Timber, carbon storage, and habitat production possibilities

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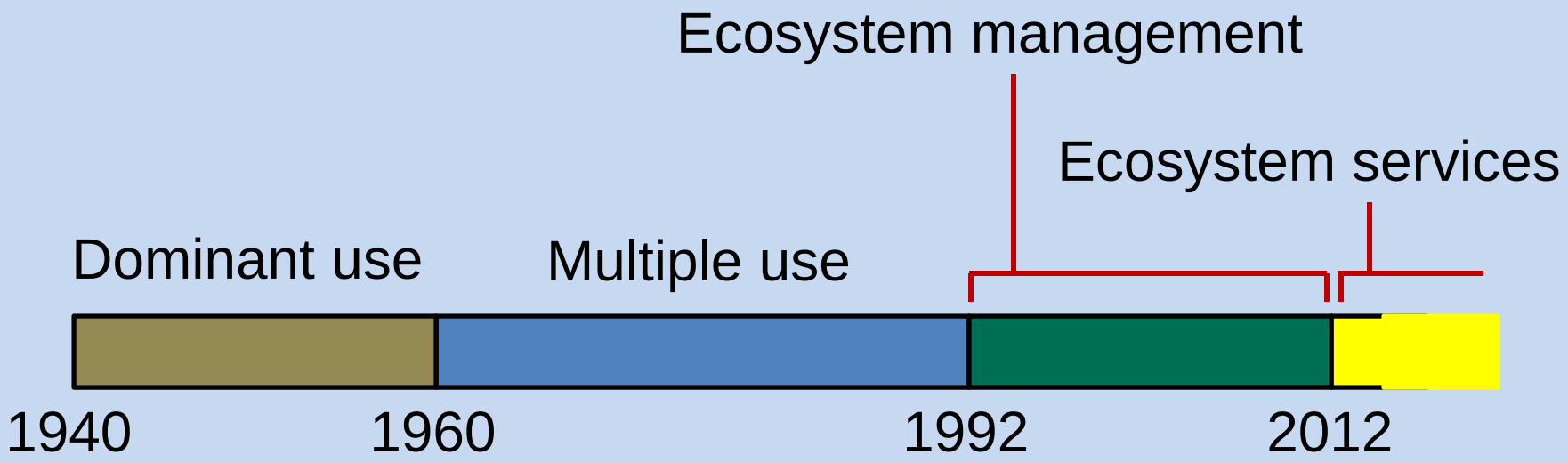
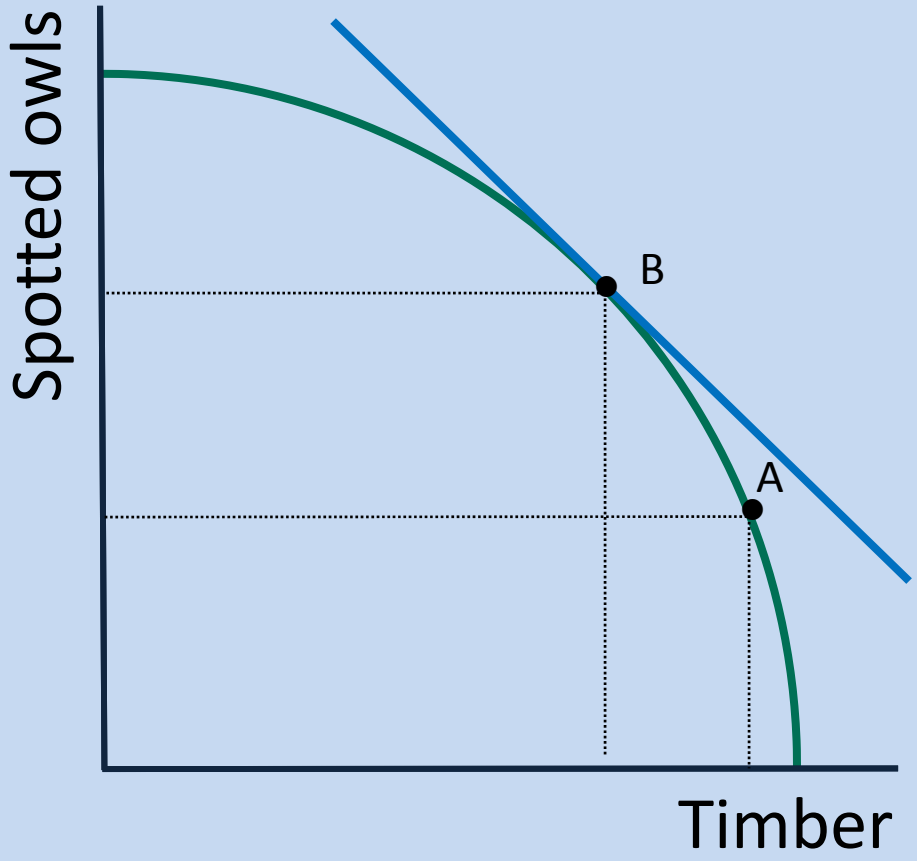
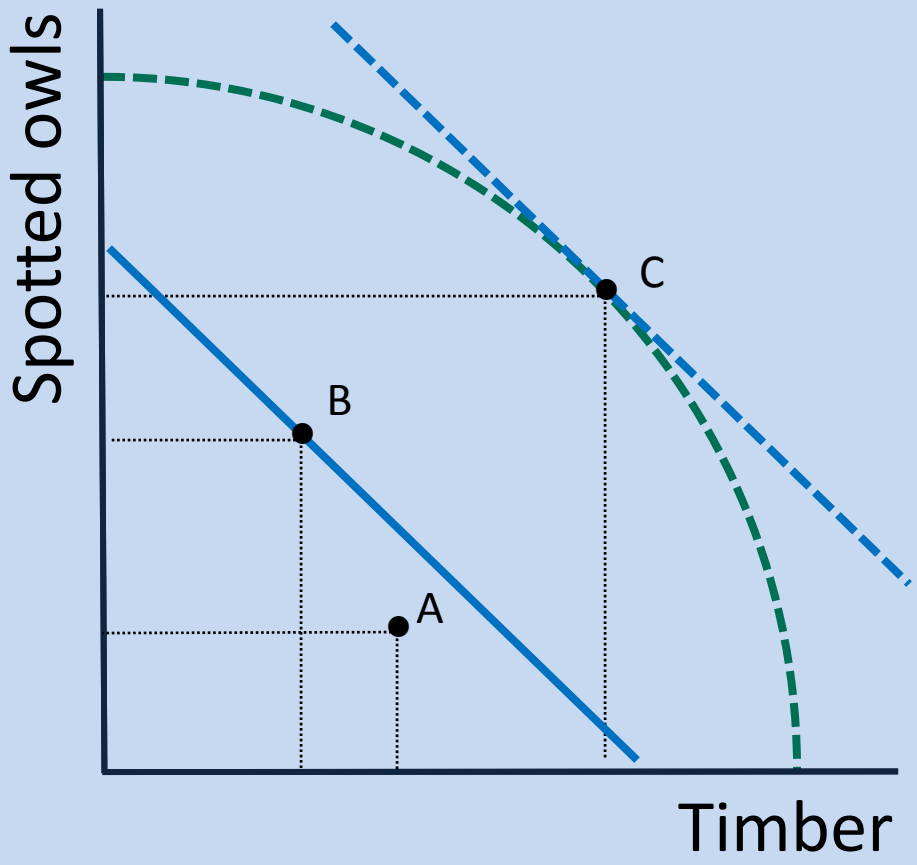
Forest Service management paradigms, World War II to present

