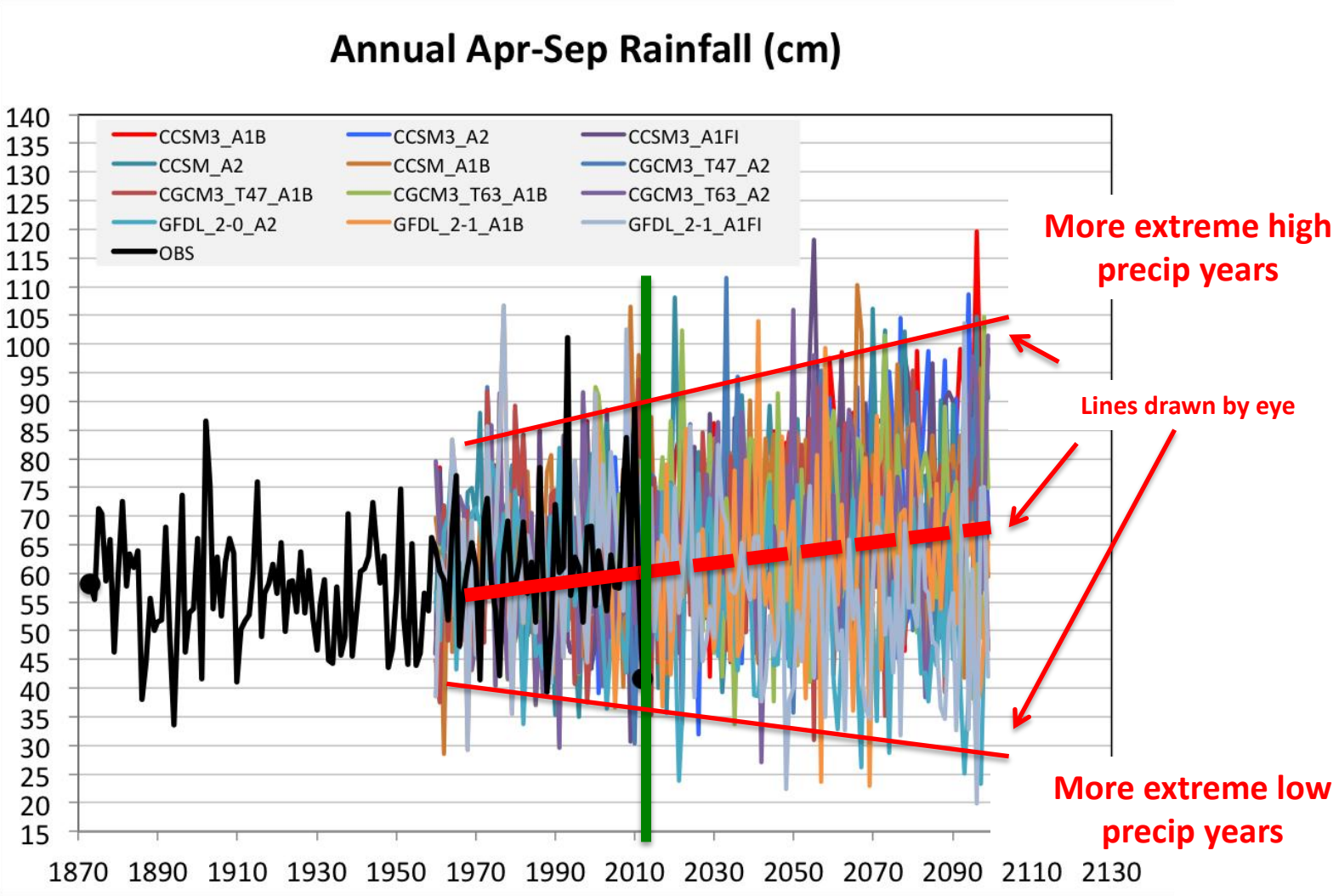


More extreme high precip years

More extreme low precip years

CJ Anderson, ISU

Future Variability in Growing Season Precipitation for Iowa



CJ Anderson, ISU

Sustaining agricultural production without depleting natural resources will become increasingly difficulty with increasing levels of climate change

