



Effects of Site and Scale on the Demographics of Standing Dead Trees in Eastside Pine Forests

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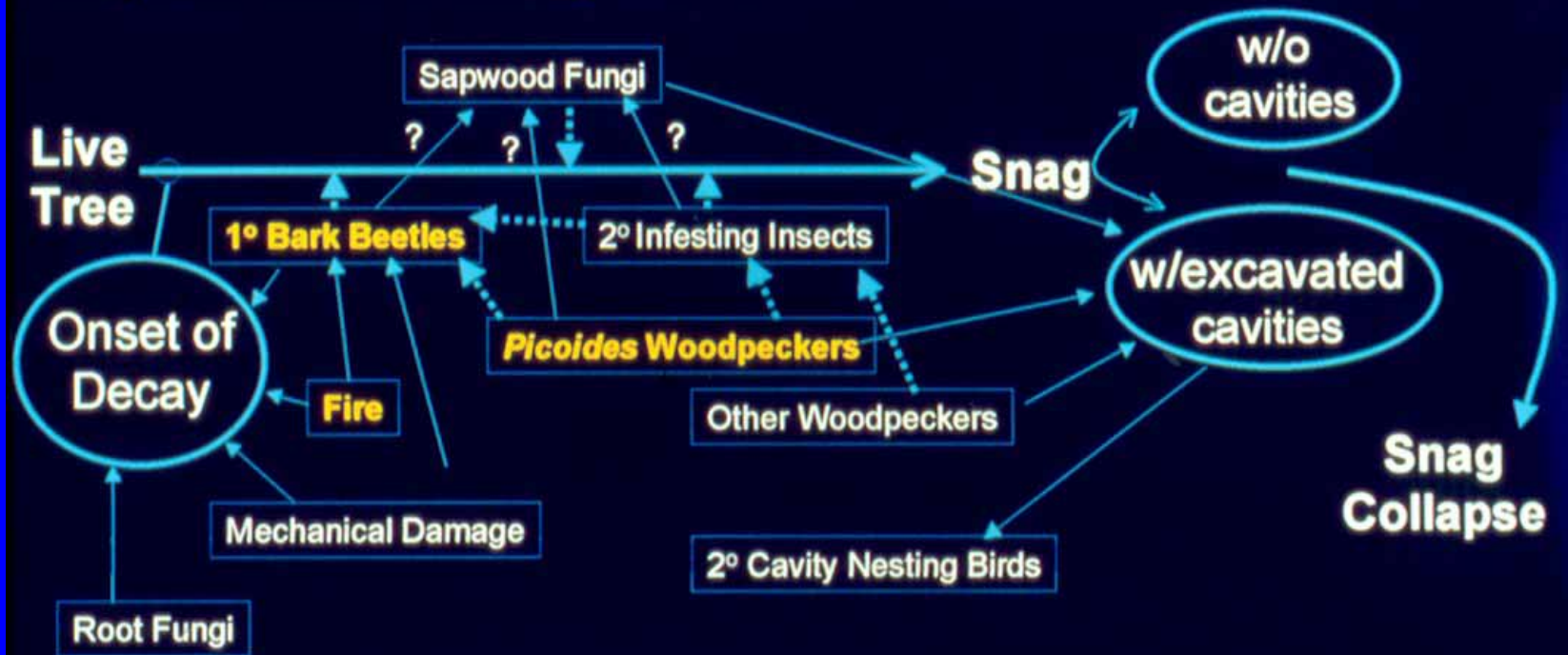
Are we managers of process,
or curators of entities?



- Dead wood has been for some time and is yet an important issue in forest management
- Dead wood is
 - a key element in many ecological interactions
 - critical to persistence of many species

- Historically, dead wood appears to be viewed primarily as an entity rather than a property that emerges from ecological processes
- If, however, dead wood is an emergent property, then we need to gain a better understanding of those processes that interact to produce dead wood

Temporal Links of Decay Process:



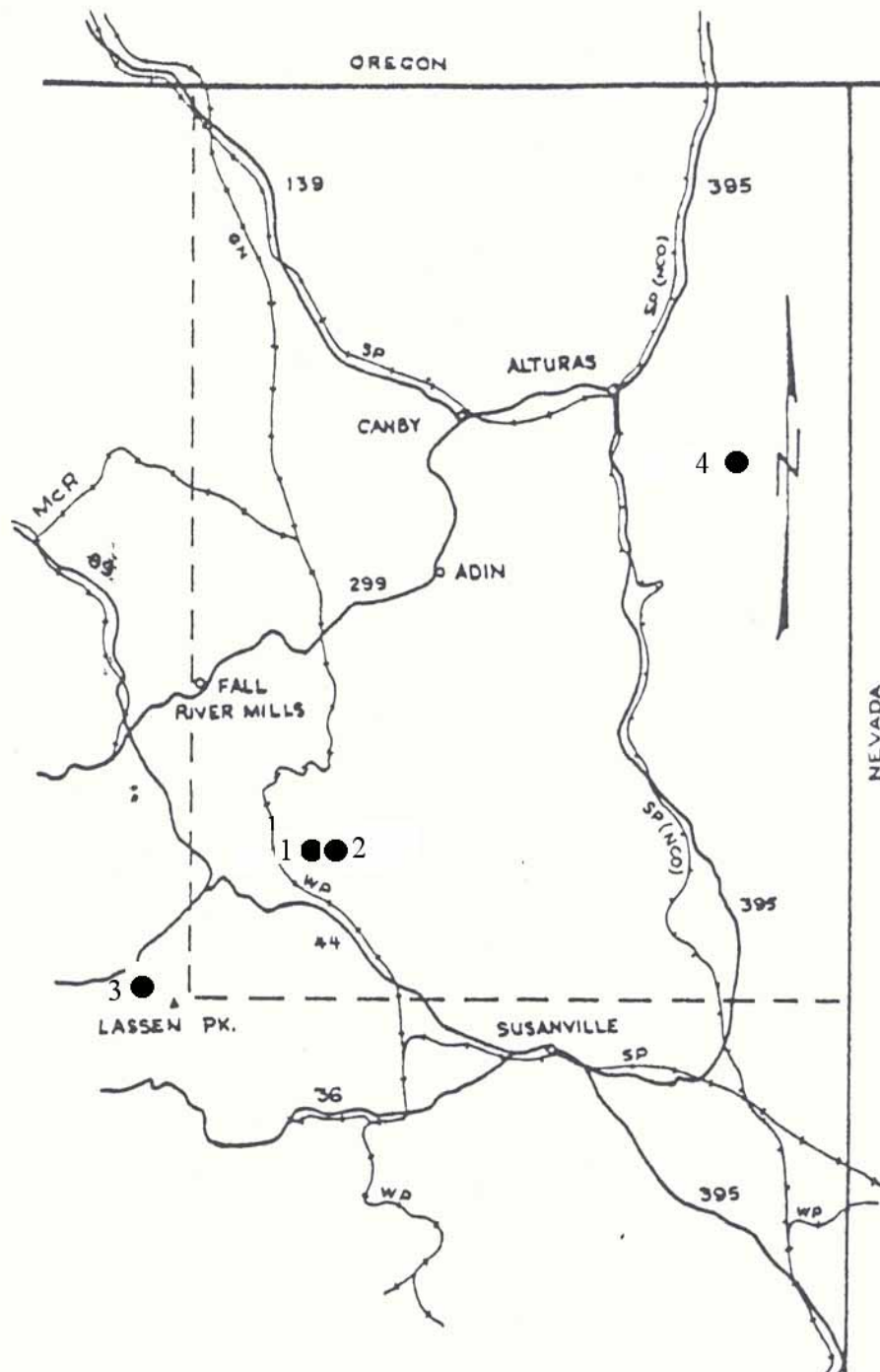
Key to Connections:

A  B (A facilitates B)

A  B (A forages on B)

- Variation in the quantity of dead wood across the landscape & vegetations
- Temporal variation in snag recruitment and loss
- Scale (both spatial and temporal) of the mortality event

- 1988 - initiated a snag and bird study on 24 study plots in eastside pine forest
- each plot was 5 ha - 100 x 500 m
- chosen to exhibit an array of snag densities
- very small patches with snag numbers approaching 7.5/ha



Dominant Vegetation

Trees

- Cedar, incense
- Fir, white
- Juniper, western
- Oak, California black
- Pine, Jeffrey
- Pine, lodgepole
- Pine, ponderosa

Calocedrus decurrens
Abies concolor
Juniperus occidentalis
Quercus kelloggii
Pinus jeffreyi
Pinus contorta
Pinus ponderosa