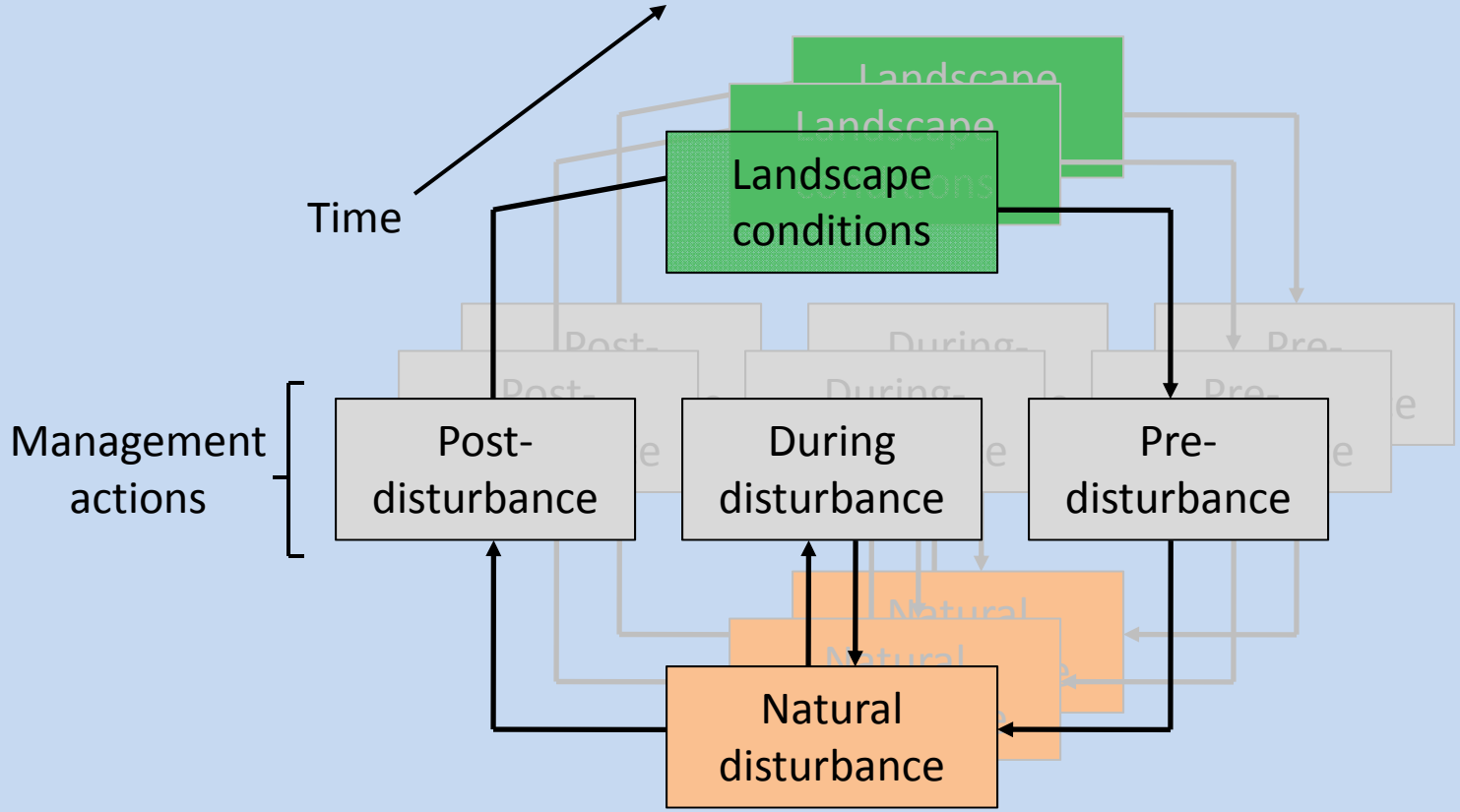




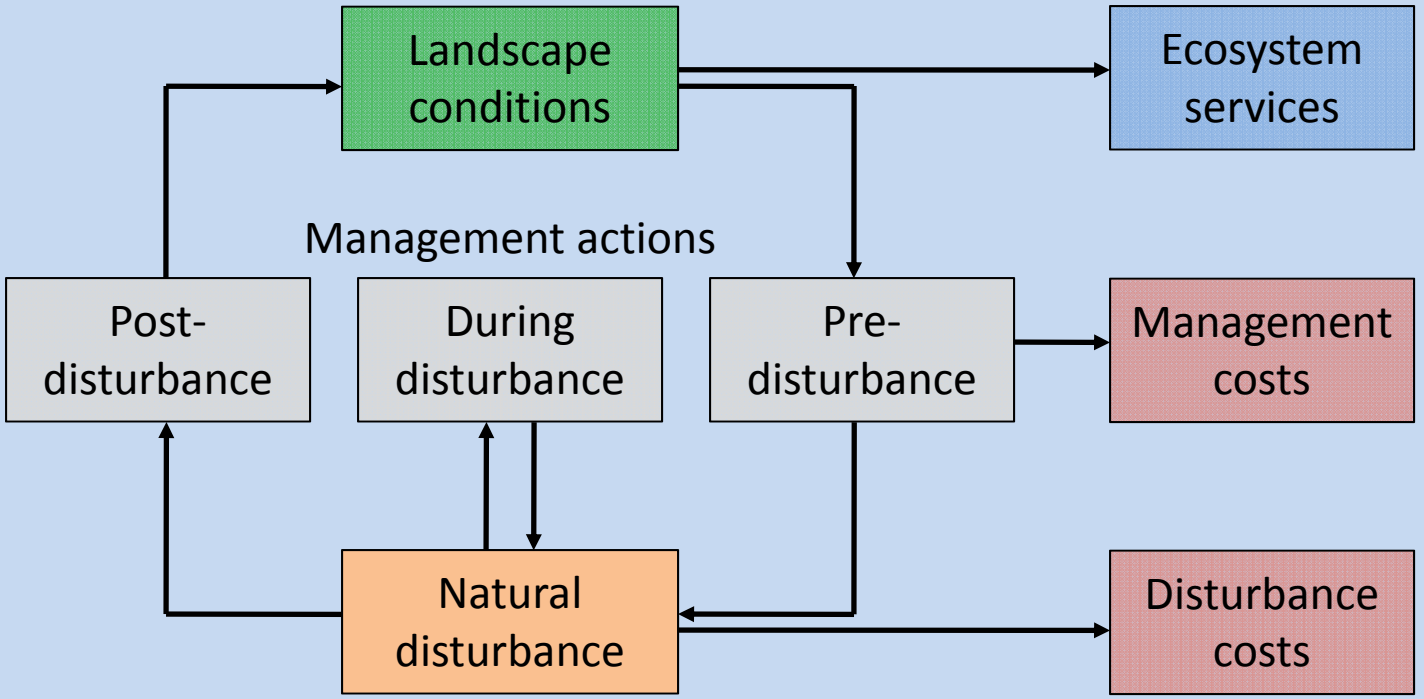
Production possibilities and social preference when ecological and socioeconomic information is perfect



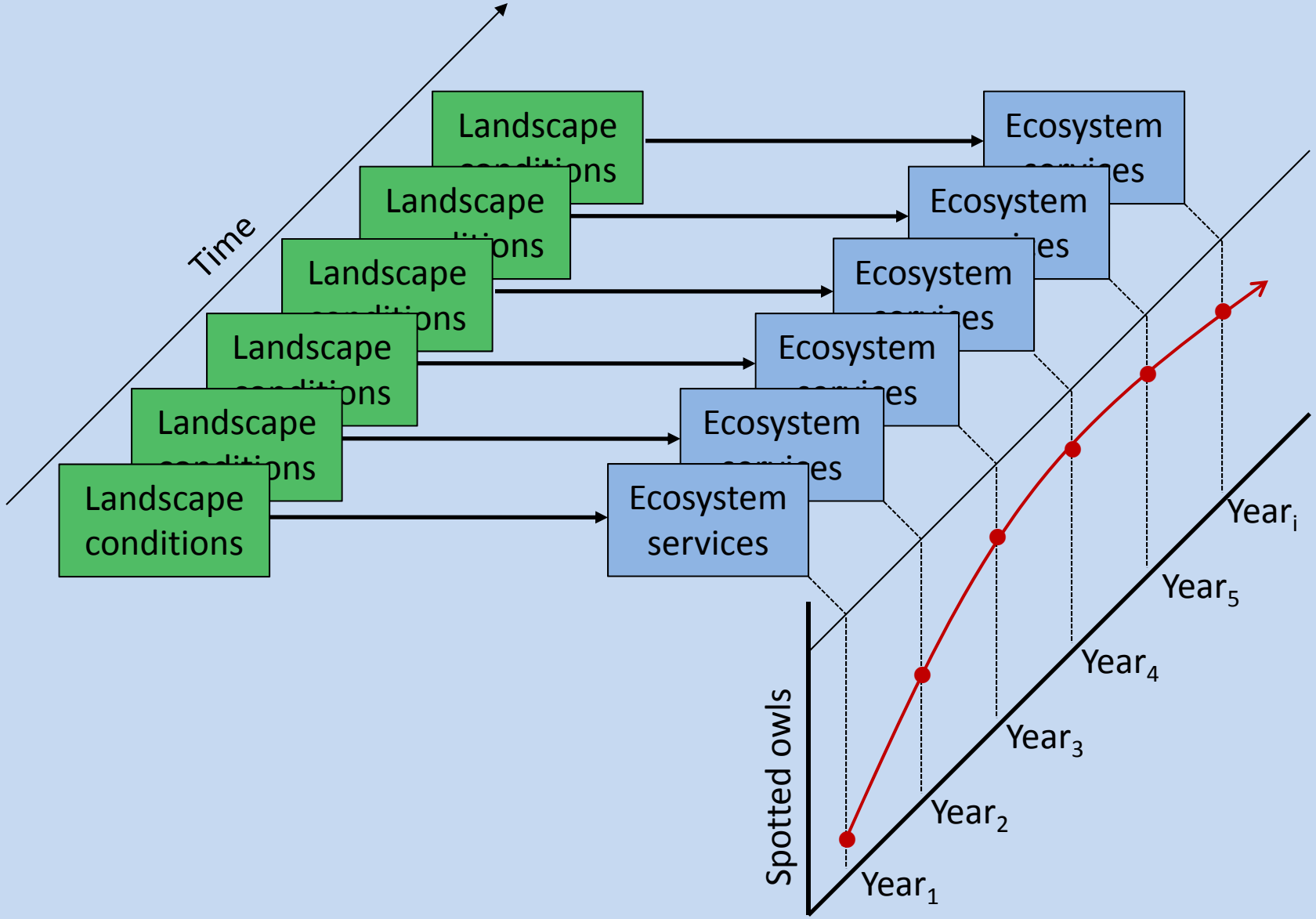
Production possibilities and social preference when ecological and socioeconomic information is limited



