

# Applying Beef Production Climate Resilience Toolkit (CRT) Case Study to PROV

ESIP Winter 2019  
A Part of the Data to Decisions Project,  
An ESIP Lab Project

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Knowledge Motifs LLC



*Mapping sensible data relationships*

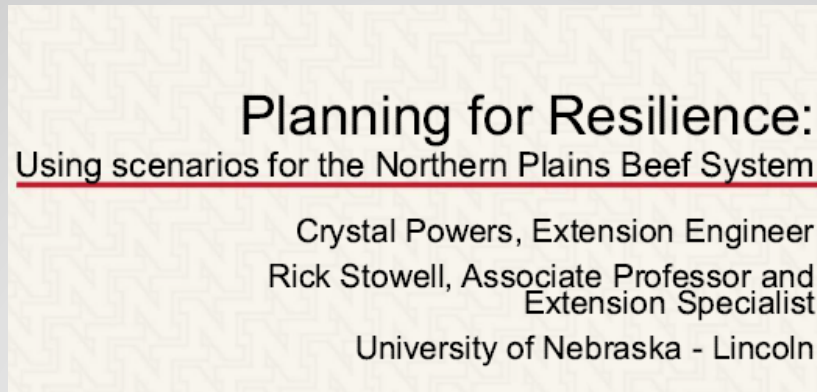
- Ag/Climate Cluster interest in recording process of decisionmaking for Provenance purposes
- Re-use a US Global Change Research Program (USGCRP) Climate Resilience Toolkit (CRT) Case Study 'nurtured' by ESIP Ag/Climate Cluster CRT "Pipeline"
- CRT Case Study at:
- <https://toolkit.climate.gov/case-studies/starting-climate-conversation-using-scenario-planning-promote-resilience-beef>
  - (currently unavailable ☹)

Why?

- Evidence: CRT case study language / links, PI slides & oral presentation
- Steps:
  1. Use Beef Production PI's slides to identify classic PROV classes and properties
  2. Analyze documentation of decisionmaking methodology & map activities of process to the steps of the methodology
  3. Extrapolate from the specific case study to various options & levels of PROV dialects
  4. Map to several PROV dialects (Tom)

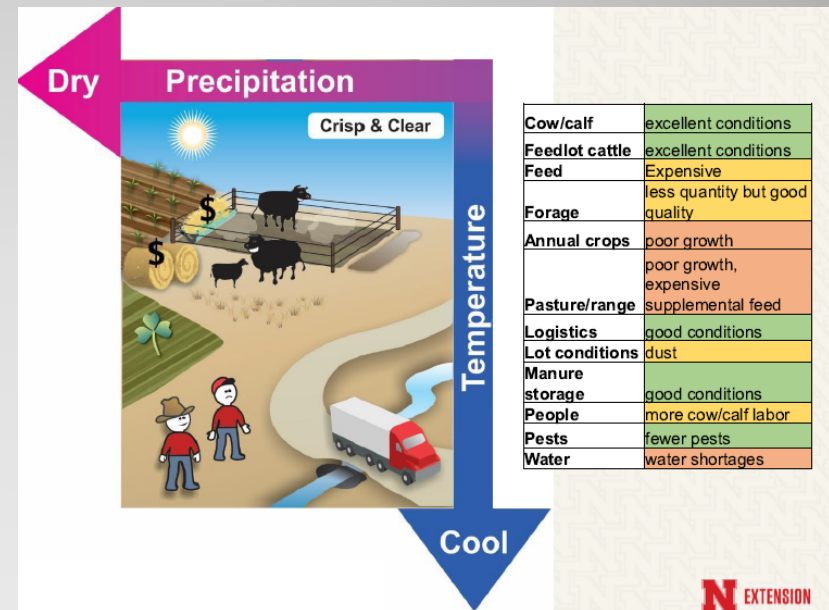
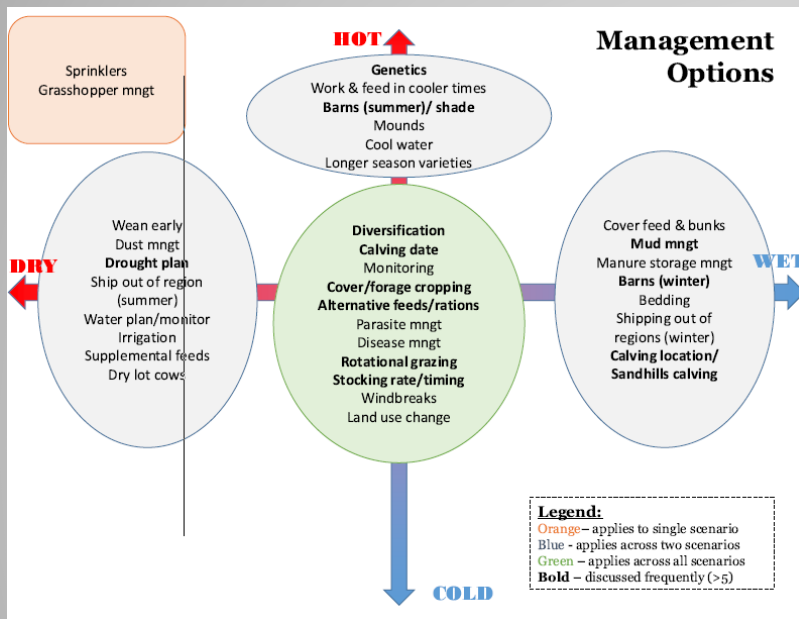
**How?**

