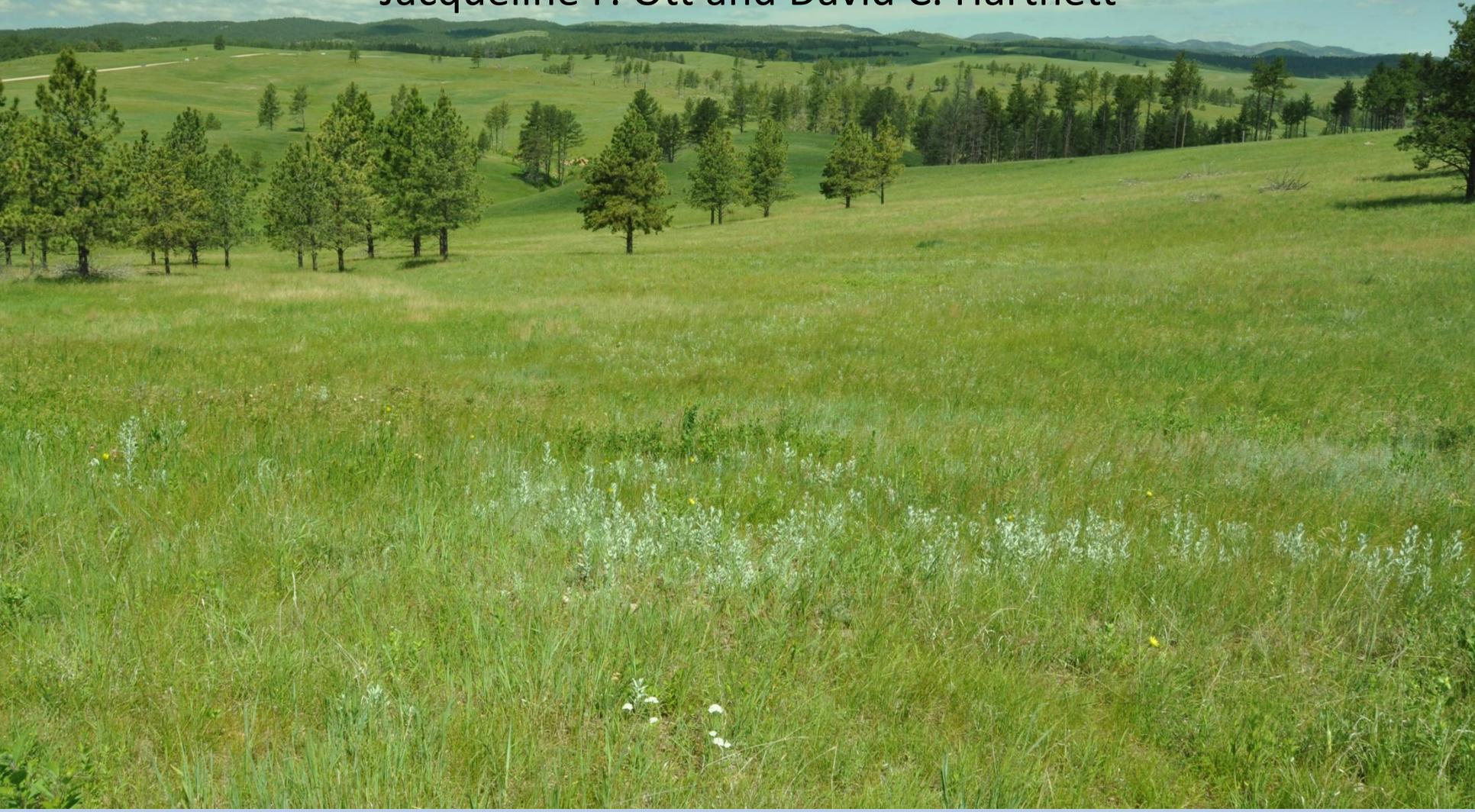
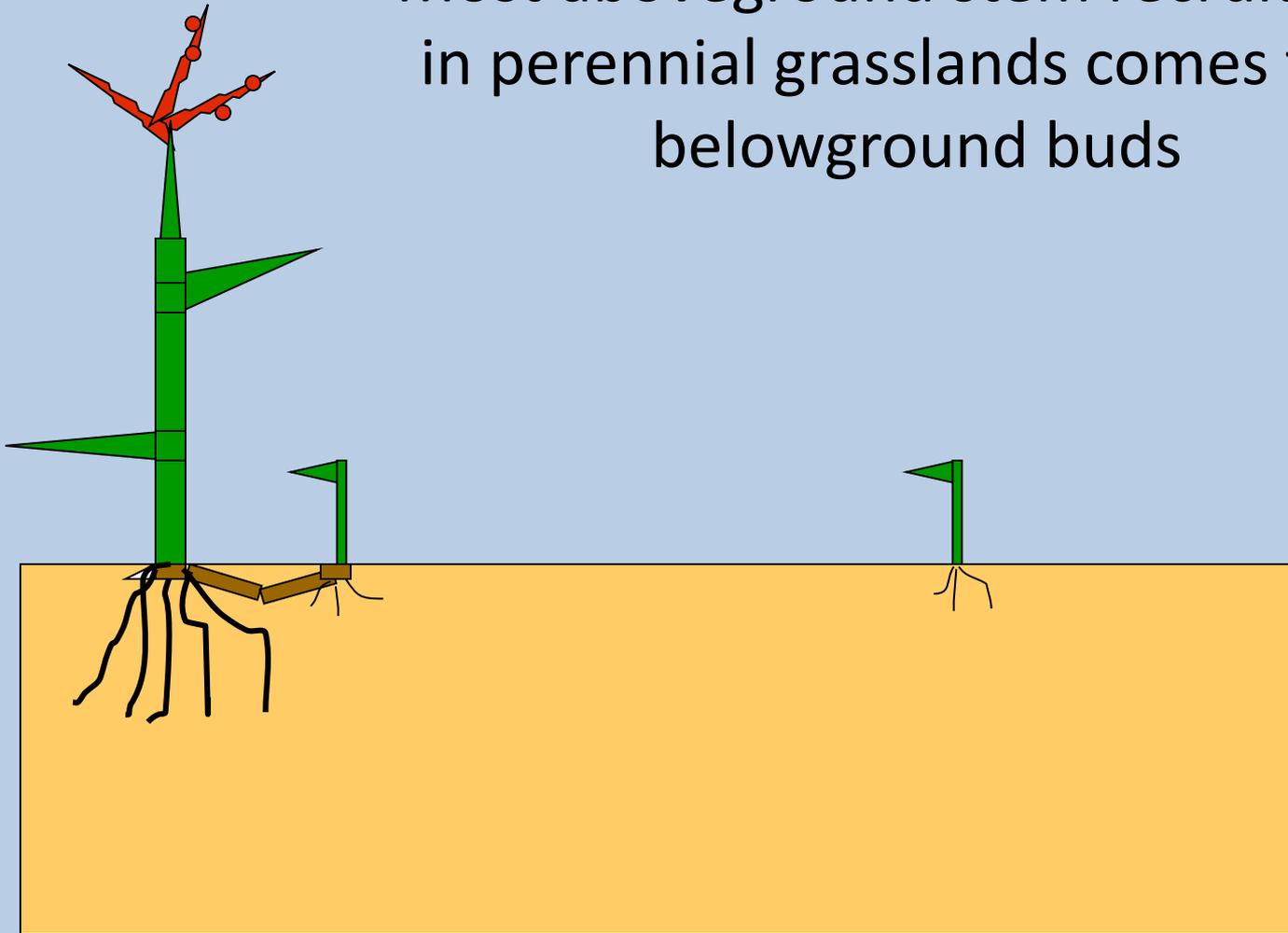