Shrubs

- Bitterbrush
- Mahala mat
- Manzanita, Nevada
- Mountain-mahogany, curl-leaf
- Sagebrush, big
- Sagebrush, silver

Purshia tridentata
Ceanothus prostratus
Arctostaphylos nevadensis
Cercocarpus ledifolius
Artemisia tridentata
Artemisia cana

- Red-breasted Sapsucker [most plots]
- Williamson's Sapsucker [higher elevation plots]
- Hairy Woodpecker [most plots]
- White-headed Woodpecker [most plots]
- Black-backed Woodpecker [higher elevation plots]
- Northern Flicker [most plots]
- Pileated Woodpecker [higher elevation plots]
- Mountain Chickadee [all plots]
- Red-breasted Nuthatch [all plots]
- White-breasted Nuthatch [many plots]
- Pygmy Nuthatch [all plots]
- Brown Creeper [higher elevation plots]
- House Wren [few plots]
- Mountain Bluebird [few plots]

Old Forest

- primarily ponderosa pine with little fir
- open pine forest with many large diameter trees (>61 cm dbh)
- soils are accessible and occupied by grasses, forbs and shrubs but are quite shallow in some locations
- little or no forest management until 1996 (understory thinned) and 1997 (prescribed burned)



Research Natural Area

- primarily ponderosa pine but with a fir component generally in the understory
- open pine forest with many large diameter trees (> 61 cm dbh)
- soils are available and densely occupied by small trees or grasses, forbs, and shrubs in openings but are quite shallow in some locations
- no historical forest management



Hot Rock

- primarily Jeffrey pine with small patches of small white firs
- very open forest with many large diameter trees (> 61 cm dbh)
- soils are covered by a thick (up to 0.5 m) layer of volcanic ash and often lack grasses, forbs, and shrubs
- no historical forest management

