Landscape Evaluation & Prescription
Mission Project Area
Okanagan-Wenatchee National Forest

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**Landscape Evaluation Goals**

1. Assess current condition & diagnose departure of structure, composition, & pattern of watershed
   - Habitat for focal species
   - Fire, insects
   - Incorporate roads, aquatics, & other user defined functions
   - HRV & FRV

2. Landscape Prescription
   - Targets for addressing departure in percent land & pattern
   - Guidance for whole watershed
   - Priority treatment areas

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Legend
- Buttermilk Bndry
- Libby Bndry
- Structure Stage
  - int
  - shrub-heb
  - si
  - seoc
  - secc
  - yfms
  - ur
  - ofss
  - ofms
Delineate polygons and collect Photo Interpreted attributes:

- % Canopy cover
- # Canopy layers
- Size class of trees
- Species composition
- Snag abundance
- Clumpiness of trees
- Others …
‘PI’ Attributes (Raw Data)

Topography Variables

Derived attributes

- Structure Class
- Cover Type
- Canopy Cover
- Large tree cover
- Habitat Indices
- Fire ratings
- Insect & disease ratings
‘PI’ Attributes (Raw Data) → Derived attributes → Pattern Metrics

- Topography Variables

- Percent Area
- Mean patch size
- Largest patch
- Nearest neighbor
- IJI vs Contagion
Evaluate Departures

HRV & FRV

‘PI’ Attributes (Raw Data)

Topography Variables

Derived attributes

Pattern Metrics

Variables

Pattern Metrics

Evaluate Departures

HRV & FRV

Variables
Evaluating Departure

Historical Watersheds

Interior Columbia Basin Ecosystem Management Project (ICBEMP)
Hessburg et al. 2000

- PI work: 1930-50’s photos
- Derived attributes
- Pattern metrics
HRV & FRV  Buttermilk

HRV: ESR 6
FRV: ESR 13
Structure Class

**Percent Land**

- **si**: Current
- **seoc**: Current
- **secc**: Current
- **ur**: Current
- **yfms**: Current
- **ofms**: Current
- **ofss**: Current
- **herb**: Current
- **shrub**: Current
- **wood**: Current
- **other**: Current

**Mean Patch Size**

- **si**: Current
- **seoc**: Current
- **secc**: Current
- **ur**: Current
- **yfms**: Current
- **ofms**: Current
- **ofss**: Current
- **herb**: Current
- **shrub**: Current
- **wood**: Current
- **other**: Current

**Patch Density**

- **si**: Current
- **seoc**: Current
- **secc**: Current
- **ur**: Current
- **yfms**: Current
- **ofms**: Current
- **ofss**: Current
- **herb**: Current
- **shrub**: Current
- **wood**: Current
- **other**: Current

Legend:
- Current
- In HRV
- In FRV in both
- In HRV
- In FRV
- Out

**Forest Classifications**

- **Young Forest Multistory**
- **Stem Exclusion Open Canopy**
- **Old Forest Single Story**
- **Stand Initiation**
Structure Class

- Percent Land
- Mean Patch Size
- Patch Density
- Mean Nearest Neighbor
- Edge Density
- Landscape Metrics

Legend:
- HRV
- Current
- In HRV
- In FRV
- In both

Graphs depict various metrics for different structure classes, with metrics such as percent land, mean patch size, and patch density, among others.
Landscape Rx

Patch Size Distribution: Structure Class
Landscape Rx

- Too much Young Forest Multi-story ➔ High crown fire
- Not enough open canopy forest. Patch size too small & fragmented
- Too much ABLA, need more PSME, LAOC, & PICO
- NSO, Large trees ➔ Area ok, pattern out of whack
Landscape Rx

• Too much Young Forest Multi-story ➔ High crown fire
• Not enough open canopy forest. Patch size too small & fragmented
• Too much ABLA, need more PSME, LAOC, & PICO
• NSO, Large trees ➔ Area ok, pattern out of whack

• More area & larger patch size of open canopy, large tree forest
• Reduce young, multi-story forest
• Consolidate: large tree, closed, multi-story into larger patches
**Landscape Rx**

**Dry Forest Areas:**
1. Reduce area in YMFS (4740ac ⇒ 0-435ac), SECC (348ac ⇒ 0-85ac), UR (800ac ⇒ 0-600ac), and SI (350ac ⇒ 0-140ac) by converting into fewer, more compact patches with more separation. Reduce size of largest patch of YFMS and SECC.
2. Increase area and patch size of OFSS
3. Increase area (540ac ⇒ 900-1700ac) and patch size of SEOC by expanding and consolidating into fewer, more compact patches with more separation.
4. Reduce area in ABLA (2340ac ⇒ ~0 ac) by reducing number of patches and size of largest patch. Reduce edge and patch separation. Increase PSME as needed.

**Moist Forest Areas:**
1. Increase area and patch size of OFMS and OFSS.
2. Reduce area in ABLA (1500ac ⇒ ~0 ac) by reducing number of patches and size of largest patch. Reduce edge and patch separation.
3. Increase PSME (11 ⇒ 1520 – 1980) & PIPO (440 ⇒ 2600-3300). Can also increase PICO.

