



Thresholds in Bird Abundance in Plantation Forests



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Food Resources on Hardwoods



- Insects
- Nectar
- Fruits
- Seeds



Unmanaged Early Seral Forest



Bob Altman

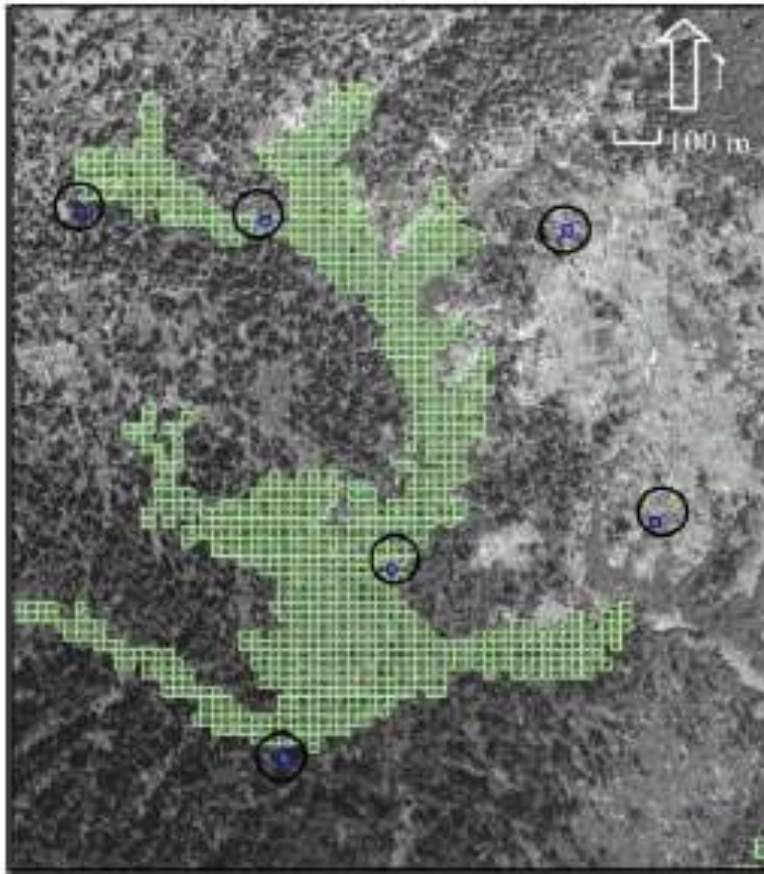


Peter LaTourrette

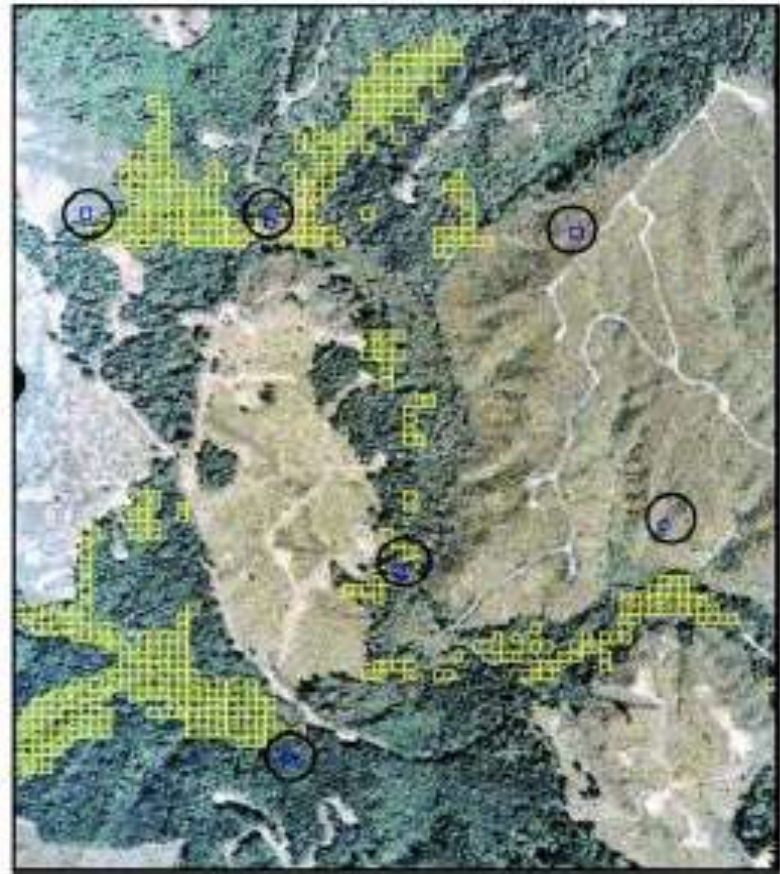


Declines in hardwood distribution

Historical (1939)