**Vegetative reproduction of the perennial grass
Andropogon gerardii (Big Bluestem) at the center and
periphery of its range**

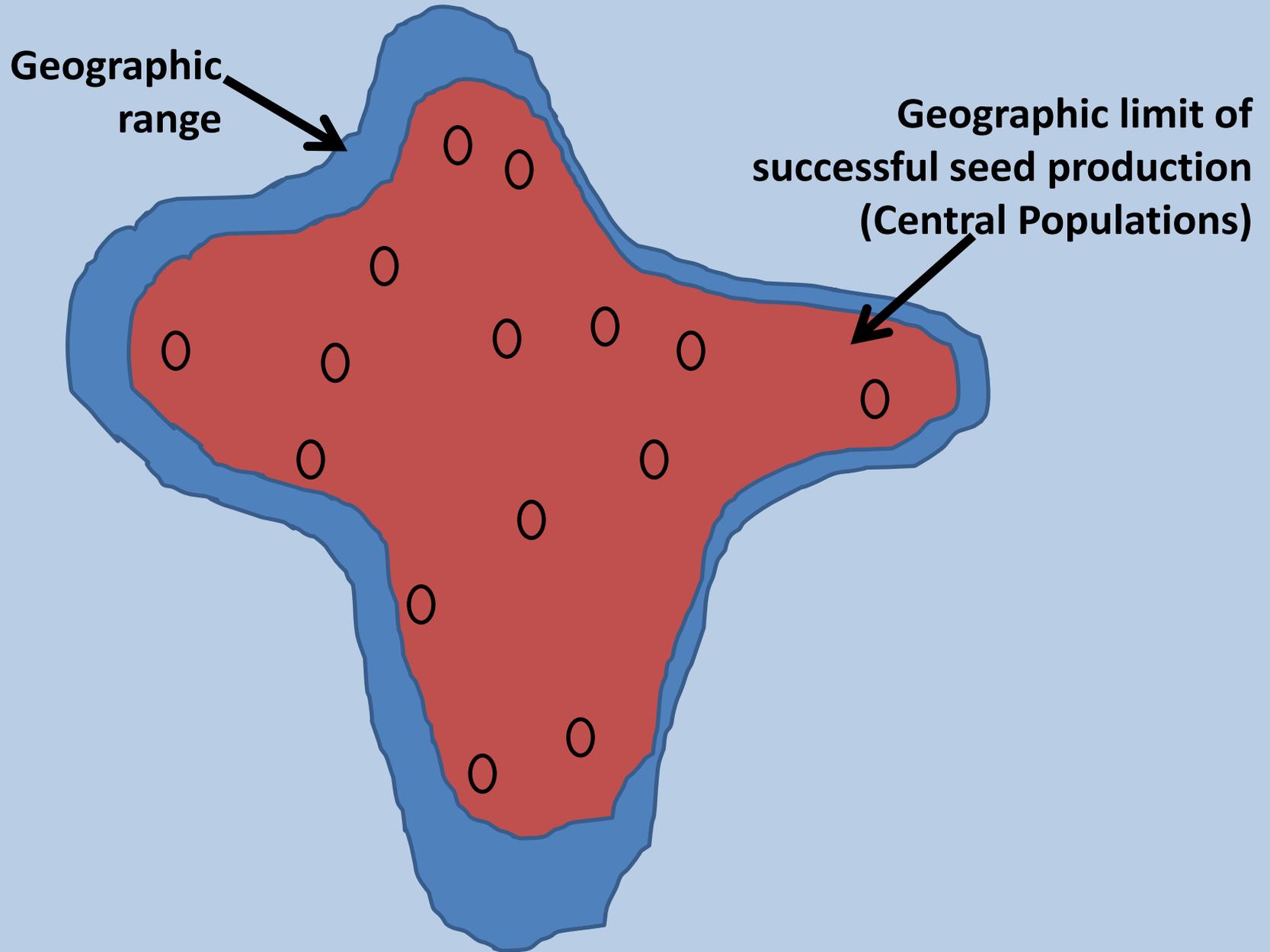
Jacqueline P. Ott and David C. Hartnett



Most aboveground stem recruitment
in perennial grasslands comes from
belowground buds



Reproduction across the range of a species



Over-arching Objective

Do/Does the ...

- Bud bank traits
 - Individual vegetative reproductive performance
 - Population vegetative reproduction performance
- ...of a common grass differ between the center and periphery of its range?