Rx ⇒ Cold Forest, Wildlife, Fire, Insect & Disease
Evaluate Departures

HRV & FRV

Derived attributes

Pattern Metrics

Evaluate Departures
HRV & FRV

Landscape Rx

Fire Sending
Deficit
NSO Designations

Aquatics

LTA’s

Treatment Recs

‘PI’ Attributes
(Raw Data)

Topography
Variables

Derived attributes

Pattern Metrics
Landscape Rx ➔ Treatment Recommendations

1. Rx ➔ Landscape Treatment Areas
Landscape Rx ➔ Treatment Recommendations

1. Rx ➔ Landscape Treatment Areas

2. Identified Fire tolerant vs. NSO/complex forest parts of watersheds
   - Water Balance Deficit
   - Fire Sending
   - NSO habitat layers
   - Fire ratings: crown fire, rate of spread etc.
   - Existing vegetation

Better align vegetation with topography and biophysical conditions
Landscape Prescription

Legend
- Fire - NSO zones
- Fire - OFSS
- Deficit
  - High: 346
  - Low: 0
- Watershed Boundary
- NSO-OFMS
- Aspen

Miles
Treatment Recommendations

3. Determined treatment for each polygon

- Landscape Rx
- No new roads. Some temp roads
- Veg & habitat conditions
- Recon information, PI metrics, Aerial photos
- Fire sending, Deficit, Riparian, etc.
- Road access & yarding systems

<table>
<thead>
<tr>
<th>Treatment Types</th>
<th>Fire &amp; Activity Fuel Treatments</th>
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</thead>
<tbody>
<tr>
<td>Dry Forest Restoration Thin (ICO)</td>
<td></td>
</tr>
<tr>
<td>DF Restoration Thin + Dwarf Mistletoe Reduction</td>
<td></td>
</tr>
<tr>
<td>Aspen Release</td>
<td></td>
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<tr>
<td>Variable Retention Regen</td>
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<tr>
<td>Moist Forest Thinning</td>
<td></td>
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<tr>
<td>Ladder fuel / Large Tree Release (small diameter)</td>
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</tr>
<tr>
<td>Young plantation thin (small diameter)</td>
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</tr>
</tbody>
</table>
Treatment Recommendations

4. Determined post treatment structure class, cover type, & canopy cover.

- Re-run departure analysis to determine how far we moved the landscape
Buttermilk

Structure Class

Percent Land
Mean Patch Size
Patch Density

Largest Patch Index

Legend
HRV FRV
Current Out In HRV In FRV In both

Percent Land
Mean Patch Size
Patch Density

Percent of Watershed

Hectares

Patches per 10k hectares
Landscape Rx ➔ Treatment Recommendations
Summary

• Evaluate current conditions ➔ HRV & FRV
  • Percent land & pattern
• Integrate fire flow, aquatics, social, economics
Summary

- Evaluate current conditions ➔ HRV & FRV
  - Percent land & pattern
- Integrate fire flow, aquatics, social, economics

**Landscape Rx**

- Concrete targets for shifting amounts & pattern of vegetation
- Quantitative, science basis
  ➔ Whole watershed, not just treatable areas
  ➔ More treatment: mechanical & fire
  ➔ Social License
Structural Stages: Low & Mixed Severity Systems

O’Hara et al. 1996

- Stand Initiation
- Stem Exclusion Closed Canopy
- Understory Re-initiation
- Young Forest Multistory
- Stem Exclusion Open Canopy
- Old Forest Multi-Story
- Old Forest Single Story

O’Hara et al. 1996

Structural Stages: Low & Mixed Severity Systems

- Stem Exclusion Closed Canopy
- Understory Re-initiation
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## Treatment Acres

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Buttermilk</th>
<th>Libby</th>
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<tbody>
<tr>
<td>Dry Forest Restoration Thin</td>
<td>923</td>
<td>1,835</td>
</tr>
<tr>
<td>DF Restoration Thin + Dwarf Mistletoe Reduction</td>
<td>351</td>
<td>405</td>
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<tr>
<td>Aspen Release</td>
<td>37</td>
<td>100</td>
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<tr>
<td>Variable Retention Regen</td>
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<td>0</td>
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<td>Moist Forest Thinning</td>
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<td>0</td>
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<tr>
<td>Ladder Fuel or Dry Forest Thin</td>
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<td>1,023</td>
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<tr>
<td>Ladder fuel / Large Tree Release (small diameter)</td>
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<td>1,179</td>
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<tr>
<td>Young plantation thin (small diameter)</td>
<td>181</td>
<td>263</td>
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<tr>
<td>Commercial</td>
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<td>2,341</td>
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<td>Non Commercial</td>
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<td>1,442</td>
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<tr>
<td>Either</td>
<td>136</td>
<td>1,023</td>
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<tr>
<td>Prescribed Fire</td>
<td>3,123</td>
<td>4,292</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Total Acres</th>
<th>Watershed % Treat</th>
<th>Dry &amp; Moist % Treat</th>
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</thead>
<tbody>
<tr>
<td>Libby</td>
<td>25,800</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Buttermilk</td>
<td>23,700</td>
<td>13%</td>
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