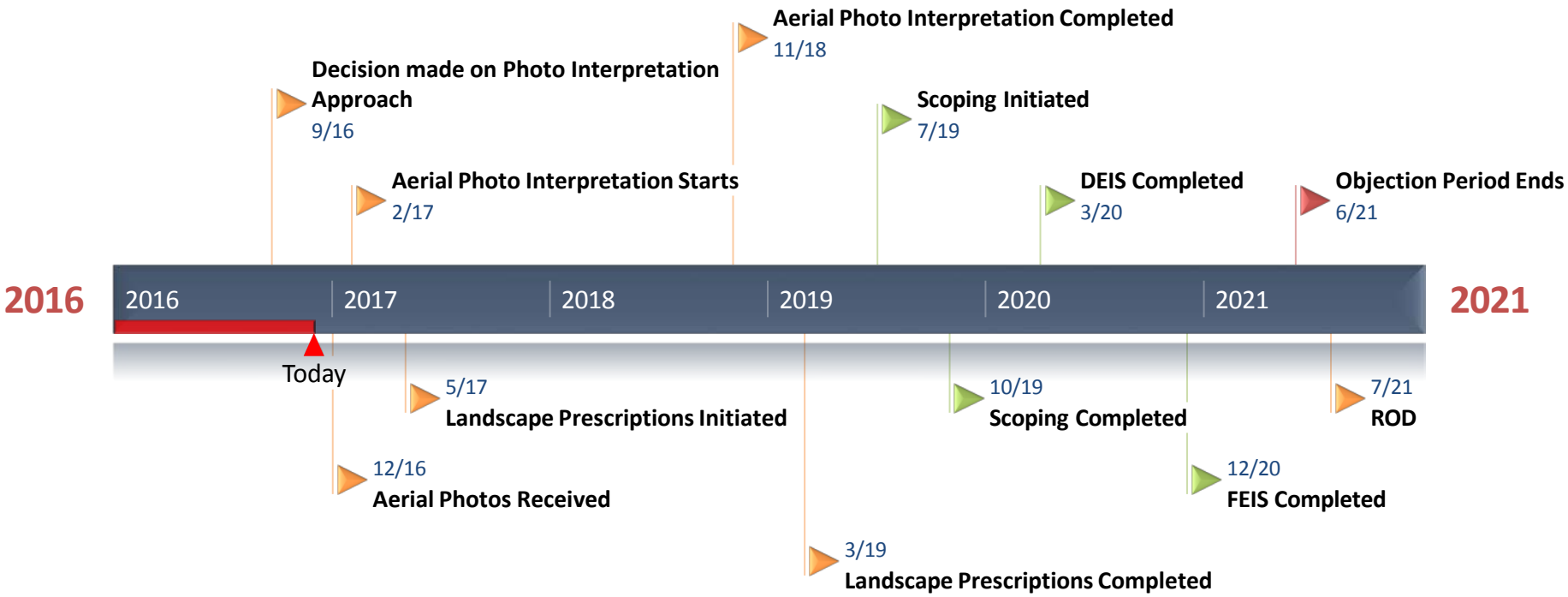
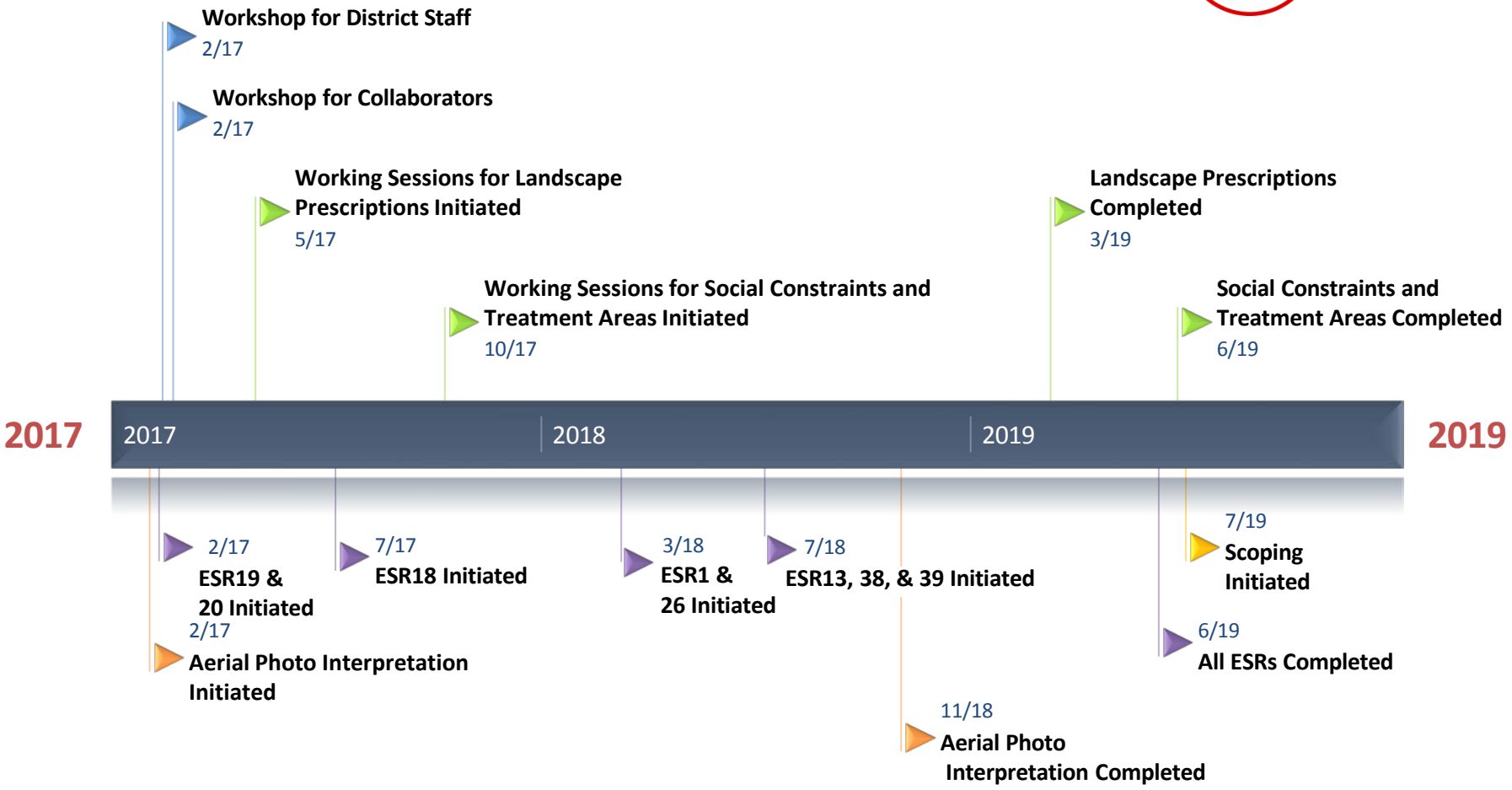
Blackfoot-Swan Landscape Restoration Project

