

Firewood as a Potential Pathway for Exotics in the Southern Rocky Mountains

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How Does Firewood Move Across State Lines?

1. Retail firewood
2. Small specialty firewood dealers
3. Campers
4. Hunters
5. Second-home owners



Study Objectives: What is the risk of firewood transporting insects and/or pathogens into new areas of the west?

- What retailers sell firewood?
 - Incidence of insects and/or fungi
 - Do we import infested wood into new states?
- Do campers move firewood?
 - From infested areas?
 - Target groups/areas for education?



Firewood Retail Purchases

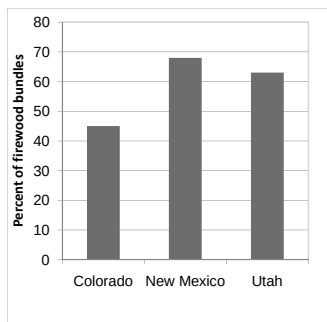
(CO, NM, UT, WY at 4 retailer types in winter and summer 2009)



Firewood Retail Purchases: Percent of firewood from out-of-state (based on labels)

Label Sources:

AZ, BC, CA, CO,
FL, GA, ID, KY,
LA, MN, MO, MT,
NE, NM, OR, PA,
TX, UT, WA and
Canada



Insects in 2009 Retail Firewood Survey

Preliminary Results

- 412 bundles
- 19 different species of wood
- 50% of bins had insects
- Over 2,500 insects
 - wood borers
 - bark beetles
 - misc other species
 - Predators, parasites, etc.
- Wow! The wood is carrying lots of living insects



Insects in 2009 Retail Firewood through April 2010

Wood Genus (common name)	State sources of firewood (from label)	Order	Family	Genus	No. of individuals
oak	unknown	Coleoptera	Buprestidae	<i>Agrilus bilineatus</i> *	4
pine / oak	WY, CO	Coleoptera	Buprestidae	<i>Chrysobothris</i>	4
pine	CO, MT, TX, UT	Coleoptera	Scolytidae	<i>Pityophthorus</i>	360
pine	AZ, CO, NM, UT	Coleoptera	Scolytidae	<i>Ips</i>	160
pine / fir	CO, MT, UT, BC	Coleoptera	Scolytidae	<i>Pityogenes</i>	330
apple / maple/ fir	CO, OR, CA	Coleoptera	Scolytidae	<i>Scolytus</i>	28
pine	UT	Coleoptera	Scolytidae	<i>Polygraphus</i>	977
pine	NM, OR	Coleoptera	Scolytidae	<i>Gnathotrichus</i>	92
pine	UT	Coleoptera	Scolytidae	<i>Carphoborus</i>	13
pine	OR, UT, CO, BC	Coleoptera	Scolytidae	<i>Dendroctonus</i>	26
pine	UT	Coleoptera	Tenebrionidae	<i>Corticeus</i>	16
juniper	NM	Coleoptera	Cerambycidae	<i>Callidium</i>	13
pine	UT	Coleoptera	Cerambycidae	<i>Tetropium</i>	15
pine	CO, BC	Coleoptera	Cerambycidae	<i>Monochamus</i>	2
oak / cherry	NE, unknown	Coleoptera	Cerambycidae	<i>Neocyttus</i>	4
pine /juniper	CA, UT	Hymenoptera	Siricidae	<i>Sirex</i>	4

* First record for Colorado (personal communication B. Kondratieff, C.P. Gillette Museum, CSU)

Preliminary Conclusions: Western U.S. Retail Firewood Survey 2009

- 75% wood purchased was conifer with bark
 - 10% is hardwood
- 45-65% wood is from out-of-state, based on labels
- Retail firewood from over 20 states and Canada
- Pre-existing evidence of insects and fungi on 65-90%
- Insects emerge from firewood (wood borers, beetles, wasps, etc.)



