

# **Climate Change and Invasive Species: Invasive Management Teams**



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## NATURE, VIRGINIA'S ECONOMY, AND THE CLIMATE THREAT

## Abstract

In Virginia, invasive species cost the state approximately \$1 billion annually due to forest loss and crop damage (Pimentel et al. 2005). There are approximately 38 invasive species managed and monitored in Virginia (VISWG 2012). Native species are not adapted to compete with invasive species and suffer as a result, which affects biodiversity (Tausch 2008). Invasive species alter the balance of ecosystems, reducing biodiversity and ecosystem health (Gamfeldt et al. 2008). Climate change is another driver in the success of invasive species as they are better adapted to withstand climate changes over native species (Duke and Monney 1999). To combat invasive species in Virginia this recommendation proposes the establishment of early detection and rapid response Invasive Management Teams (IMTs). IMTs will be responsible for locating, assessing, monitoring, and removing invasive species across the state. IMTs will be lead by qualified invasive species individuals from the Virginia Invasive Species Working Group. IMTs will be under the advisement of the Virginia Invasive Species Working Council with operations overseen by the Virginia Department of Conservation and Recreation and collaboration from other state and federal governmental agencies. Funding for the taskforce will stem from the current state and federal governmental funding for invasive species (NISC 2014). Virginia needs a stronger initiative to combat invasive species and protect its unique biodiversity.

## **Invasive Species Threaten Biological Diversity**

The Southeastern United States is exceptionally vulnerable to climate change in the form of sea level rise, extreme heat events, hurricanes, and decreased water availability (Carter et. al. 2014). Temperatures since 1970 have increased an average 2°F across the Southeast with annual temperatures continuing to increase during this century (Carter et. al. 2014). The rising temperatures will have a detrimental impact on ecosystems across the Southeast and Virginia.

Ecosystem services provide humans with clean water, clean air, natural resources, and protection from weather events (Lant et. al. 2008). The diversity of species and communities is an important aspect of biodiversity that governs the efficiency of ecosystem processes (Gamfeldt et. al. 2008). Biodiversity is critically important for the long-term survival of the human species and biodiversity is being lost at an alarming rate (Gowdy 1997). Virginia is ranked 12<sup>th</sup> in regards to species diversity for the United States and over 900 species are threatened by the loss or degradation of habitat (Kane et al. 2013).

One of the threats to biodiversity in Virginia comes from the increase of invasive species. Invasive species are defined as non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order No. 13112). Invasive species are likely to increase with climate change as they succeed in environments where there are increased ecosystem disturbances, altered weather changes, and increased stress to native species (Tausch 2008). As invasive species flourish in climate change pressured environments, they outcompete and eventually force out native species, as the native species cannot adapt as rapidly to climate change affects (Duke and Mooney 1999)

All of these invasive species either outcompete or harm native species and have the potential to threaten biodiversity throughout the state (Wilcove et al 1998). Virginia has a high level of biodiversity, especially in the Appalachian mountains, and it is important to protect the unique areas where these species inhabit (Figure 1).



Figure 1: Biodiversity hotspots in the Continental U.S. and Hawaii



## Implementation of Invasive Management Teams in Virginia

In order to prevent the continuous growth and movement of invasive species, Virginia needs an early detection and rapid response group, Invasive Management Team (IMT), in the state. Virginia will be divided into nine regions with IMTs located and assigned to each region to monitor invasive species. The regions will be divided up using the current Virginia State Park Regions.



## Formation:

• IMTs are lead by educated invasive species personnel from the Virginia Invasive Species Working Group and overseen by the Virginia Department of Conservation and Recreation with cooperation from other state governmental agencies.

### Monitoring

· IMTs respond to calls from local communities about invasive species sightings and will monitor and map the spread of invasives, reporting all findings to the Virginia Invasive Species Working Group.

### Education

 IMTs work with local communities to enable them to identify invasive species and collaborate with universities to provide the IMTs with more hands on help and support from research students.

## Removal

• IMTs physically extract invasive species when encountered through methods such as controlled burning, herbicides, permit hunting, and humane trapping

### Funding:

 Redirect partial funding from the Virginia Department of Conservation and Recreation invasive species programs, apply for grants focused on invasive species control, and funding from federal governmental agencies with specific interest in invasive snocios



- Rapidly grows up and over all other vegetation
   Creates dense canopy blocking sunlight from reaching other plants
- · Annual costs to control Kudzu in the Southeastern United States are around \$1.5 million (Britton 2002)

## Northern snakehead fish (Channa argus): Aggressive predator Reaches up to 4ft long

- · Outcompetes native fish species
- Able to breathe out of water to travel to other water bodies
- · Carries pathogens that can harm native fish (USFWS 2002)









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- Phragmites (Phragmites australis): Tall grass species (up to 15ft)
   Invades brackish wetlands (Saltonstall 2002)
- Overwhelms other marsh plants
  Creates habitat that lacks value to wildlife
- Virginia Department of Conservation and Recreation mapped over 12,000 acres of Phragmites in the Chesapeake Bay

Emerald ash borer (Agrilus planipennis): Small beetle

- Native to Asia
- Larvae feed on the inner bark of ash trees
- Disrupts the tree's ability to transport water and nutrients
  Has killed millions of ash trees costing hundreds of millions to billions of
- dollars to forest product industries (Snydor et. al. 2007)

Source: Virginia Invasive Species Management Plan (2012)

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## References

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