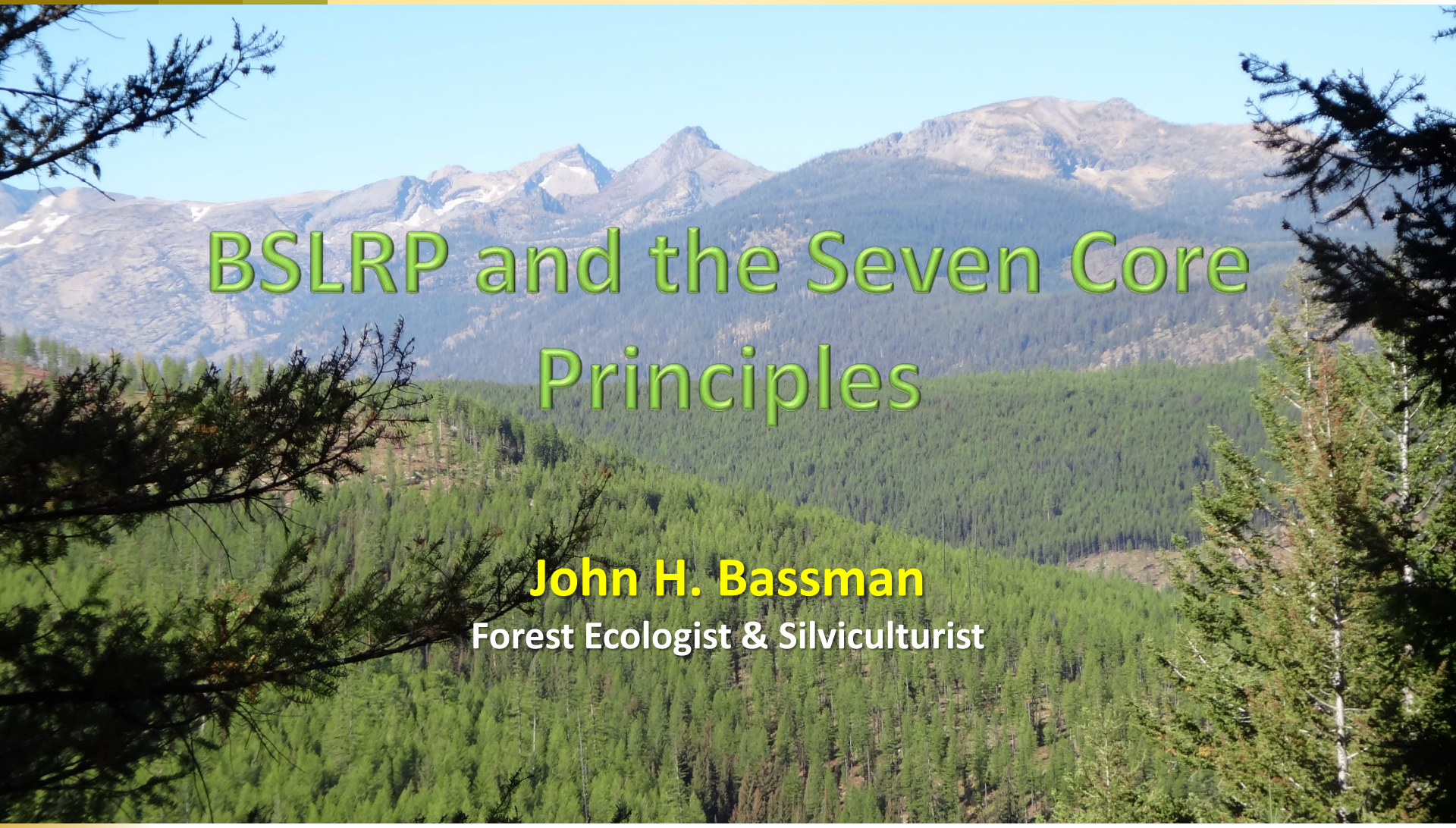
AN INTRODUCTION AND OVERVIEW

BSLRP Milestones Timeline



BSLRP FY17 & FY18





BSLRP and the Seven Core Principles

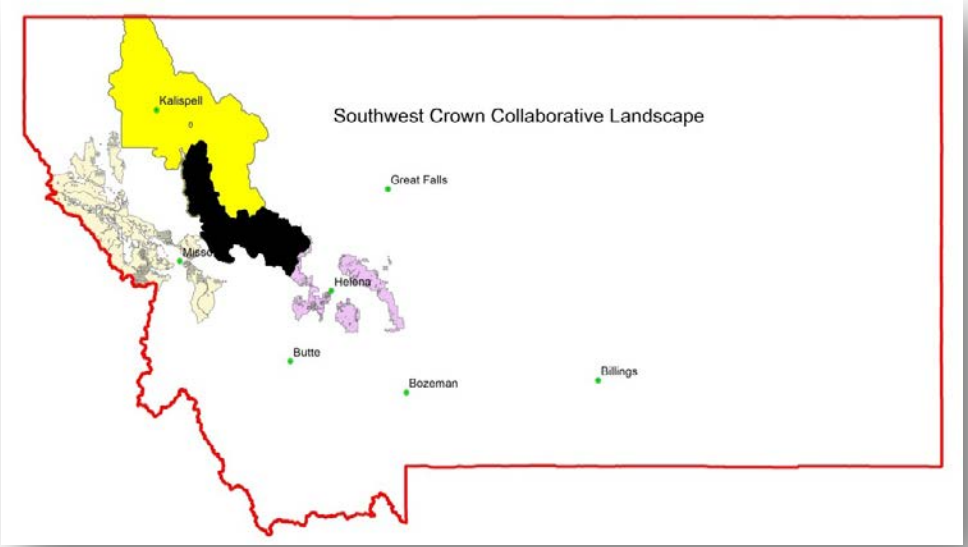
John H. Bassman
Forest Ecologist & Silviculturist

BSLRP is a Landscape Project

Why a landscape restoration approach?

- Biodiversity is best managed at greater spatial & temporal scales
- Economies of scale for NEPA process
  - Greater efficiencies
  - Reduced planning costs
  - Reduced litigation expenses

- Project area: 1.3 million acres – larger than the Helena National Forest
- Multiple land ownerships and tenure
- 3 National Forests, 3 Ranger Districts, 3 major watersheds



Project History

1. SWCC Restoration Strategy 2012
2. Forest Supervisors take landscape project proposal to regional forester
3. Regional forester embraces ecological objectives and economies of scale; becomes Northern Region Pilot for large-scale projects
4. Project launches March 2014; PIL signed by Forest Sups Oct. 2014
5. Framework developed incorporating 7 principles early 2015; approved by line officers Sept. 2015
6. Hessburg landscape assessment approach proposed March 2016; approved by line August 2016.

Project Purpose

- **Reduce the risk of uncharacteristic wildfire**