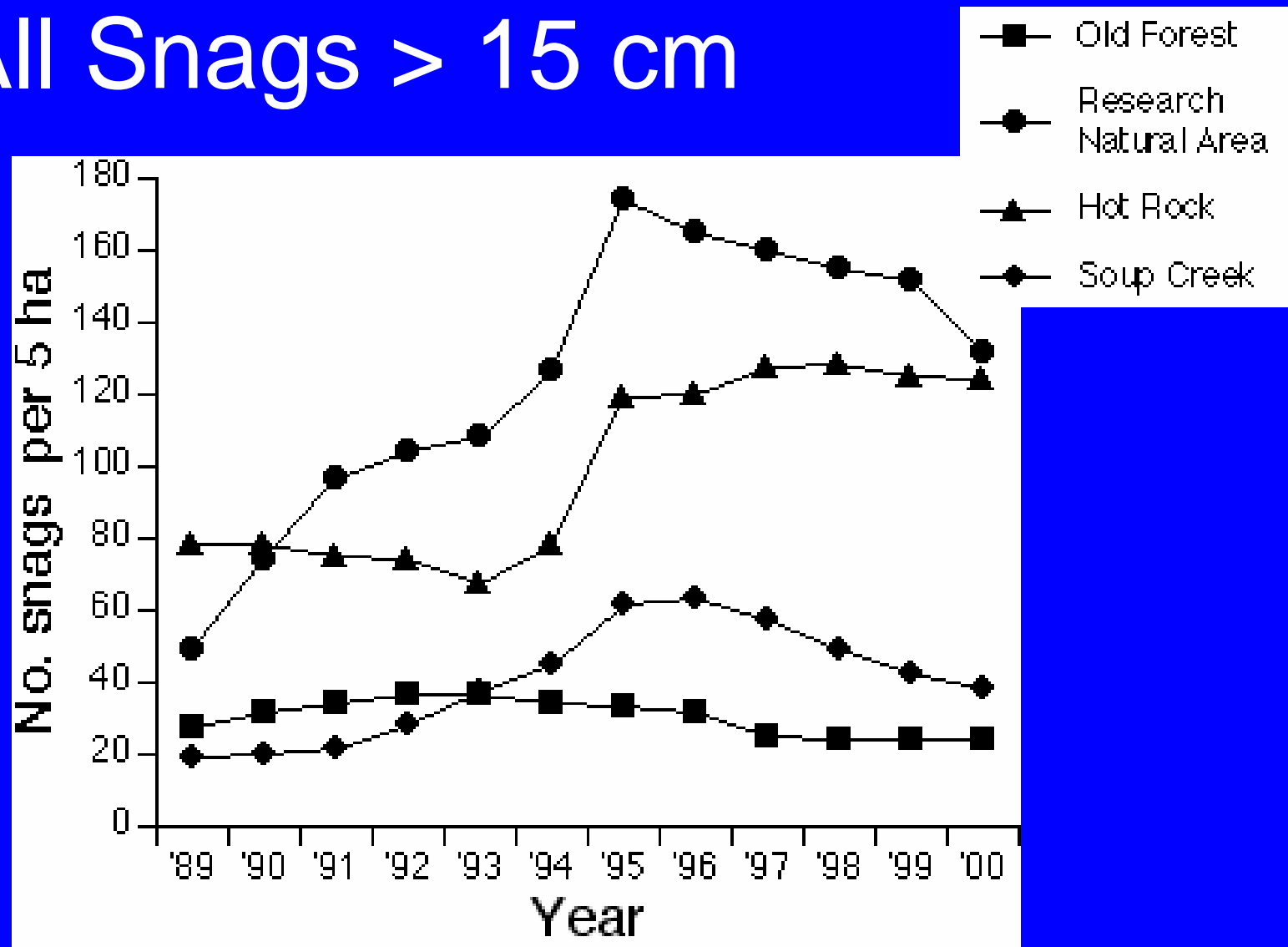


Soup Creek

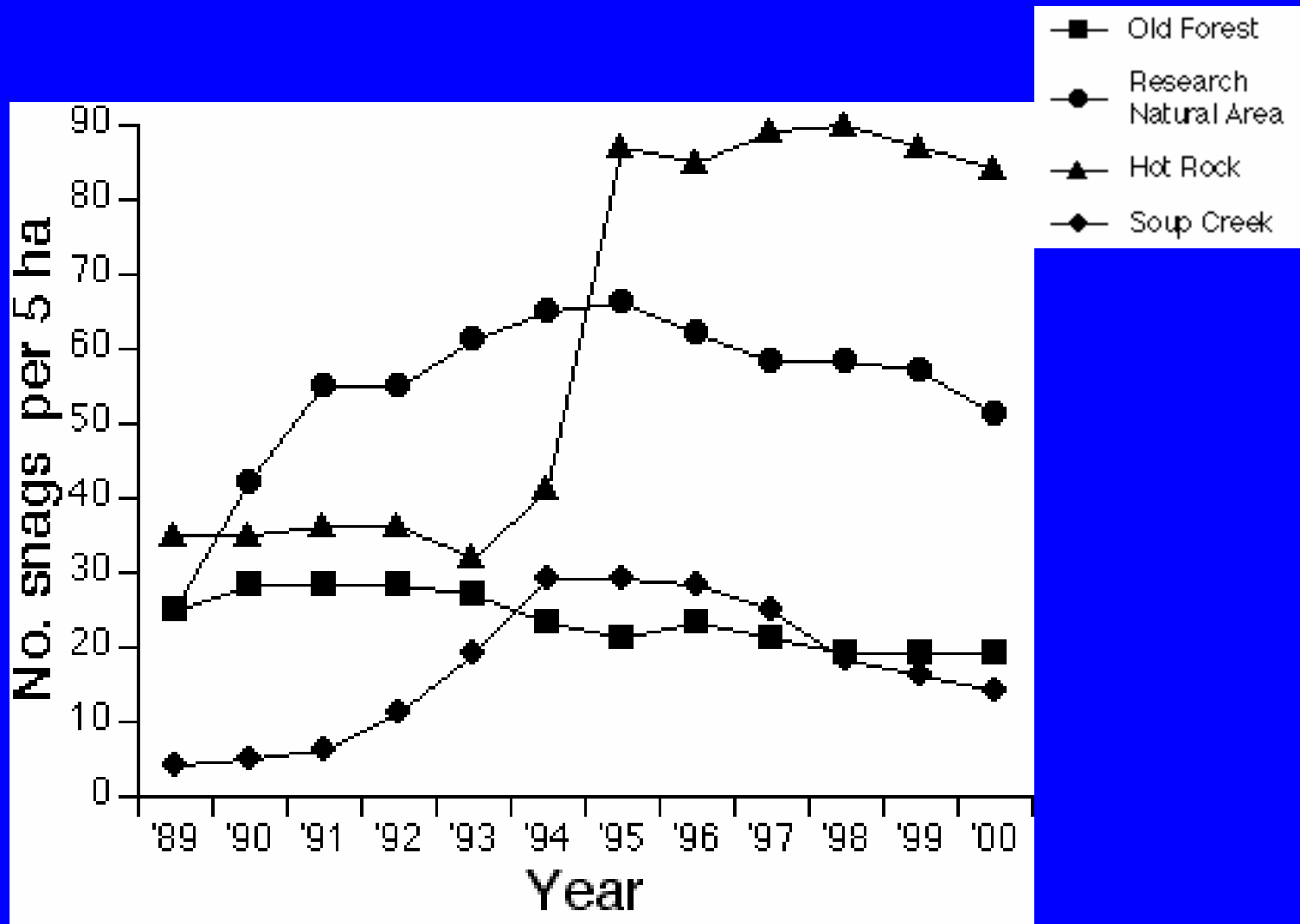
- ponderosa pine and white fir forest
- open forest with many large diameter trees (> 61 cm dbh)
- soils are available and occupied by patches of smaller trees or grasses, forbs and shrubs
- steep slopes several areas dominated by boulders
- limited historical management



