

Plant Community Dynamics in the Northern Great Plains – Recognizing the Impacts of Invasive Species



Jeff Printz
Rangeland Mgt. Specialist
USDA-NRCS
Bismarck, ND

Stan Boltz
Rangeland Mgt. Specialist
USDA-NRCS
Huron, SD





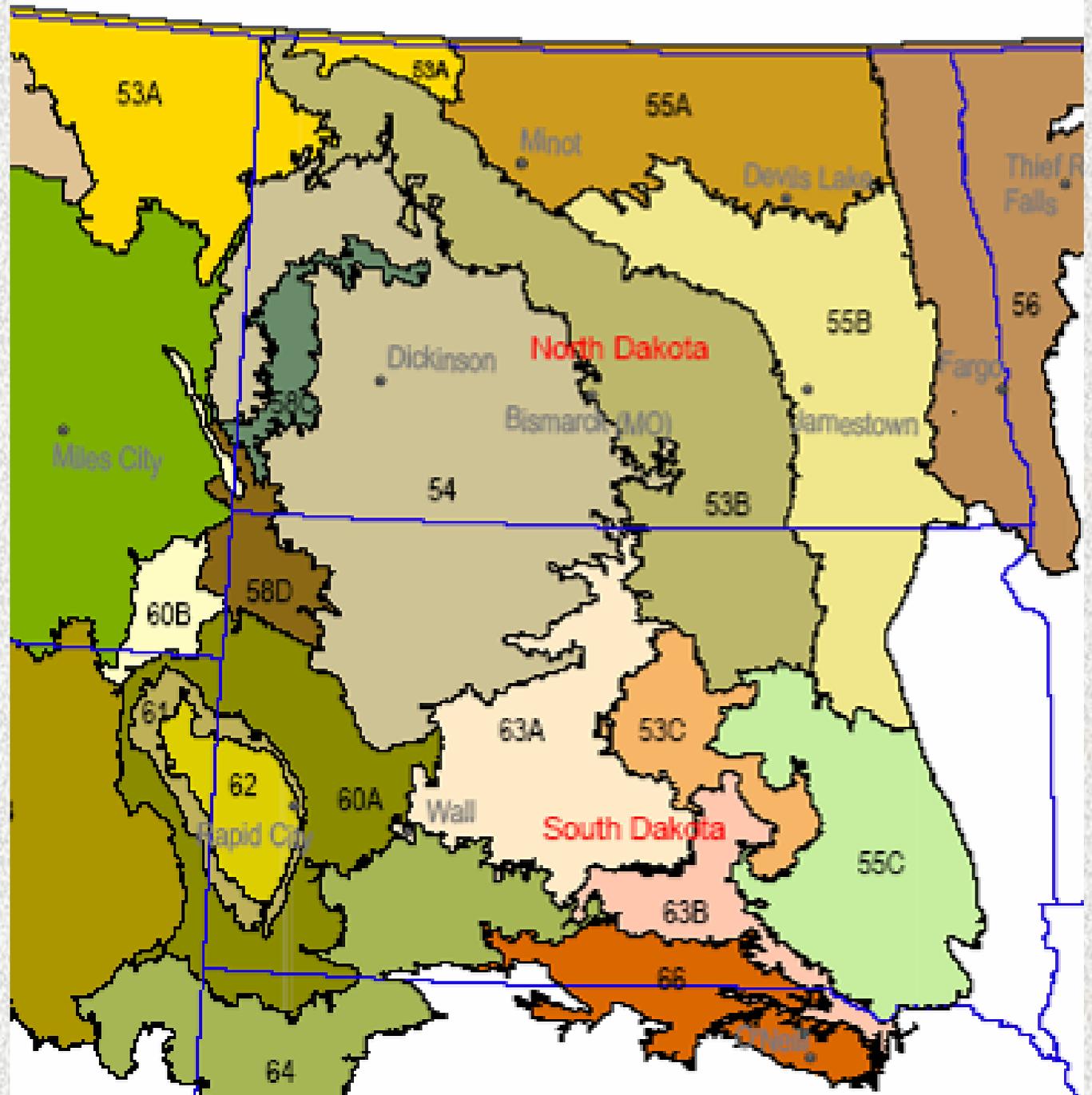
Dr. Kevin Sedivec, ND State Univ.
Dr. John Hendrickson, USDA-ARS
Dr. Mike Brand, ND State Land Dept.
Kelly Krabbenhoff, KDK Consulting
Bob Patten, ND State Univ.
Stan Boltz, NRCS (SD)
Chuck Stanley, NRCS (CNTSC)
Jody Forman, NRCS (ND)
Lee Voigt, NRCS (ND)
Dennis Froemke, NRCS (ND)