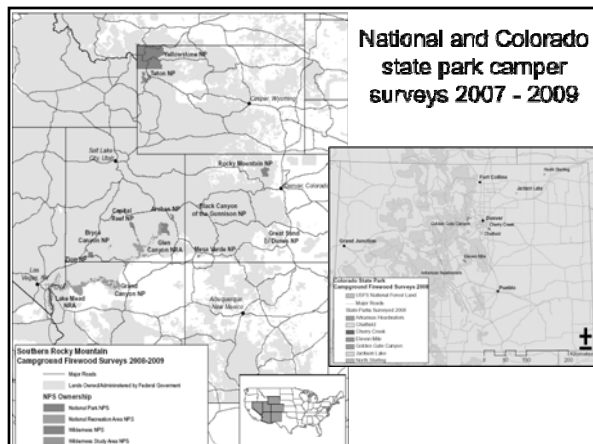
Camper Survey

Do campers bring firewood from home?

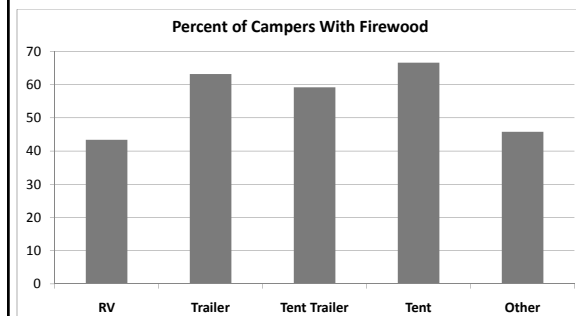


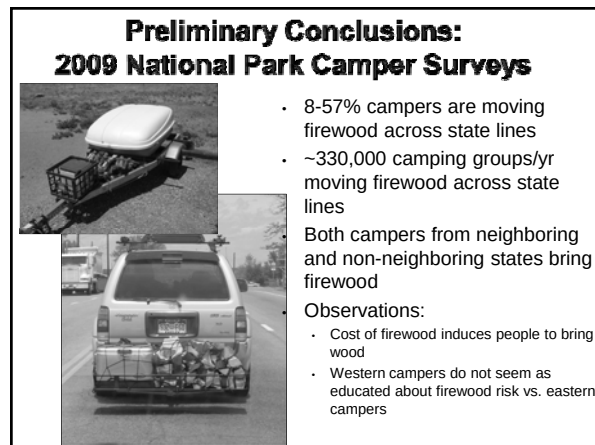
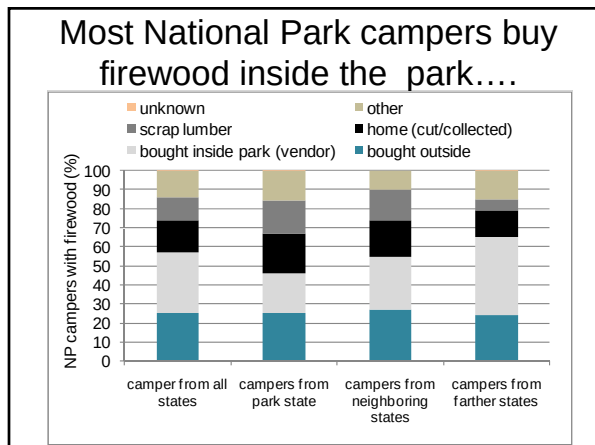
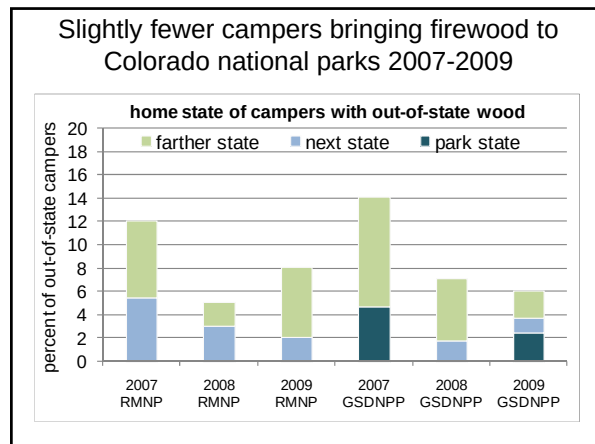
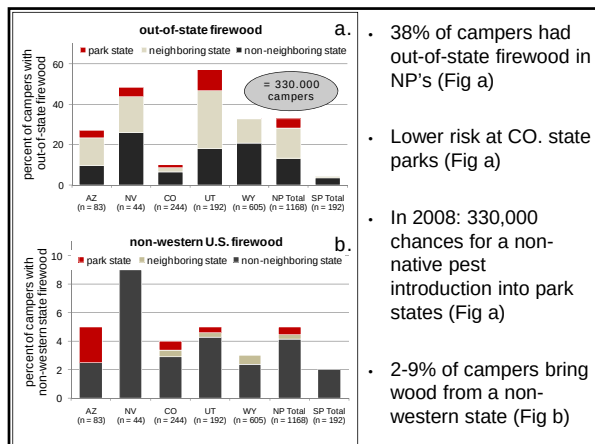
National and State Park Camper Surveys 2007-2009

