

# Direct and Indirect Impacts of Invasive Plants to Wildlife

Meeting the Challenge: Preventing, Detecting,  
and Controlling Invasive Plants

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# Why Worry?

- Recent papers / editorials questioning the concern over invasive species (eg. Davis et al. 2011)
- Research on ecological effects is relatively recent, not well known
- Difficult to document direct effects to wildlife – more complex

# Indirect Impacts to Wildlife

- Habitat loss or alteration
  - Loss of breeding or foraging habitat
- Change in Ecosystem Processes
- Population sinks
  - Competitive interaction
  - Increased predation

# Habitat Loss or Alteration

## Artichoke thistle

- 55% fewer birds and 83% fewer small mammals than native shrub habitat (DeSimone and Gibson 2010)



Artichoke thistle (*Cynara cardunculus*) infestation in California

## Purple Loosestrife

- Extirpation of black terns at Montezuma NWR coincident with explosion in purple loosestrife at the marsh
- Reduces habitat suitability by eliminating open water and preferred vegetation for nests
- Black terns returning after control of loosestrife



## Reed Canarygrass

- Does not provide structure for OR spotted frog breeding (Cushman & Pearl 2007)
  - Factor in listing as threatened (FR Aug. 29, 2014)
  - Identified as a “high to very high” impact on habitat loss



# Spotted Frogs Avoid RCG

Adapted from Watson et al. 2003



# Ecosystem Process Changes

Exotic plants alter soil nutrient dynamics by differing from native species in biomass and productivity, tissue chemistry, plant morphology, and phenology (Ehrenfeld 2003)

- Compared invaded vs. non-invaded sites for 56 species of invasive plants





Gordon, 1998, concluded that ecosystem alteration may be relatively common among invasive plants

- Geomorphology
- Hydrology
- Biochemistry
- Disturbance
- Structure
- Recruitment
- Competitive ability



UGA2307167

Kudzu in north Florida. Photo: UGA Bugwood

## Japanese Knotweed

- Reduces Nitrogen input into streams (Urgenson & Reichard 2007)
- Decreased soil pH & potassium (Kappes et al. 2007)

## Firetree

Fixes nitrogen,  
quadrupling N amounts in  
volcanic soils of Hawaii

Firetree invading Maui. Photo by  
Forest and Kim Starr



## Spartina

- Converts mudflats to marsh
- Increase siltation, channelization, nutrient cycling
- Reduces foraging habitat

*Spartina alterniflora* in Willapa Bay,  
WA. Photo: Vanessa Howard-Morgan



# Population Sinks

- Invasive shrubs utilized by native birds for nesting, but increase risk of predation
  - Buckthorn (Chew 1981, Schmidt and Whelan 1999)
  - Gorse: hummingbirds (Keith Saylor, pers. obs.)
- Japanese stiltgrass increases wolf spider predation on juvenile American toads (DeVore & Maerz 2014)

# Direct Impacts to Wildlife

Weeds can impact wildlife by:

- Injury / Development
- Toxic effects
- Direct mortality

# Injury/Development

- 18/124 Red-tailed hawks captured in southern CA had eye injuries from invasive annual grasses (“foxtails”) (McCrary & Bloom 1984)
- Purple Loosestrife - Slower development of American toad tadpoles (Brown et al. 2006)