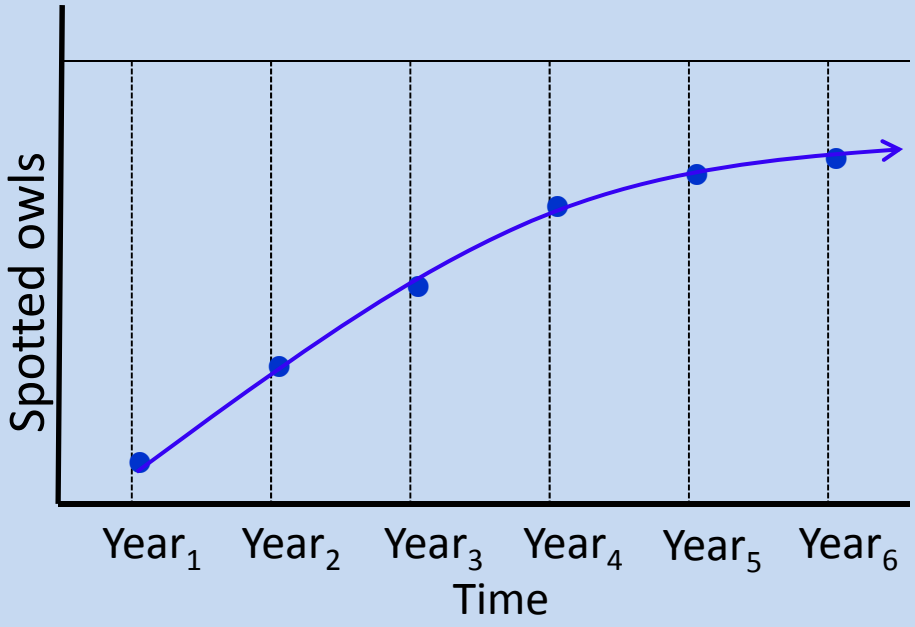
Conceptual model of forest land management

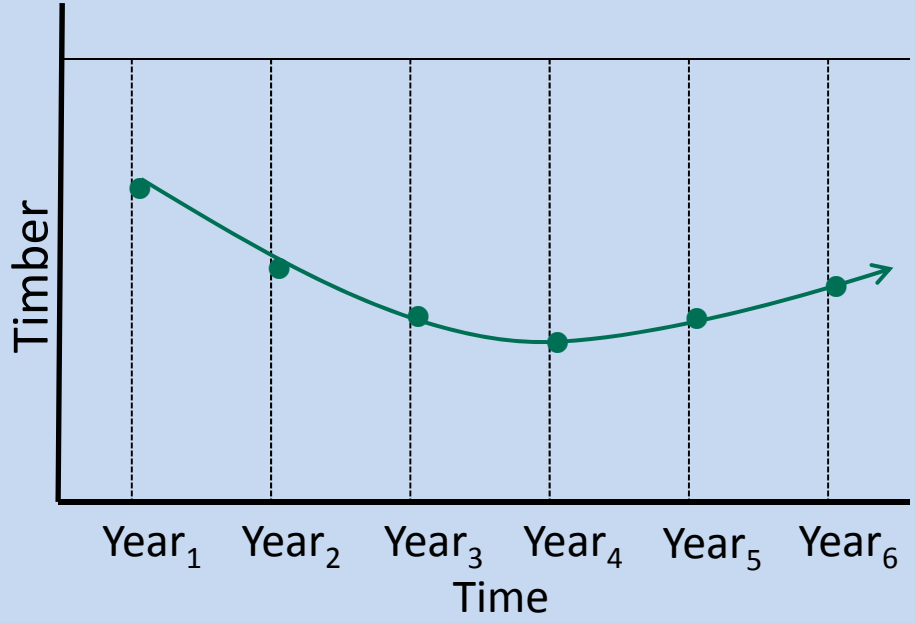


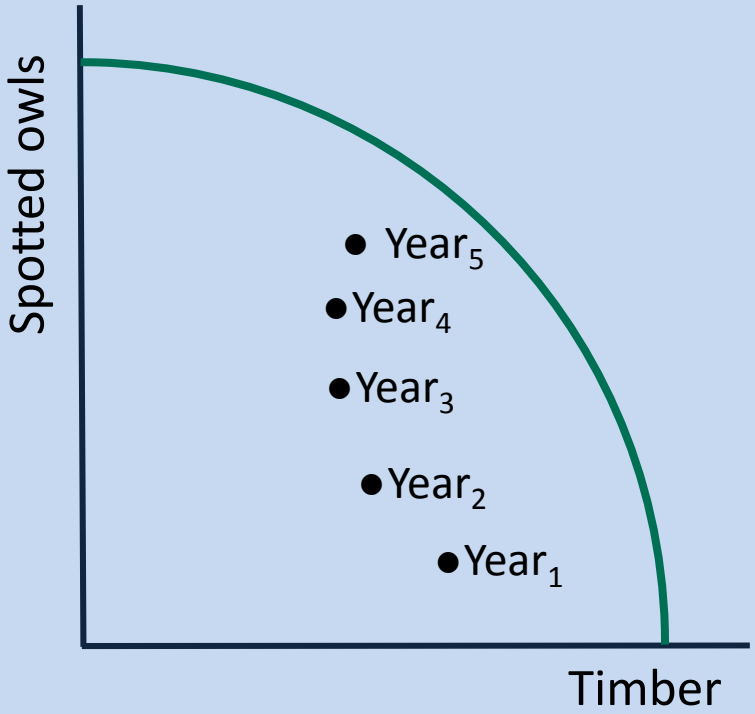
Ecosystem services associated with landscape conditions