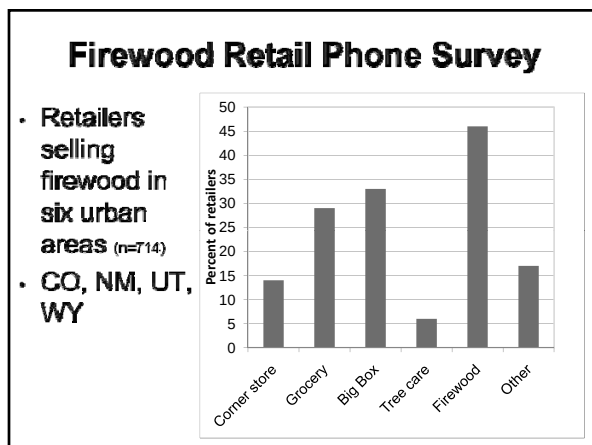
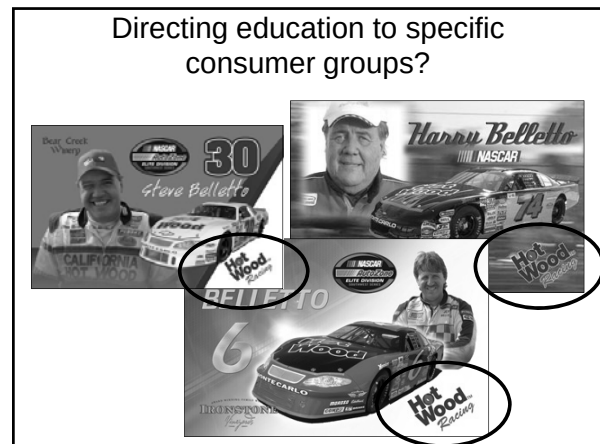
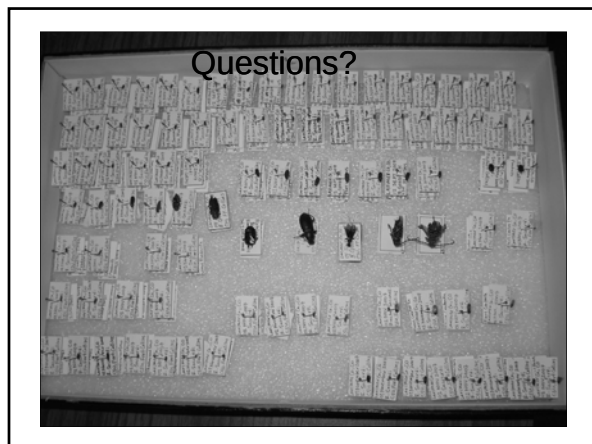
- National parks in NV, AZ, CO, UT, WY
 - 13 Parks, 30 campgrounds
 - 1,658 campers
- Repeat surveys in RMNP and GSDNPP (CO) in 2007-09
 - 3 campgrounds
- Colorado state parks
 - 7 parks, 15 campgrounds
 - 304 campers
- States weighted by NPS 2008 camper data
 - Calculates potential risk numbers



Recreational Type vs. Firewood Use







Firewood Retail Purchases: Other Risk Factors

- 55% wood sitting outside store
- Amount of sales = ?
- 75% retailers sold in winter and summer
- Infested walnut purchased