- **Conserve terrestrial and aquatic biodiversity**

  - Shift planning from stand to landscape management
  - Analyze for conservation of biodiversity vs. single species management
  - Conservation & restoration across ownerships
  - Focus on potential impacts of climate change

Landscape Ecology & Biodiversity

Structure	Function	Pattern	Process
-size, shapes, numbers, kinds, configuration -determinant of and limits function	-interaction between spatial elements -flow of energy, materials, organisms	-spatial distribution of structural units -a determinant of landscape structure	-spatial pattern influences many ecologically important processes

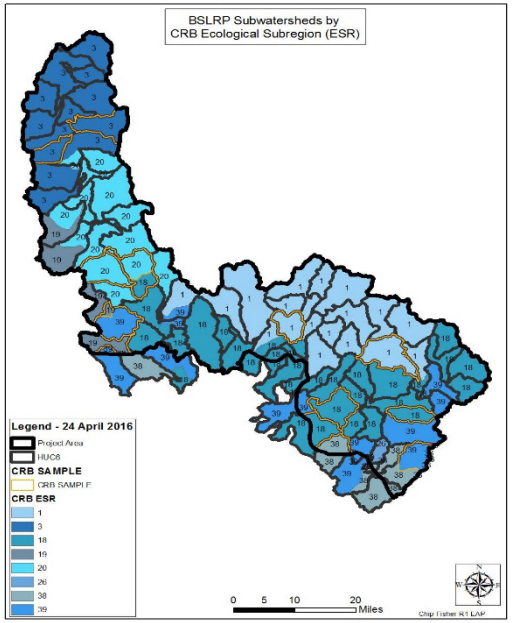
- Since it is not possible to quantify and monitor biodiversity directly, a proxy for biodiversity is needed that can be.
- Spatial patterns define landscape structure, which in turn, is responsible for supporting functions (processes) that sustain biodiversity.
- Consequently, restoring spatial patterns is consistent with conserving biodiversity.
- **If you build it, they will come. . .**
- **Goal: Functional Ecosystems**

Gaines et al. (1989)

(1) Regional landscapes function as multi-level, cross-connected, patchwork hierarchies with patterns and processes that interact across spatial scales.