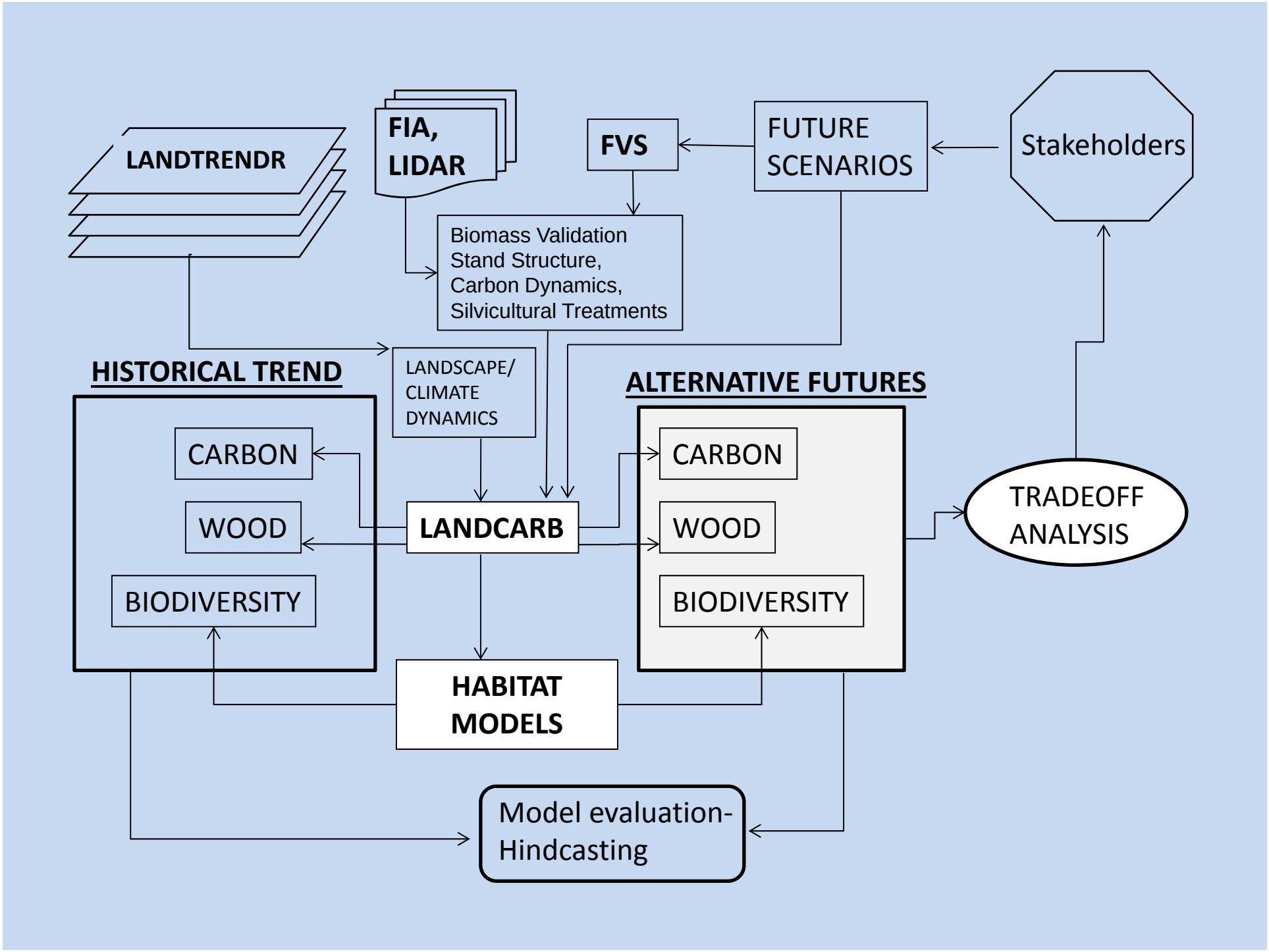


Ecosystem services trajectory as management outcome


Spotted owls
Year1
Year2
Year3
Year4
Year5
Year6
Time


Timber
Year1
Year2
Year3
Year4
Year5
Year6
Time


Spotted owls
Year5
Year4
Year3
Year2
Year1
Timber


LANDTRENDR
FIA, LIDAR
FVS
FUTURE SCENARIOS
Stakeholders
Biomass Validation
Stand Structure,
Carbon Dynamics,
Silvicultural Treatments
HISTORICAL TREND
LANDSCAPE/ CLIMATE DYNAMICS
ALTERNATIVE FUTURES
CARBON
WOOD
BIODIVERSITY
LANDCARB
CARBON
WOOD
BIODIVERSITY
TRADEOFF ANALYSIS
HABITAT MODELS
Model evaluation-
Hindcasting

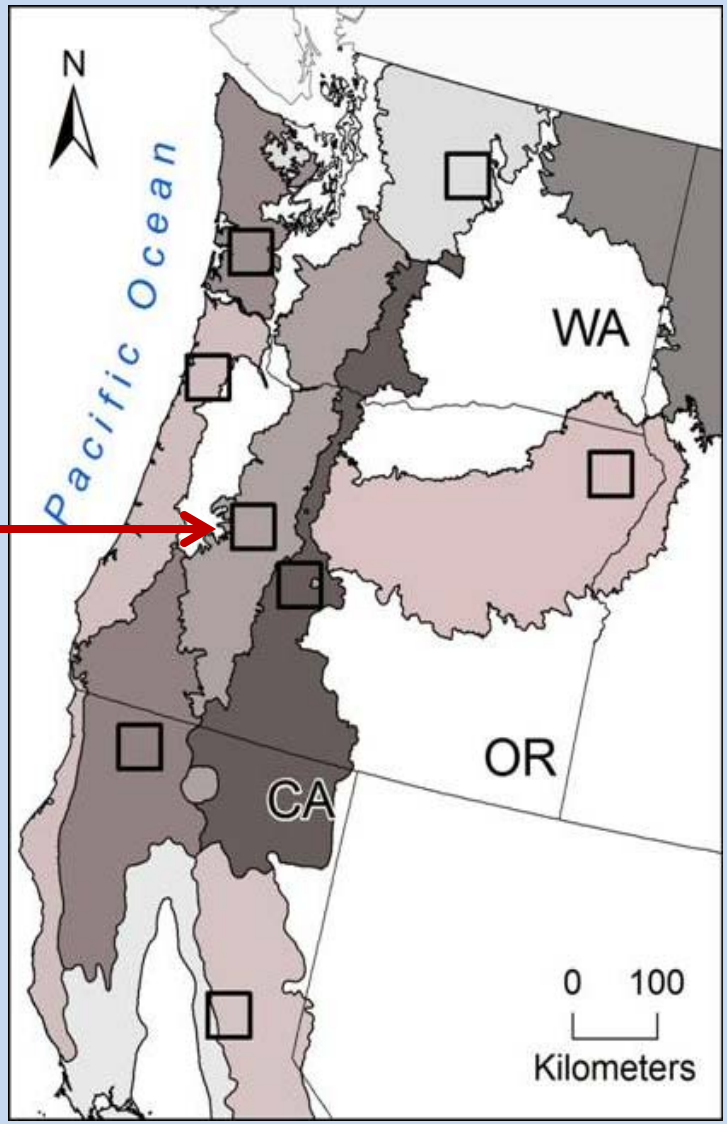
Study area and focal landscapes

3,200 km^2

Douglas fir, western hemlock, silver fir

Mixed federal and private ownership

Intensive timber production to old-growth



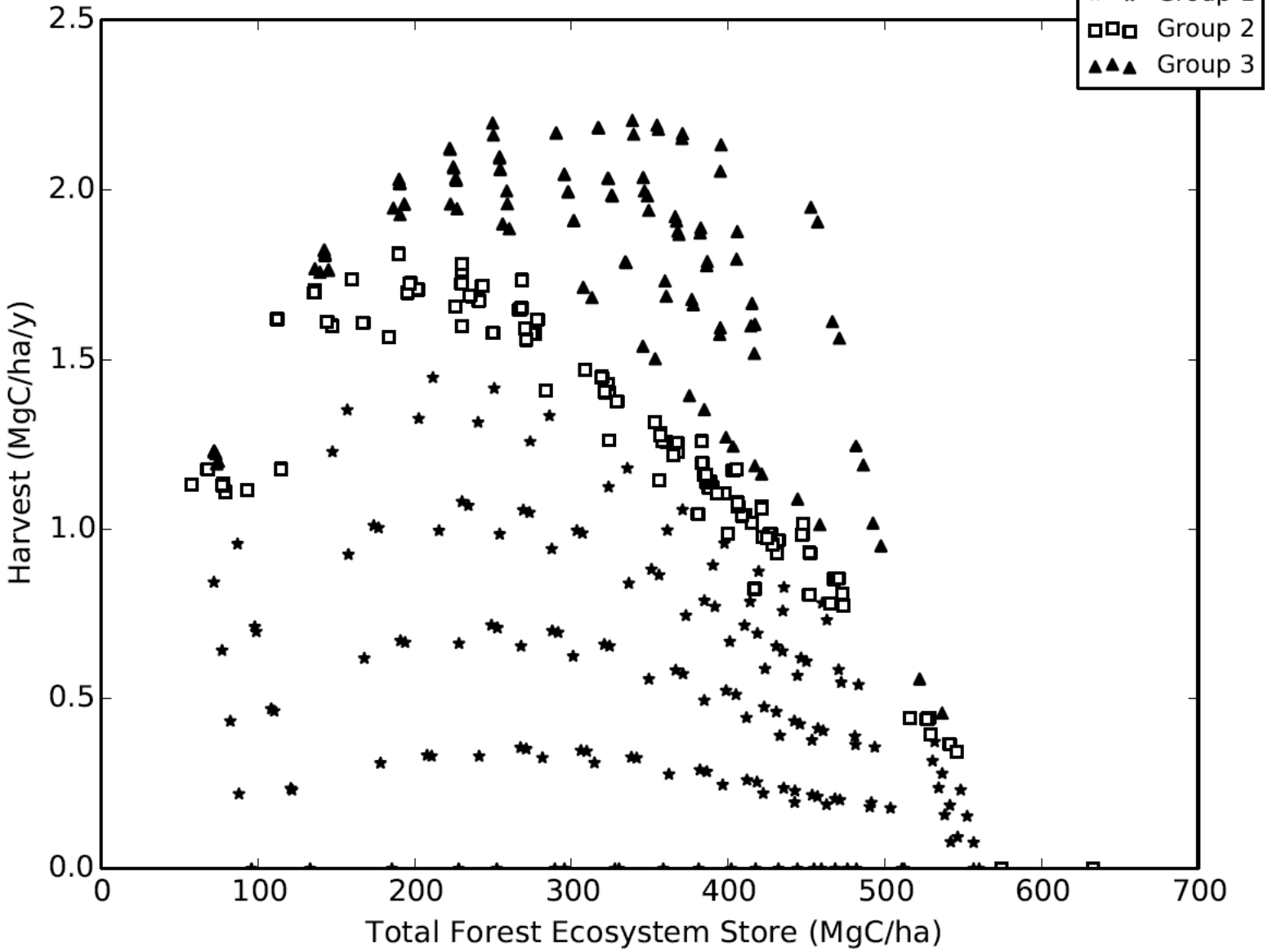
Management variables

Management variable	Values
Live tree harvest interval (yr)	25, 37, 50, 62, 75, 100, 125, 150, 175, 200, 250, 500, infinite
Harvest size (ha)	10, 100, 500, 1,000
Harvest intensity (% cell cut)	25, 50, 100
Harvested wood utilization (%)	0, 20, 40, 60, 80
Snag felling at harvest	Yes, no
Prescribed fire	Yes, no
Salvage (%)	0, 100
Salvage interval (yr)	10, 20, 40
Salvage snags	Yes, no

