Apr 4th, 2:30 PM - 2:45 PM

Recognizing and integrating wildlife as Elwha restoration agents

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WESTERN WASHINGTON UNIVERSITY

HUXLEY COLLEGE OF THE ENVIRONMENT

ELWHA KLALLAM TRIBE

USGS science for a changing world

NATIONAL PARK SERVICE

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Outline

1 Restoration requires wildlife
2 Spatial & temporal contexts
3 Early wildlife distributions
4 Wildlife restoration roles
    -- ungulate browse patterns
    -- avian seed dispersal
    -- nutrient dispersal
5 Revegetation and LWD
6 Restoration implications


Roorda and Coastal Watershed Institute©

Attributes of Restored Ecosystems (SERI 2004)

1 Characteristic species, community structure

2 Indigenous species dominate

3 All functional groups for ecosystem development, stability

4 Capable of sustaining species required for (3)

5 Ecosystem functions "normally" for developmental stage

6 Integrated into larger landscape; biotic & abiotic interactions

7 Potential threats to integrity reduced or eliminated

8 Resilient to normal periodic stress events

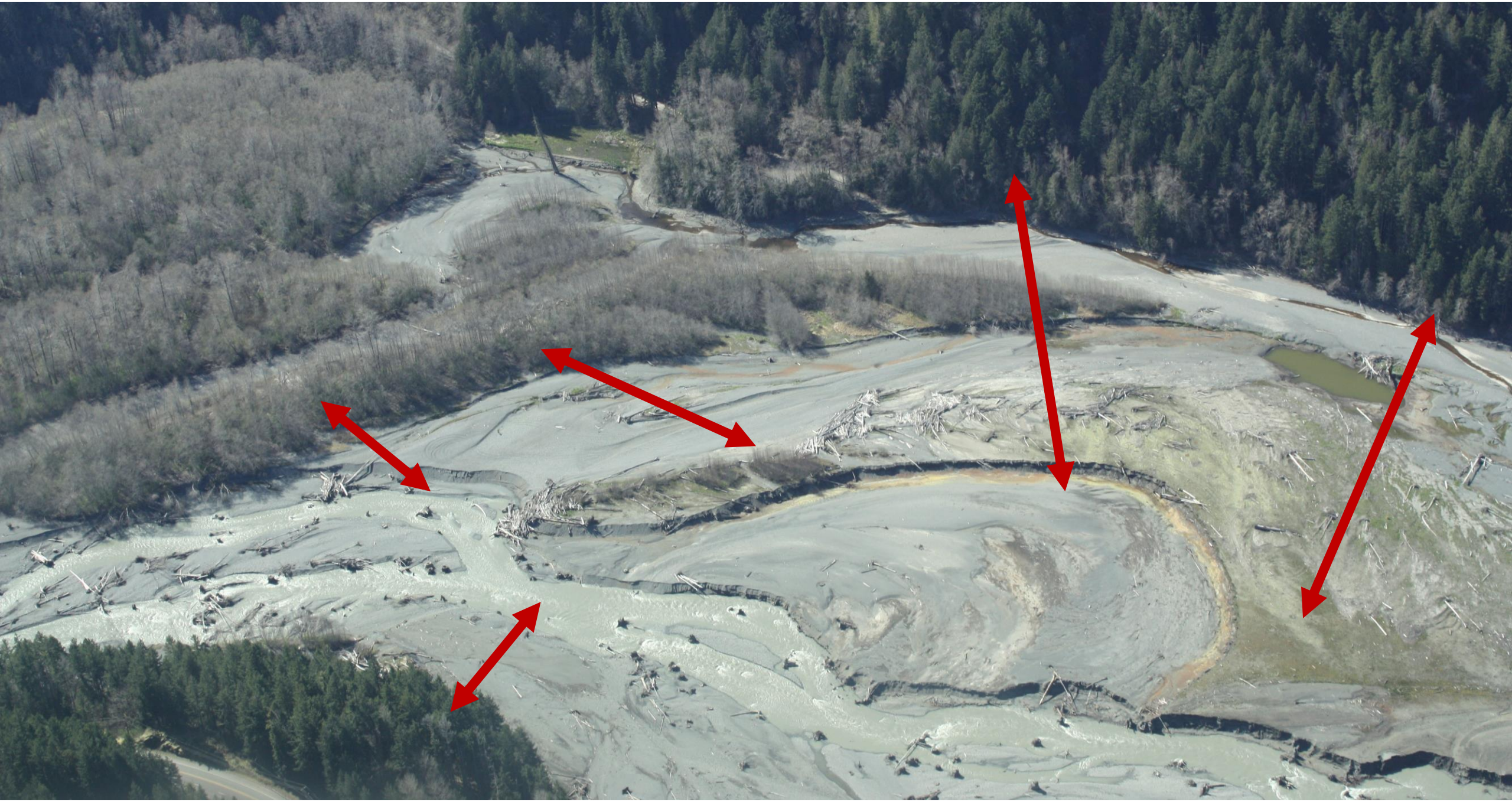
9 Self-sustaining; potential to persist

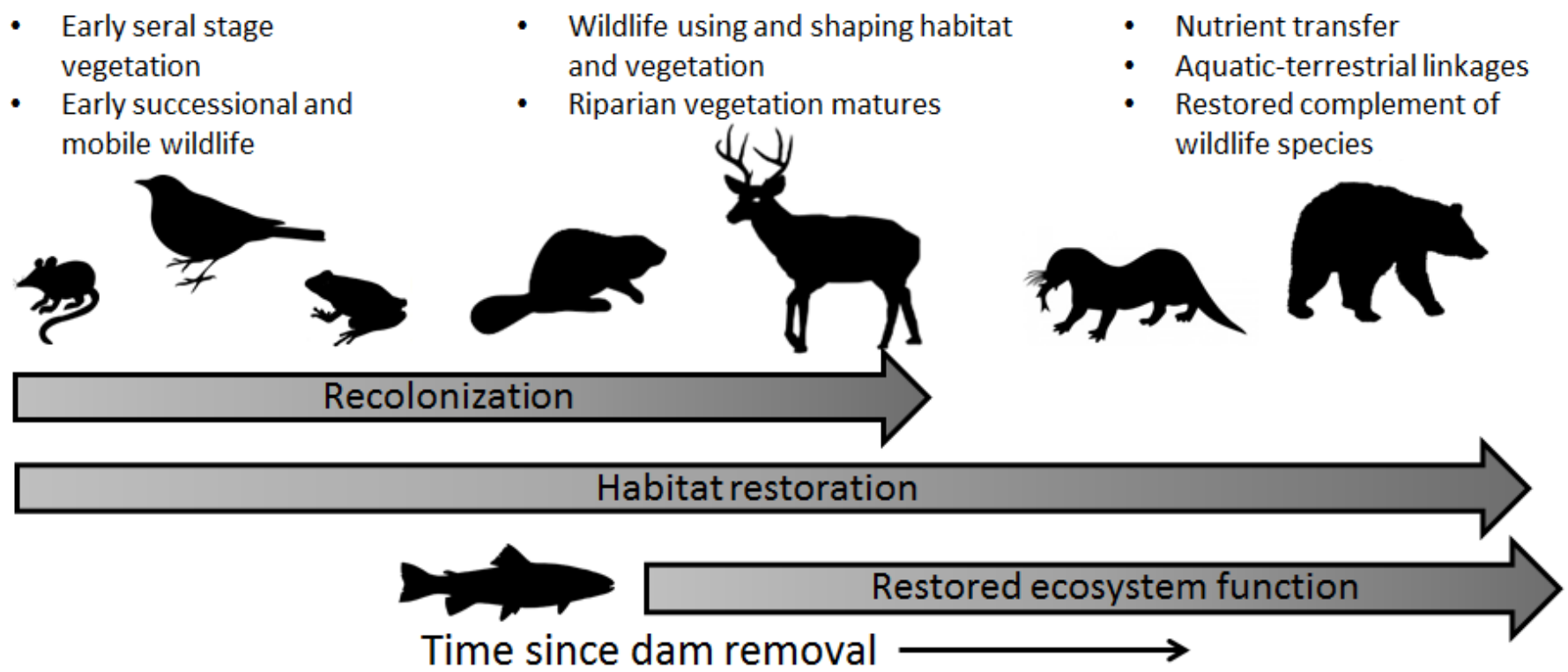
Wildlife roles

Presence

Functions

Indirect functions




• Early seral stage vegetation
• Early successional and mobile wildlife
• Wildlife using and shaping habitat and vegetation
• Riparian vegetation matures
• Nutrient transfer
• Aquatic-terrestrial linkages
• Restored complement of wildlife species
Recolonization
Habitat restoration
Restored ecosystem function
Time since dam removal

Natural revegetation

Active revegetation

Small mammals

Peromyscus (mice)

Mustela (weasels)