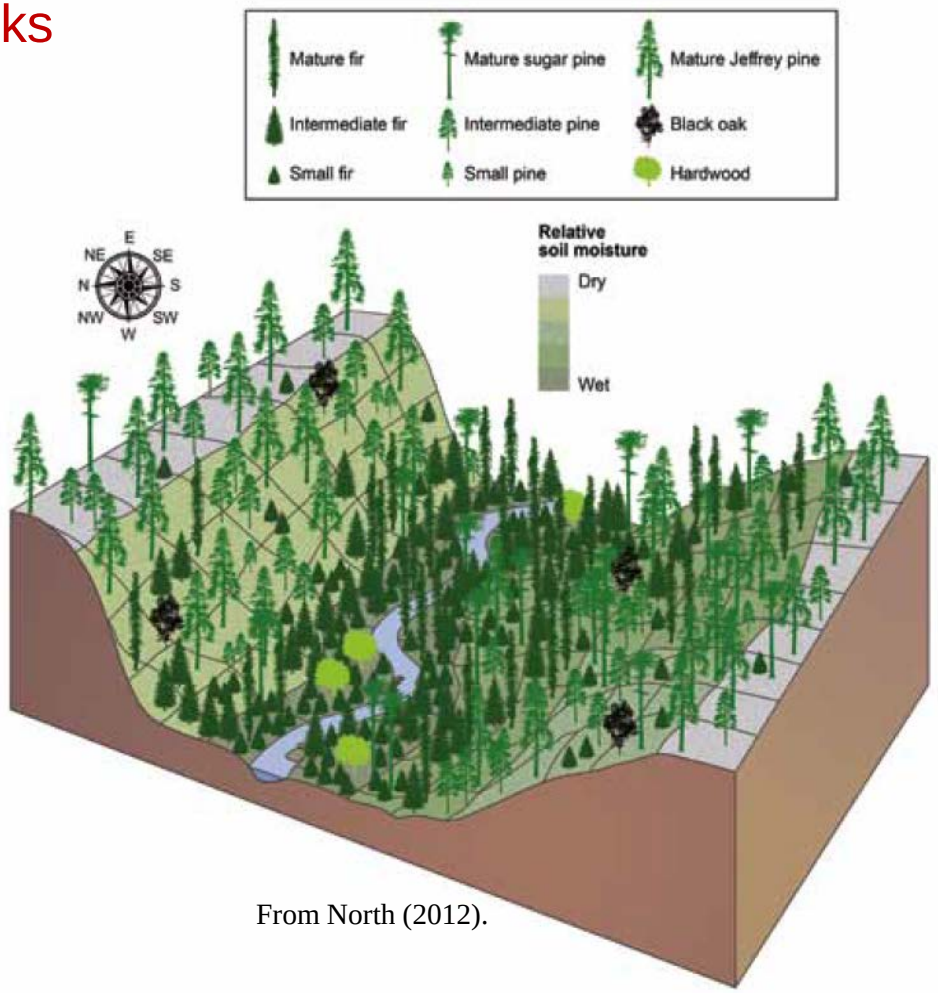
Conduct planning and management at appropriate scales to effectively restore multi-level landscape patterns, processes, and dynamics.

- **BSLRP project will organize around ecological subregions**
- **Within subregions, sub watersheds.**
- **Within sub watersheds, successively smaller divisions based on similarity in biophysical attributes at smaller scales.**
  - At the finer level of ecological classification, the landscape can be partitioned according to the potential to support vegetation communities
  - Region 1 Classification:
    - Broad Potential Vegetation Types (PVTs)
      - Habitat Type Groups
        - Habitat Types



Use topography to guide restoration and successional and habitat patchworks

- **Fire risk models developed as part of our assessment work have already incorporated this principle**
- **We can further utilize this principle in developing desired conditions, assessing departures from those, and establishing priorities and sideboards for treatments (or design criteria).**



From North (2012).

(3) Disturbance and succession drive ecosystem change.

Move toward restoring natural fire regimes and the variation in successional patterns that supported them so that other processes may follow

- Planning and management should identify and restore natural disturbance regimes to create resilient landscapes (Hessburg).
- Will likely require modification of forest structure and composition patterns using a combination of mechanical and/or prescribed burns.
- The framework for the BSLRP project is centered on this concept.

(3) Disturbance and succession drive ecosystem change.