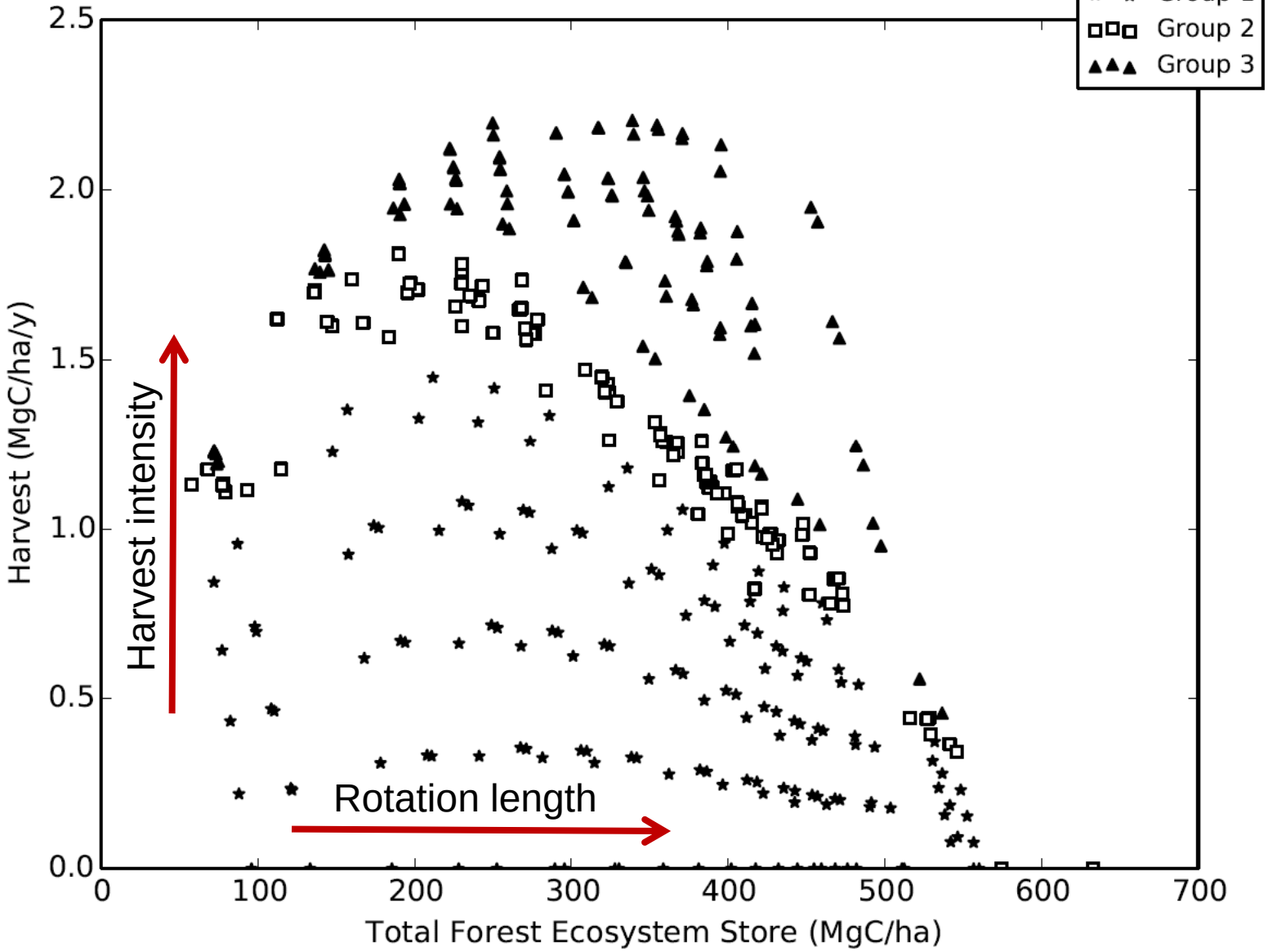
Habitat suitability indices

Species	Variables
Pacific marten	Diameter diversity, volume down logs, snags
Mule deer	Average diameter, canopy closure, canopy layers
Olive-sided flycatcher	Canopy closure, snags, live trees, edge contrast
Pileated woodpecker	Volume down logs, snags, live trees
Red tree vole	Canopy closure, diameter diversity, quadratic mean diameter, Douglas fir density
Northern spotted owl	Diameter diversity, large trees
Western bluebird	Canopy closure, snags