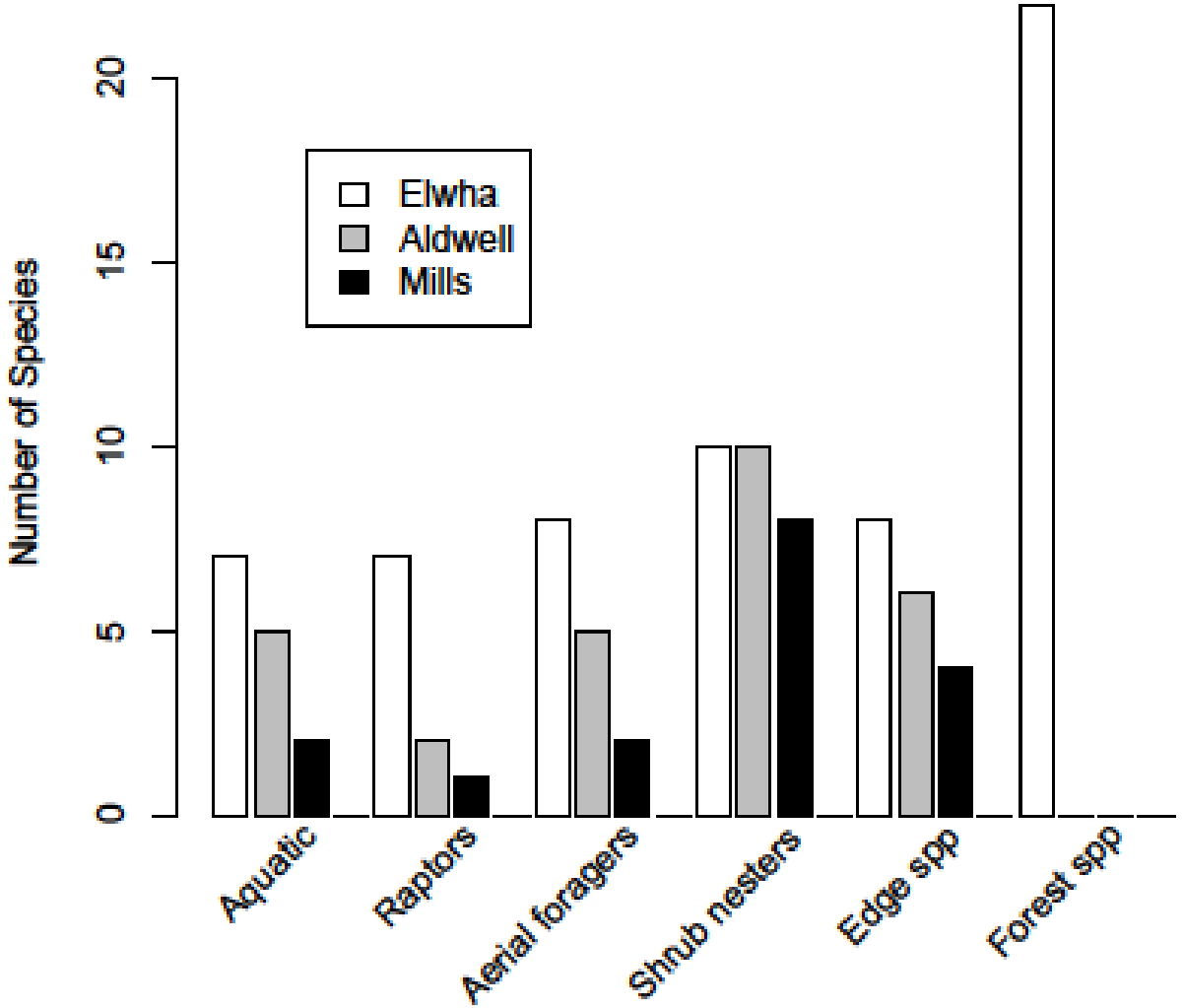
Sorex (shrews)

Neotoma