Types of firewood in National Parks

- 67% of firewood was conifer (68% in CO)
- 14% hardwoods (19% in CO)
- 53% with insect (borers and/or beetles) evidence
 - 70% with bark beetles in Colorado
- 39% with stain fungi, 0% with decay fungi
 - 64% with stain in Colorado
- Spp: walnut, oak, aspen, cherry, pecan, eucalyptus, elm, almond, cottonwood, mesquite, pine, fir, juniper

Insect Families Collected in 2008 Survey of Colorado Firewood Bundles n=72

- Bark beetles and weevils
 - Scolytidae
 - Curculionidae
- Other beetles
 - Scarabaeidae (scarab)
 - Elateridae (click)
 - Throscidae (throscid)
 - Tenebrionidae (darkling)
- Wood boring beetles
 - Buprestidae (metallic)
 - Cerambycidae (longhorn)
- Other insects
 - Miridae (plant /leaf bugs)
 - Chalcididae (wasps)
 - Coccinellidae (ladybeetles)
 - Blattidae (cockroaches)

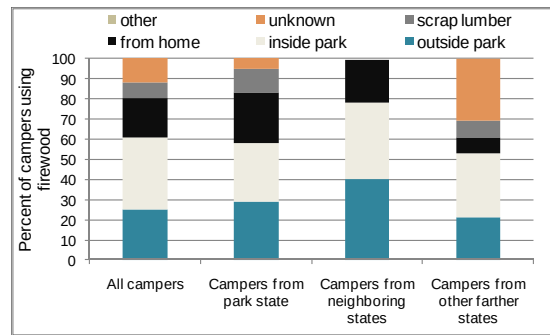
2008 Results: Firewood Species Collected

- lodgepole pine (CO and BC)
- ponderosa pine (AZ and NM)
- Jeffrey pine (CA)
- alder (CA)
- western red cedar (CA)
- California laurel (CA)
- oak spp. (KS and MO)
- apple (MO)
- persimmon (MO)
- hickory? (KS)
- yellow poplar (PA)
- Aspen
- Douglas-fir
- elm



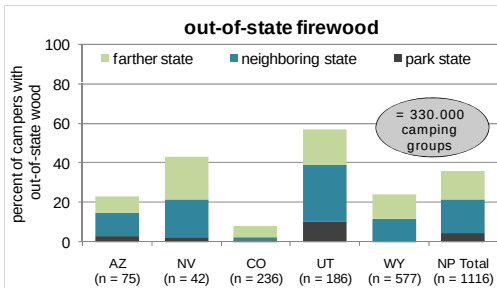
* ID by Dr. Kurt Mackes, CSU

Most State Park campers buy firewood inside the park....



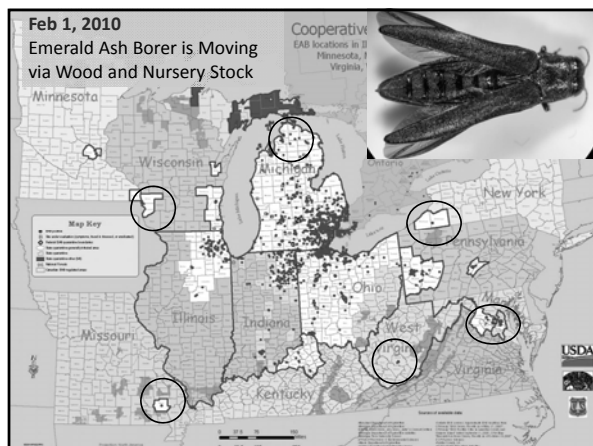
Firewood source in national parks

- 38% of campers had out-of-state firewood in NP's
- In 2008: 330,000 chances for a non-native pest introduction into park states



Outline

- Exotic movement within North America
- Firewood as a potential carrier of exotics
- Two firewood studies.



Potential pest pathways on firewood

- Across state lines
 - Emerald ash borer
 - Sudden oak death
 - 1000 cankers disease of walnut
- Within states
 - Natives: mountain pine beetle, 1000 canker disease
 - Exotics: Dutch elm disease, emerald ash borer
- Firewood off public lands
- Urban infested tree disposal



Assumptions About Fire Wood

1. People like wood fires
2. People will move firewood
3. Exotic pests should not be moved
4. Native insect and disease organisms should not be moved