Present



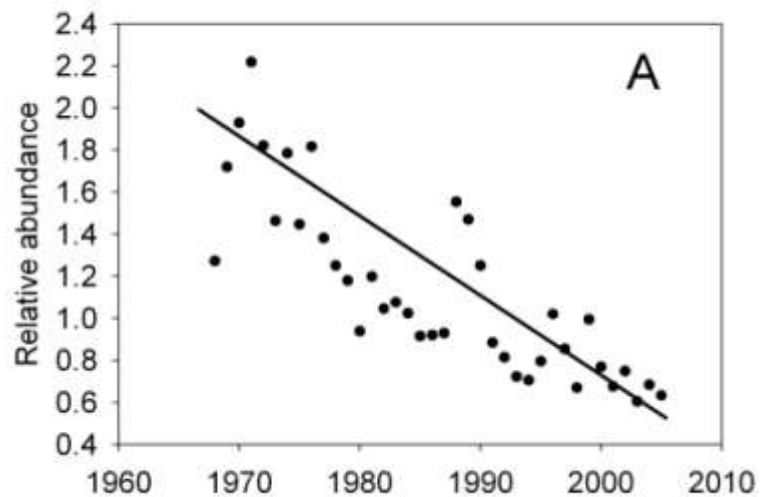
Area decrease = ~40%

Mean patch size decrease = ~35%

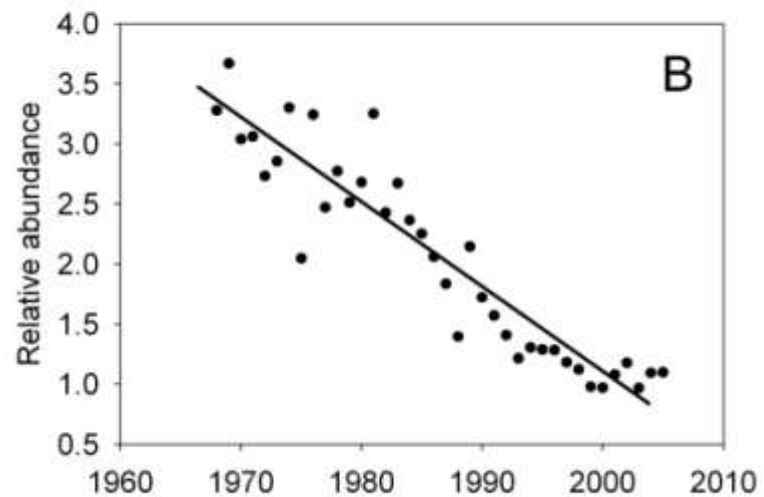
Kennedy and Spies 2005 Biol. Cons.

“Structurally and compositionally diverse early seral forest habitats are now the scarcest habitat in the region” (Thomas et al. 2006 – Cons. Biol.)