Ag & climate scientists ==> assist County Extension Agents to talk about planning for climate change ==> with Beef Production Stakeholders ==> who seek advice on management options ==> ***to make operational decisions in "the field"***



**Who & What -- the story**

- Desired outcomes for two levels of decisionmakers:
  - Extension agents: management options to offer
  - Beef producers in the field: operational choices



**What -- the outcomes**

- As first cut, use PI's slides to identify classic PROV classes and relationships:
  - Agents
  - Entities
  - Activities
  - Relationships
    - associatedWith
    - generatedBy
    - derivedFrom
    - attributeTo
    - Others, e.g., used?

**Step 1:**

## Agents

- Expert team
- Focus Group 1
- Focus Group 2

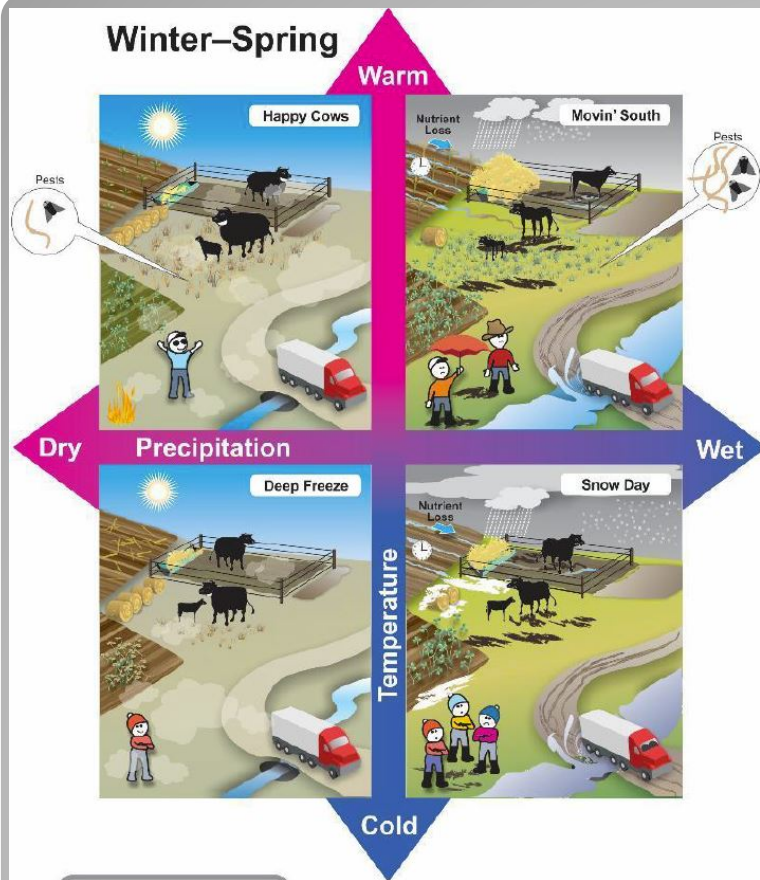
## Entities:

- Park Service process model
- Data from National Climate Assessment (NCA) Report or subsets from other sources
- Physical entities used in discussions as background info (Wtr-Spr / Summer-Fall charts, record of weather stories, etc.)