Study species

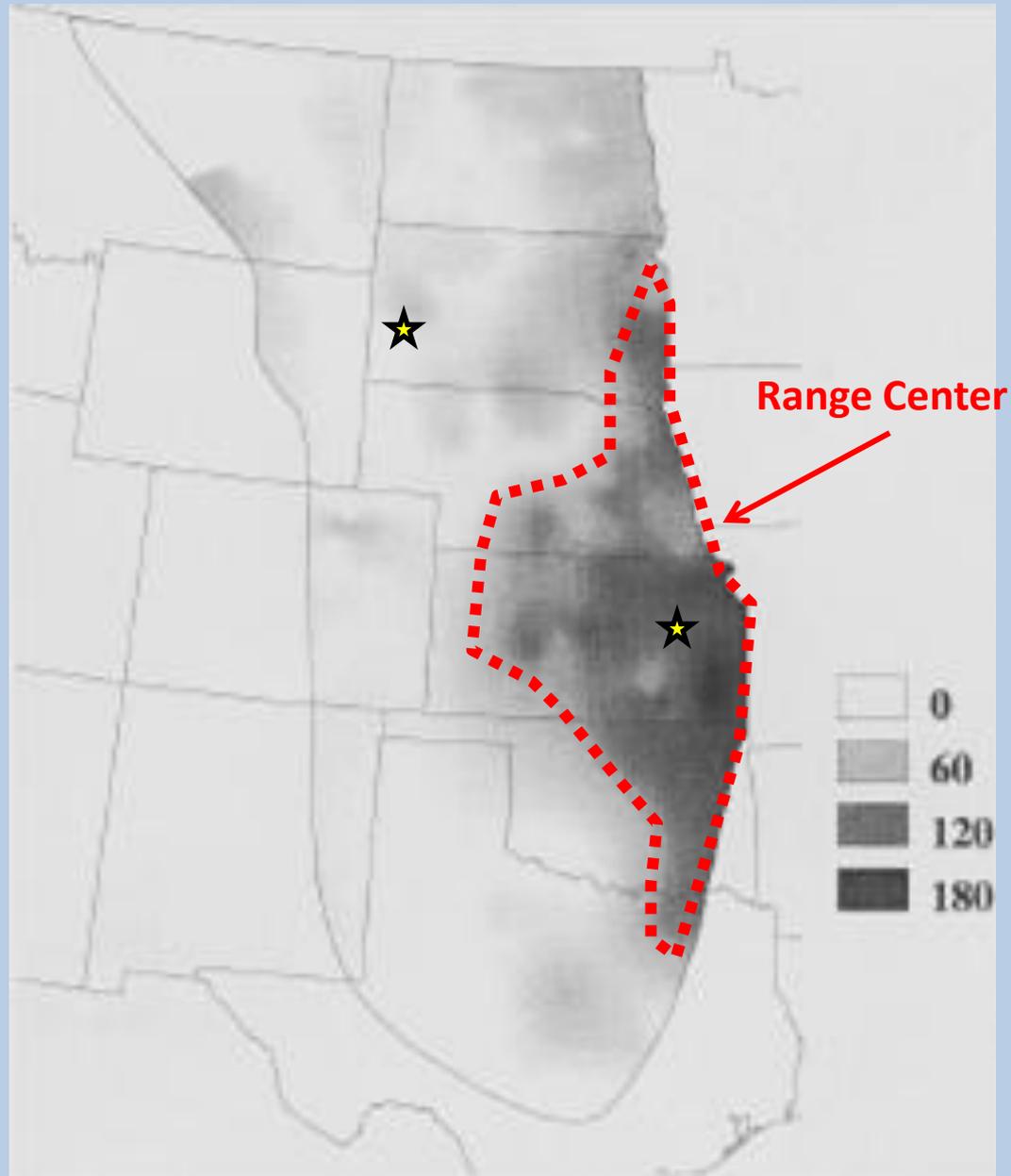
Andropogon gerardii



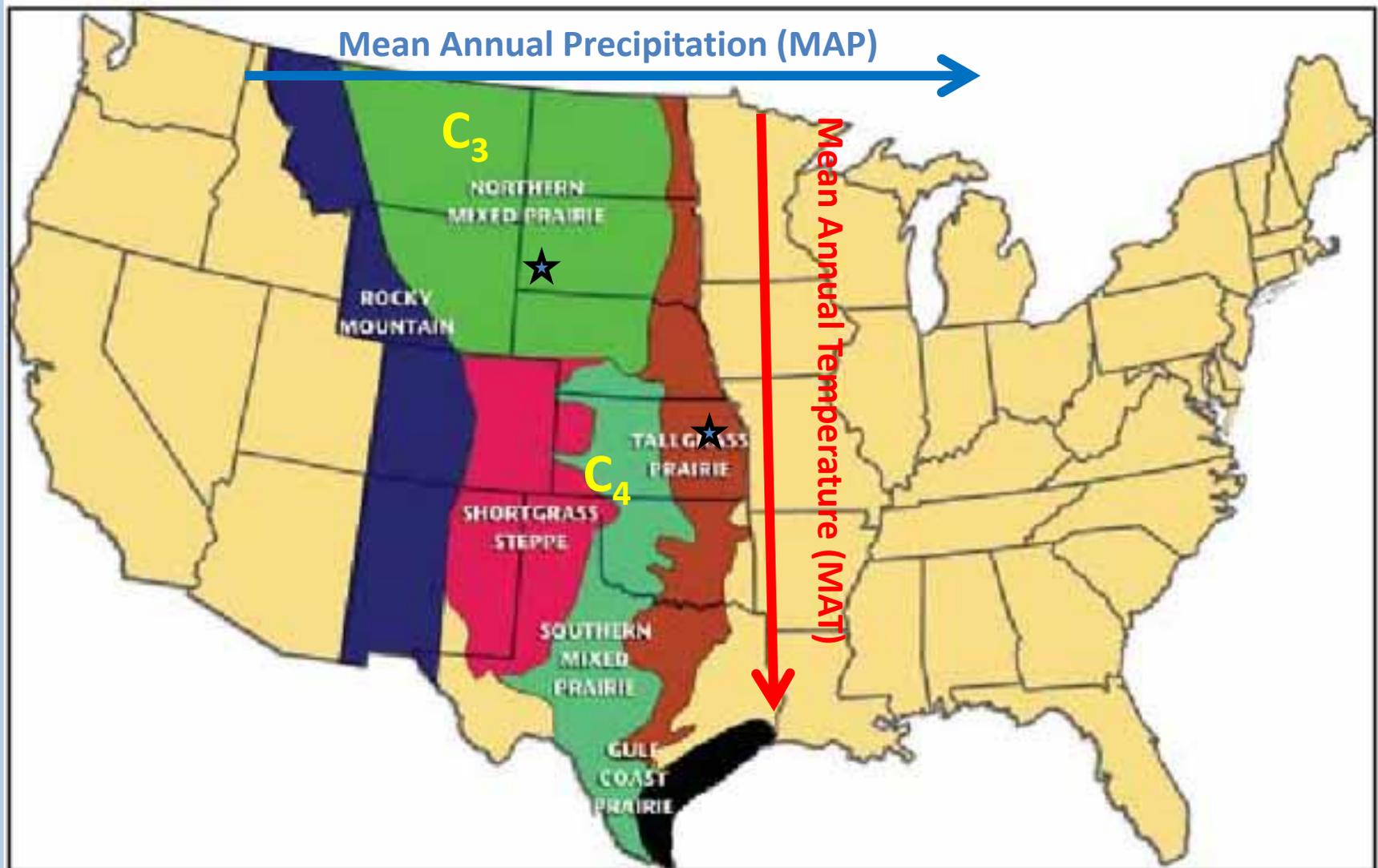
Jennifer Anderson @ USDA-NRCS PLANTS Database

Rhizomatous, C₄

Regional Productivity (g/m²) of *Andropogon gerardii*



Grassland types are determined by MAP and MAT



Field Methods

- 10 populations located within the Elk Mountain Enclosure at Wind Cave NP with no bison grazing and last burned in 2008