Dr. Jay Volk, BNI Coal
Dr. Shawn Dekeyser, ND State Univ.
Gary Petik, US Forest Service
Bernadette Braun, US Forest Service
Kim Dolatta, US Forest Service
Sheila McNee, US Forest Service
Kent Belland, ND National Guard
Pat Shaver, NRCS (WNTSC)
Jeff Printz, NRCS (ND)



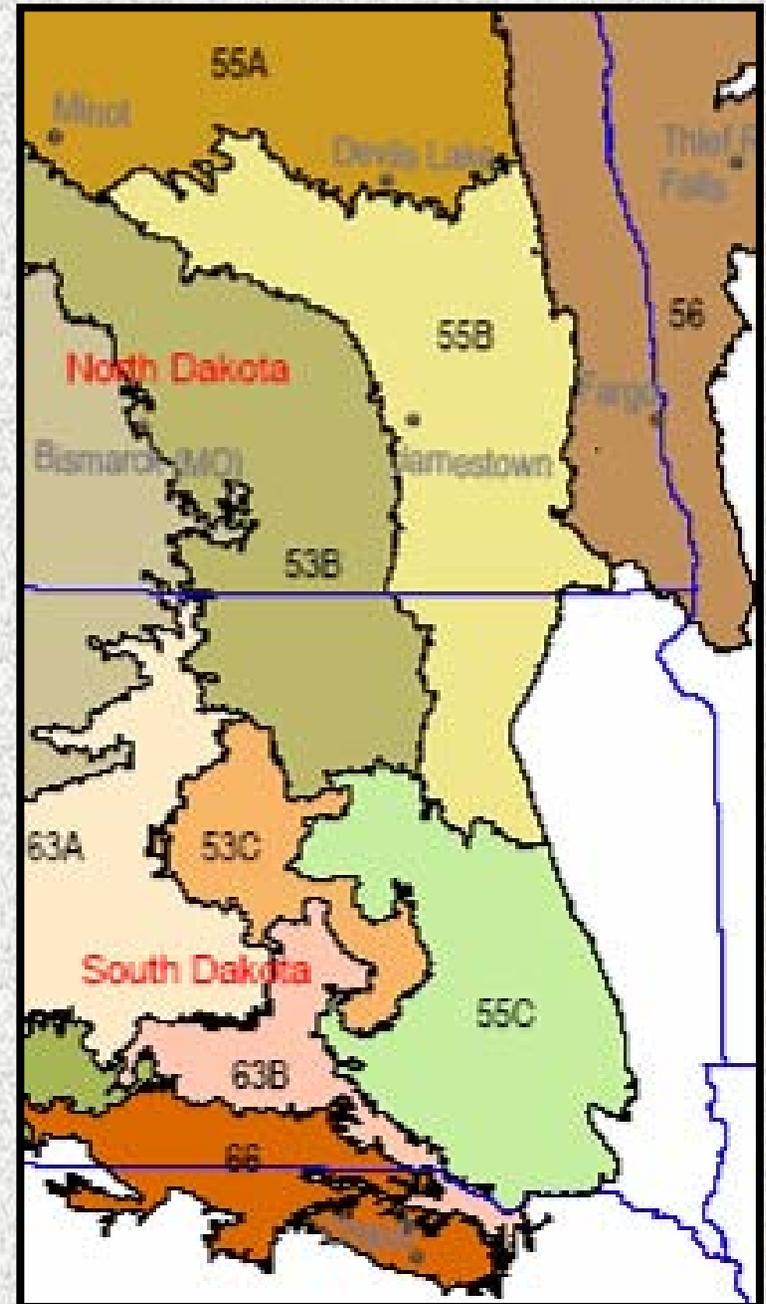
**Differing data
collection
protocols**

Major Land Resource Areas



Average growing conditions:

- 16 to 21 inches precipitation
- 118 to 140 day frost free days



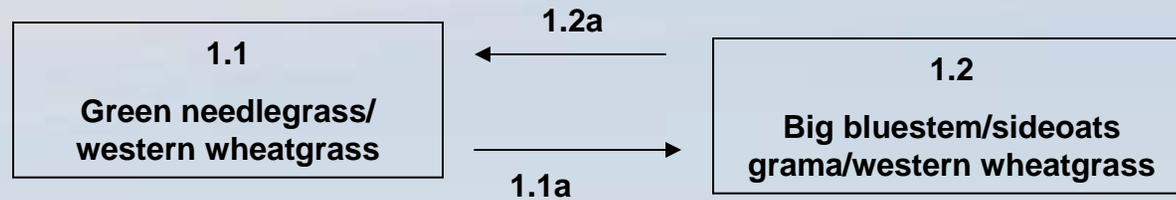
Loamy ecological site in MLRA 55B







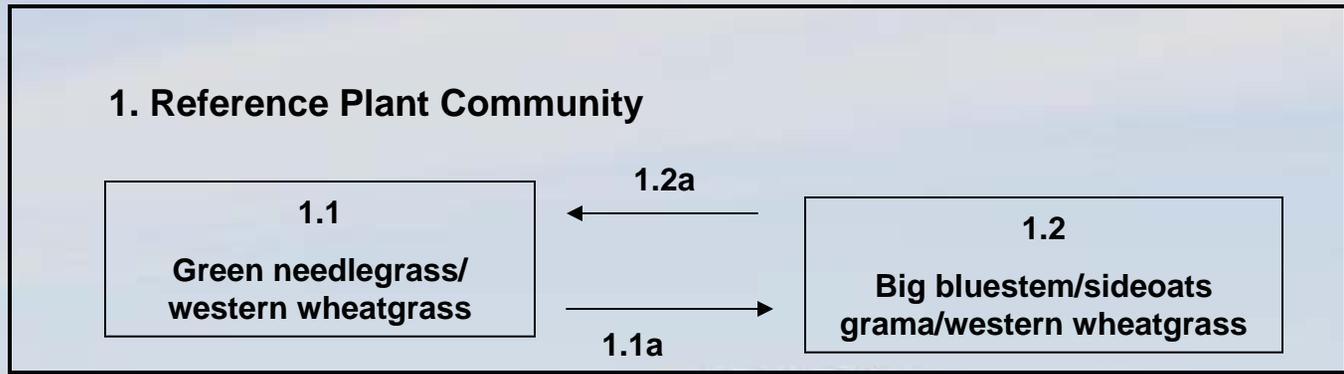
1. Reference Plant Community



Feedback mechanisms:

- Periodic grazing with varying levels of frequency and intensity
- Periodic fires at varying times of the growing season
- Climatic fluctuations

7 10:29 AM



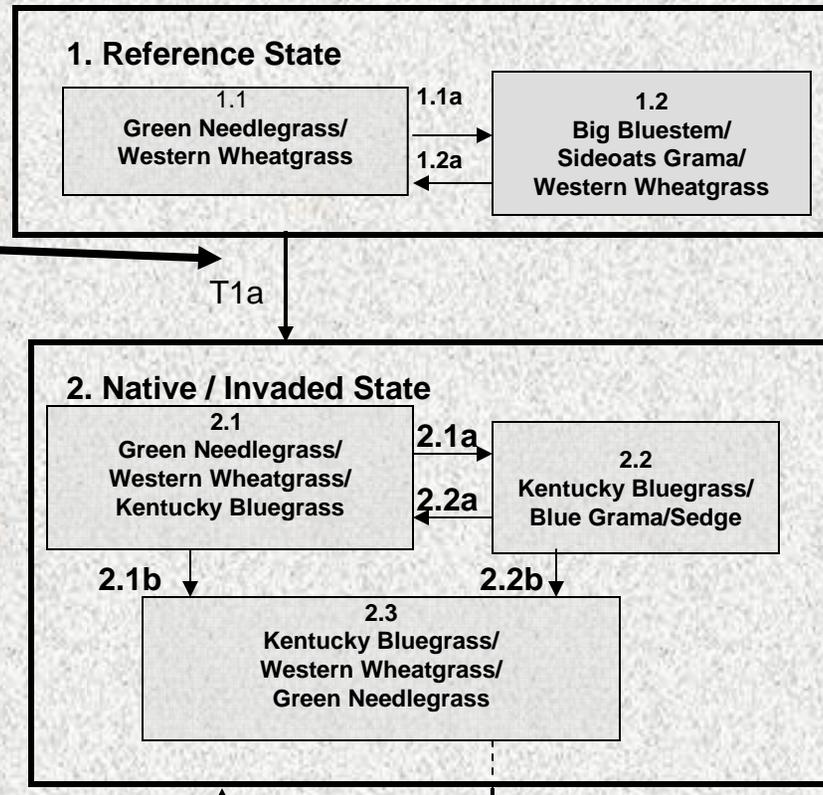
Feedback mechanisms (post-settlement):

- **Altered grazing regime**
- **No or very infrequent fires**
- **Climatic fluctuations (impacts)**

Introduction of non-native species

(Smooth Brome, K. bluegrass, black medic, sweet clover)