For More Information:

Climate Science Program

Iowa State University

http://climate.engineering.iastate.edu/

http://www.meteor.iastate.edu/faculty/takle/

gstakle@iastate.edu

TOM RICHARD

Director of the Penn State Institutes of Energy and the Environment; Professor of Agricultural and Biological Engineering

Recommendation Areas

- Research
- Risk Management
- Decision-making Tools
- Production Systems & Practices
- Communications, Outreach, & Education

Research

1. Support research designed to create more accurate climate forecasting and scenarios.
2. Study the impact of anticipated changes on crops and animals.
3. Examine the economic, political, and social barriers to adaptation facing producers.
4. Expand private research into new bioengineered species while preserving heritage varieties.
5. Develop new crop management tools, such as pesticides and herbicides.

Production Systems & Practices

1. Implement conservation practices designed to maintain the productive capacity of land.
2. Adopt new production practices to address climate-related challenges.
3. Develop new private and public sector programs and markets for creating additional value for ecosystem services.
    - Evaluate a wide range of market models
    - Empower lower-level experimentation

Risk Management

1. Maintain a robust federal crop insurance program.
2. Ensure that there are adequate relief programs available for natural disasters.
3. Provide multiple avenues for funding adaptation measures.

Planning & Decision Support Tools

1. Develop new tools to take advantage of how producers will use and access information in the future.

Planning & Decision Support Tools

University of Missouri

Thermal Aid

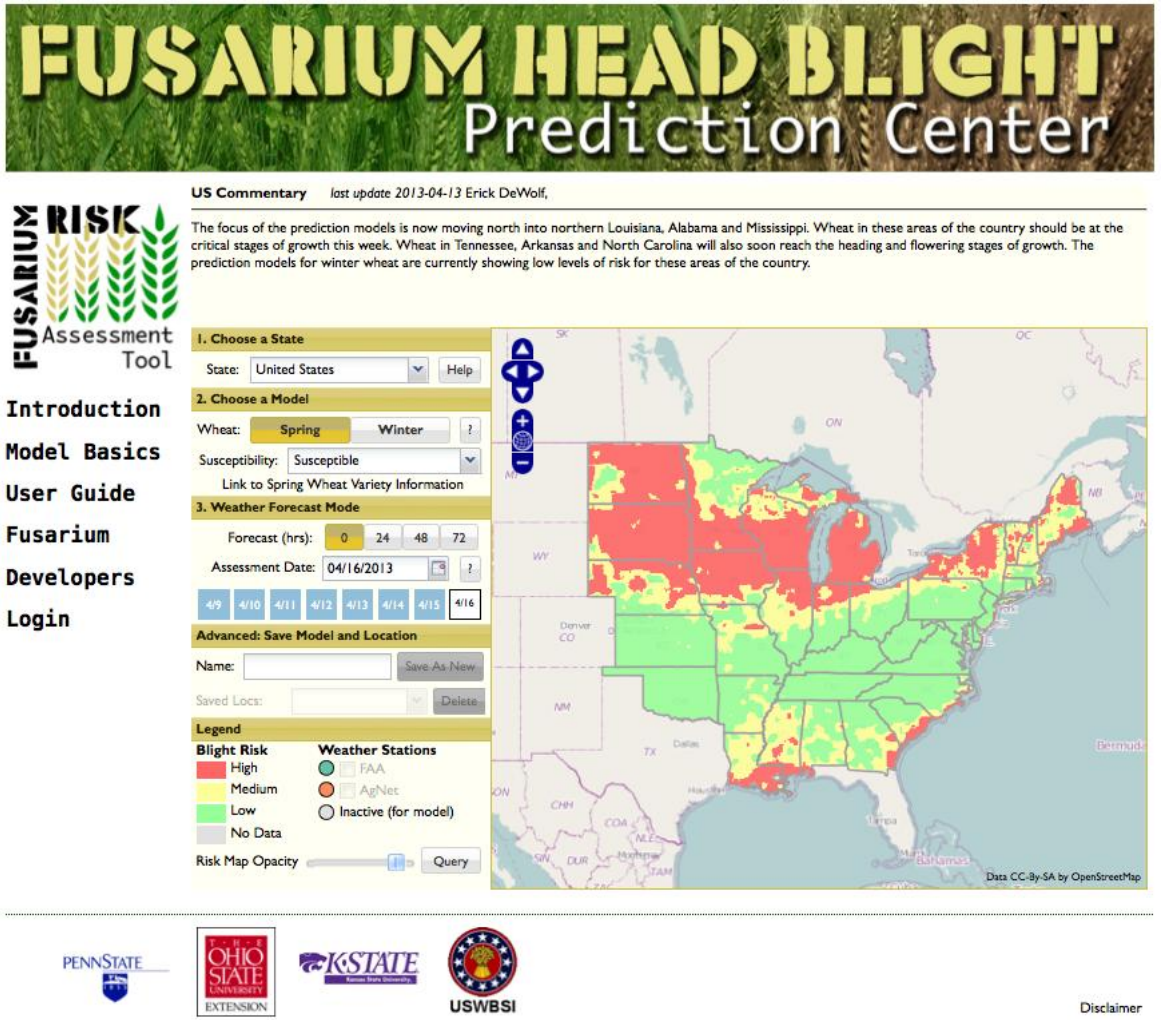
Planning & Decision Support Tools

Crop Varieties

Pest Prediction

Disease…

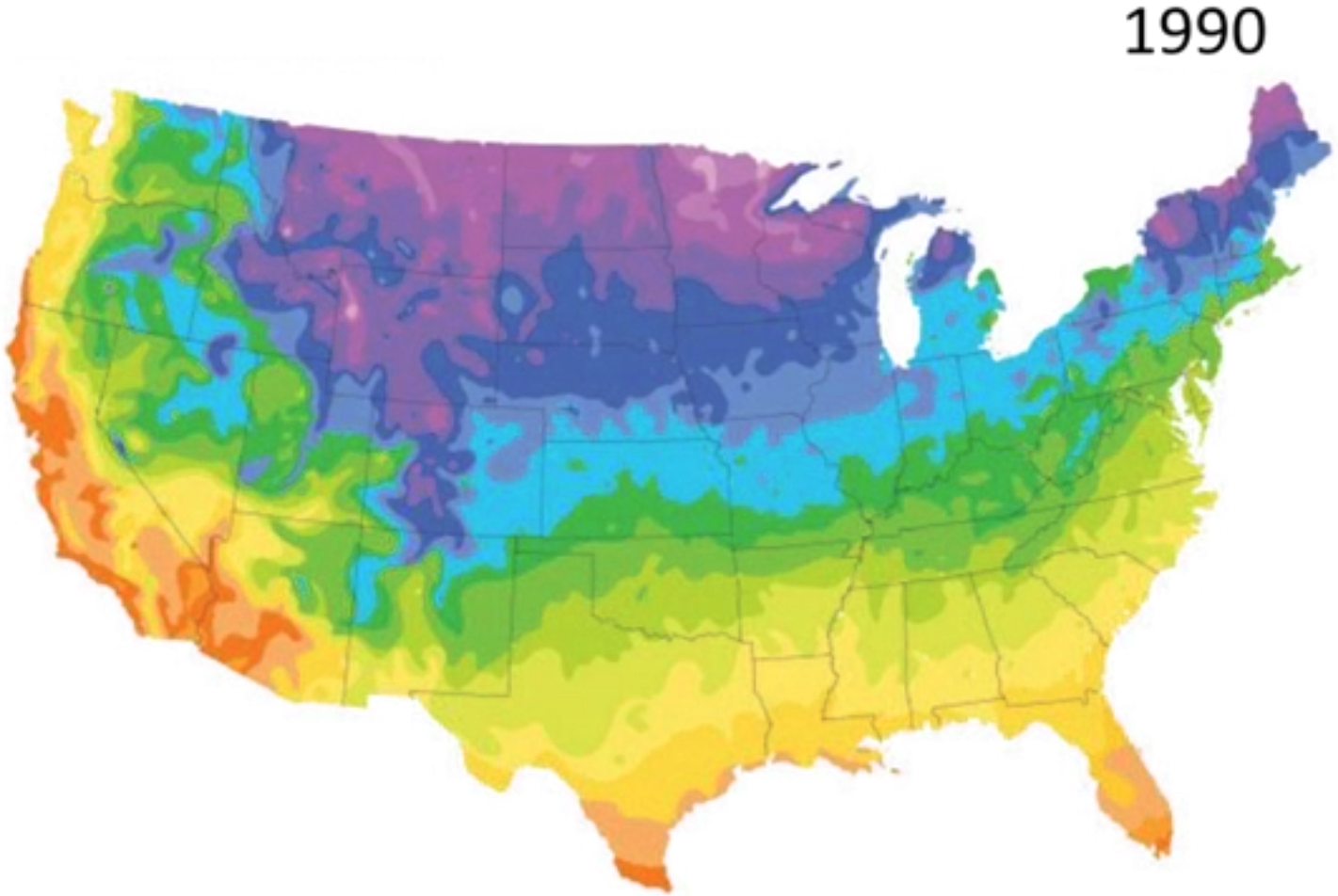
Pest Information Platform for Extension and Education (PIPE)



