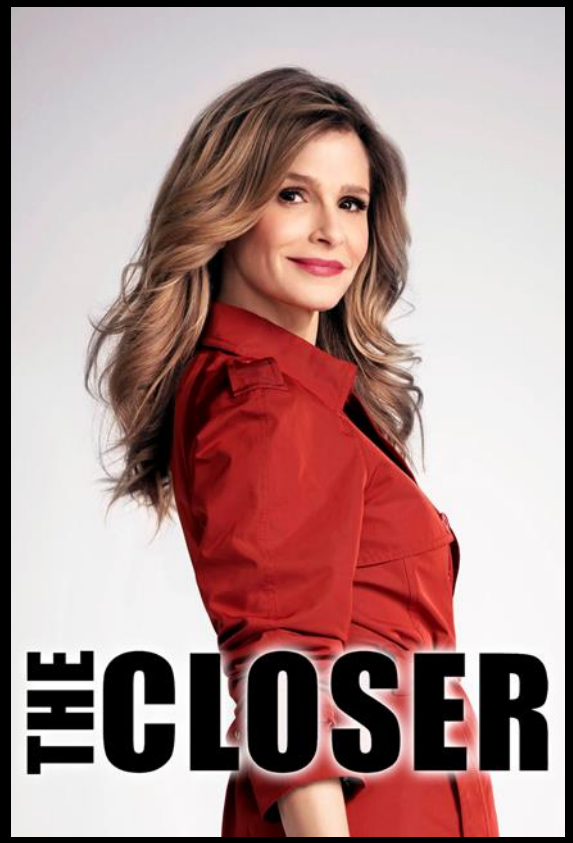
CSI: CHEYENNE

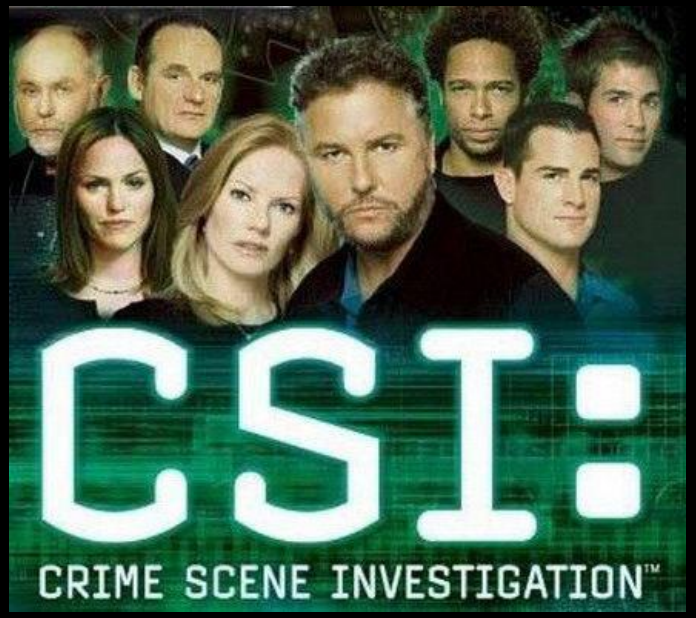
Amy Seiler,
Western Community Forestry Specialist,
Nebraska Forest Service

University of Nebraska

FORENSIC FILES

No Witnesses. No Leads. No Problem.





LAW & ORDER

LAW & ORDER

"IN THE CRIMINAL JUSTICE SYSTEM, THE PEOPLE ARE REPRESENTED BY TWO SEPARATE YET EQUALLY IMPORTANT GROUPS: THE POLICE, WHO INVESTIGATE THE CRIME; AND THE DISTRICT ATTORNEYS, WHO PROSECUTE THE OFFENDERS. THESE ARE THEIR STORIES".