# Preliminary Summary



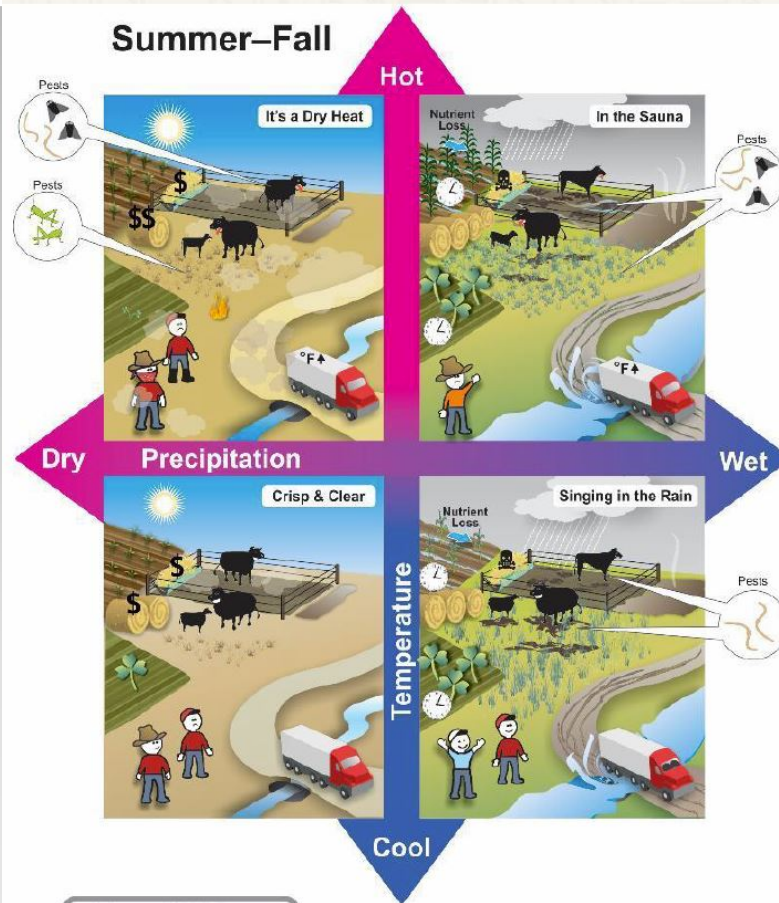
## Winter-Spring



### Overall Drivers



## Summer-Fall



### Overall Drivers



# Artifacts as PROV Entities



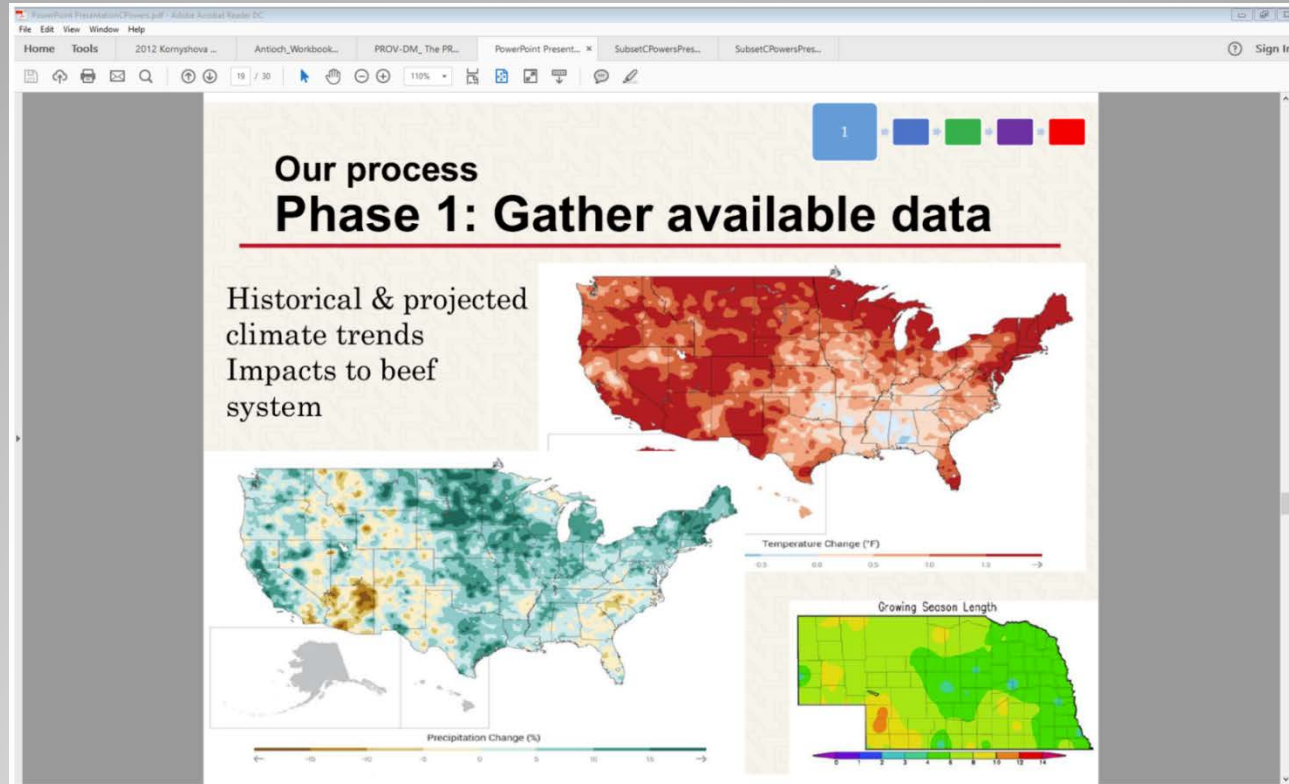
## Activities

- Use the Park Service process model to:
  - Gather information of pertinent climate data by experts
  - Collect weather stories from production stakeholders
  - Sort & prioritize input from stakeholders
  - Model scenarios
  - Establish preferred scenarios
  - Create extension program plan with operational management options

## Relationships

- associatedWith
- generatedBy