- Plants marked in Summer 2010 using a ring to encircle each plant and smaller rings to encircle each flowering tiller
- Tri-weekly sampling during the growing season from each population over the 2011 growing season (March-November)





Lab Methods

Buds and Tillers were:

- 1) Counted
- 2) Assessed to be living or dead
- 3) Classified by developmental stage and generation



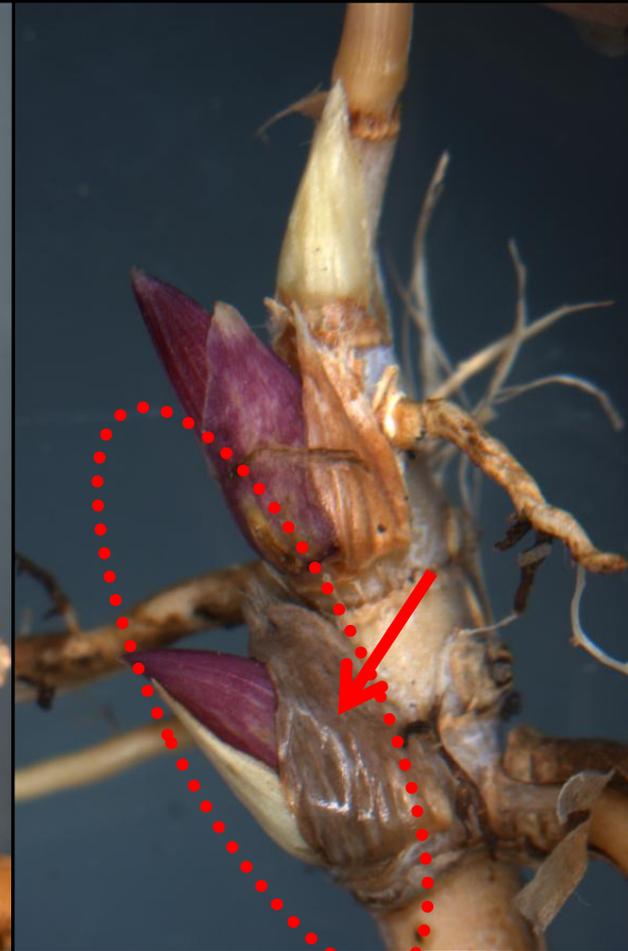
Bud and Juvenile Tiller stages of *A. gerardii*