(wood rat)

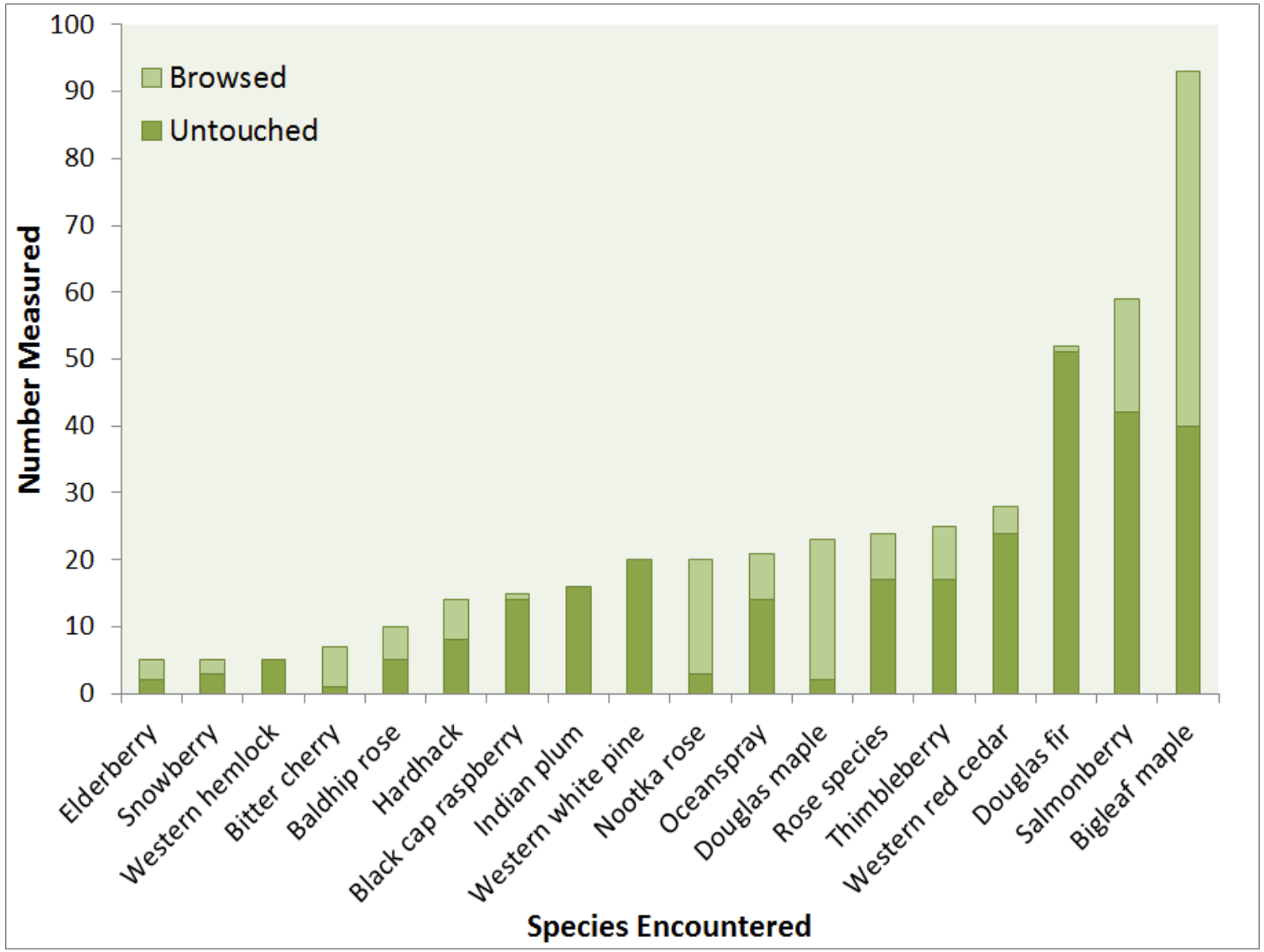
Microtus (voles)

