Ecological Overview of Riparian Areas in the Blue Mountains
S Trent Seager
Science Advisor, Blue Mountains Forest Partners

Bob Hassmiller
Hydrologist, Blue Mountains Ranger District, Malheur National Forest

trent.seager@oregonstate.edu
1. Why riparian areas?

2. Their ecological role & our social values:
   - function & process
   - aquatic food webs
   - wildlife & fire

3. Landscape scale

4. Watershed scale

5. Project and Unit scale

6. Next Steps
Ecological Overview of Riparian Areas

1. Why riparian areas?

2. Their ecological role & our social values:
   • function & process
   • aquatic food webs
   • wildlife & fire

3. Landscape scale

4. Watershed scale

5. Project and Unit scale

6. Next Steps
Riparian areas have different *Processes and Functions* than the dry-mixed-moist conifer forests we otherwise work in.

In these settings...

Collaboratives may have different Social Values

Forest Service may have different Purpose & Need

- entirely different food webs
- aquatic & terrestrial wildlife
- different role in fire behavior & recovery
- connectivity-permeability on the landscape
Data and research shows that some riparian areas are not functioning properly and would benefit from restoration.

Which ones? How? When? and Why?

Answer some but not all of those questions today. We’ll be giving: **new tools, new tech, and new insights** so you can work to find those answers with our collaborative partners!
1. Why riparian areas?

2. Their ecological role & our social values:
   - function & process
   - aquatic food webs
   - wildlife & fire

3. Landscape scale

4. Watershed scale

5. Project and Unit scale

6. Next Steps
Riparian areas have different *Processes and Functions* than the dry-mixed-moist conifer forests we otherwise work in.

**Watershed Scale Processes**

- Runoff and stream flow
- interception
- snow melt
- surface runoff
- subsurface flow
- hyporheic flow
- groundwater flow
Riparian areas have different *Processes and Functions* than the dry-mixed-moist conifer forests we otherwise work in.

**Watershed Scale Processes**

- Runoff and stream flow
- interception
- snow melt
- surface runoff
- subsurface flow
- hyporheic flow
- groundwater flow
Riparian areas have different *Processes and Functions*

**Watershed Scale Processes**

- Erosion and sediment supply
  - surface erosion, mass wasting, soil creep
- Nutrient delivery
Reach Scale Processes

- **Riparian vegetation**
  - shading, bank, wood supply, sediment retention, litter fall
- **Stream flow and flood storage**
- **Sediment transport and storage**
- **Channel, floodplain, and habitat dynamics**
- **Organic matter transport and storage**
- **Instream biological processes**
Ecological Role

Function

• **Hydrology and sediment dynamics**
  - surface water storage, high water table, sediment accumulation & transportation

• **Biochemistry and nutrient cycling**

• **Habitat and food web maintenance**
  - streamside vegetation maintenance, terrestrial vertebrate populations, aquatic vertebrate populations
Social Values

• While Ecological Role influences some social values, diverse backgrounds and diverse places emphasize or highlight values important to us

• This is done in the context of the FS Purpose & Need, which usually captures Ecological Role

• Cover some social values for examples
Aquatic Food Webs

- Listed fish species
- Covered by PACFISH/INFISH
- NOAA/NMFS and USFWS become their voices
- Listed fish are protected by not harming habitat (stream temperature, disturbance, etc.)
Aquatic Food Webs

- Listed fish species
- Insects and inputs from terrestrial system
- Nutrient delivery upstream for downstream habitat
- Management decisions impact these positives
Terrestrial Wildlife
- Woodpeckers (multiple MIS)
- Marten (MIS)
- Goshawk (ES screens)
- Beaver
- Cavity nesters: passerines, small mammals
- Ungulates: elk and deer
- Carnivores: cougar, bobcat, bear, wolf
A Watershed And Its Parts

- Ephemeral Draws
- Water Source Area
- Perennial Stream
- Intermittent Stream
- Riparian/Wetland Area
- Watershed Outlet
Fire

- May help some of our social values
- Restoration can ID how to decrease impact on those values
- Natural fire break (moisture, plants, trees)
- Recovery post-fire to keep key functions and processes
- Keep habitat stable or quickly recover

Social Values
Economics

• If removal of trees helps ecological processes and doesn’t impact wildlife (or helps)
• Reduction in fuels allows systems to recover more quickly post-fire
• Then ecological framework has been met
• Economics are important for local communities and keeping mills open for further restoration
• Economics helps funds projects, especially NFs that don’t have CFLRP
Fire Return Intervals

- Some burned same as adjacent uplands (conifer forest type)
- Some burned less frequently (and severity)
- Some burned more frequently (and severity)

Luce et al. 2012. Climate change, forests, fire, water, and fish (GTR).
Social Values

- So which sites were burning historically?
- When do we know that it is ecologically important?
- When is it ecologically valid for our wildlife social values?
- Is it economically viable?
- Are we sure it is going to do good?
- What about not doing bad?

