Black-backed Woodpecker Density in Green-Unburned Forests

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Background

- Black-backed woodpecker touted as a ‘post-fire’ obligate species; incompatible with salvage logging. (Hanson and North 2008; Hutto 2008; Cahall and Hayes 2009)

- Availability of food resources likely contributes to population regulation. (Rota et al. 2014)

- Burned ‘patch’ connectivity cited as necessary for population persistence and connectivity. (Pierson et al. 2013)

- USFWS will determine listing status for OR/CA and SD Black Hills DPS.

“There may be no forest bird in western North America more restricted to a single vegetation condition than the black-backed woodpecker (Picoides arcticus) is to forests of relatively dense fire-killed trees”

– Odion and Hanson (2013)
"(Dr. Richard) Hutto has spent years studying black-backed woodpeckers, determining that they live only in forests burned by severe fires. 'The data are so strong it's not even funny', he told me. 'You show me a black-backed outside of a burn, and I'll give you $10,000.'"
California Black-backed Woodpecker Green Forest Surveys

- Passive and playback calls to survey 10 National Forest units in California for BBWO
- Occupancy models to examine green forest habitat associations
- Positive relationships between occupancy and elevation, latitude, number of snags, tree dbh, and lodgepole pine
- Occupancy in green forests was higher than previously expected
Black-backed Woodpecker Density in Green-Unburned Forests

• 6 minute playback call surveys in green-unburned forests of S. Oregon (Siegel et al. 2010)

• Winema NF not proximate to recent fires (>10km) and contains appropriate elevation and forest types (Fogg et al. 2014)

• Surveys designed for playback occupancy estimation
Study Area

- Elevation range: 4300 ft. – 7000 ft.; Average elevation: 5200 ft.
- Dense mixed conifer forest in the southwestern portion of the study area
- Dry ponderosa pine in the southeastern study area
- Open mixed conifer and lodgepole in the northern study area.
Sampling

- Southern portion of the study area surveyed in 2014 – 44 transects
- Northern portion surveyed in 2015 – 46 transects
- Transects were a 3x5 grid of points with 250m spacing
- 90 transects - 1350 pts sampled
Vegetation Sampling Methods

- Used broadcast call data from visits 1 and 2 to select 8 of 15 survey points for vegetation sampling
- Variable radius sampling design
- Trees, snags, coarse woody debris, understory cover, canopy cover
• Very little variation in transect level occupancy
• Single covariate occupancy models considered
• Detection modeled as the quadratic form of Julian date
• Snag basal area (Rota et al. 2014), Number of snags > 27 cm DBH (Rota et al. 2014), Elevation and Precipitation (Fogg et al. 2014)
• 77 of 90 transects had at least one black-backed woodpecker detection

• 964 detections in 4050 point visits (24%)

• Territorial pair detections were common

• Juveniles noted on several transects during round 3 of broadcast calling

• 2 nests located incidental to broadcast calling
Fogg et al. (2014) found highest occupancy in red fir (*Abies magnifica*) and lodgepole pine (*Pinus contorta*) stands.
Model Results - Detection

- Average per visit detection was 0.79 when modeled with median Julian date = **Very detectable** (95% CI: 0.7 – 0.85)
- Weak quadratic effect of survey date on detection
- High detection probability - our three visit broadcast call approach was more than adequate
Model Results - Occupancy Estimates

• Null model transect level (141 ha) occupancy estimate = 0.87 at average Julian date (95% CI: 0.78-0.93)

• Occupancy/100 ha = 0.295 in California (Fogg et al. 2014)

Comparison to Burned Habitat:

• Average per ‘visit’ detection probability - broadcast = 0.71
• Occupancy/100ha ≈ 0.49
Abiotic Effects

• Positive effect of elevation on occupancy
• Little evidence of a relationship between precipitation and occupancy
Both snag basal area and large snag (> 27cm dbh) density had a weak negative effect on occupancy.

Greater number of snags in dense true fir stands.
Nest Searching
Pilot Nest Searching Effort

- 23 transects with prior pair activity
- 11 excavations detected (2 by the same pair)
- 9 active nests confirmed
- 10 excavations in Lodgepole Pine, 1 in Ponderosa Pine
- 3 excavations in live trees

Comparison with burned habitat in Northern California:
- Average of 1 nest/90-100 ha of burned habitat in Chips Fire (WM Beaty unpublished data)
- In areas with pair activity in the prior year we found 1 nest/360 ha
Nest Location Context

- Open dry mixed conifer forest, mostly volcanic soils
- Not especially high snag densities or beetle kill
- Vegetation data not yet compiled
Conclusions

- Black-backed woodpeckers are abundant in green/unburned forests of the S. Oregon Cascades
- Black-backed woodpecker density similar to burned habitats in the Sierra Nevada
- Population estimates should include vast areas of green/unburned forest habitat previously unconsidered
Conclusions

- Evidence that BBWO are nesting and producing young in green forests
- Nesting pair density is likely lower in green forest than in burned forest
Next Steps

• Population estimation

• Nest success
  • Beetle killed nest success is 44-78% (Bonnet et al. 2013)
  • High severity fire nest success is ~ 80-90% (Saab et al. 2007; Vierling and Lentile 2008)
  • Nest success in green forest is largely unstudied

• Juvenile dispersal
  • Distinct dynamics for populations in burned and green forests?

• Dispersal into newly disturbed habitat
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