Zapus (Jumping mouse)

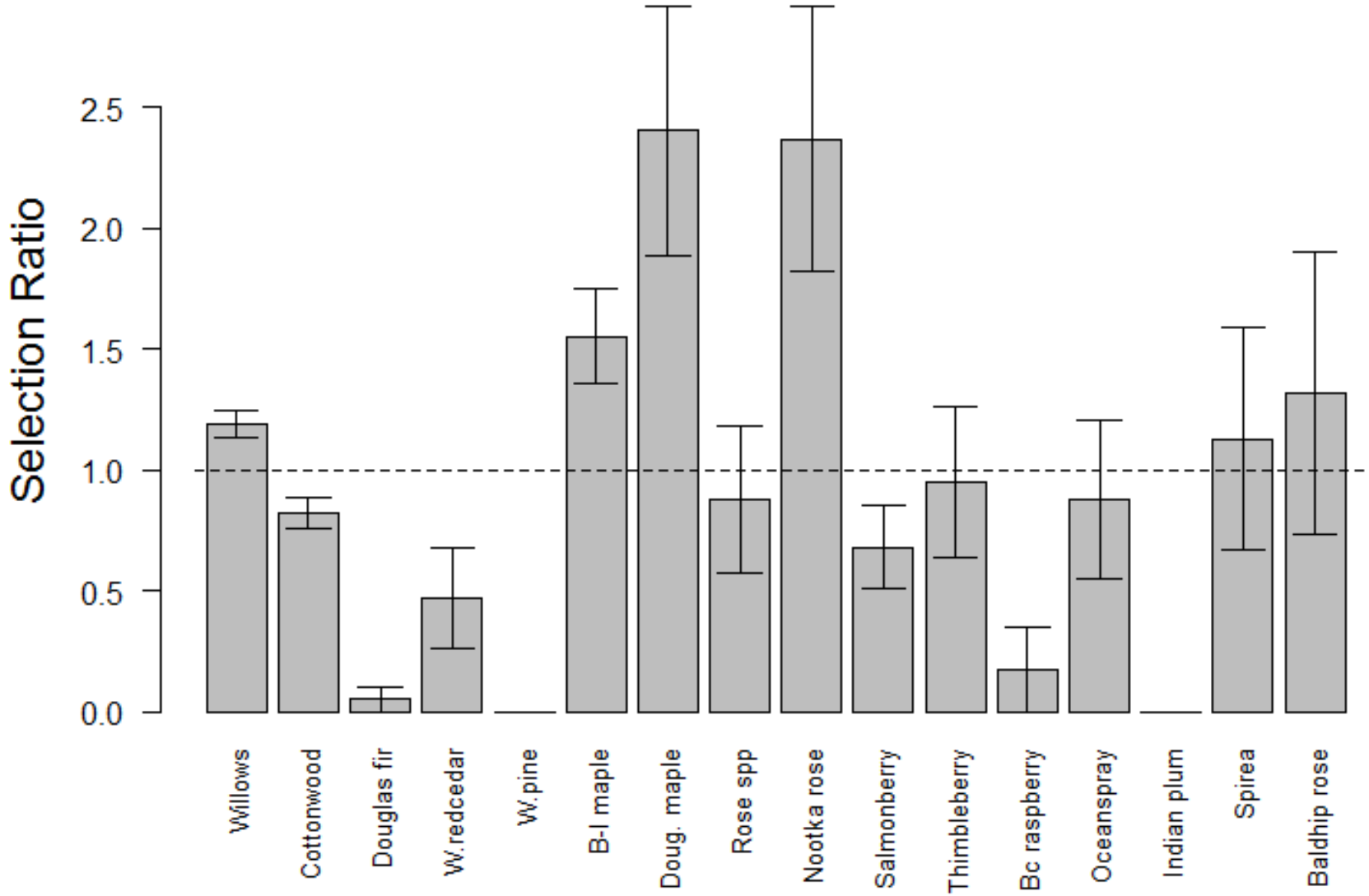
Bird species composition



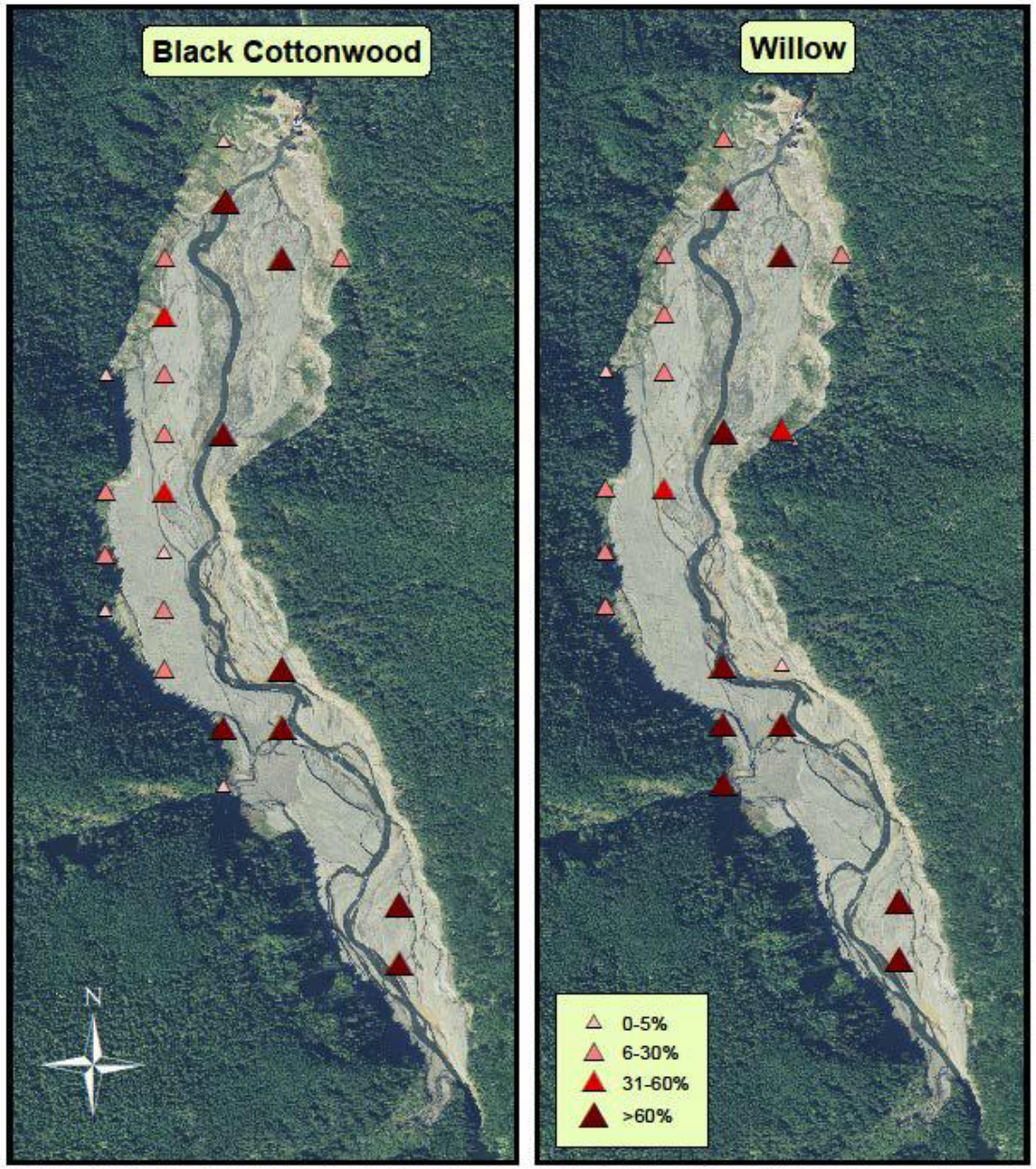