- derivedFrom
- attributeTo
- Others, e.g., used?

# Preliminary Summary



**PROV Activity, but also PROV entities for source reports / datasets**

PowerPoint Presentation: Powers.ppt - Adobe Acrobat Reader DC

File Edit View Window Help

Home Tools 2012 Kornysheva ... Antioch\_Workbook... PROV-DM\_ The PR... PowerPoint Present... SubsetCPowersPres... SubsetCPowersPres...

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# Modeling

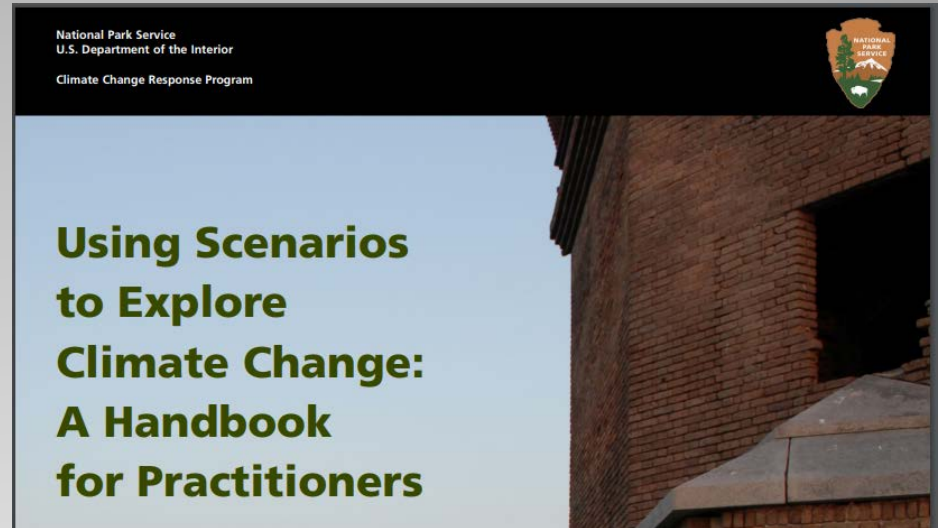
- Integrated Farm Systems Model
- Use state trends and projections
- Range of economic and performance impacts
- Farm sensitivity analysis