Transition #1

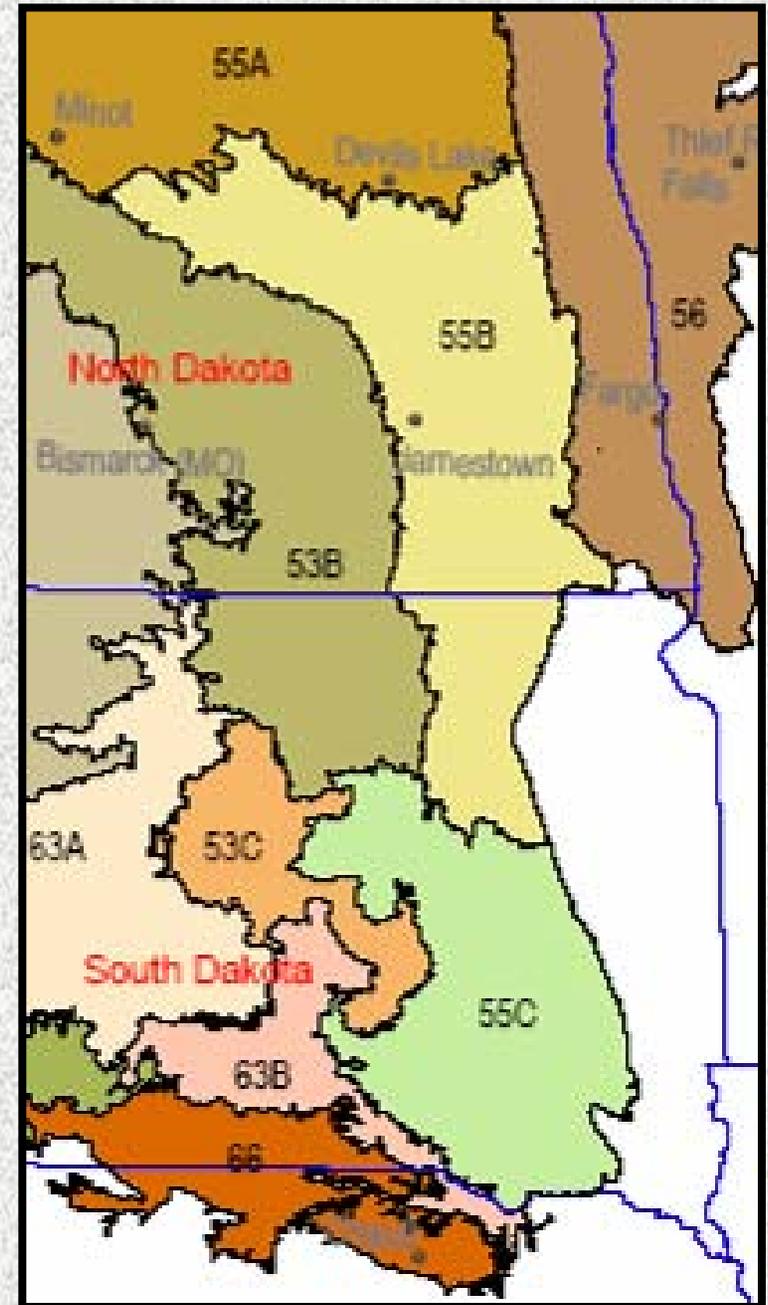


Proposed threshold occurs when trace amounts of non-native species are present....examples would include Kentucky bluegrass, (*Poa pratensis*) and smooth brome grass (*Bromus inermis*) .

Extent of T1a:

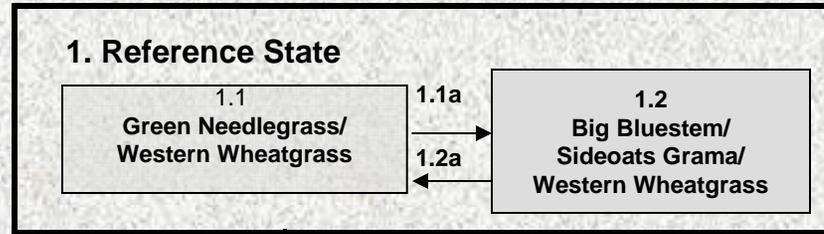
**42 Loamy sites inventoried
2003 to 2006 (NRI):**

- ❖ **41 sites had some level of
Kentucky bluegrass invasion**
- ❖ **22 sites had some level of
smooth brome grass invasion**