BBS Population trends for Oregon



Orange-crowned warbler

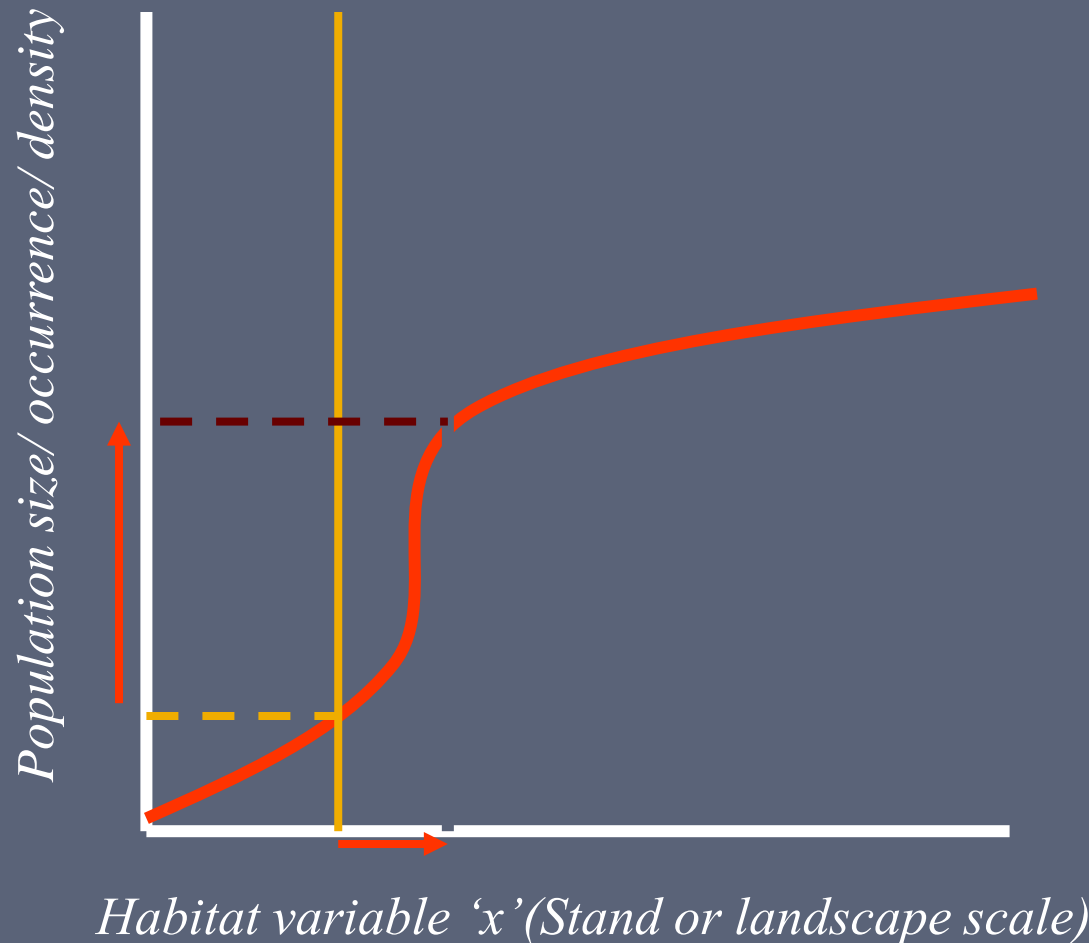


Rufous hummingbird

A small, brown and white speckled bird, possibly a thrush or similar species, is perched on a thin, brown branch. The bird has a brown head, a small black eye, and a brown beak. Its body is covered in brown and white speckles. The background is a blurred green, suggesting a forest or woodland setting. The text "How much broadleaf cover?" is overlaid on the right side of the image.

How much
broadleaf cover?

Thresholds as Quantitative Targets



Study Questions:

1. Which songbird species are associated with broadleaf forest?
2. Is the occurrence of these bird species influenced by landscape composition?
3. Are there threshold levels of broadleaf in stands/landscapes?
4. Is habitat change 'driving' pop. declines?