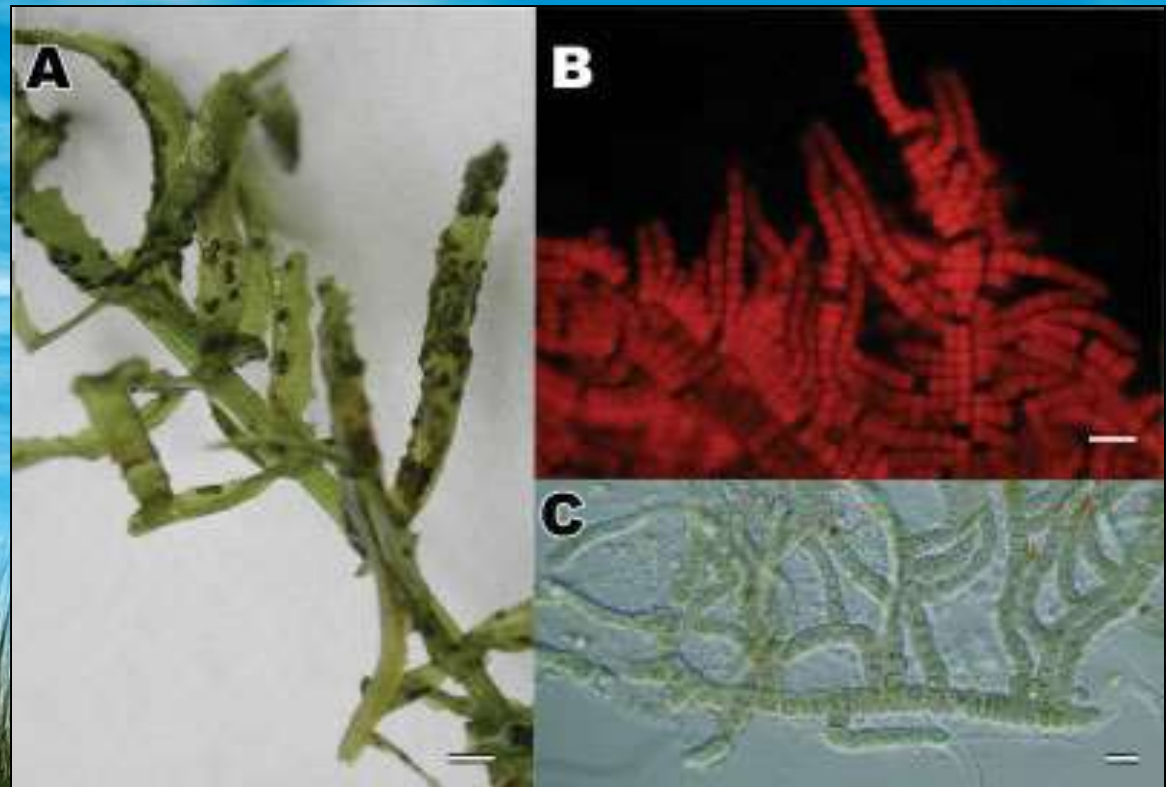
# Toxicity

- Yellowtuft alyssum concentrates heavy metals – implicated in deaths of cattle, goats and deer



Yellowtuft alyssum (*Alyssum murale*)

Hydrilla hosts a cyanobacteria fatal to waterfowl and bald eagles (Wilde, et al. 2005)



Colonies of *Stigonematales* sp. growing on *Hydrilla*.  
From Wilde et al. 2005



# Moose kill in Alaska



Moose calf killed by eating bird cherry. Photo by AK DFG

- European bird cherry (*Prunus padas*)
- Plant concentrates cyanide in stem tips during freeze (death in 20 min)
- Widely planted as ornamental in Alaska

# Entrapment

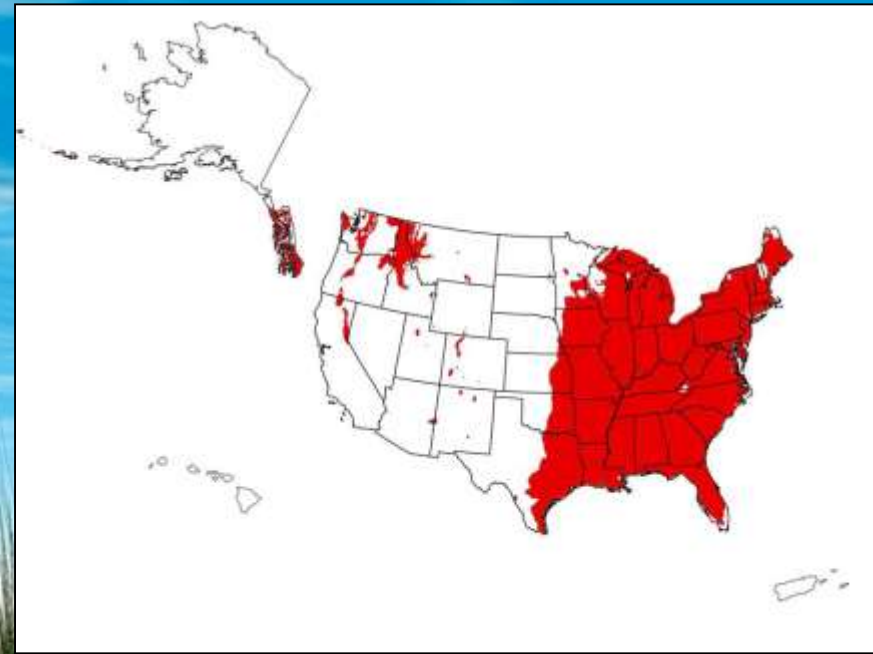


Big brown bat and hummingbird killed by entrapment in common burdock

# Japanese Chaff Flower



Storm-petrels killed by Japanese chaff flower  
(Pearson 2010)



Predicted distribution in the U.S. (APHIS 2014)



1. Wildlife effects can be complex
2. Use  $\neq$  Benefit
3. Effects should be further studied and publicized