Developing Buds

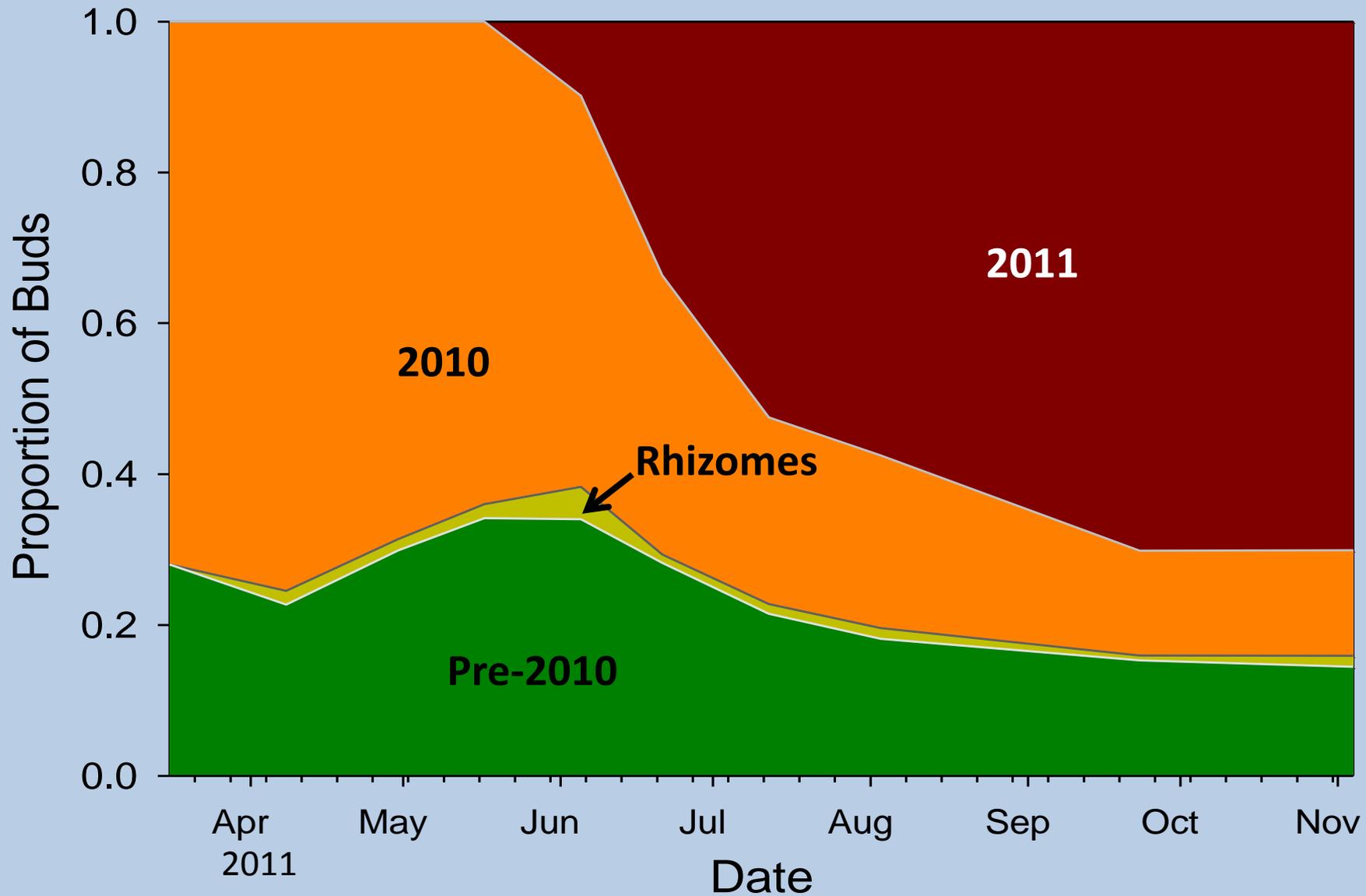


Mature Buds

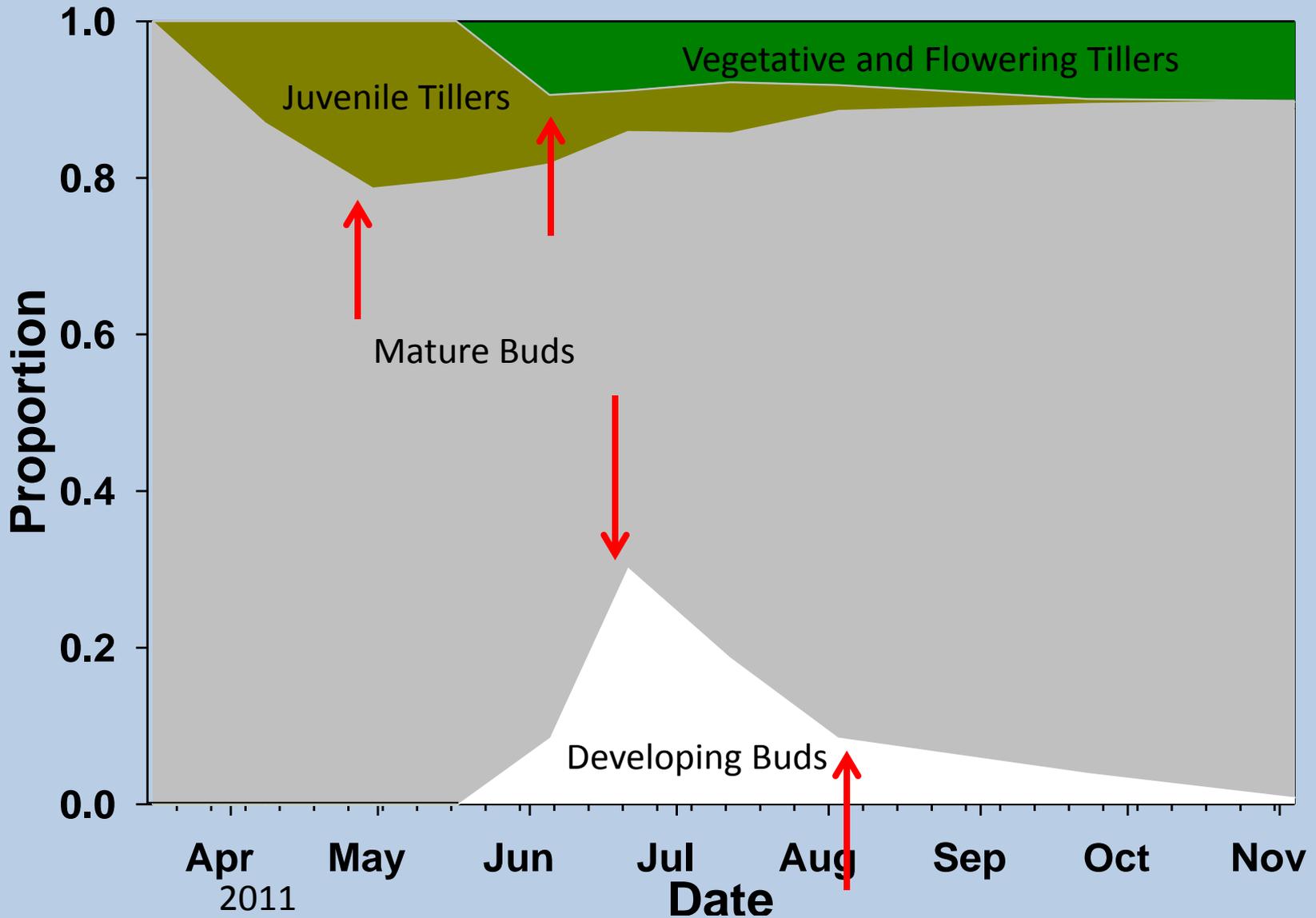


Juvenile Tillers

Bud bank trait: Bud Longevity ≥ 2.5 Years