Move toward restoring natural fire regimes and the variation in successional patterns that supported them so that other processes may follow

- Except that a *focus on resiliency* as defined by Forest Service Handbook direction means that **it is neither feasible nor desirable to return all the way to historical fire regimes in some cases**, particularly where those regimes entailed high fuel loadings and stand replacement fires.
- The future climate may cause shifts in inherent disturbance regimes that can be anticipated with some degree of reliability based on climate prediction models (NRAP).

4) Predictable patch size distributions historically emerged from linked climate-disturbance-topography-vegetation interactions.

Move toward restoring size distributions of historical successional patches and allow changing climate and disturbance regimes to adapt to them.

- **Hessburg et al. (2015) observe that low, mixed, and high severity wildfires historically maintained heterogeneous patchworks of burned and recovering vegetation with insect, pathogen, and weather disturbances contributing to complexity.**
  - These mosaics resisted abrupt and largescale changes by reducing fuel contagion and the likelihood of large and severe fires.
- **Our understanding of distributions of successional patches on the BSLRP landscape is at present incomplete.**
  - We are acquiring data necessary to better characterize spatial patterns.
- **But even without specific knowledge of the historical condition, treatments can focus on increasing the frequency of variably-sized openings and successional patches.**
  - This will increase landscape heterogeneity and thus biodiversity (Churchill and others 2013).

(5) Successional patches are "landscapes within landscapes".

In dry pine, and dry to mesic mixed-conifer forests, restore characteristic tree clump and gap variation within patches.

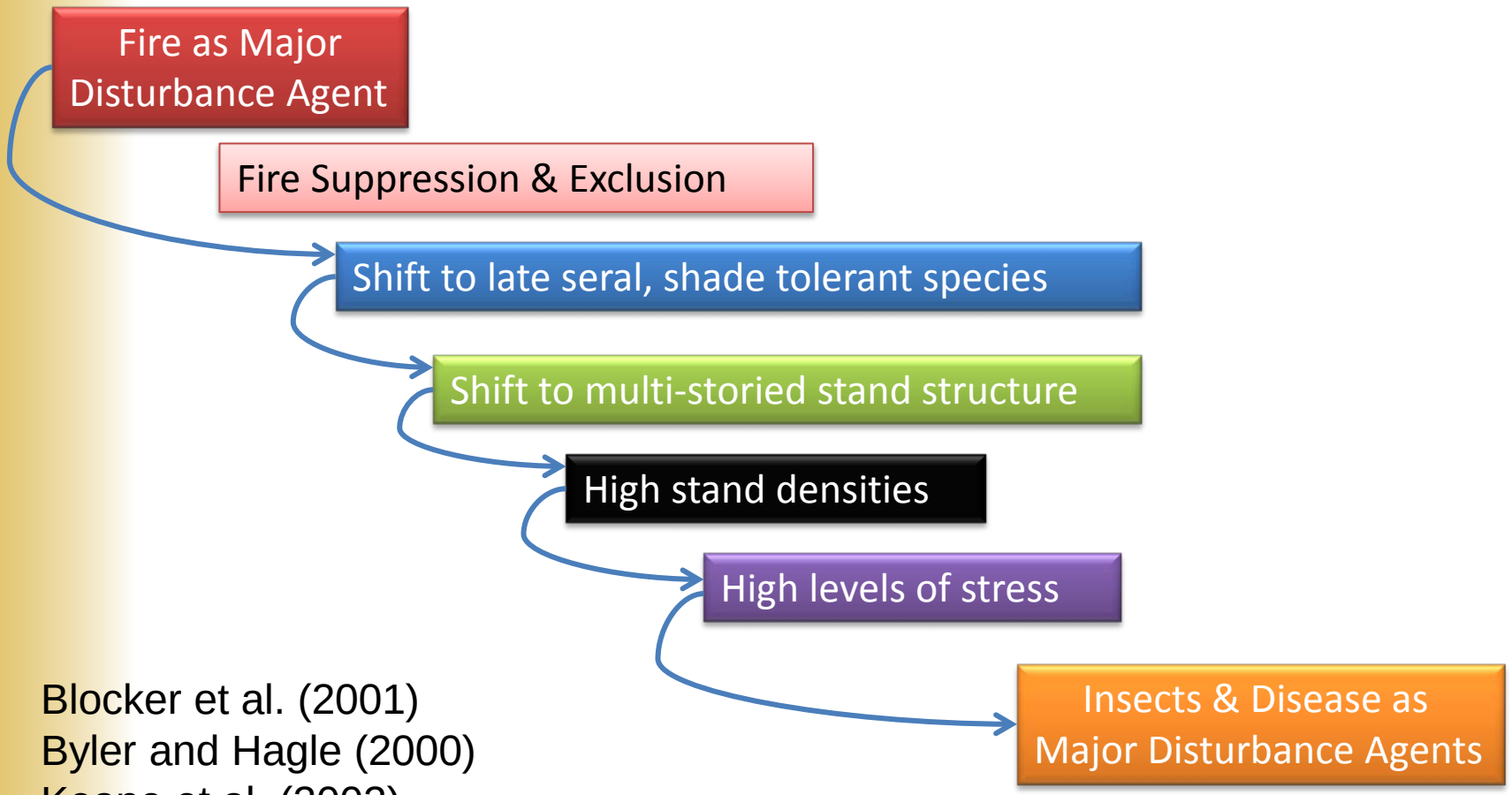
- **On the continuum from ecoregions to local landscapes to individual patches, this principle applies to the fine scale, individual patches**
- **Hessburg et al. (2015) observe that patch level prescriptions should aim to restore variable patterns within stands by re-establishing historical mosaics of individual trees, tree clumps, and openings.**
- **The BSLRP project will aim at evaluating and correcting departures from desired conditions at the midscale (patch) level.**
- **Consequently, we will not directly address the issue of spatial heterogeneity within patches (stands).**
  - However, design criteria can address this issue by providing guidance during development of site-specific prescriptions at implementation.