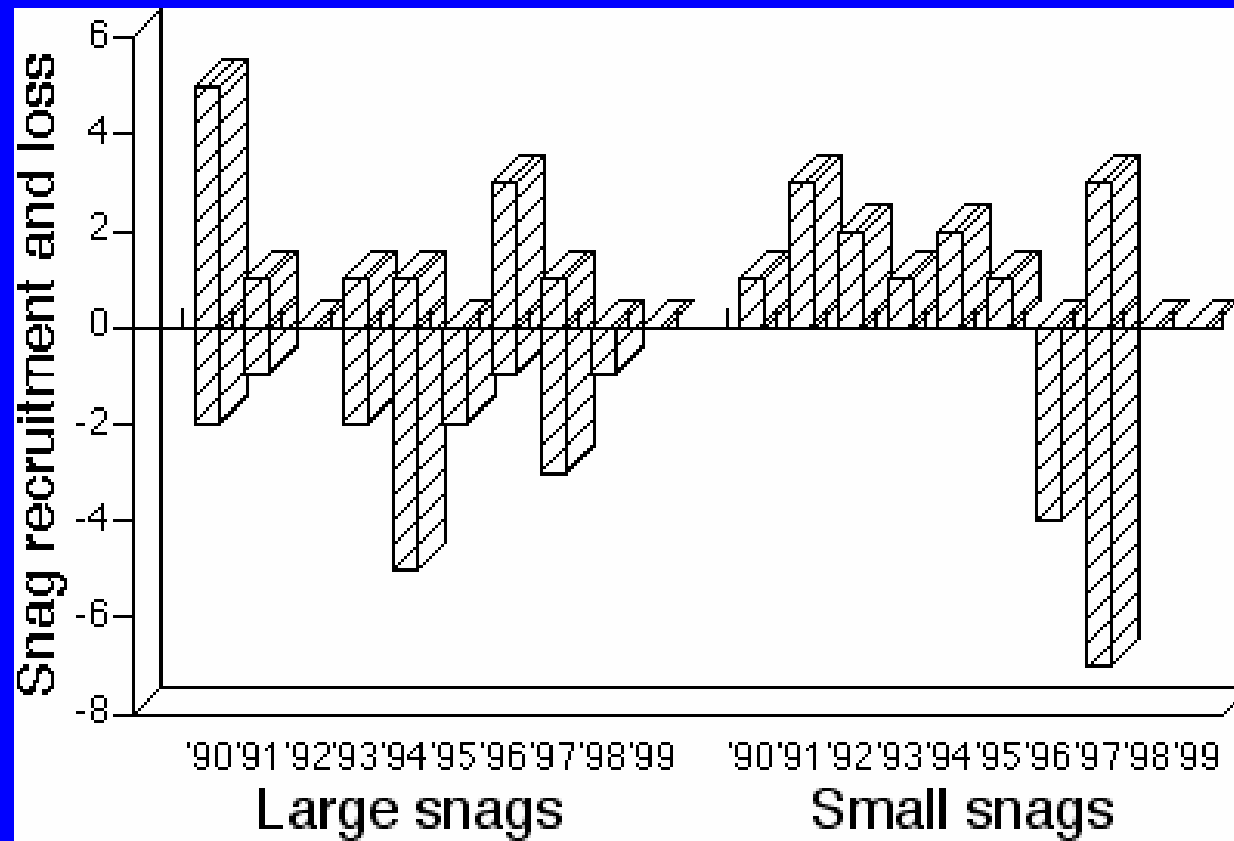
All Snags > 15 cm



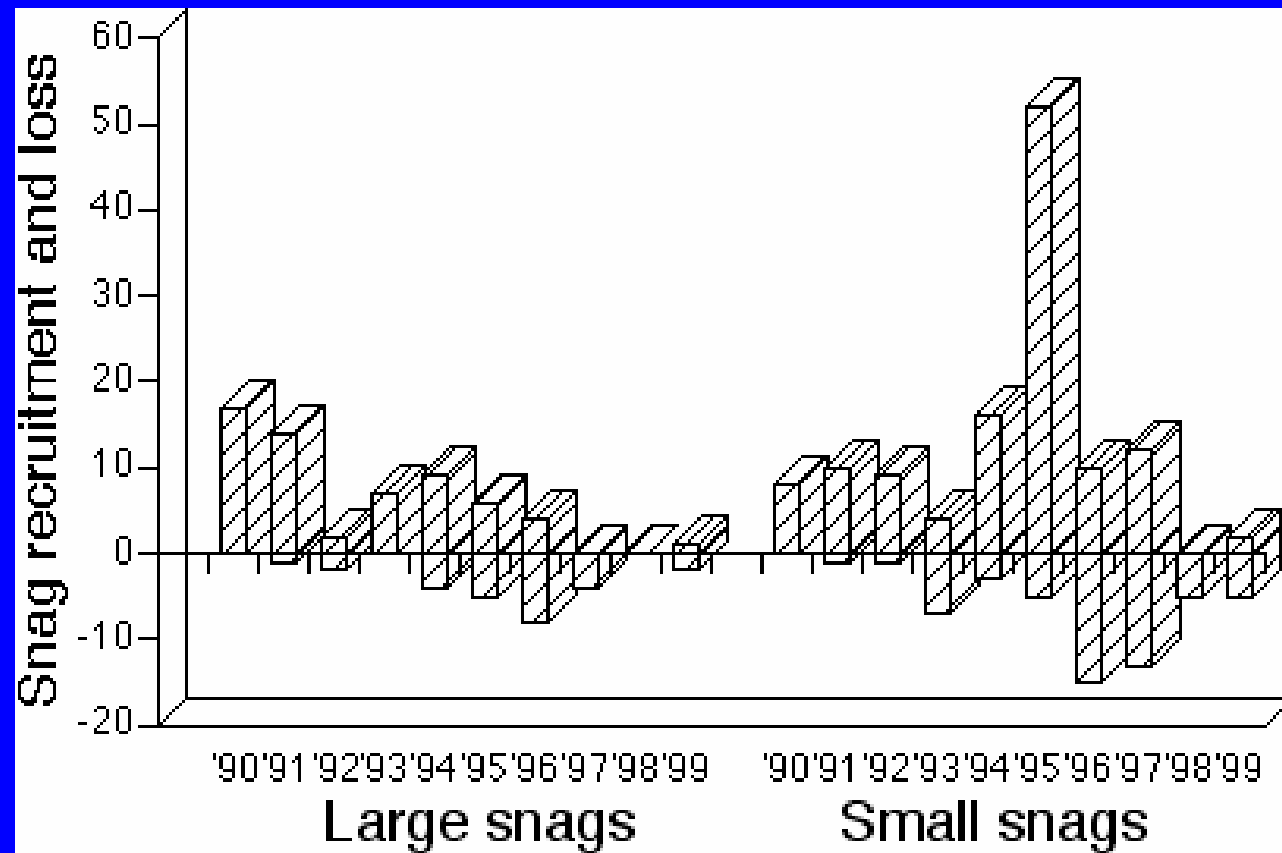
Large Snags > 38 cm & 6 m



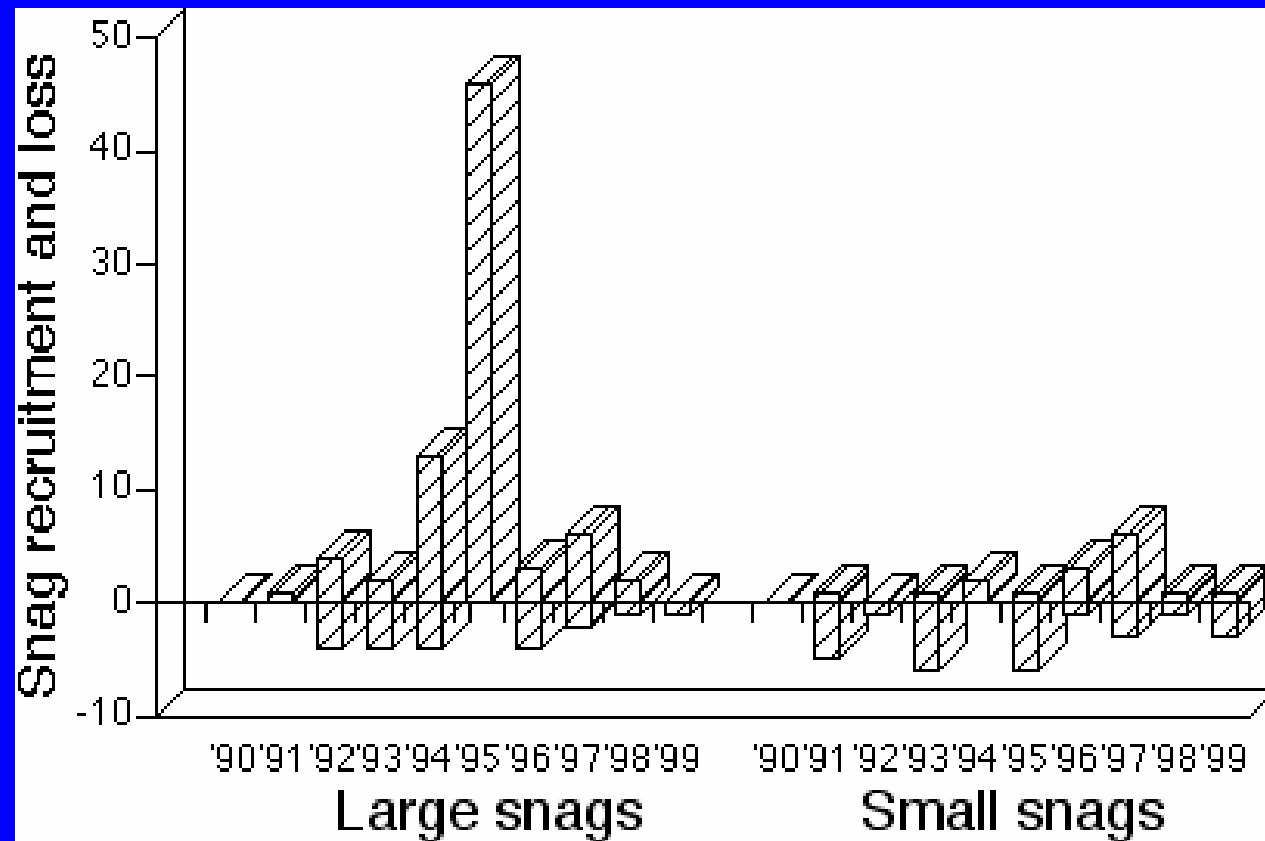
Old Forest



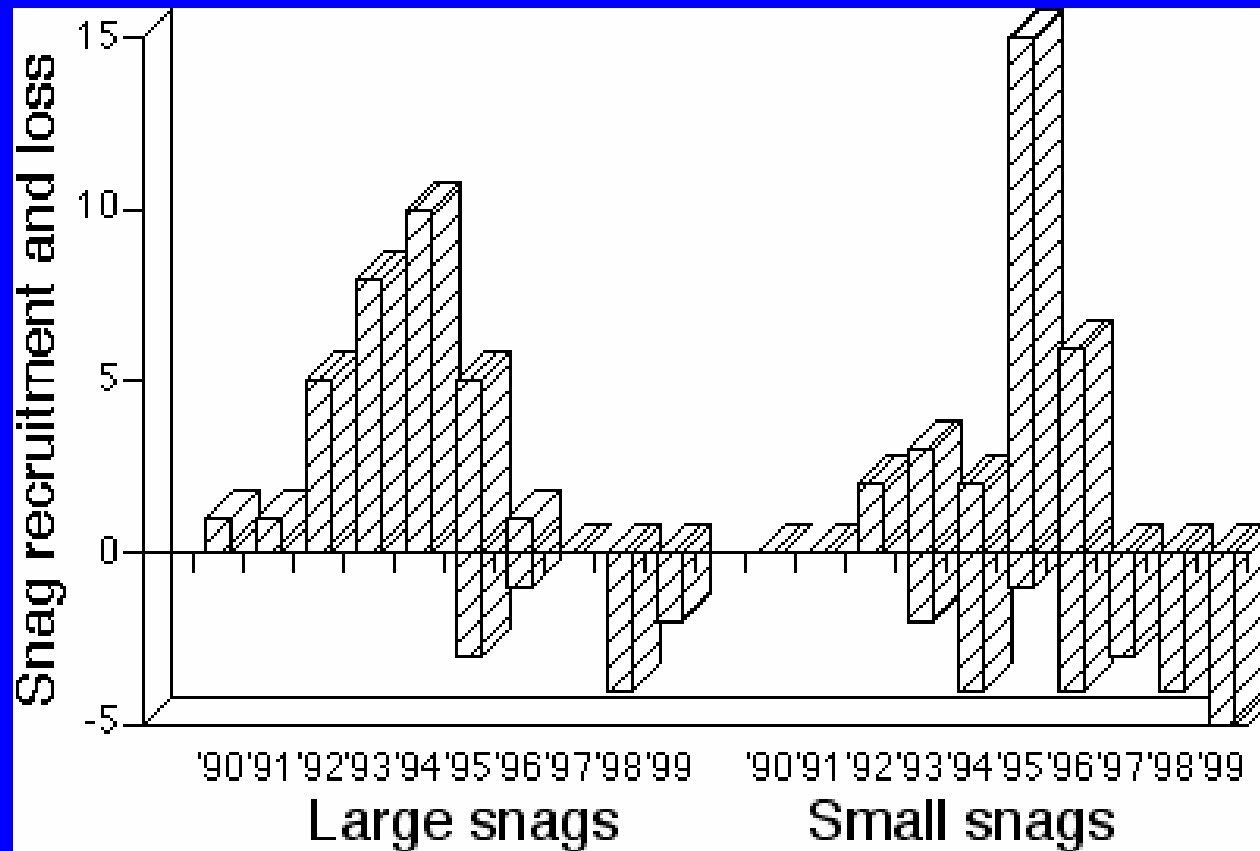
Research Natural Area



Hot Rock



Soup Creek



Large Snag Recruitment/Loss

- Old Forest '90+ '96+ '94- '97-
- Res Nat Area '90+ '91+ '96-
- Hot Rock '94+ **'95+** '92- '93- '94- '96-
- Soup Creek '92+ '93+ '94+ '95- '98-

Small Snag Recruitment/Loss

- Old Forest '91+ '97+ '96- '97-
- Res Nat Area '94+ '95+ '96- '97-
- Hot Rock '97+ '91- '93- '95-
- Soup Creek '95+ '96+ '94- '96- - '99-

- Variation in the quantity of dead wood across the landscape & vegetations
- All snags:
 - Research Natural Area & Hot Rock increased substantially and leveled
 - Old Forest & Soup Creek increased slightly and leveled
- Large snags:
 - Hot Rock large increase level
 - RNA moderate increase level
 - Soup Creek slight increase and slight decline
 - Old Forest had no substantial change

- Temporal variation in snag recruitment and loss
 - While large snag recruitment tended to be clustered in the early 1990s, the pattern of mortality varied across the 4 transects
 - Small snag recruitment was more scattered through the decade
 - Snag losses were more noticeable in later '90s and were related to the larger number of standing snags than existed at the beginning of the study

- Scale (both spatial and temporal) of the mortality events
 - A relatively dry period in the late 1980s and early 1990s appears to have been the driver for this mortality event [a previous one occurred in the mid-1970s]
 - Mortality is constant with short peaks of high mortality whereas snag loss is more constant
 - At Hot Rock, the 1994-95 mortality included all trees in a 0.5-0.75 hectare area

Snag Management

- Manage to local conditions
 - Many features forests are smaller than the minimum mapping units
 - Consider areas where trees cannot grow or have a tough time
 - Consider current stand conditions - are they suitable for the snags desired
 - Are there disease centers in area
 - Evaluate snagging at larger scales than per acre per year