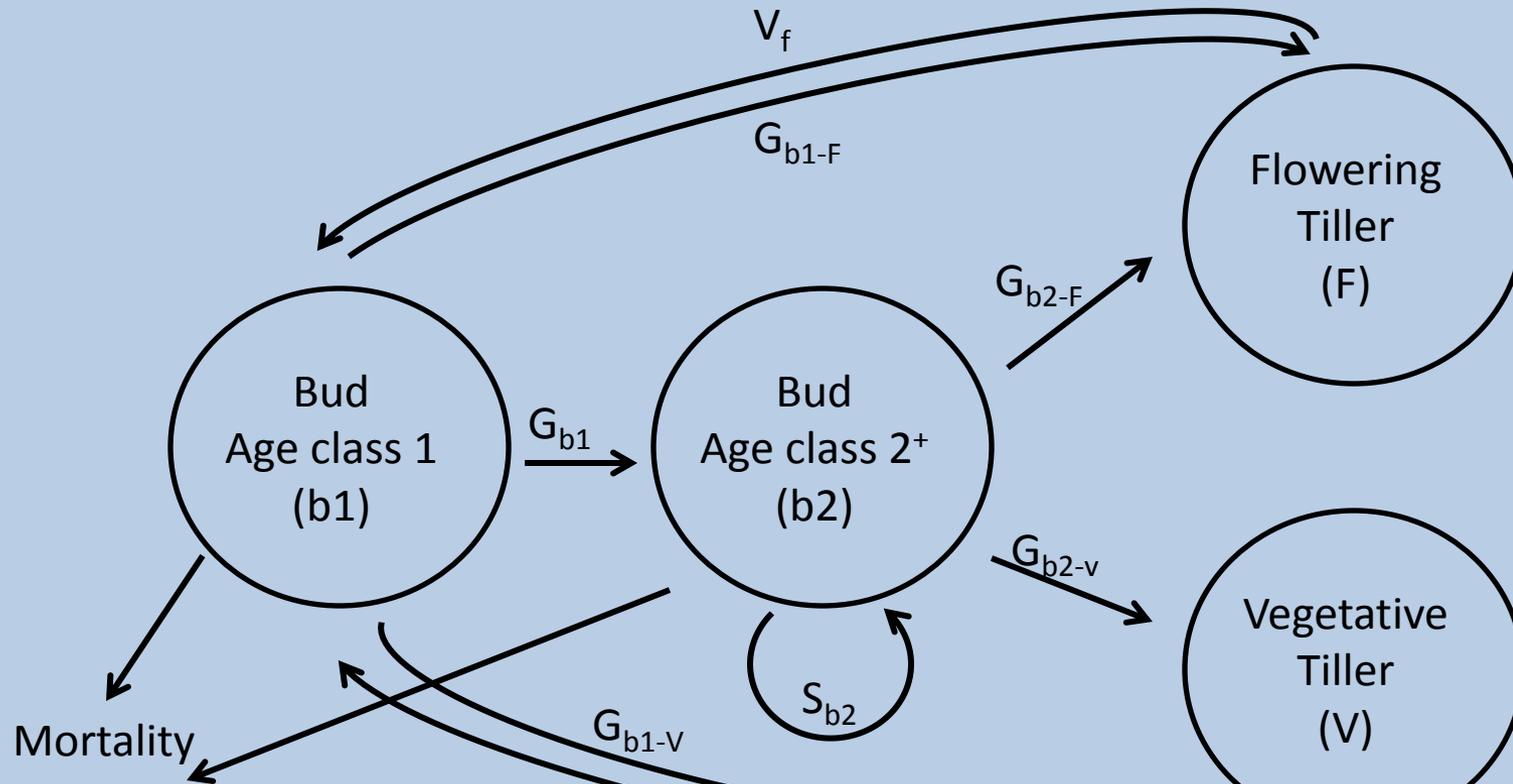
Bud bank trait: Synchronous Development



Summary of *A. gerardii* Bud Bank Traits

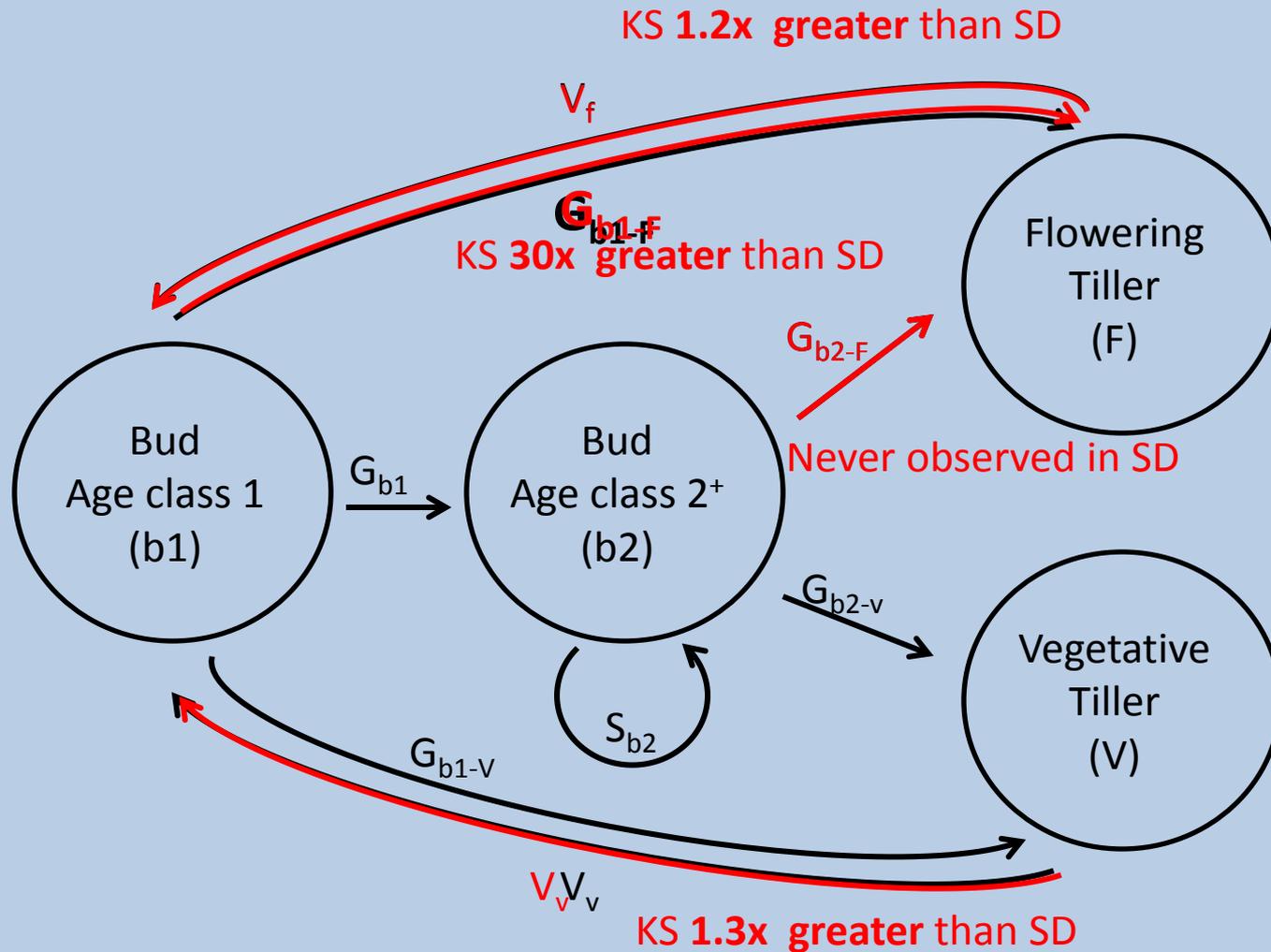
	Tallgrass prairie (center of its range)	Mixed-grass prairie (periphery of its range)
Bud Longevity	≥ 2.5 years	≥ 2.5 years
Bud Development	Syn.	Syn.
Critical period of bud dormancy	Winter	Winter