(6) Widely distributed large, old trees provide a critical backbone to dry pine and dry to mesic mixed-conifer forest landscapes.

Retain and expand on existing relict trees, old forest, and post-disturbance large snags and down logs in these types.

Changing Disturbance Regimes

Inherent Disturbance Regimes

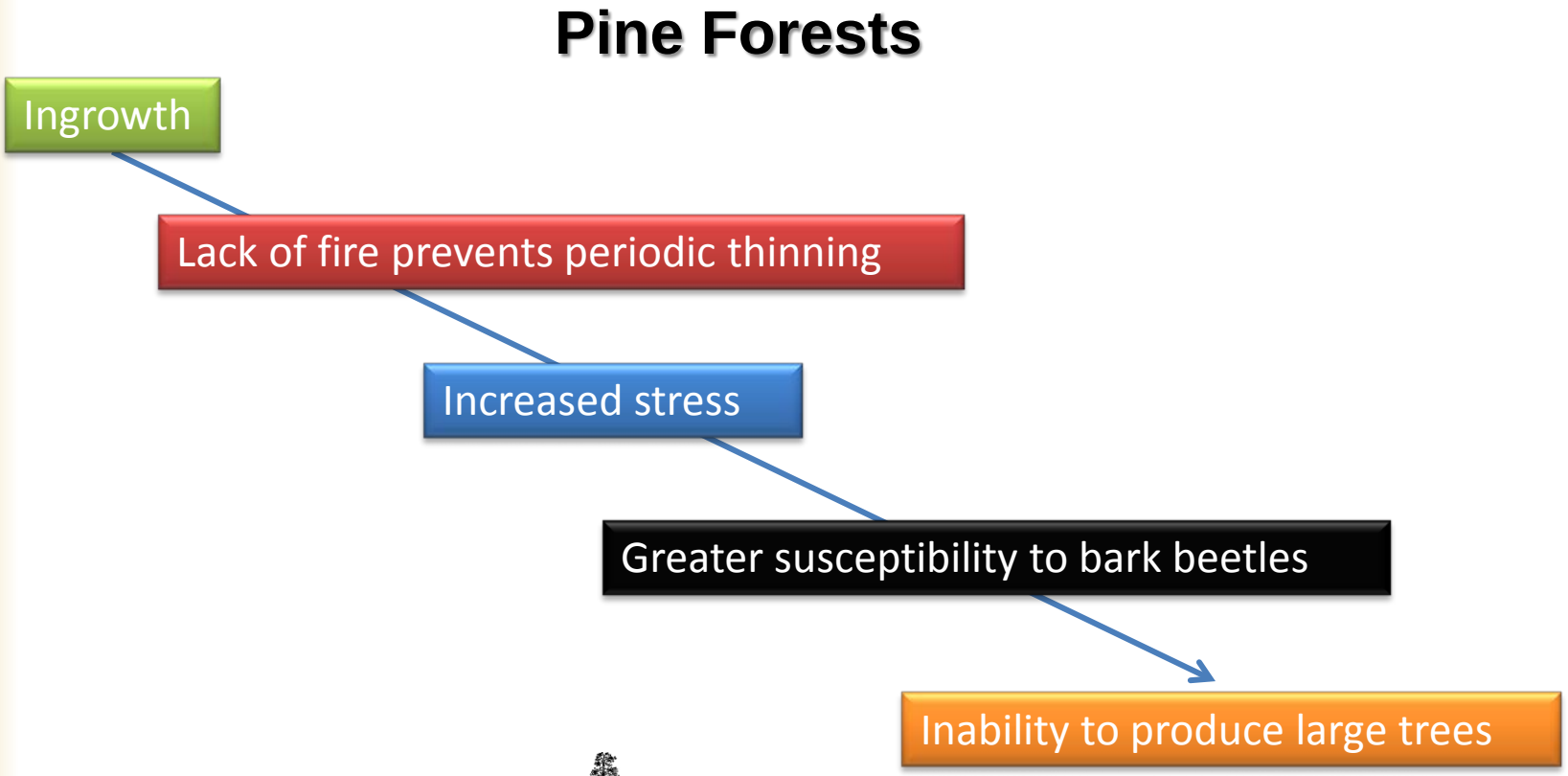


Blocker et al. (2001)
Byler and Hagle (2000)
Keane et al. (2002)

Existing Disturbance Regimes

Changing Disturbance Regimes

With 100 years of fire suppression, stand structures and species composition have been altered and thus the ways in which insects and disease function in the landscape.