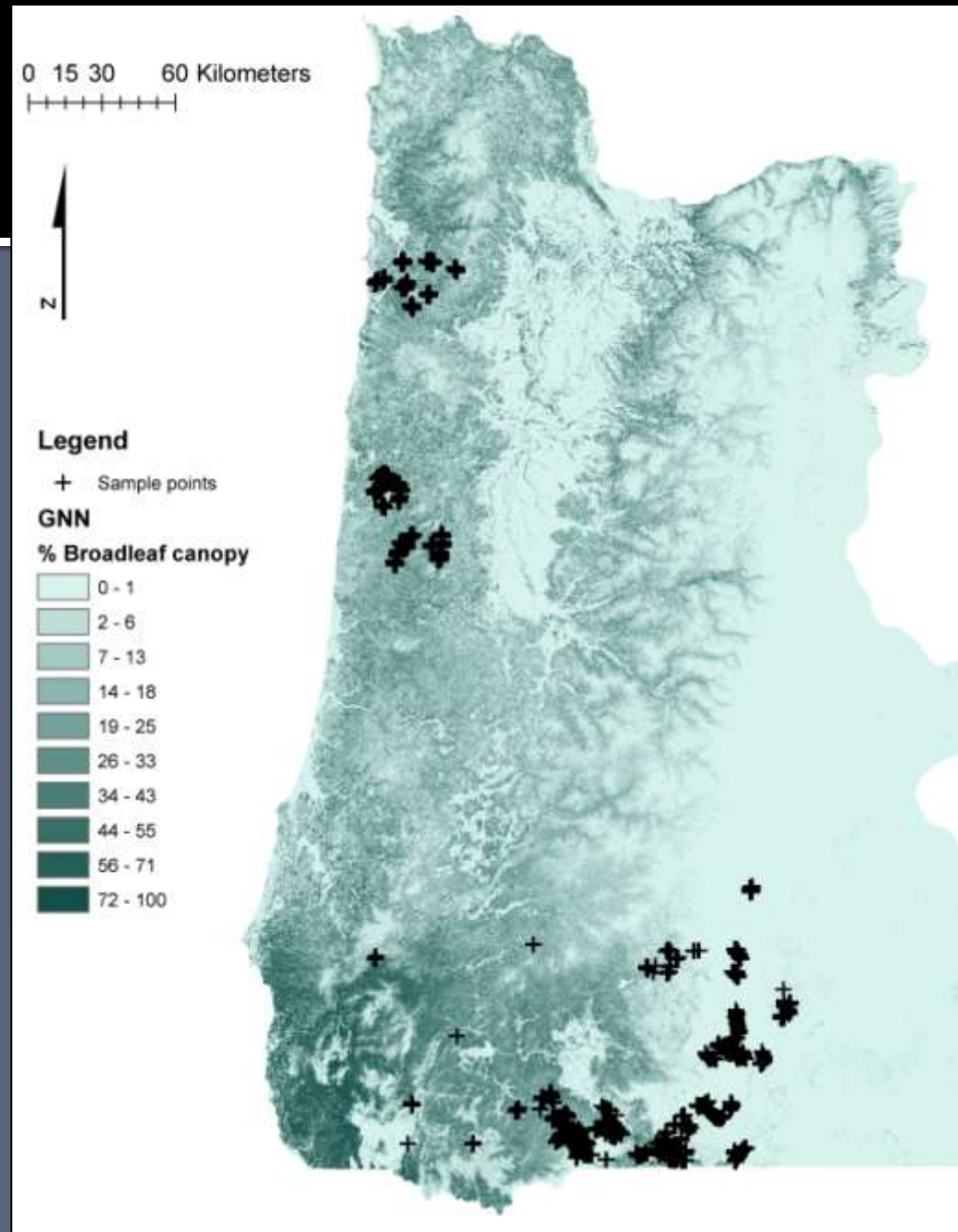
'Meta-analysis' of existing data

Authors of 14 studies contacted

- Klamath Bird Observatory (southern OR)
- McGarigal & McComb (Coast range)
- Hagar et al. (Coast range)
- Fontaine (Biscuit fire)

Total N (after removing sites due to missing data) = 4375

4375 sample points
127,164 bird detections
110 species



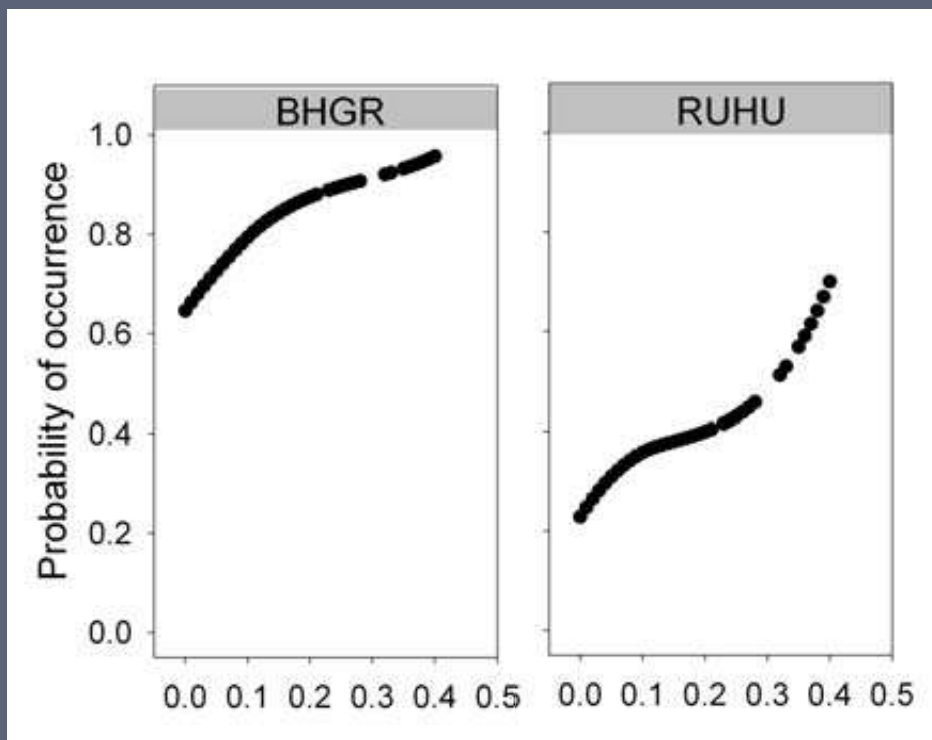
- % Broadleaf
- % Early seral broadleaf (<10 cm dbh)
- Spatial extents: 150, 500, 2000 m