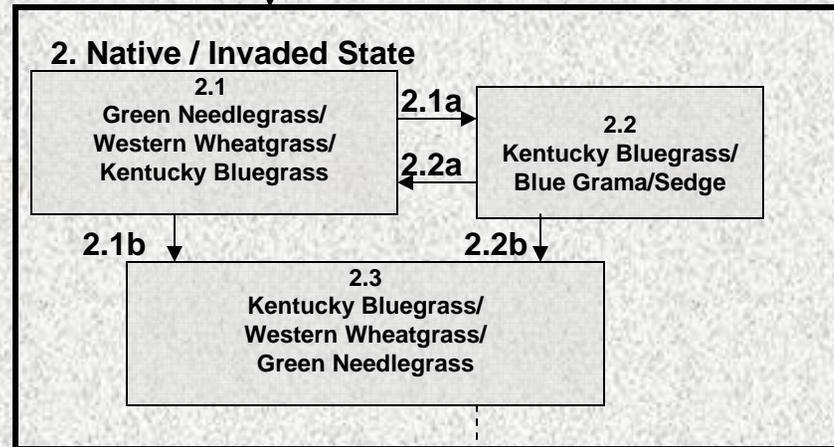


(Dr. Ken Spaeth)

Note: no restoration pathway



T1a



Transition T2a

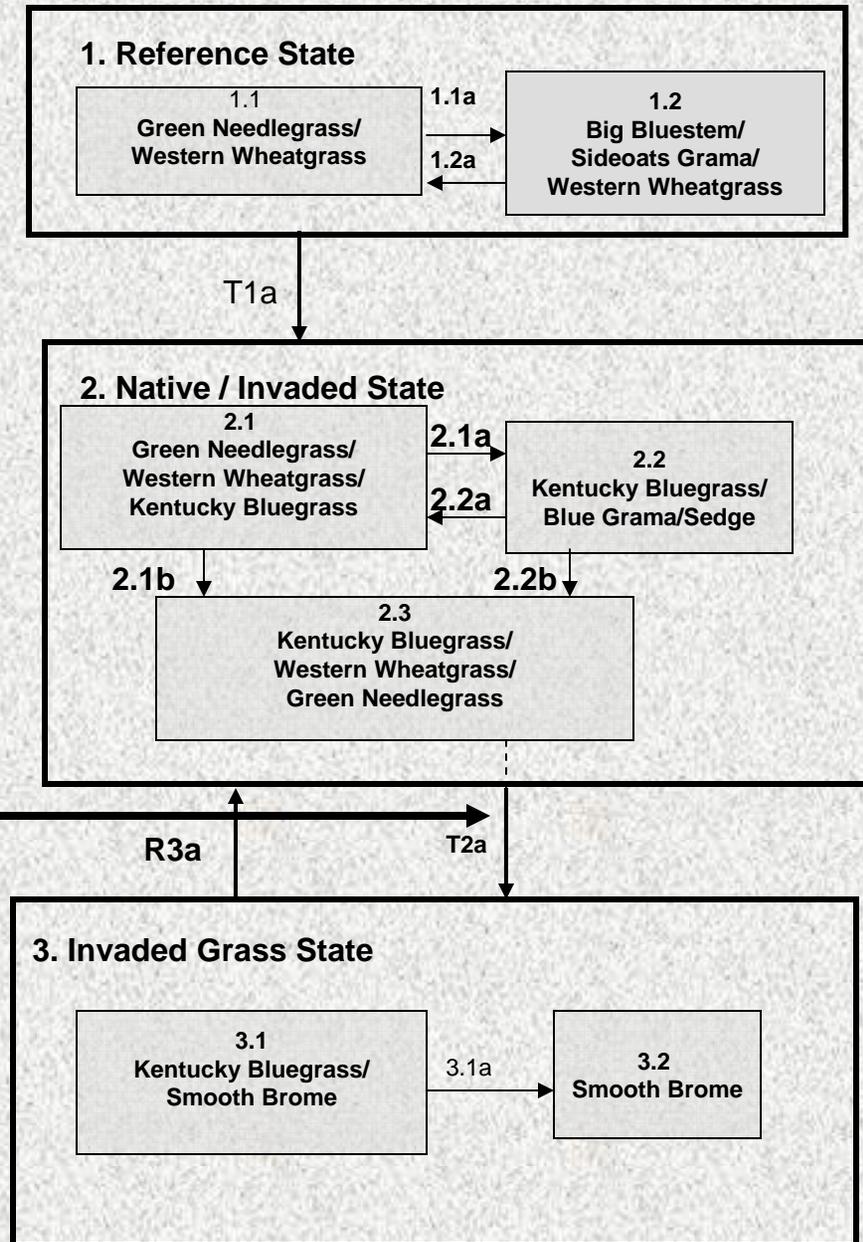
Feedback mechanisms:

- **Grazing by domestic livestock**
- **No fire**
- **Climatic fluctuations**

DRAFT Loamy Ecological Site (055BY011ND) DRAFT

Transition #2

Proposed threshold occurs when native grasses decline to < 40% of community and invasives (e.g. Kentucky bluegrass) increase to >30% of the plant community



