

# BNZ-LTER Consumer Working Group

BNZ All Hands Meeting, March 2023

How do population dynamics and activities of consumers interact with climate change to shape patterns of ecological succession?

Current Members: Berner, Doak, Genet, Hayes, Johnstone, Kielland, Leigh, Manlick, Schuette, Wagner, Walker

## Consumers Task C1

- Question: What factors control the population dynamics of aspen leaf miner and its impacts on aspen physiology and performance?
- Hypothesis: Should ALM densities remain high, they will have significant and widespread negative impacts on aspen physiology and growth, causing cascading shifts in canopy structure and successional trajectories



Approach C1	Lead Pls	BNZ support
Continue monitoring ALM pop'n dynamics at 4 intensive sites	Doak, Wagner	<ul> <li>Technician to support summer field &amp; lab work</li> </ul>
Add ALM & insect monitoring to annual sampling in RSN	Doak, Wagner, Johnstone	<ul><li>BNZ staff time</li><li>Training for staff</li></ul>
Aspen responses to experimental ALM suppression in aspen stands	Wagner, Mack, Doak	<ul> <li>Staff time to support new exp. in 2024</li> </ul>



#### Hypotheses:

- Infection by fungal canker elicits immune responses in aspen at the molecular level that depend on tree size, C and water balance, and severity of infection
- Variation in canker and ALM severity will affect tree growth and mortality depending on stand structure, time since fire, and site conditions

## Consumers Task C2

**Question**: How do legacies of stand structure, ALM activity, and drought interact to affect aspen susceptibility to running canker disease and the consequences for aspen dynamics?

Approach C2	Lead PIs	BNZ Support
Aspen physiology & gene responses to insecticide + shading experiment	Wagner, Schuette, Leigh, Doak	<ul> <li>Financial contribution to molecular work</li> <li>Final exp. year</li> </ul>
Monitor aspen responses to canker & ALM at RSN sites	Schuette, Leigh, Wagner, Doak	<ul><li>BNZ staff time</li><li>Summer RA</li></ul>
Surveys of canker infection across monitoring network	Schuette, USDA collaborators	<ul><li>BNZ staff time</li><li>Training</li></ul>



**Hypothesis**: Consumers act as a strong secondary filter affecting the:

- pace and outcomes of alternative successional trajectories via
- species-specific effects on growth and mortality of canopy species

### Consumers Task C3

**Question**: How do forest consumers interact with climate to shape successional trajectories?

Approach C3	Lead PIs	BNZ Support
Synthesize impacts of herbivores on successional trajectories	Johnstone, Doak, Kielland, Wagner	<ul> <li>Synthesis PostDoc (2 yrs starting fall 2023)</li> </ul>
Monitor insect herbivores & disease at RSN sites	Johnstone, Wagner, Doak, USDA collaborators	<ul> <li>BNZ staff time</li> <li>Support for training workshops</li> </ul>
Integrate field data with modeling, remote sensing, and SES	Hayes, Genet, Berner, Leigh, Johnstone	<ul> <li>Communication between groups</li> <li>Community involvement in training wkshops</li> </ul>

## Pest/Pathogen Workshop

•What:

• Annual spring training workshop

- •Why?
  - Monitor presence and intensity of insect pests and pathogens
  - Integrate with BNZ forest monitoring
  - Build broad capacity for pest/pathogen ID
  - Make part of forest health awareness

### •When: either

- June 1-2 (Thurs/Fri)
- June 2 and 5 (Fri/Mon)

•Who:

- Leaders: USFS Lori Winton & Sydney Brannoch
- Co-leads: Wagner, Doak, Schuette, Leigh
- Trainees: BNZ staff, students, investigators
- Future: Community members, artists

BNZ Break-out groups <u>Groups 1-3</u>: Identify the questions that interest you the most about the role of consumers in ecosystem dynamics

- 1. Invertebrate herbivores
- 2. Vertebrate herbivores
- 3. Pathogens

<u>Group 4</u>: Brainstorm strategies for recruiting diverse applicants for a BNZ synthesis post-doc.

\*\*Early career researchers especially welcome!\*\*

# Summary of 3 main questions for discussion

- 1. What factors control the population dynamics of aspen leaf miner and its impacts on aspen physiology and performance?
- 2. How do legacies of stand structure, ALM activity, and drought interact to affect aspen susceptibility to running canker disease and the consequences for aspen dynamics?
- 3. How do forest consumers interact with climate to shape successional trajectories?
- 4. What strategies should we consider for recruiting the first BNZ synthesis post-doc to work with the Consumers group?