■ ■ 3 ■ ■

**N** EXTENSION

**Key PROV activity**

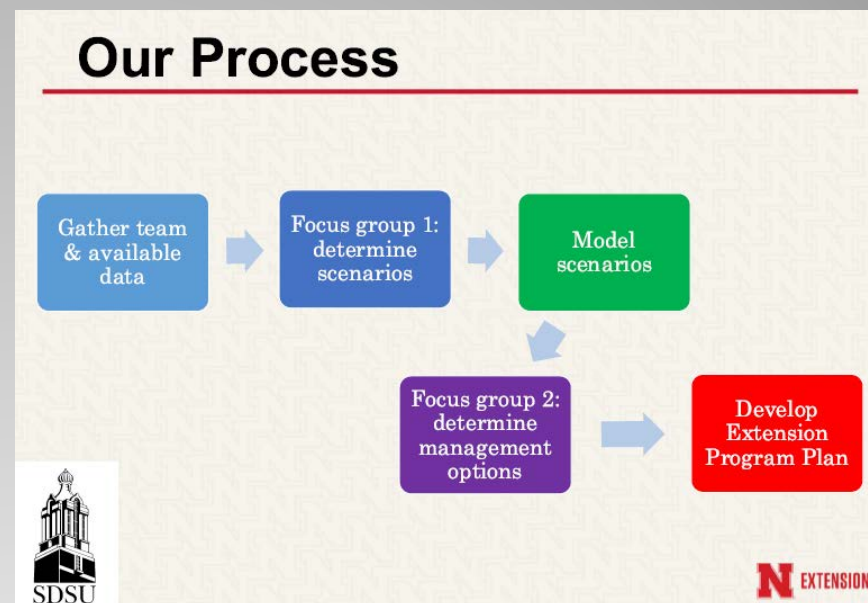
- National Park Service (NSP) scenario-building process uses data from scientific experts & community experts (multi-step)



## Step 2: A closer look at the decisionmaking process used

<https://www.nps.gov/subjects/climatechange/upload/CCScenariosHandbookJuly2013.pdf>

- Orient
  - 6 Subphases
- Explore
  - 3 Subphases
- Synthesize
  - 5 Subphases
- Apply
  - 3 Subphases
- Monitor
  - (out of scope for the Beef Production case study)



**What -- key steps of the NPS process**

# Estimate of Park Service Scenario Building Proposal sans input from Crystal Powers

Draft January 2019

Legend: Yellow = Should be included in general mapping to PROV dialects; Teal = to be included in case specific background documentation

PHASE	SubPhase	Used (Y/N)	Documentation Created (Y/N)	Comments / Notes
<b>Orient</b>	Establish project purpose & desired outcomes	Y		<p>Desired: Extension Program plan (slide 29):</p> <p><b>Extension Program Plan</b></p> <ul style="list-style-type: none"> <li>Identifying gaps in Extension and Research</li> <li>Prioritizing new programming or resources</li> </ul>
<b>Orient</b>	Recruit core team	Y	Aka "Stakeholders: 1: core team for scenario building process; 2: Extension agents who advise; 3: the people who have decisions to make re: operations for beef production including:	<p><b>University of Nebraska</b></p> <ul style="list-style-type: none"> <li>Biological Systems Engineering</li> <li>Animal Science</li> <li>Agronomy</li> <li>Climatology</li> <li>Extension – Climate and Beef teams</li> </ul> <p><b>South Dakota State University</b></p> <ul style="list-style-type: none"> <li>Agricultural and Biosystems Engineering</li> <li>Extension</li> </ul> <p><b>Funding</b></p> <ul style="list-style-type: none"> <li>USDA Northern Plains Climate Hub</li> <li>USDA NIFA Animal Agriculture in a Changing Climate</li> </ul>

## Step 3: Extrapolate from process to PROV – the need for extensions

<https://docs.google.com/document/d/13fUAja07x9mupBceD8-PEh0dmNzfzSQnQet5Jocxc4w/edit?usp=sharing>



- Take it away, Tom...

## Step 4: Mapping to PROV extensions