Changing Disturbance Regimes

Douglas-fir Pine Mixtures

- Root disease dominant influence in Douglas-fir
- Fire intervals influence root fungal colonies
  - ❖ Frequent low intensity fire favors ponderosa pine
  - ❖ Open spacing minimizes extent of root pathogens
- Fire exclusion favors Douglas-fir and increased root disease
- Once converted to Douglas-fir, most stands remain so even with root disease killing many of the Douglas-fir
- Prolonged root disease alters appearance and function
  - Limited production of large tree elements – live trees, snags, coarse woody debris
  - Develop mosaics of multistoried tree structures with few large trees
- Increased susceptibility of larger trees to Douglas-fir beetle

Changing Disturbance Regimes

Western Larch Forests

- Historically, combination of root disease, low-intensity surface fires, and mixed severity fires worked in concert to maintain larch cover types
- Fire return interval important to maintaining larch cover type
  - When frequent, reduces fungus biomass by keeping Douglas-fir and true fir root systems small
  - Absence of fire allows Douglas-fir and true firs to establish; limited opportunity for larch to regenerate
  - Large trees become increasingly rare and tallest canopy becomes sparse while lower canopy becomes very dense
  - Fire behavior, forage, and habitat characteristics can be very different from those historically typical

(6) Widely distributed large, old trees provide a critical backbone to dry pine and dry to mesic mixed-conifer forest landscapes.

Retain and expand on existing relict trees, old forest, and post-disturbance large snags and down logs in these types.

- **The BSLRP project is committed to finding and preserving the large tree component of the landscape and has developed new assessment tools in conjunction with R1 Inventory and Analysis to quantify their numbers and distribution.**
- **Recently acquired LiDAR data will be an important asset in accomplishing this goal as well.**

(7) Land ownership, allocation, management and access patterns disrupt landscape and ecosystem patterns.

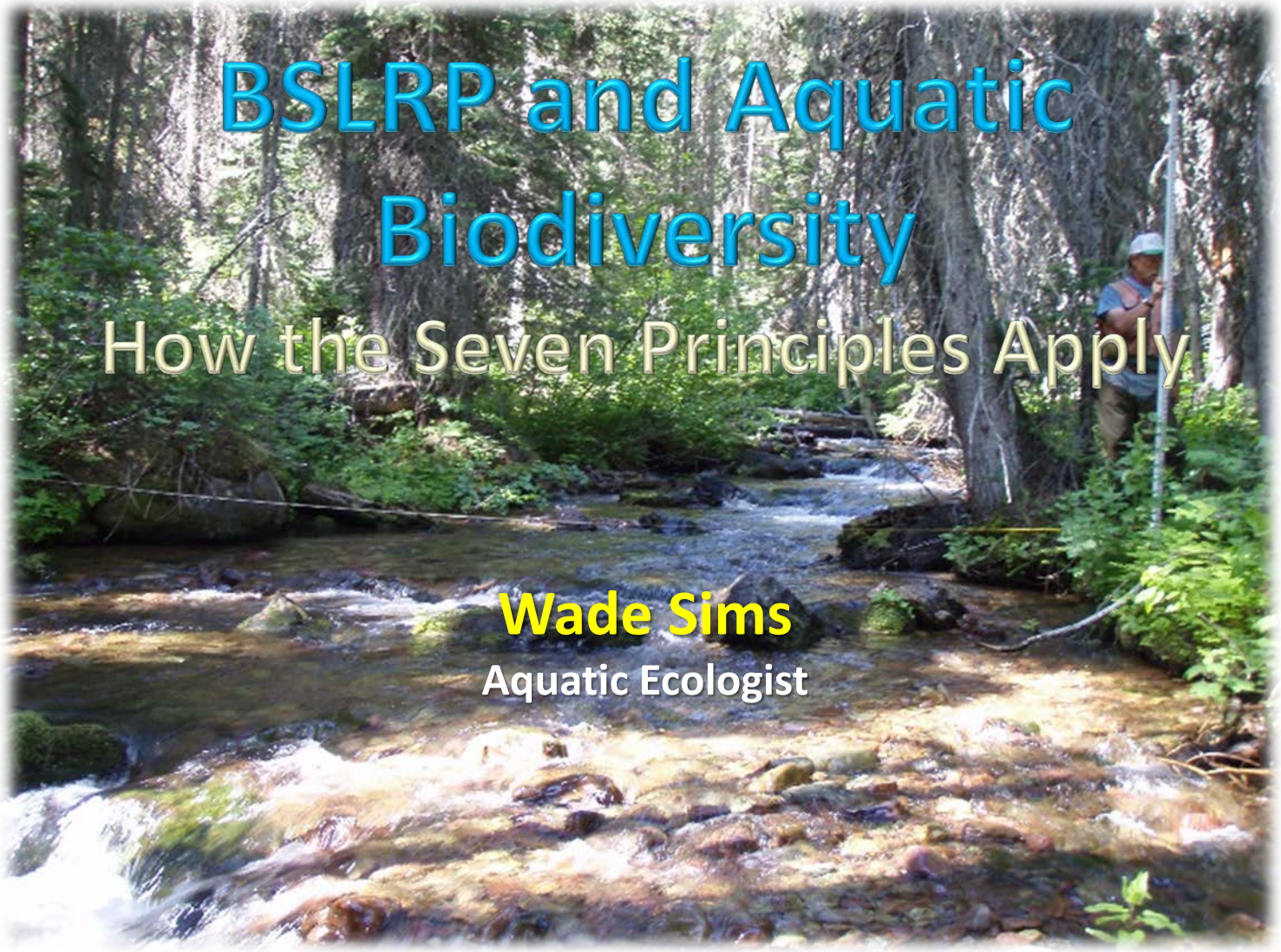
Work collaboratively to develop restoration projects that effectively work across ownerships, allocations, and access needs.