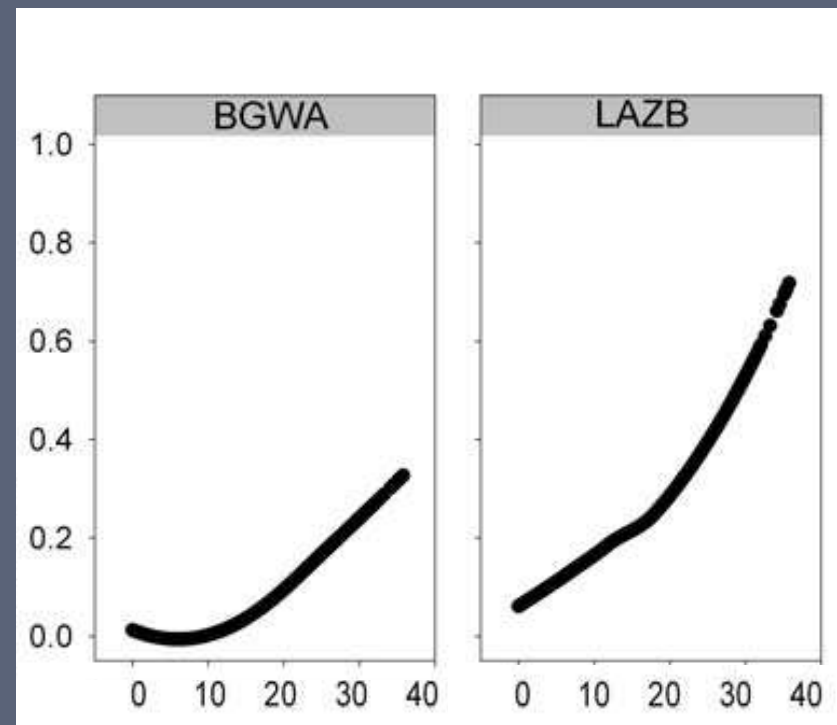
Results



- Positive response to early-seral broadleaf by 8/12 species



Early Seral Broadleaf within 2000 m,
Coast Range