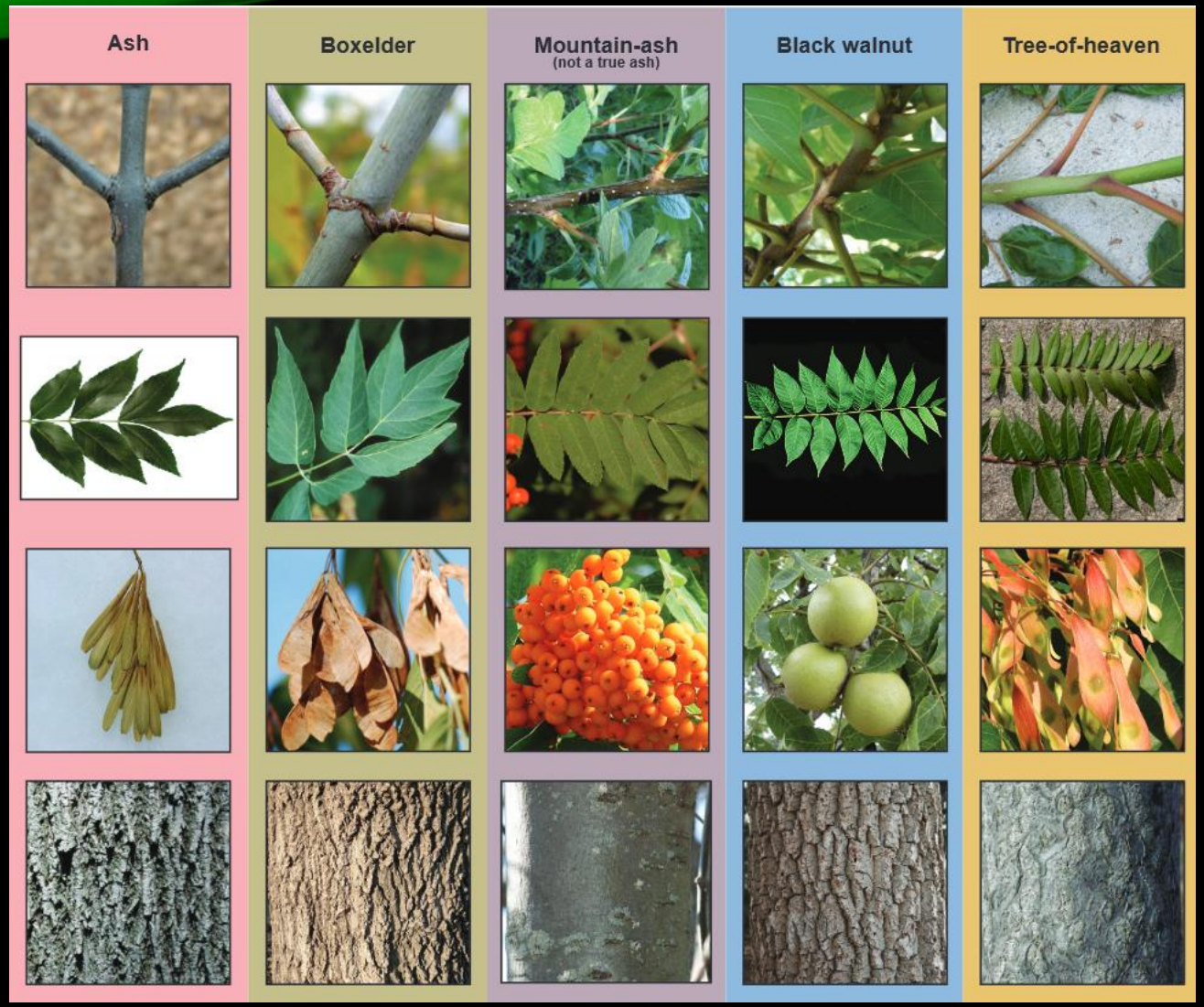
INVESTIGATION PROCESS

- Systematic, unbiased process:
  - involves information gathering
  - intense observation and examination of the situation
  - logical analysis
  - elimination of possibilities

CRIME SCENE INVESTIGATION

- Identify the victim
- Identify symptoms and signs
- Inspect the whole tree
- Inspect the site
- Look for abnormal patterns
- Interview property owner or manager
- If necessary take soil and plant samples for testing
- Identify the suspects and determine the motive (stressors)