Ungulate browse selection



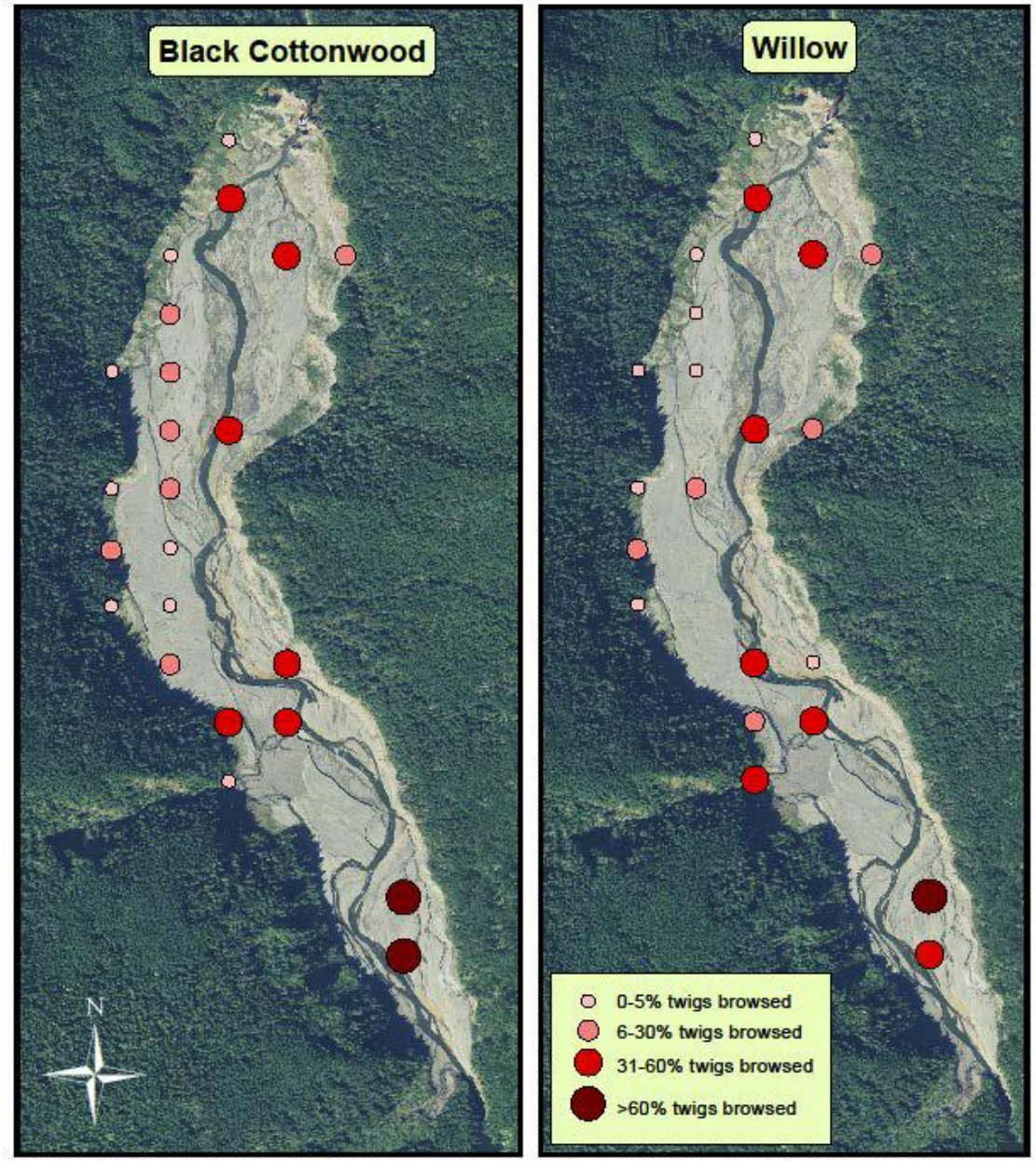
Year	Plots w/ Elk pellets
2015	10.3%
2016	20.0%
2017	48.3%