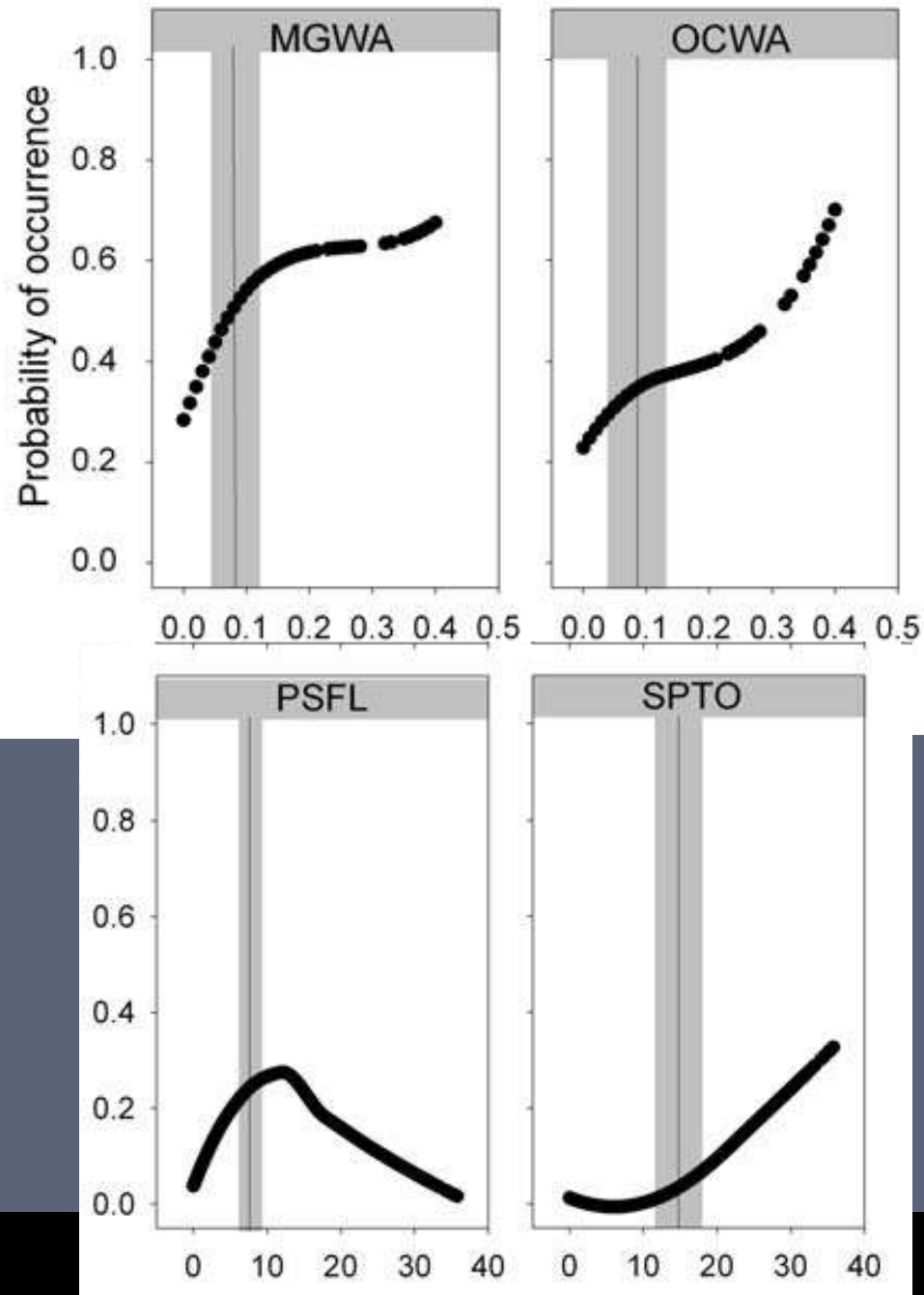


Early Seral Broadleaf within 2000 m,
SW OR

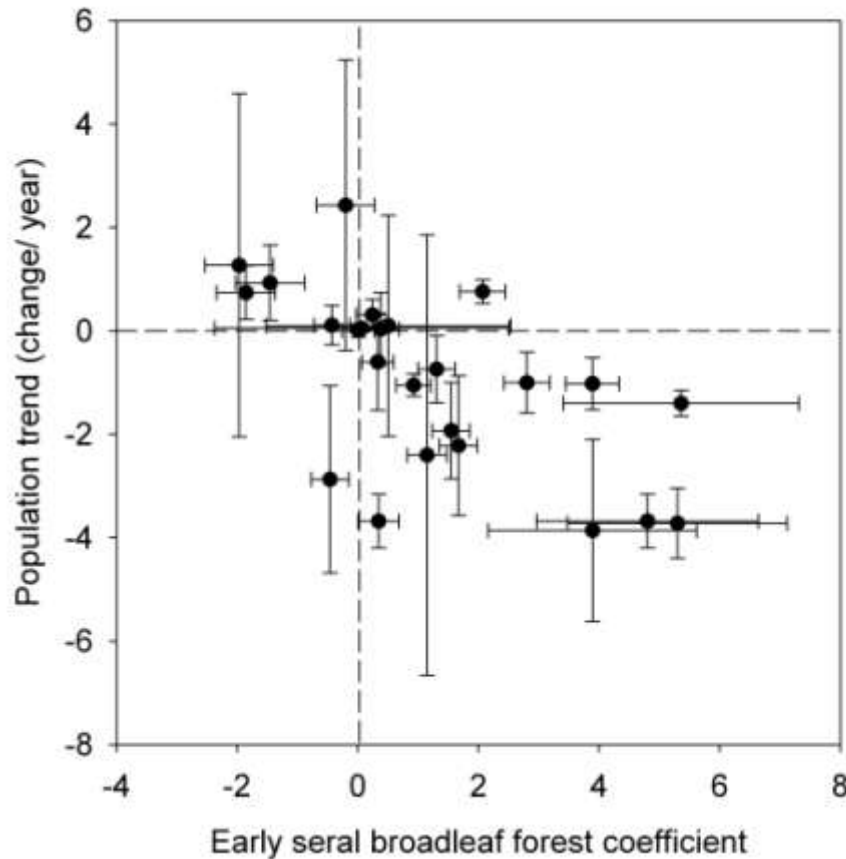
- 11/ 27 models showed threshold response