IDENTIFY THE VICTIM



“THERE IS NOTHING MORE DECEPTIVE THAN AN OBVIOUS FACT” SHERLOCK HOLMES

- “Accurate diagnosis of a tree disease requires much information about the abnormal appearance (know as symptoms) and the presence of pathogen structures or products (known as signs) on the host plant.” Field and Laboratory Guide to Tree Pathology pg. 9 Robert O. Blanchard, Terry A. Tattar

SYMPTOMS
PLANTS RESPONSE/REACTION TO A STRESSOR OR CAUSAL AGENT

Symptoms are physical changes in the tree appearance

WHAT IS A CAUSAL AGENT?

"ANY ENTITY THAT PRODUCES AN EFFECT OR IS RESPONSIBLE FOR EVENTS OR RESULTS"

- The Suspects!
- **BIOTIC:** problems caused by living organisms, such as fungi, bacteria, viruses, nematodes, insects, mites, and animals.
- **ABIOTIC:** nonliving factors, such as drought stress, sunscald, freeze injury, wind injury, chemical drift, nutrient deficiency, or improper cultural practices, such as overwatering or planting too deep."

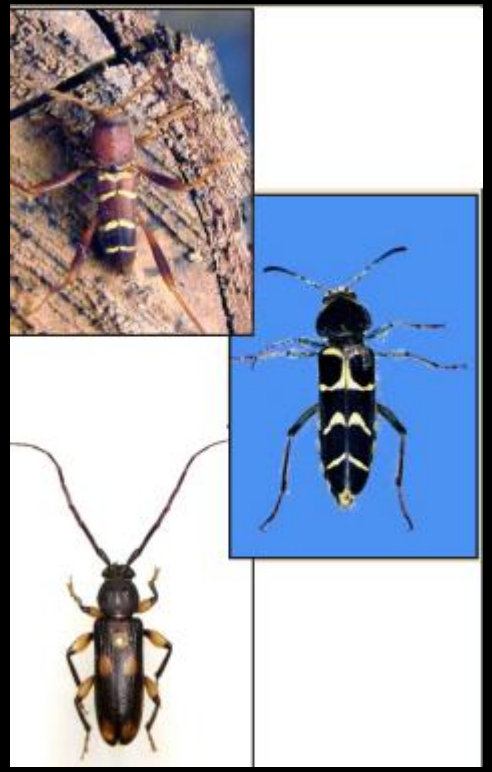
Biotic vs. Abiotic - Distinguishing Disease Problems from Environmental Stresses
Paula Flynn, Iowa State University