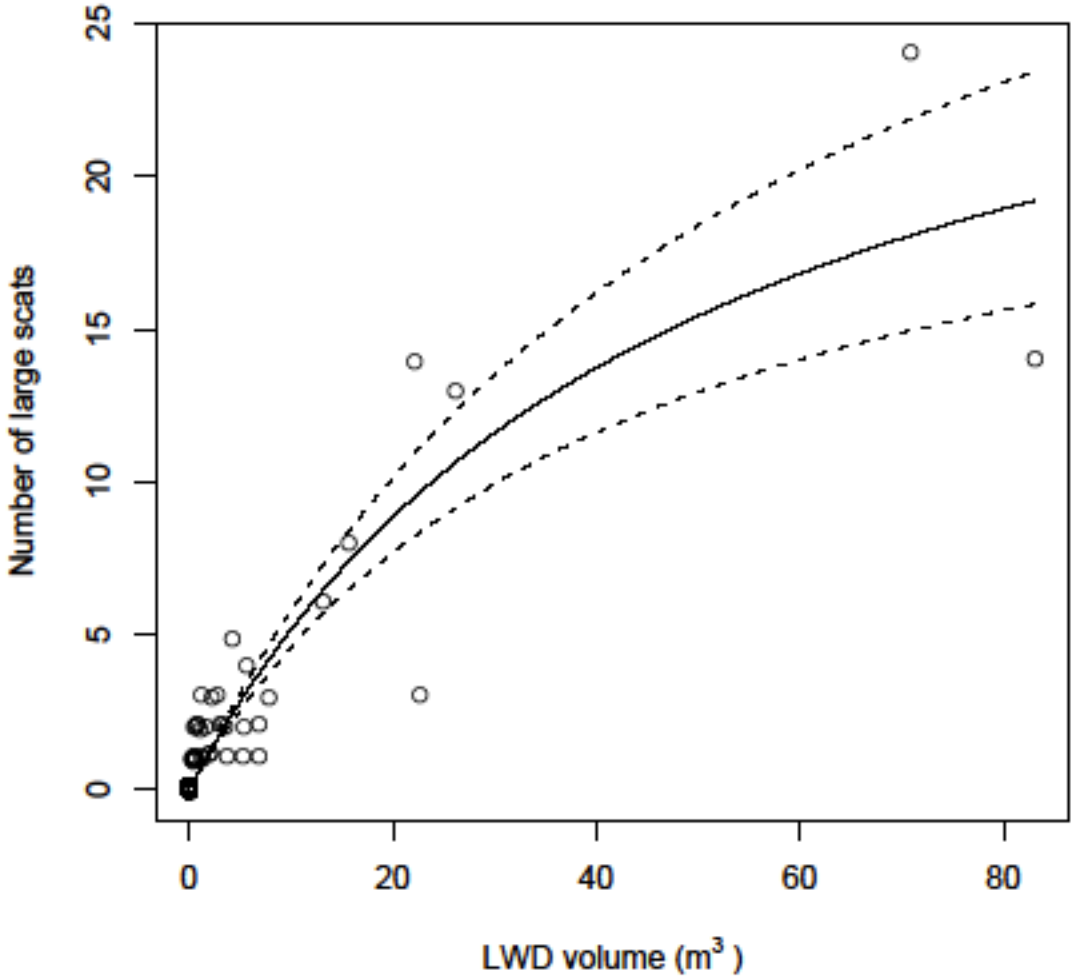

Selection Ratio
2.5
2.0
1.5
1.0
0.5
0.0
Willows
Cottonwood
Douglas fir
W.redcedar
W.pine
B-l maple
Doug. maple
Rose spp
Nootka rose
Salmonberry
Thimbleberry
Bc raspberry
Oceanspray
Indian plum
Spirea
Baldhip rose

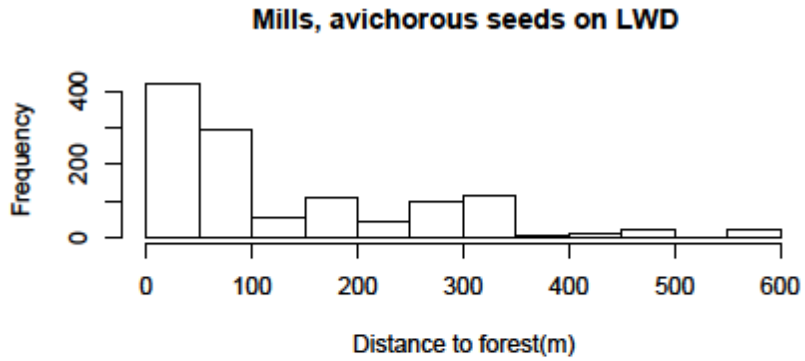
Mills - % of individual plants browsed per plot

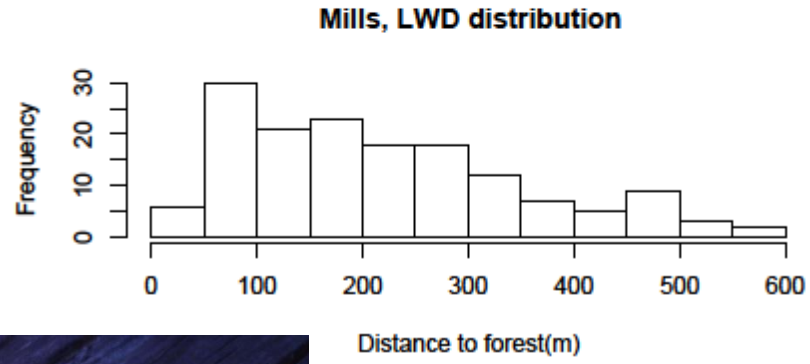


Mills - average % of browsed twigs per plant




Number of large scats
0
5
10
15
20
25
0
20
40
60
80
LWD volume (m3)


Mills, avichorous seeds on LWD
Frequency
0
200
400
0
100
200
300
400
500
600
Distance to forest(m)