Planning & Decision Support Tools

1. Develop new tools to take advantage of how producers will use and access information in the future.
2. Provide regular updates to decision tools dependent upon climate data.

USDA Plant Hardiness Zone Map



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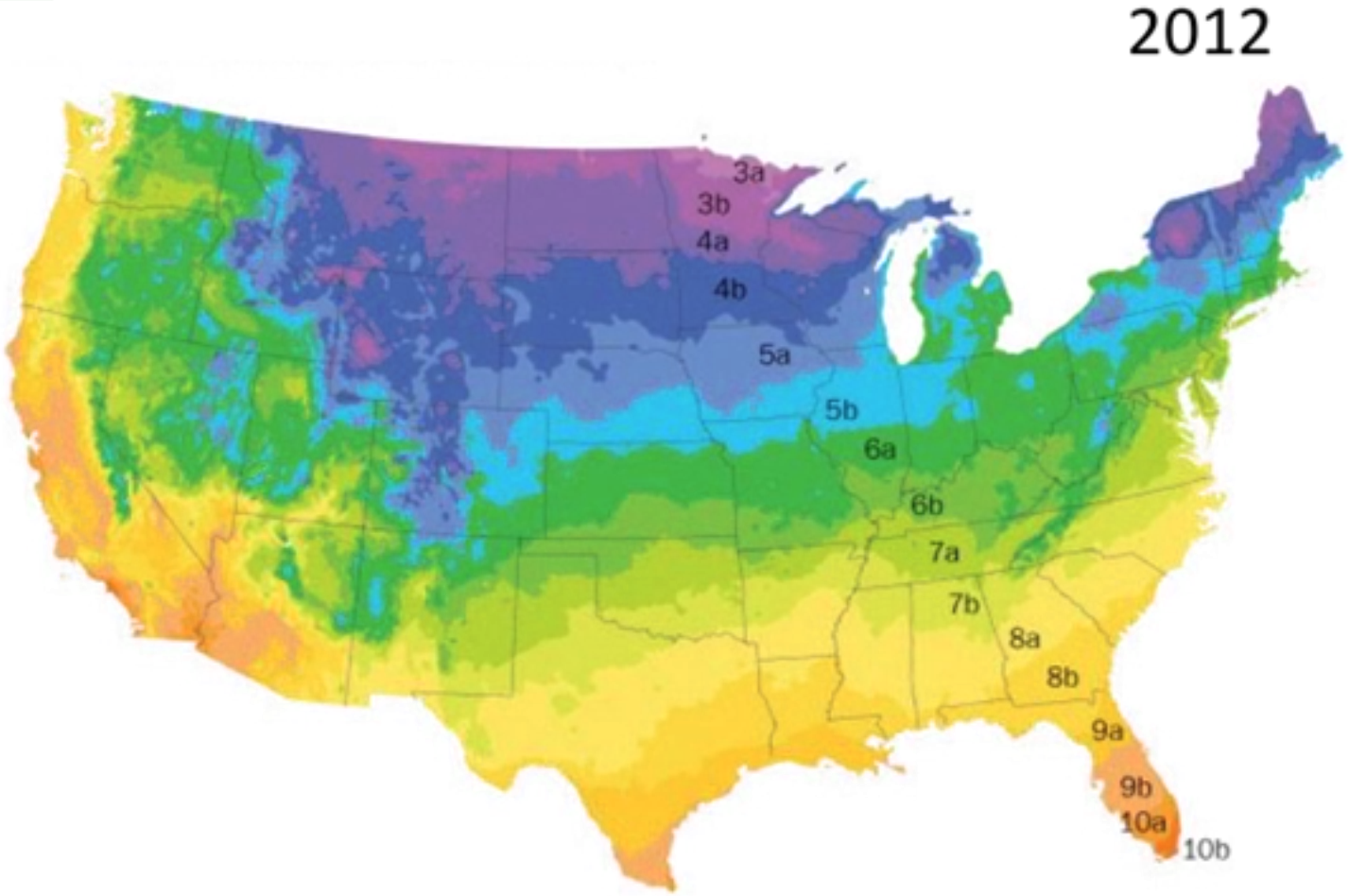