BIOTIC DISORDERS
THE USUAL SUSPECTS

Lilac Borer

Ash Bark Beetle

Roundheaded Borers



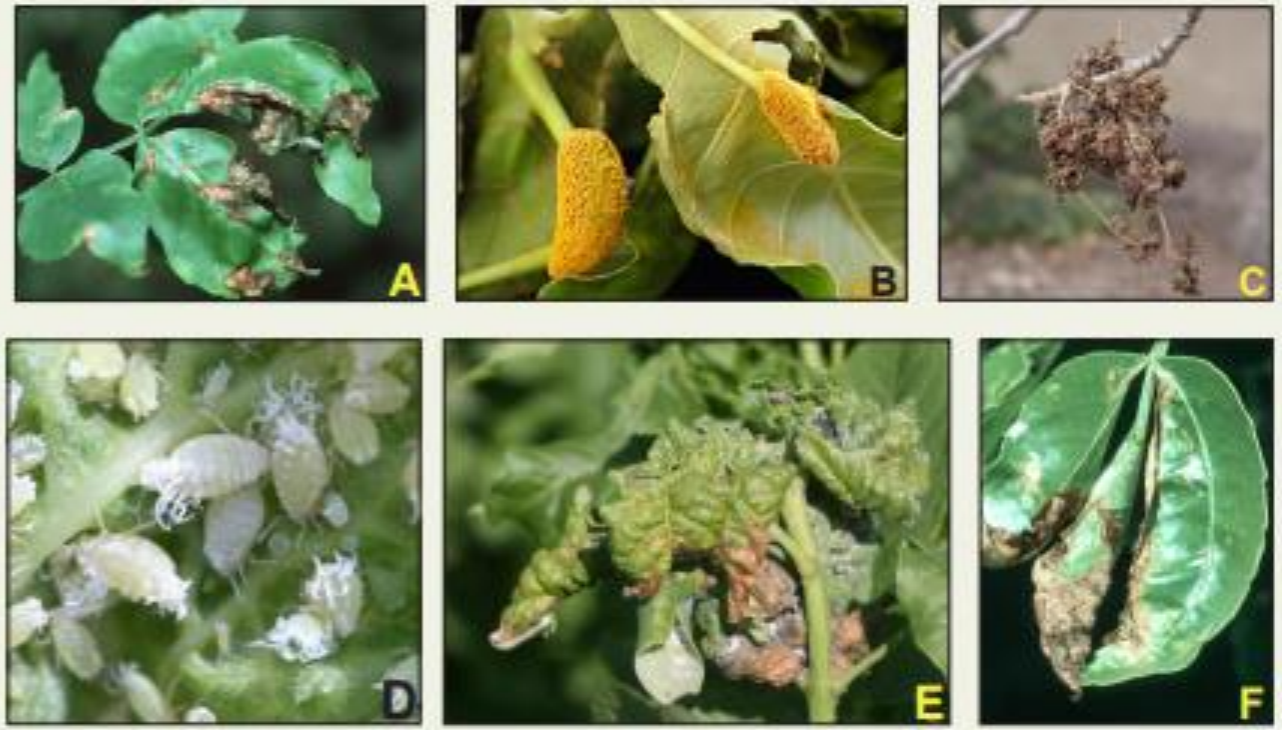
Flatheaded Appletree Borer

BIOTIC DISORDERS
THE USUAL SUSPECTS

Minor Ash Pests

- ✓Some pests of ash affect the appearance of trees, but usually cause little serious damage.
- ✓These minor problems rarely require control.

A. Ash anthracnose
B. Ash rust[5]
C. Ash flower gall
D, E. Ash leaf curl aphid[6]
F. Ash plant bug[7]



ABIOTIC DISORDERS
THE UNUSUAL SUSPECTS

- Caused by non-living factors
- Physical or environmental problems
  - Moisture extremes
  - Temperature extremes
  - Mechanical damage to trunk or roots
  - Girdling roots
  - Soil compaction
  - Soil Volume
  - Chemical damage
  - Soil salinity
  - Nutrient deficiency
  - Planting depth