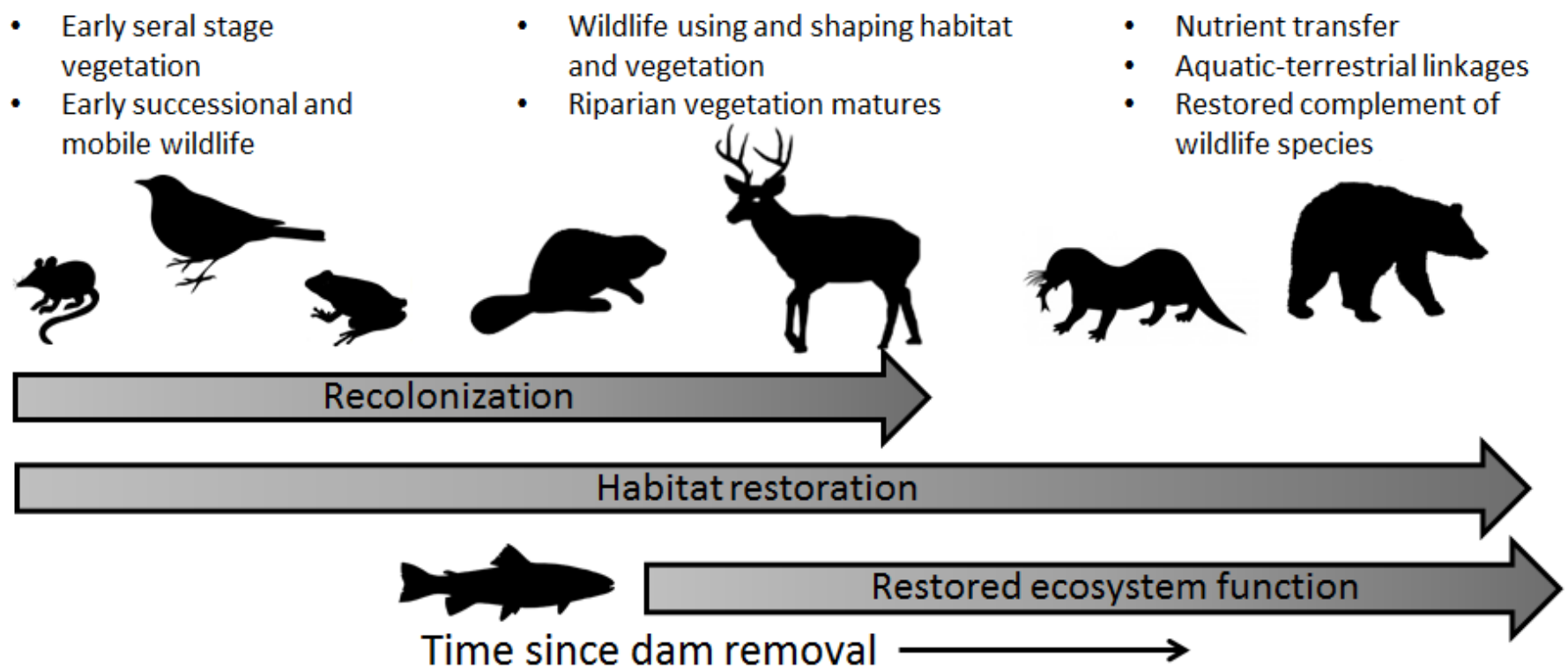

Mills, LWD distribution
Frequency
0
10
20
30
0
100
200
300
400
500
600
Distance to forest(m)

Revegetation and LWD

Dispersal

Substrate

Herbivory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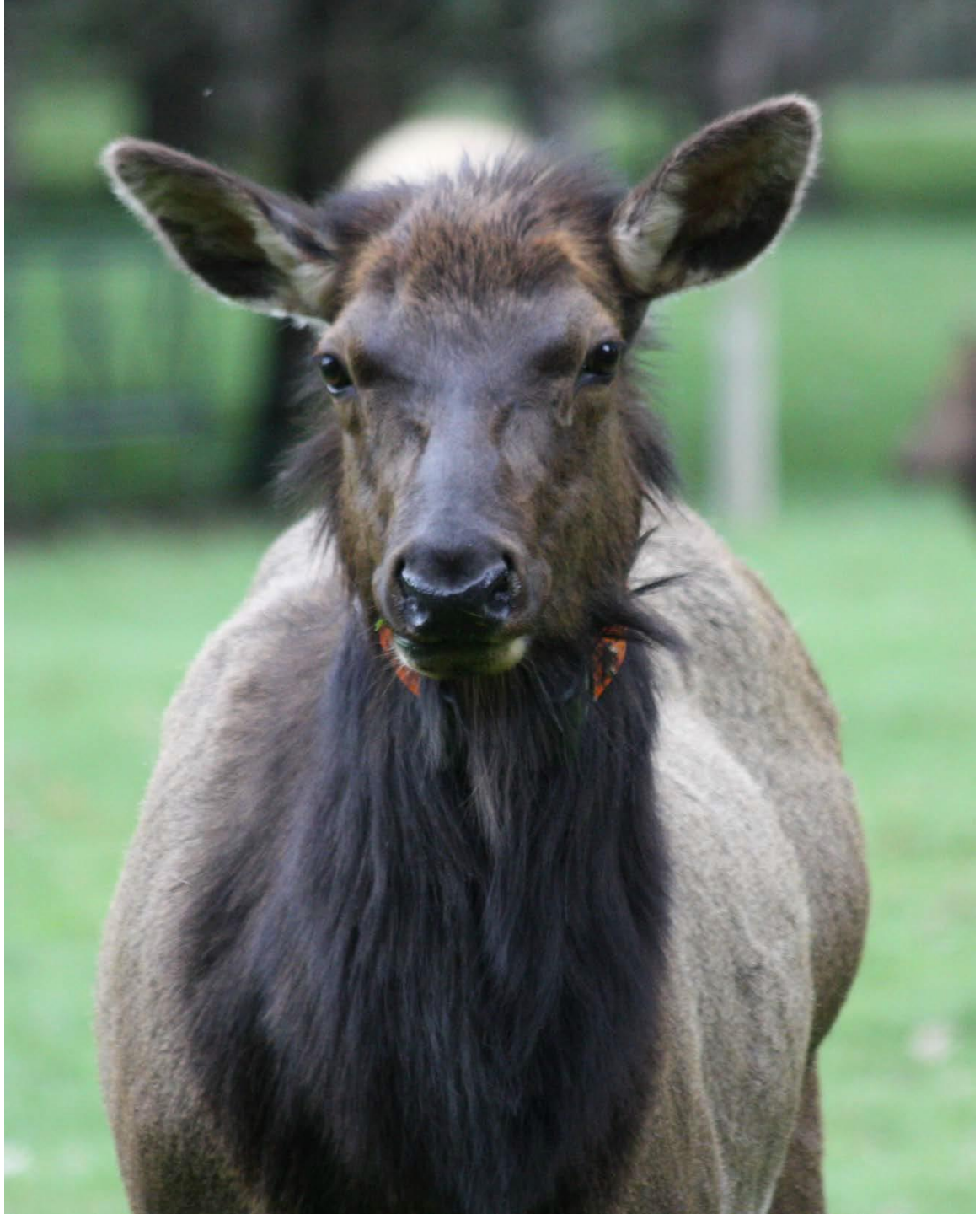

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