Vegetative life cycle of *Andropogon gerardii*



$$\mathbf{A} = \begin{bmatrix} 0 & 0 & V_v & V_f \\ G_{b1} & S_{b2} & 0 & 0 \\ G_{b1-v} & G_{b2-v} & 0 & 0 \\ G_{b1-F} & G_{b2-F} & 0 & 0 \end{bmatrix}$$

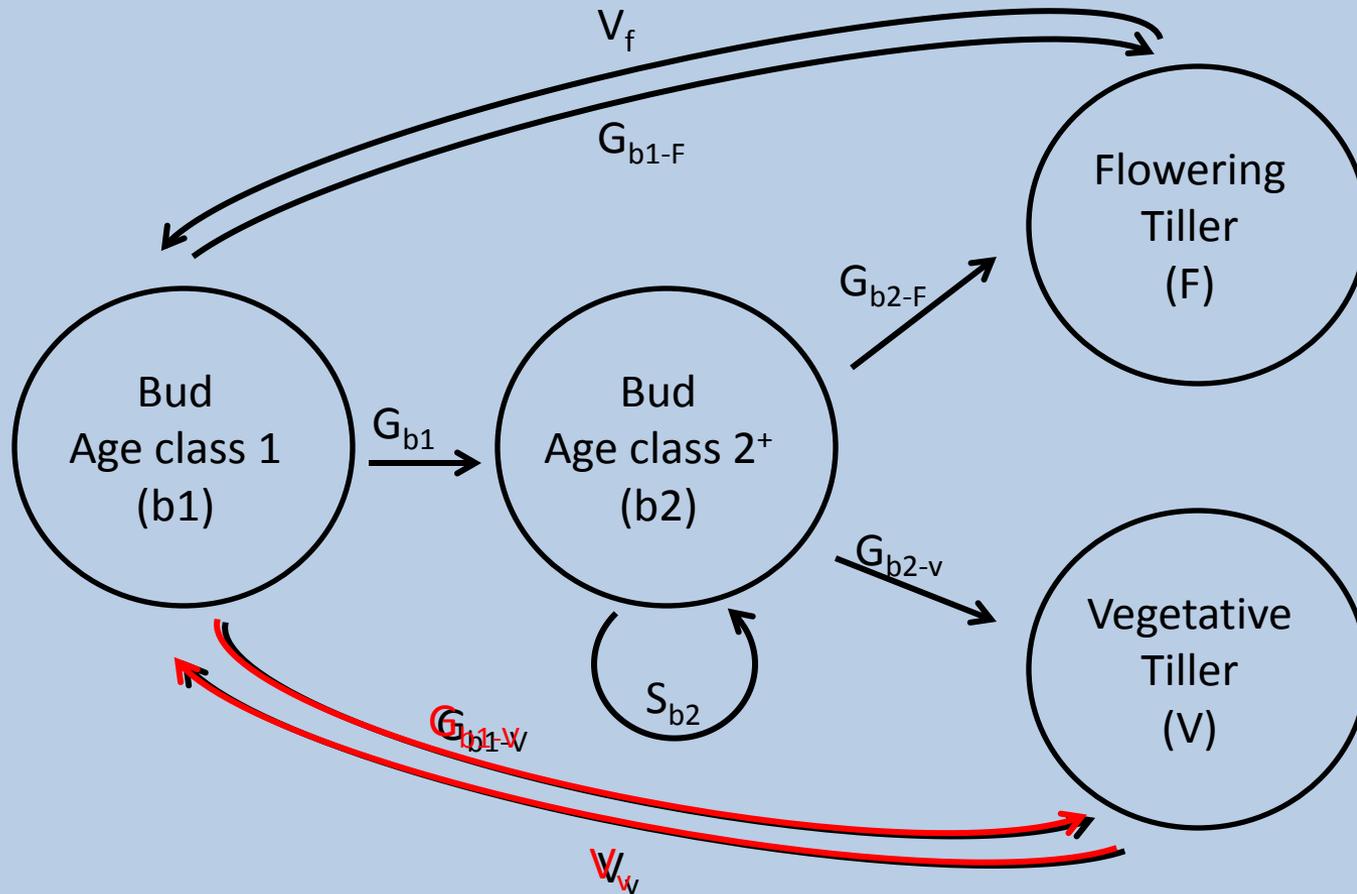
Differences in Regional Vital Rates (Individual Performance)



Regional Population Performance

	KS (Central)	SD (Peripheral)
λ	1.514	1.485
95% Bootstrapped CI of λ	[1.140, 1.877]	[0.930, 1.947]

Prospective Analysis: Loop Elasticities



KS: 0.717 ± 0.001

SD: 0.710 ± 0.002

Synthesis

- No change in bud bank traits between central and peripheral populations
- Decline in both sexual and vegetative reproduction of individual tillers in peripheral populations
- Vegetative reproduction enabled population persistence of a perennial grass at both the center and periphery of its range

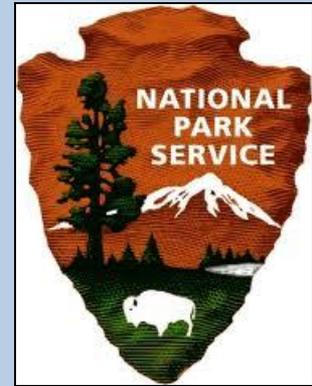
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