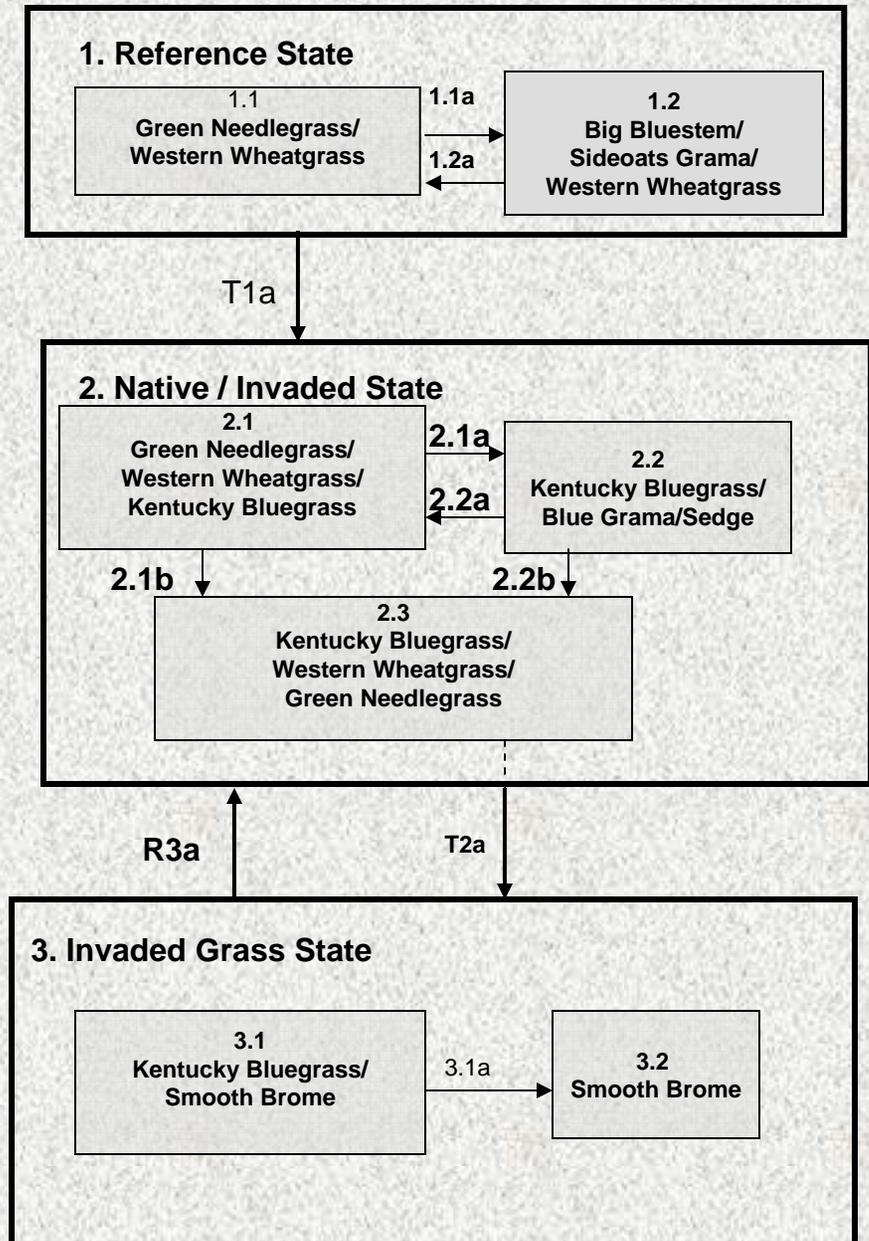
Extent of T2a:

Of the 41 loamy sites from the NRI study with some level of Kentucky bluegrass invasion

63% would fit into State 2

22% “Transitional”

15 % would fit into State 3



(Dr. Ken Spaeth)