Planning & Decision Support Tools

1. Develop new tools to take advantage of how producers will use and access information in the future.
2. Provide regular updates to decision tools dependent upon climate data.
3. Engage in local- and watershed-level planning with relevant stakeholders.

Communications & Outreach

1. Create forums for engagement between producers from different parts of the country.
2. Encourage ongoing, two-way dialogues between scientists, policymakers, and agricultural organizations.
3. Involve producers and trade associations in research decisions and implementation.
4. Provide additional support for existing outreach networks such as agricultural extension, government agencies, and universities.

RAY GAESSER

Iowa Grain Farmer and First Vice President of the American Soybean Association

FRED YODER

Chairman of the Adaptation Work Group and Past President of the National Corn Growers Association

Progress to Date

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2. Examined the anticipated changes and their potential impacts
3. Developed a series of recommendations to reduce negative outcomes and seize new opportunities
4. Engage in adaptation dialogues with agricultural and forestry stakeholders

Outreach Partners

Help disseminate the recommendations report to their members and allies

NATIONAL CORN GROWERS ASSOCIATION
FARM BUREAU
Farmers Union
Conserving Natural Resources for Our Future
National Association of Conservation Districts
Soil Science Society of America
NASDA
National Association State Departments of Agriculture
NATIONAL FFA FOUNDATION
Farm Foundation
ASA
American Soybean Association
ASSOCIATION OF PUBLIC AND LAND-GRANT UNIVERSITIES
CropLife AMERICA
The Nature Conservancy
THE COUNCIL
American Farmland Trust
SOIL AND WATER CONSERVATION SOCIETY
NCSE
Southeast ClimateConsortium
Iowa Soybean ASSOCIATION
EXPANDING OPPORTUNITIES. DELIVERING RESULTS.
Advancing Innovative Solutions Since 1984
EESI
CTIC
CONSERVATION TECHNOLOGY INFORMATION CENTER

Partnership Opportunities

1. Co-hosting webinars for members
2. Presentations and exhibiting at major conferences and events
3. Briefings and workshops for boards of directors, staff, and key committees
4. Study groups for in-depth examination of real-world solutions

For additional information on this project, contact Ernie Shea at adaptation@25x25.org or 410-252-7079.