Aspen Ecology in the United States: recent advances and future needs

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Outline:
• Current Issues
• Recent developments
  • Genetics & phytochemistry
  • Silviculture & management
  • Aspen as wildlife habitat
  • Monitoring extent & health
• Adaptive strategies for aspen futures
Current Issues

- Trophic cascades
- Natural Range of Variation
  - Keystone species
- SAD (short-term)
- Climate change & disturbance
- Wildlife browsing
- Historical human impacts
- “Oldest/largest living organism”
- Aspen decline (long-term)
- Ecological role of seedlings
Recent Developments

Genetics & phytochemistry

• Role of seeding?

• Stand structure/function

• Tradeoffs: growth & defense

• Genetics and/or climate in deteriorating stands

Mock et al., 2008; Wooley et al., 2008; Osier & Lindroth, 2006
Recent Developments

Silviculture & management

• All aspen are not alike

• Manage the system; not the species
  Dependent species
  Landscape mosaics
  Wildlife interactions

• Research needs:
  1. How low can you go?
  2. Large landscapes, wildfire, & wildlife
  3. Options for functional types
  4. Special situations: WUI, rec. areas, multi-owners

Rogers & Ryel, 2008; Kashian et al., 2007; Kurzel et al., 2007; Rogers et al., 2007; Shepperd et al., 2006
Recent Developments

Aspen as wildlife habitat

- Trophic interactions
- Disturbance & herbivory
- Interdisciplinary management
- Fencing & alts.
- Non-game species
- Behavioral Management?
- Economics vs. Ecosystems

Ripple et al., 2001; Hessl & Graumlich, 2002; Suzuki et al., 1999; Griffis-Kyle & Beier, 2003; Ripple & Beschta, 2007; Kota, 2005; Baker et al., 1999
Recent Developments

Monitoring extent & health

- Natural Range of Variation
  Settlement, climate, management
  Historical sources & methods

- Climate warming/historical analogues

- Measuring Change
  SAD & Long-term decline
  (current) Aspen present vs. aspen dominant
  Functional types, regional variation

- Application of existing monitoring
  Forest Inventory & Analysis
  USFS aerial & ground surveys
  USFS remote sensing service center
  NPS Monitoring

Rogers et al., 2007; Zier & Baker, 2006; Kaye et al., et al., 2004; Bartos & Campbell, 1998
Adaptive strategies for aspen futures

Critical Questions:

• Social science sensibilities?
  Economic & aesthetic uses
  Historical perspectives
  Land use and manager values

• Standardize definitions?
  Aspen cover
  Functional types
  Sustainable communities

• Life history
  Role of seeding/climate interactions
  Age of clones
  Growth & defense

• Biodiversity/system understanding
  Historic & current beaver role
  Hydrological systems & tradeoffs
  Floral /faunal changes with succession
Adaptive strategies for aspen futures

Strategies:

• Preserve ecological functionality
• Engender flexible management approaches
• Promote experimentation or “learning as we go”
• Not one size fits all (limiting options)
• Strategic “systems” thinking: functional structure; local adaptation

Holling & Meffe, 1996; Gunderson & Holling, 2002
Adaptive strategies for aspen futures

Closing Thoughts:

1. Not only ecology; integrate human systems

2. A network of managers/scientists
   - Make resources/knowledge widely available
   - Utilize expertise & two-way communication
   - Open dialogue
   - Avoid “turfiness”
   - Consider alternatives; critically evaluate applications

3. Do we know all there is to know about aspen?
Credits

Utah State University
College of Natural Resources
FORESTRY EXTENSION

USDA Forest Service
Intermountain Region

Rocky Mountain Research Station

USDA
Rocky Mountain Region