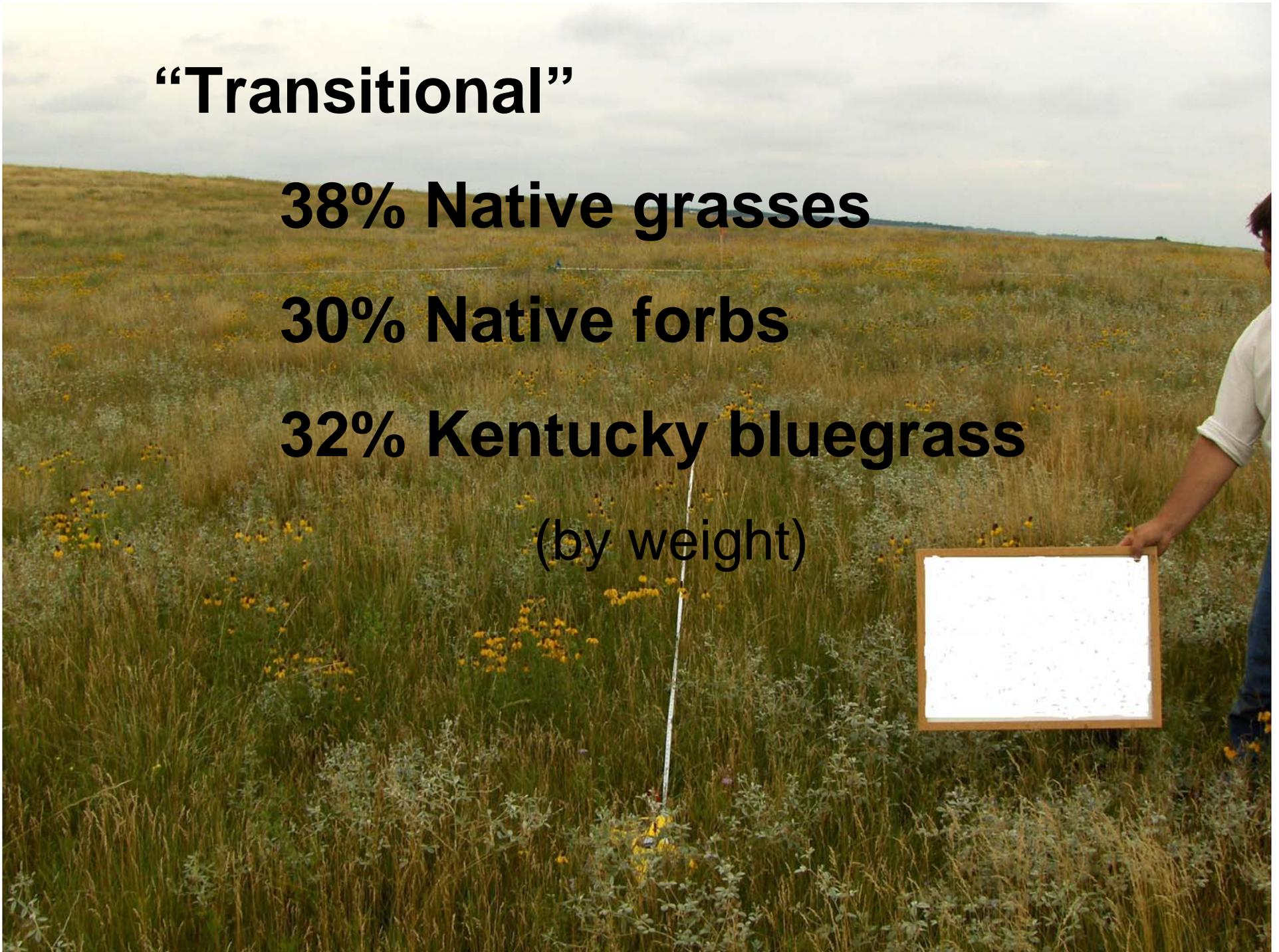
“Transitional”

38% Native grasses

30% Native forbs

32% Kentucky bluegrass

(by weight)



Impacts and feedback mechanisms

Loss of plant diversity (grasses and forbs)