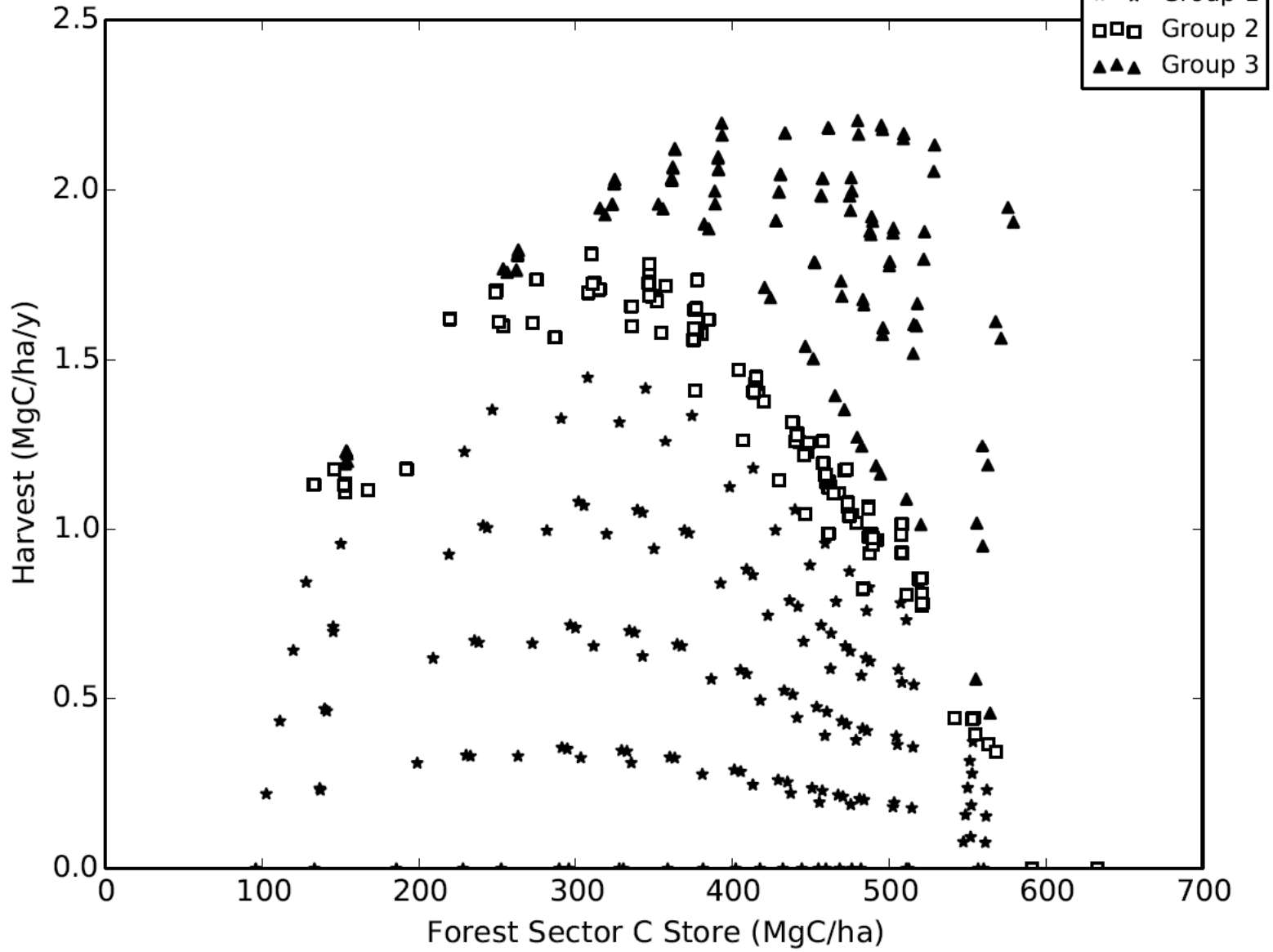
Carbon versus timber harvest



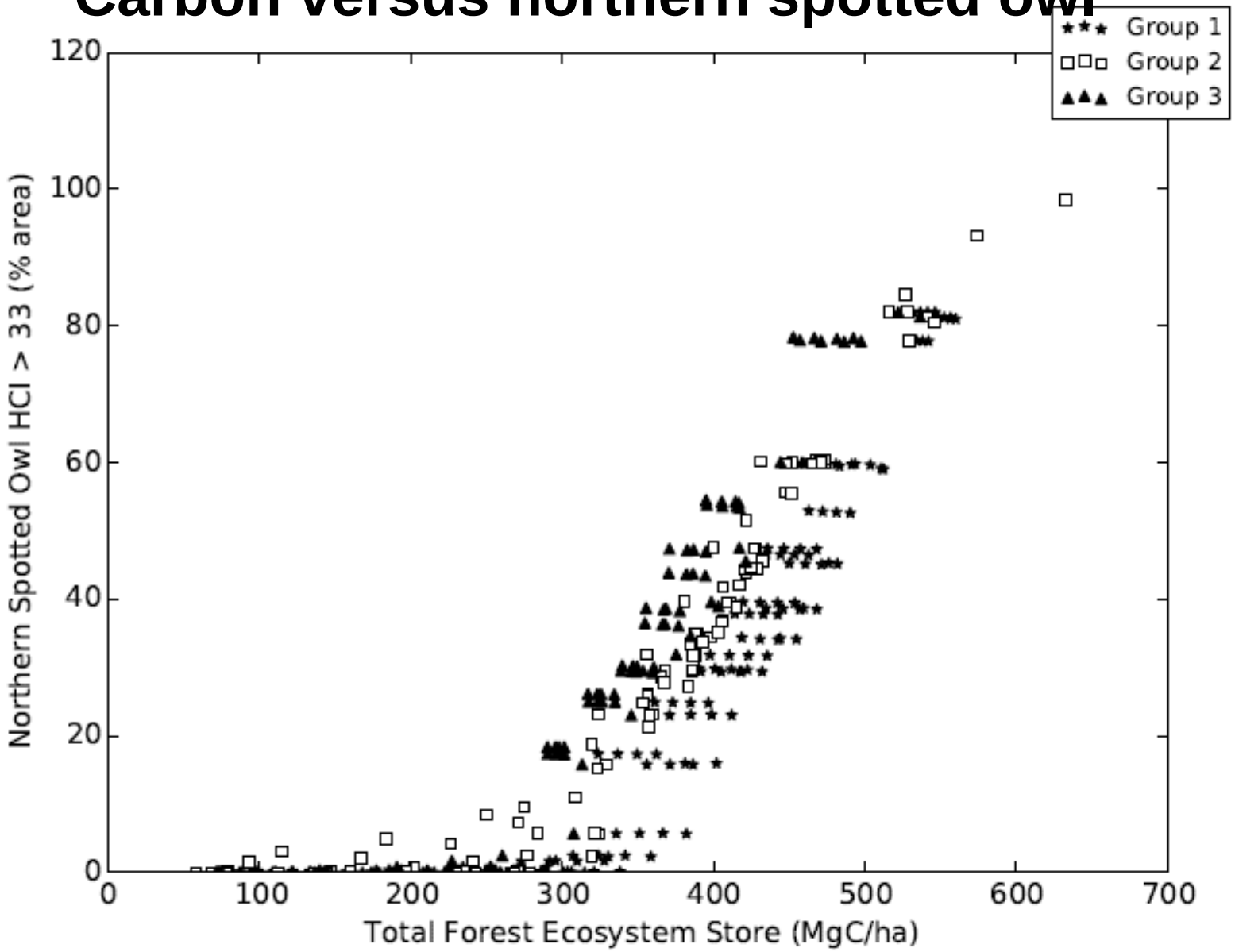
Carbon versus timber harvest



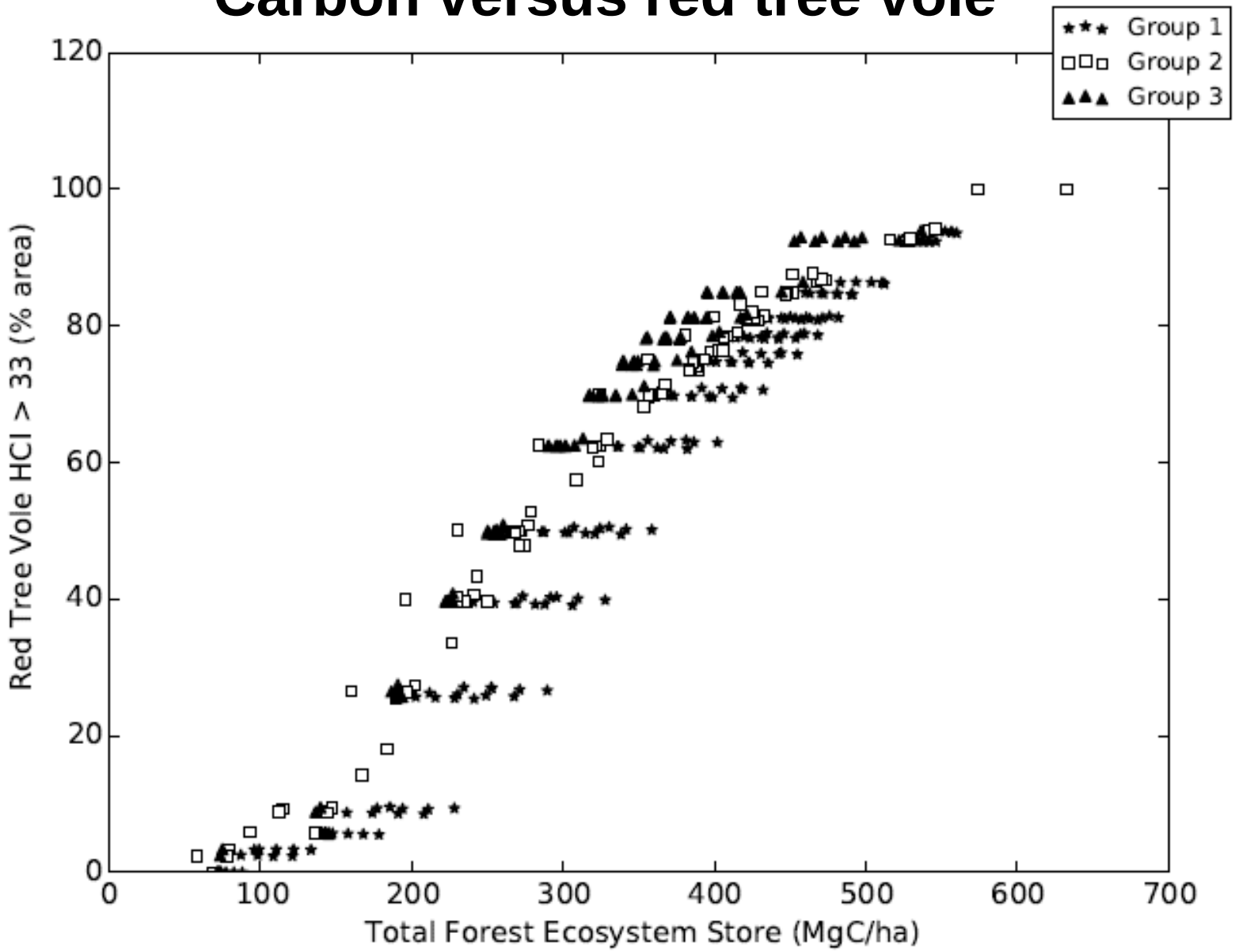
Carbon versus timber harvest



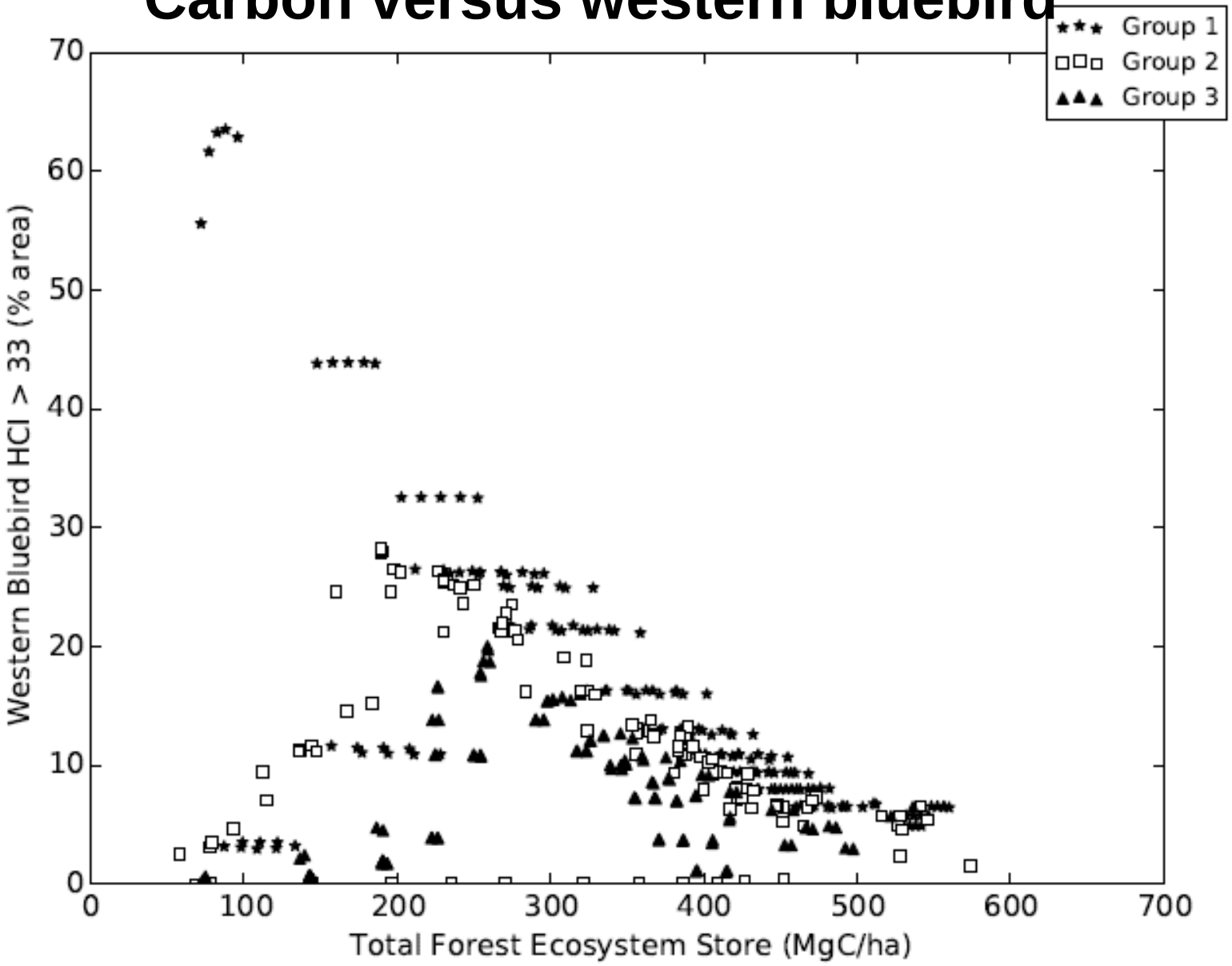
Carbon versus northern spotted owl



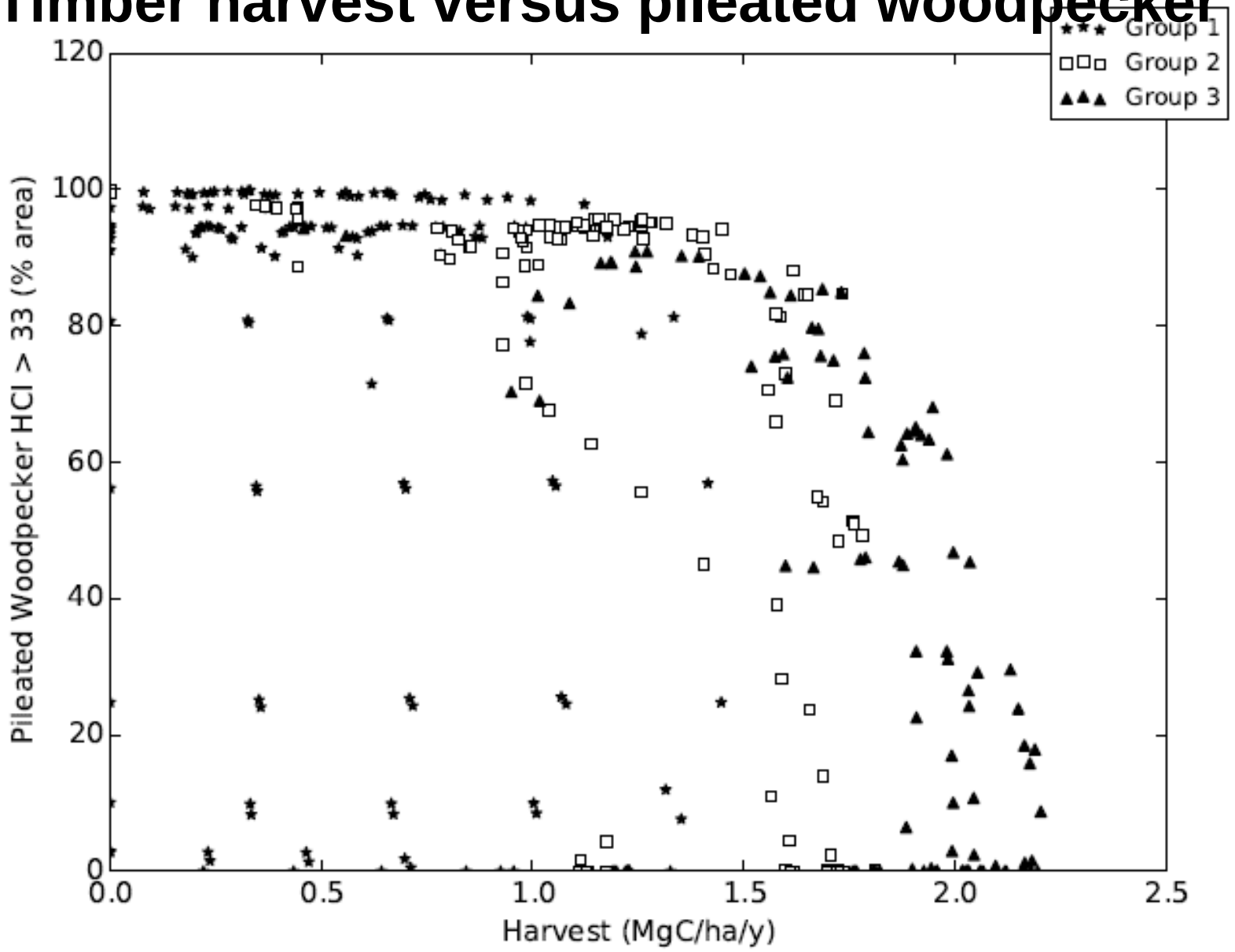
Carbon versus red tree vole