Pacific-slope flycatcher



Population trends of 'early-seral' species



Preliminary conclusions

- Positive influence of early and late seral broadleaf forest on many species
- Population consequences may have already occurred
- High variation in thresholds among species and regions
- More research needed at stand and landscape scales (manipulations)

Quantifying broadleaf management targets for bird conservation in timber plantations



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& Society

Research Questions

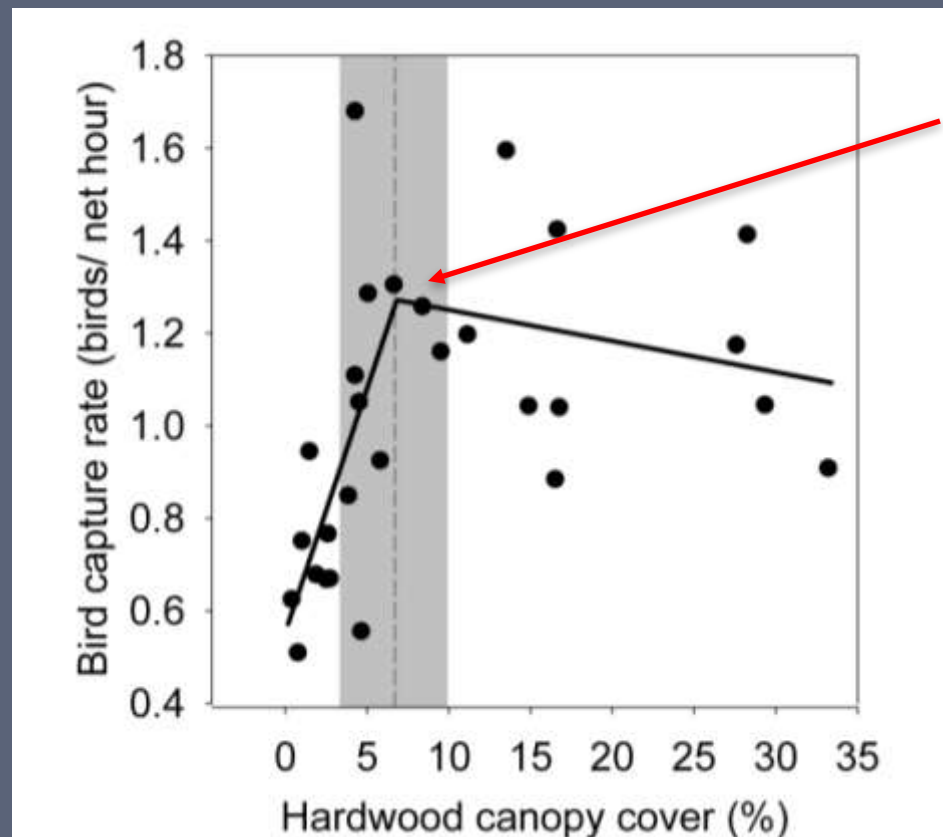
1. Does amount of hardwood cover within a stand influence
 - occurrence of songbirds?
 - productivity of songbirds?
2. Are there threshold levels of hardwood within a stand?