- These are the key questions many collaboratives have – here in the Blues – also in Washington and Idaho

- The science is still looking into fuels & fire behavior, but much of the other information if available, and today we’ll discuss key pieces and where to get more information
1. Why riparian areas?

2. Their ecological role & our social values:
   - function & process
   - aquatic food webs
   - wildlife & fire

3. Landscape scale

4. Watershed scale

5. Project and Unit scale

6. Next Steps
Landscape Scale

A Watershed And Its Parts

- Ephemeral Draws
- Water Source Area
- Perennial Stream
- Intermittent Stream
- Riparian/Wetland Area
- Watershed Outlet
Ecological Overview of Riparian Areas

1. Why riparian areas?

2. Their ecological role & our social values:
   • function & process
   • aquatic food webs
   • wildlife & fire

3. Landscape scale

4. Watershed scale

5. Project and Unit scale

6. Next Steps
1. Function and Processes?

✔ Watershed Scale Processes
Watershed Scale

1. Function and Processes?

2. Aquatic Food Webs?
   - Listed fish species
   - Insects and inputs from terrestrial system
   - Nutrient delivery for downstream insects
1. Functions and Processes?
2. Aquatic Food Webs?
3. Terrestrial Wildlife?
   ✓ Corridors, Connectivity
   ✓ Wildlife movement
     • Ungulates
     • Carnivores
     • Avian dispersal and migration
1. Functions and Processes?
2. Aquatic Food Webs?

3. Terrestrial Wildlife?
   ✔ Corridors, Connectivity
   ✔ Wildlife movement
   • Ungulates
   • Carnivores
   • Avian dispersal and migration
1. Functions and Processes?
2. Aquatic Food Webs?
3. Terrestrial Wildlife?
4. Fire (desired effect/HRV)?
   ✔ History, current
   ✔ Depends (NetMap can help!)
   ✔ Modeling fire behavior
1. Functions and Processes?
2. Aquatic Food Webs?
3. Terrestrial Wildlife?
4. Fire (desired effect/HRV)?
5. Economics

✔ Unknown, scale up from units and projects
1. Why riparian areas?

2. Their ecological role & our social values:
   • function & process
   • aquatic food webs
   • wildlife & fire

3. Landscape scale

4. Watershed scale

5. Project and Unit scale

6. Next Steps
Project or Unit Scale

1. Functions and Processes?
   ✔ Reach Scale Processes
   • Riparian vegetation
   • Stream flow and flood storage
   • Sediment transport and storage
   • Channel, floodplain, and habitat dynamics
   • Organic matter transport and storage
   • Instream biological processes
1. Functions and Processes?
2. Aquatic Food Webs?
   ✔ Key habitat; key inputs; direct =/- impact
Project or Unit Scale

1. Functions and Processes?
2. Aquatic Food Webs?
3. Terrestrial Wildlife?
   ✔ Core habitat; breeding habitat
1. Functions and Processes?
2. Aquatic Food Webs?
3. Terrestrial Wildlife?
1. Functions and Processes?
2. Aquatic Food Webs?
3. Terrestrial Wildlife?
4. Fire (desired effect/HRV)?
   ✔ History, current
   ✔ Depends (NetMap can help!)
   ✔ Local data for local effect
1. Functions and Processes?
2. Aquatic Food Webs?
3. Terrestrial Wildlife?
4. Fire (desired effect/HRV)?
5. Economics

✔ Start with pilot project
✔ Tie into larger projects to help assure restoration is affordable to meet social values
1. Why riparian areas?

2. Their ecological role & our social values:
   - function & process
   - aquatic food webs
   - wildlife & fire

3. Landscape scale

4. Watershed scale

5. Project and Unit scale

6. Next Steps
Next Steps

Take what we’re discussing and learning today back to our collaboratives, our FS partners, and into the field

Consider formalizing it to capture your values