- **Hessburg et al. (2015) observe that land ownership and allocation boundaries within ownerships are a byproduct of historical social and political decisions that were indifferent to the underlying ecology.**
- **The accumulated results of these decisions are a landscape fragmented by ownership and allocation.**
- **Consequently, a landscape approach to restoration necessarily must take a cross-boundary, collaborative approach.**

(7) Land ownership, allocation, management and access patterns disrupt landscape and ecosystem patterns.

Work collaboratively to develop restoration projects that effectively work across ownerships, allocations, and access needs.

- **The BSLRP project early on recognized this issue.**
- **The Project Initiation Letter specifies that the team should set biodiversity and fuels goals across ownerships in collaboration with other agencies and the private sector.**


BSLRP and Aquatic Biodiversity
How the Seven Principles Apply
Wade Sims
Aquatic Ecologist

Conserve Aquatic Biodiversity

- **In general, landscape management following the 7 principles will result in functioning terrestrial landscapes that contribute to functioning aquatic systems.**
- **Specific principles that are directly applicable:**
  - Principle 4: “Disturbance and succession drive ecosystem change” and
  - Principle 7: “… management and access patterns disrupt landscape and ecosystem patterns”

Conserve Aquatic Biodiversity

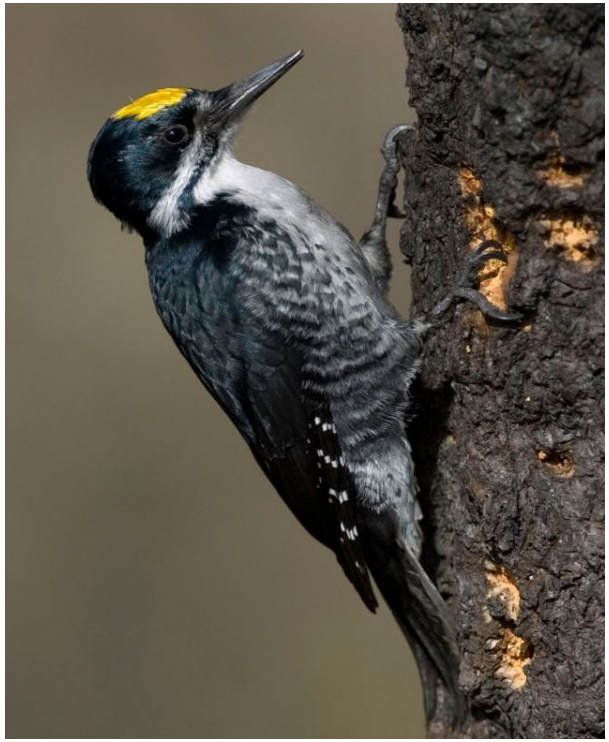
- **Inherent disturbance regimes have changed over portions of the BSLRP aquatic network due to road construction and fire exclusion.**
  - interrupting the recruitment of large wood
  - accelerating the delivery of fine sediment
- **Restoration activities can reduce non-natural disturbance events through road improvements or removal, and reintroduction of fire.**


BSLRP and Conserving Wildlife Biodiversity
How the Seven Principles Apply
Chip Fisher
GIS Analyst
BSLRP
Melissa Hart
GIS Analyst/Ecologist
Montana Natural Heritage Program

Conserve Wildlife Biodiversity

Moving toward restoration of natural fire regimes would lead toward heterogeneous patch distributions and, in turn, diverse and resilient wildlife habitat networks.

1. **Analysis of regional landscapes allows for multiscale wildlife habitat use patterns and importance of connectivity, critical for species like lynx**
2. **Topographic based restoration is a way to act on Principle 1, and could improve habitat patchworks and connectivity**
3. **Disturbance and succession drive ecosystem change, and species like black-backed woodpecker follow that change across landscapes**



Conserve Wildlife Biodiversity

4. **Repeating patch size distributions across landscapes could also be an important part of habitat suitability and connectivity**
5. **Addressing within-patch heterogeneity when developing site-specific prescriptions can enhance habitat**
6. **Widely distributed large, old trees are used by several species within the BSLRP area, including flammulated owls and pileated woodpeckers**
7. **Wildlife species don't stop at ownership or management boundaries, so we can't stop our management there either**