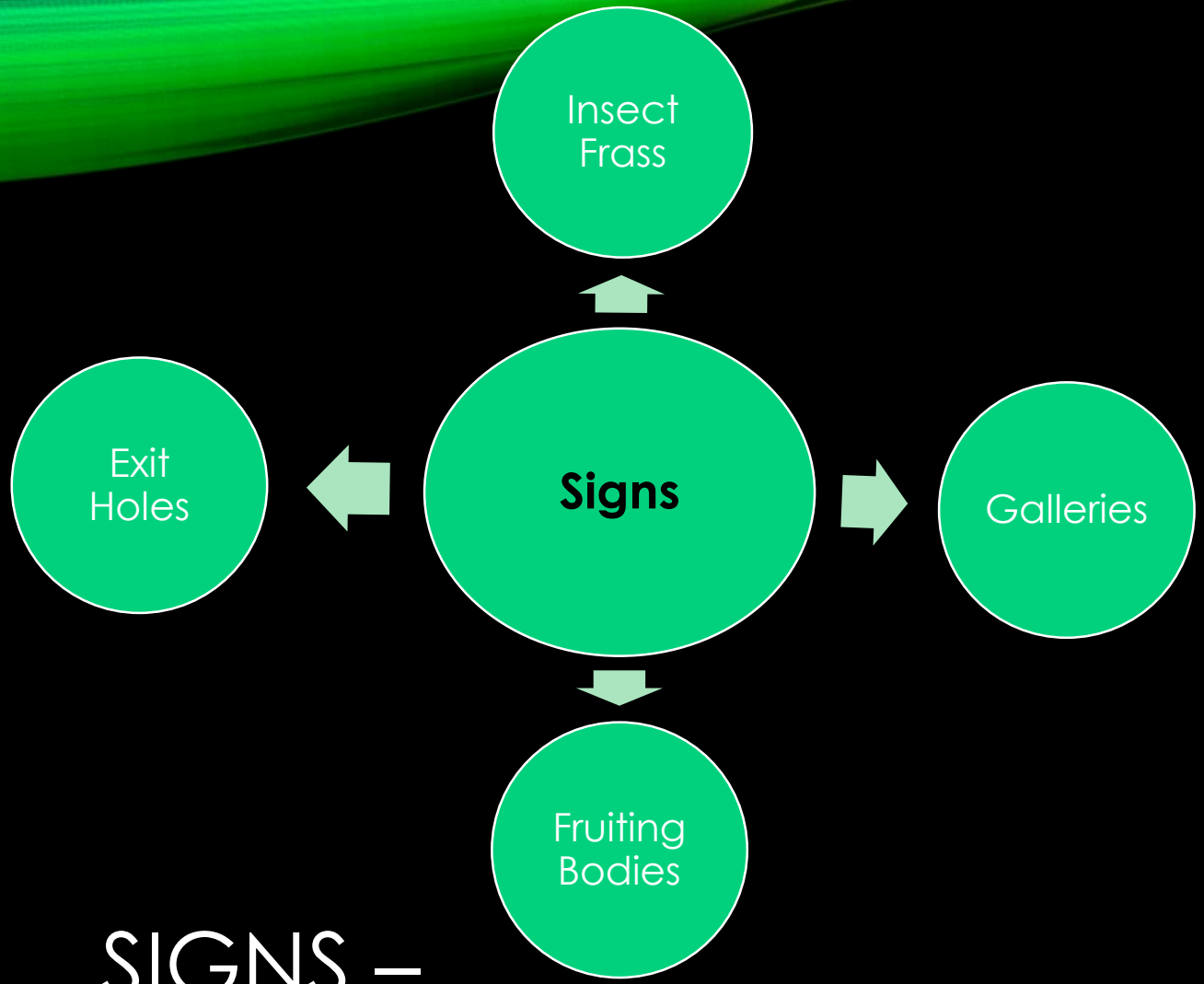
IDENTIFY THE SYMPTOMS

photo://www.johnson.k-state.edu/

Photo: http://nmai.si.edu/

CIRCUMSTANTIAL EVIDENCE

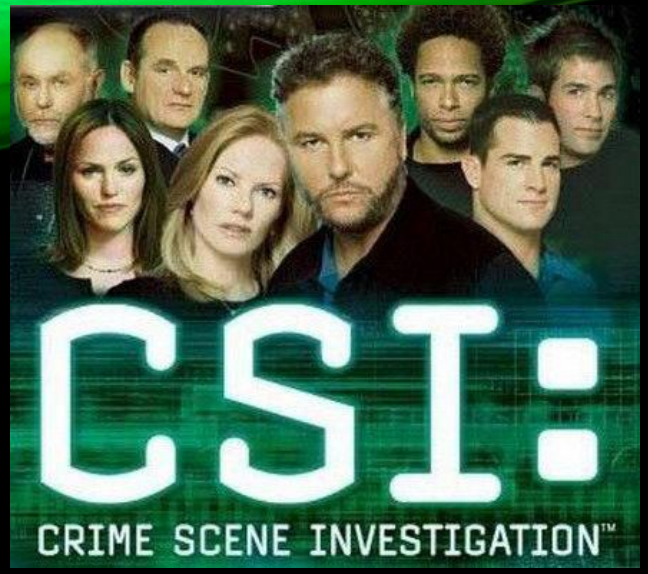
"Circumstantial evidence is a very tricky thing, It may seem to point very straight to one thing, but if you shift your own point of view a little, you may find it pointing in an equally uncompromising manner to something entirely different."
Sherlock Holmes, Boscombe Valley Mystery