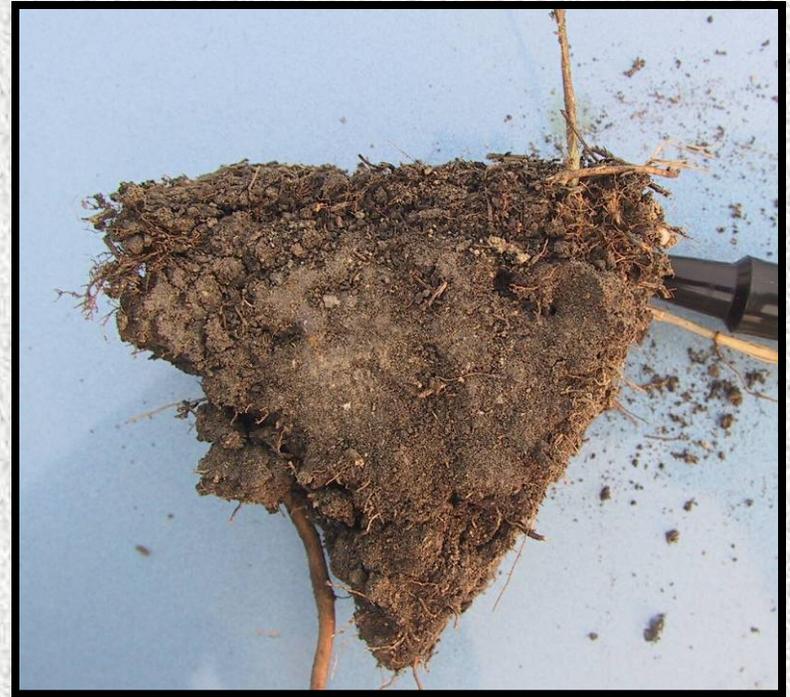




Litter to soil surface gap



State 3 – Invaded Grass



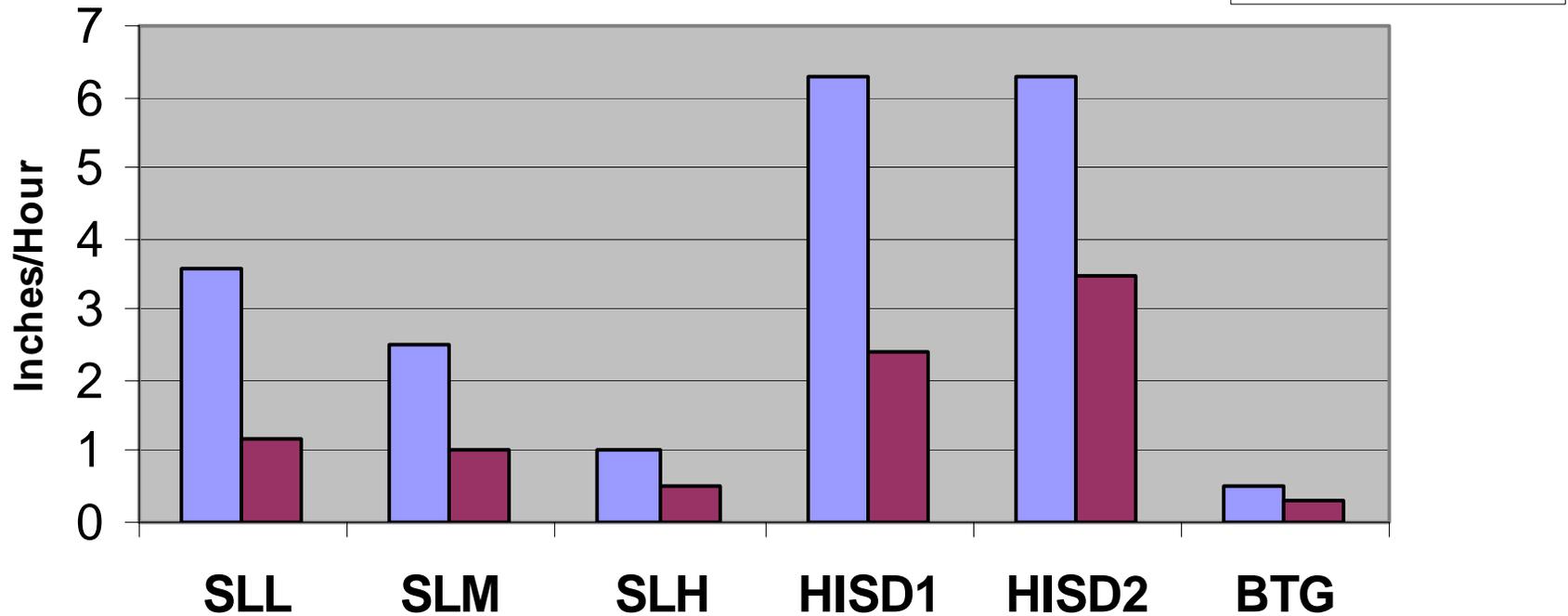
**State 2 – Native / Invaded
Grass**







**Grassland Grazing Systems Water Infiltration Rates
Loamy Ecological Site (Williams Loam)
Single Ring Method (Inches/Hour)**



SLL- Kentucky bluegrass dominated
SLM- Kentucky bluegrass dominated
SLH- Kentucky bluegrass dominated
HISD1- Diverse native community
HISD2- Diverse native community
BTG- Brome Tame Grass Pasture

**Dr. Jimmy Richardson
and Dr. Jay Volk**

2. Native / Invaded State

**88% Native grasses,
forbs & shrubs
(19 species)**

**12% Introduced species
(3 species)**

(by weight)



3. Invaded State

**89% Introduced species
(5 species)**

**11% Native grasses and
forbs (6 species)**

(by weight)



**“Soil Modification by Invasive
Plants: Effects on Native and
Invasive Species of Mixed-Grass
Prairies”**

by

**Nicholas Jordan, Diane Larson
and Sheri Huerd.**

**USGS Northern Prairie Wildlife
Research Center, St. Paul, MN**

**“Overall, these results
support the hypothesis
that invasive alterations of
the soil biota can be highly
important to plant
invasions, and moreover
can impede restoration of
native communities after
removal of an invasive
species”**









Thank You.