Loss of structure and diversity may lead to - Loss of plant species - Changes in/loss of native ecosystems **Vegetation Structure** - Loss of canopy and Diversity - Changes in midcanopy openness - Changes in views Forbs/Herbs **Garlic Mustard** Alliaria petiolata **Insect Diversity Charismatic Bird Diversity and Abundance** Historic Landscape

- There is a negative correlation between abundance of garlic mustard in the forest understory and the diversity of native plant species (seedlings in particular), indicating that invasion by garlic mustard may lead to changes in native ecosystem structure and loss of canopy forming trees (Stinson et al., 2007; www.nps.gov/plants/alien/pubs/midatlantic/toc.htm).
- In greenhouse experiments, garlic mustard was found to have greater competitive ability and aggressivity than chestnut oak (Q. prinus), indicating that the oak forest understory may be more vulnerable to invasion and that garlic mustard may negatively affect oak regeneration leading to loss of canopy forming trees (Meekins & McCarthy, 1999).
- Garlic mustard causes changes in soil microbial dynamics, impacting some mycorrhizal dependent species, leading to loss of native understory seedlings and herbs, potentially causing loss of canopy forming trees and native species (Stinson et al., 2006; Burke, 2008; Callaway et al., 2008; Wolfe et al., 2008; www.ipm.msu.edu/garlicAbout.htm).
- Garlic mustard can produce levels of cyanide 150x those of native plants, at levels considered toxic to many vertebrates (Cipollini & Gruner, 2007; Rodgers et al, 2008), potentially leading to changes in native ecosystems.
- Plants grown in soil previously occupied by garlic mustard had reduced germination rate which may lead to loss of native plant species (Rodgers et al., 2008).
- Green rosette leaves of garlic mustard have been found to significantly increase the decomposition of leaf litter from native trees, therefore possibly creating a positive feedback between site occupancy and proliferation (Rodgers et al., 2008), leading to changes in views as garlic mustard becomes the dominant understory plant species.
 - Garlic mustard is credited with decline of West Virginia white butterfly due to chemicals that appear to be toxic to butterfly's eggs (www.nps.gov/plants/alien/pubs/midatlantic/toc.htm).
 - Relative to eggs laid on native hosts, eggs of the native mustard white butterfly (P. oleracea) experience reduced survival rate and lower pupae body weight when laid on garlic mustard (Renwick et al., 2001; Renwick, 2002; Keeler & Chew, 2008).
 - In addition, simulated invasion by garlic mustard also reduces both the probability of persistence and mean population size of the native mustard white butterfly (P. oleracea) (Keeler et al., 2006).
 - Garlic mustard may dramatically alter forest structure and composition, therefore leading to
 → increased predation on songbird nests built in monospecific stands (Blossey, 1999; Schmidt, 2002).
 - Garlic mustard is suspected to replace sping ephemerals (Cavers et al., 1979; Nuzzo 1993; McCarthy, 1997).
 - Ranunculus is known to form monocultures that blanket floodplains and crowd out spring ephemerals. This may be followed by stiltgrass invasion (NPS pers.comm., 2009)