Threshold test: Capture rate of all species

Captures ~ HWD + BROADLEAF +HWD²K

Model	Wi	AIC	Δ AIC	THRESHOLD	SE
Segmented	0.98	2.19	0.00	6.456	1.709
Linear	0.02	10.18	8.00	-	-



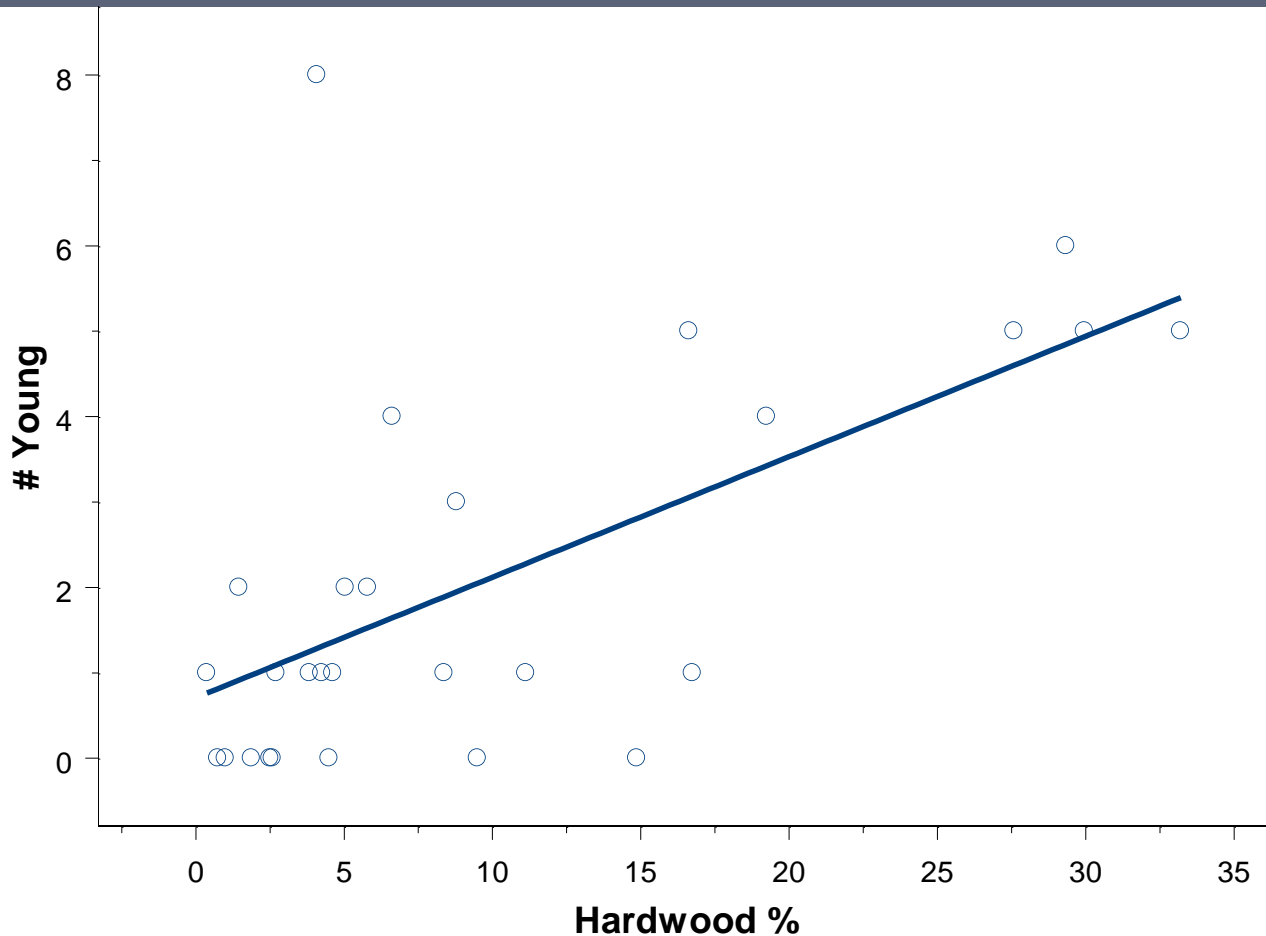
Hardwood
threshold at
6.7 %
(SE=1.6)

Full model
 $R^2 = 0.45$

Foliage gleaners=
12.8% (SE=3.5)

Productivity

Swainson's Thrush



Linear Regression
 $p = 0.0005$
 $R^2 = 0.3794$



Preliminary conclusions

- Evidence of stand-level hardwood cover relationships
 - Bird abundance (threshold of $6.4 \pm 1.9\%$ hardwood cover)
 - Number of young
- Maintaining a hardwood component important to forest bird conservation



Decline in broadleaf-associated birds in Oregon

Breeding Bird Survey data showing declines for early-seral broadleaf associates

- Orange-crowned Warbler
- Wilson's Warbler
- Swainson's Thrush
- Rufous Hummingbird