SIGNS – DIRECT INDICATION OF THE PRIMARY OR SECONDARY CAUSAL AGENT/STRESSOR

THE PHYSICAL EVIDENCE

INSPECT THE WHOLE PLANT



INSPECT THE SITE

LOOK FOR ABNORMAL PATTERNS

- Compare trees to others similar around it
  - If several are exhibiting similar effects it generally is abiotic
  - If symptoms appear all over plant typically abiotic
  - Non-uniform patterns within the canopy may indicate a biotic issue

INVESTIGATE THE PLANT MANAGEMENT HISTORY

DETERMINE THE MOTIVE (THE STRESSORS)

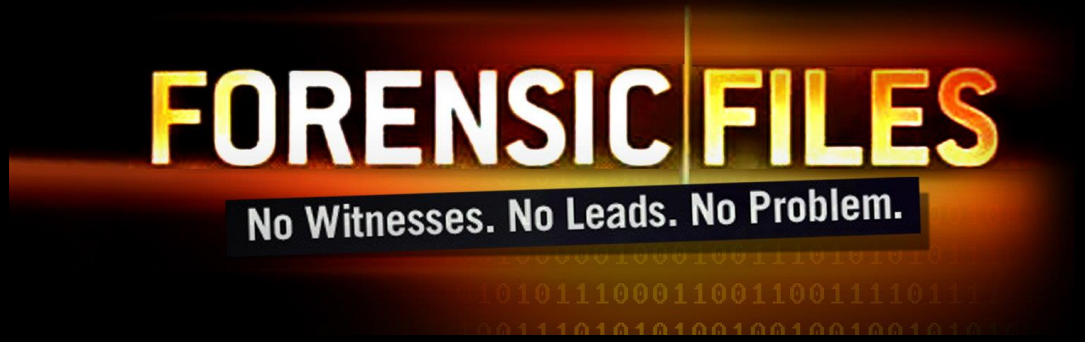
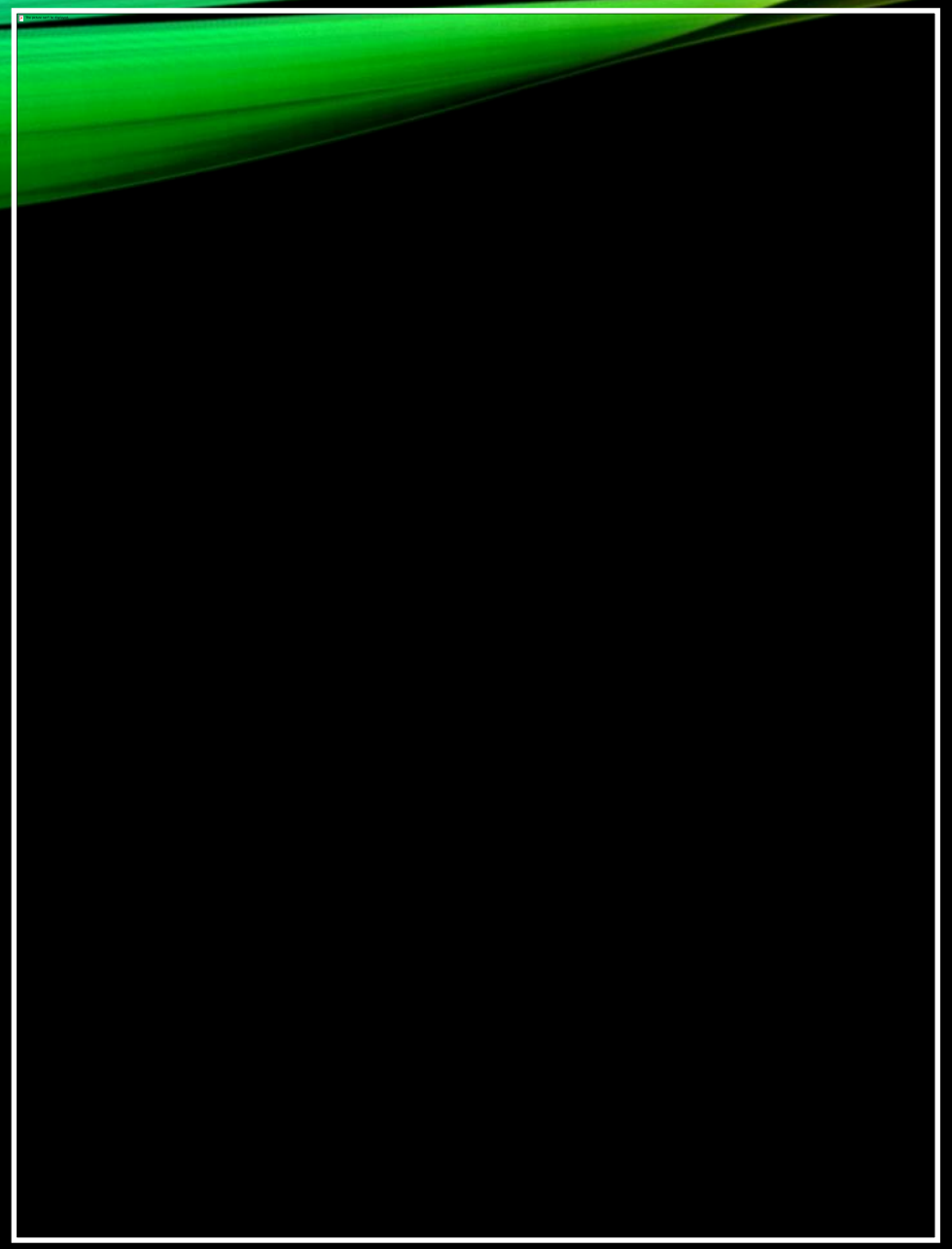