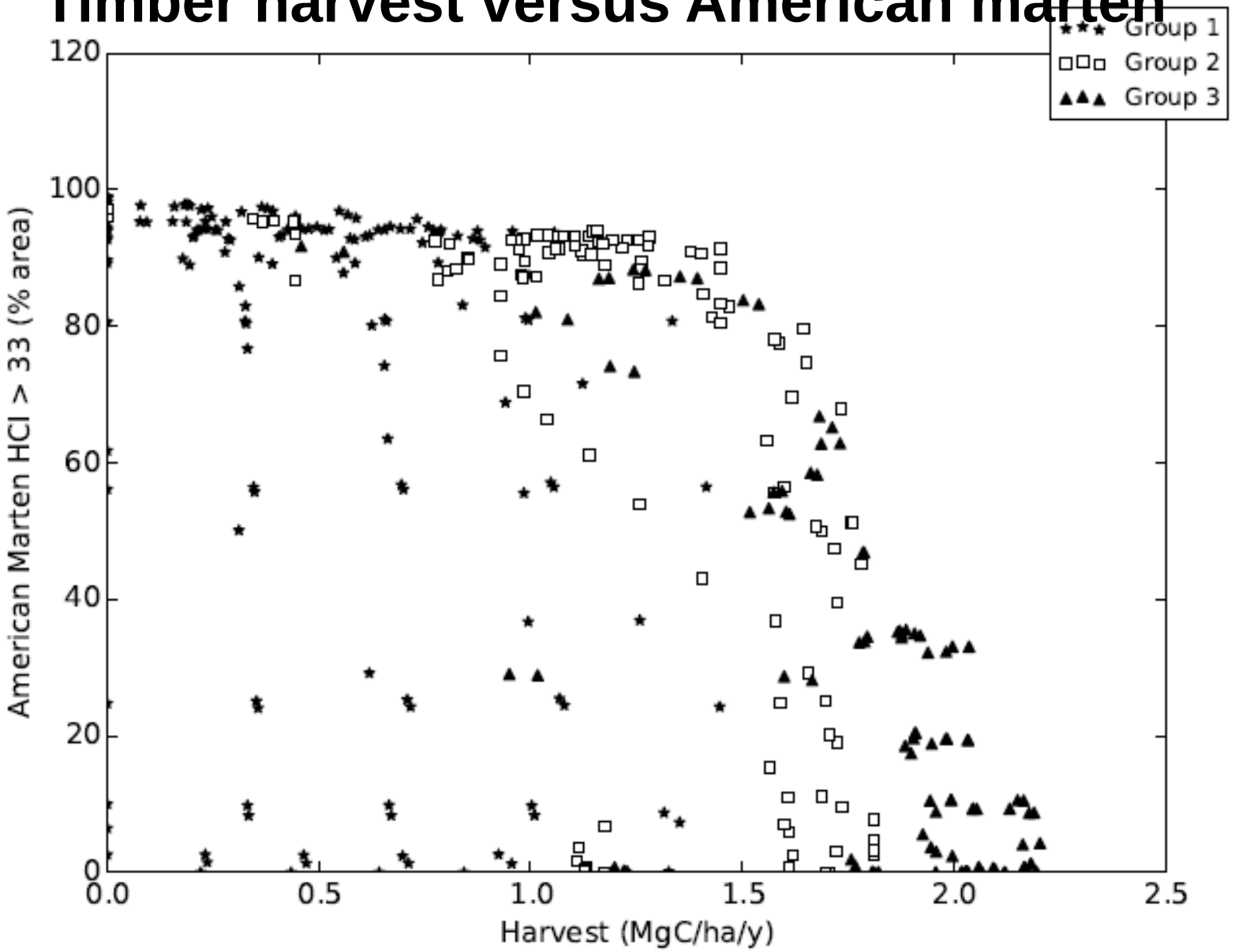
Carbon versus western bluebird



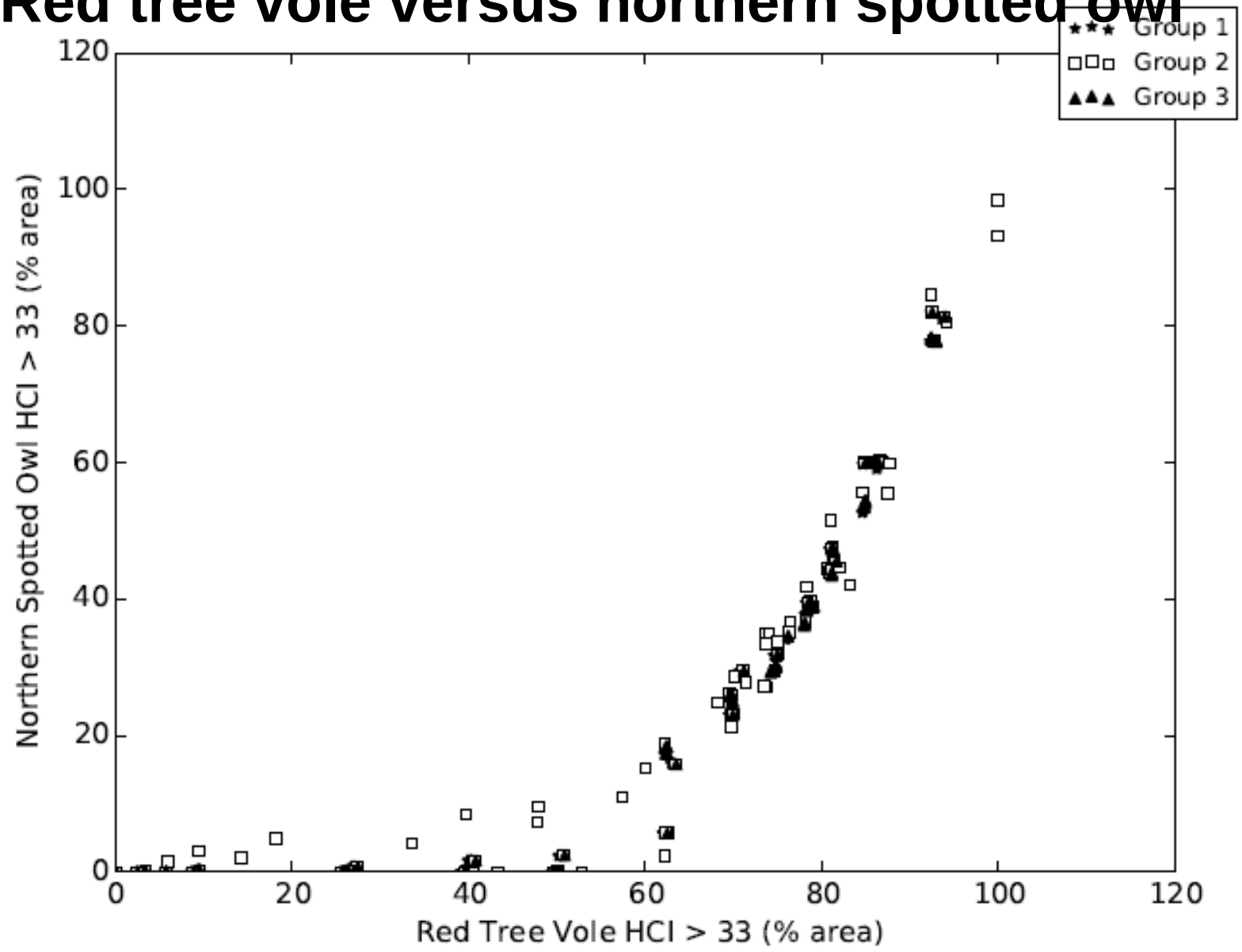
Timber harvest versus pileated woodpecker



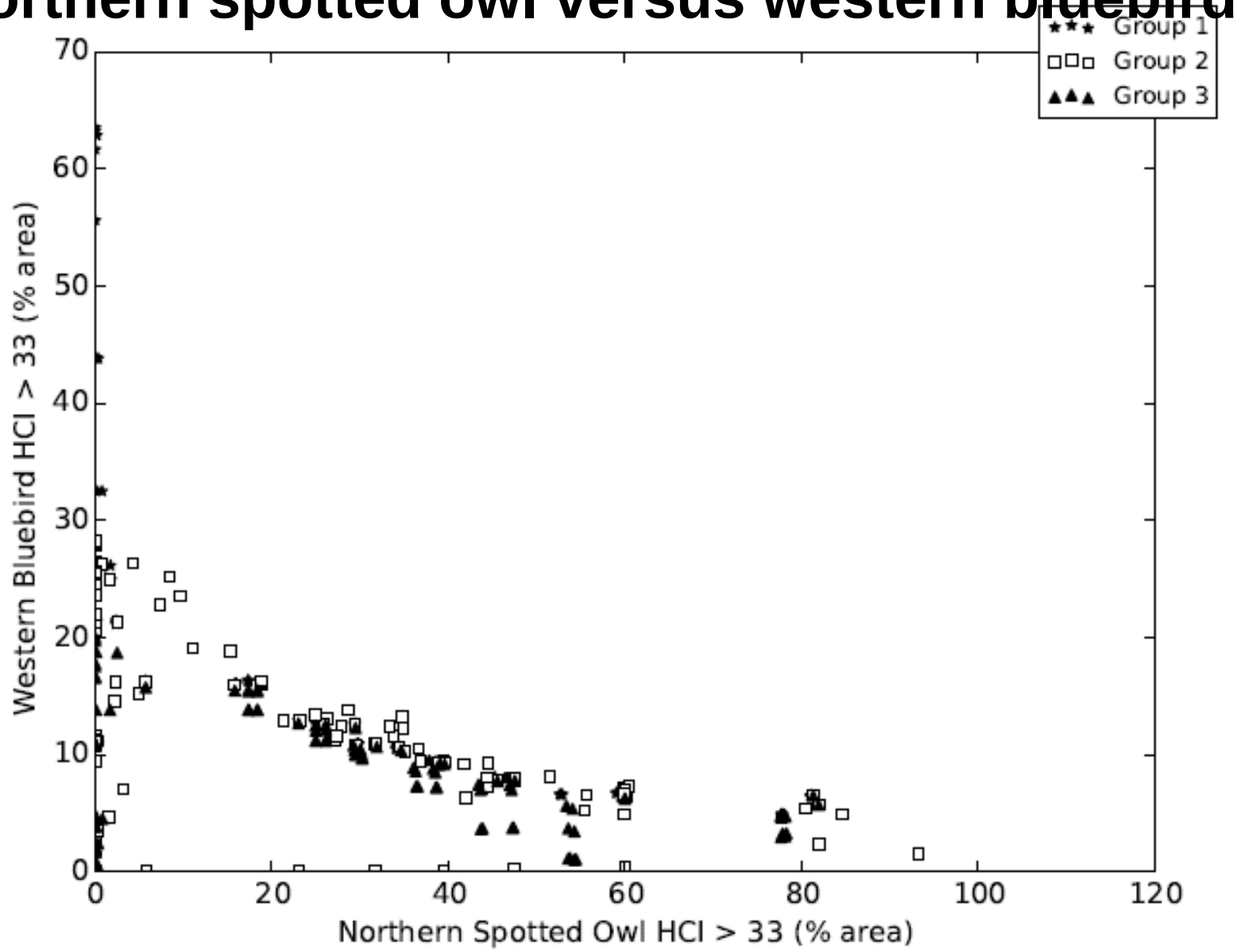
Timber harvest versus American marten



Red tree vole versus northern spotted owl



Northern spotted owl versus western bluebird



Conclusions

1. Could be useful to inform manager discourse with stakeholders and public;
2. Enables managers and stakeholders to see where their ideas would take us, what may be possible or not;
3. Makes tradeoffs among multiple ecosystem services more explicit; Not an argument about one service versus another;

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USDA United States Department of Agriculture