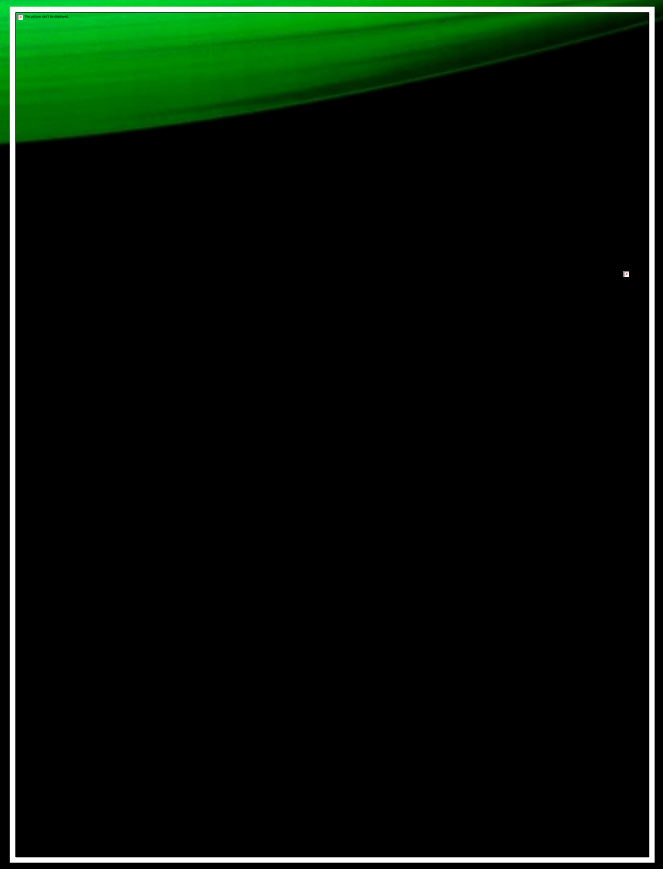
Photo credit: Angie Tenney MSU Diagnostic Services

CRIME SCENE INVESTIGATION

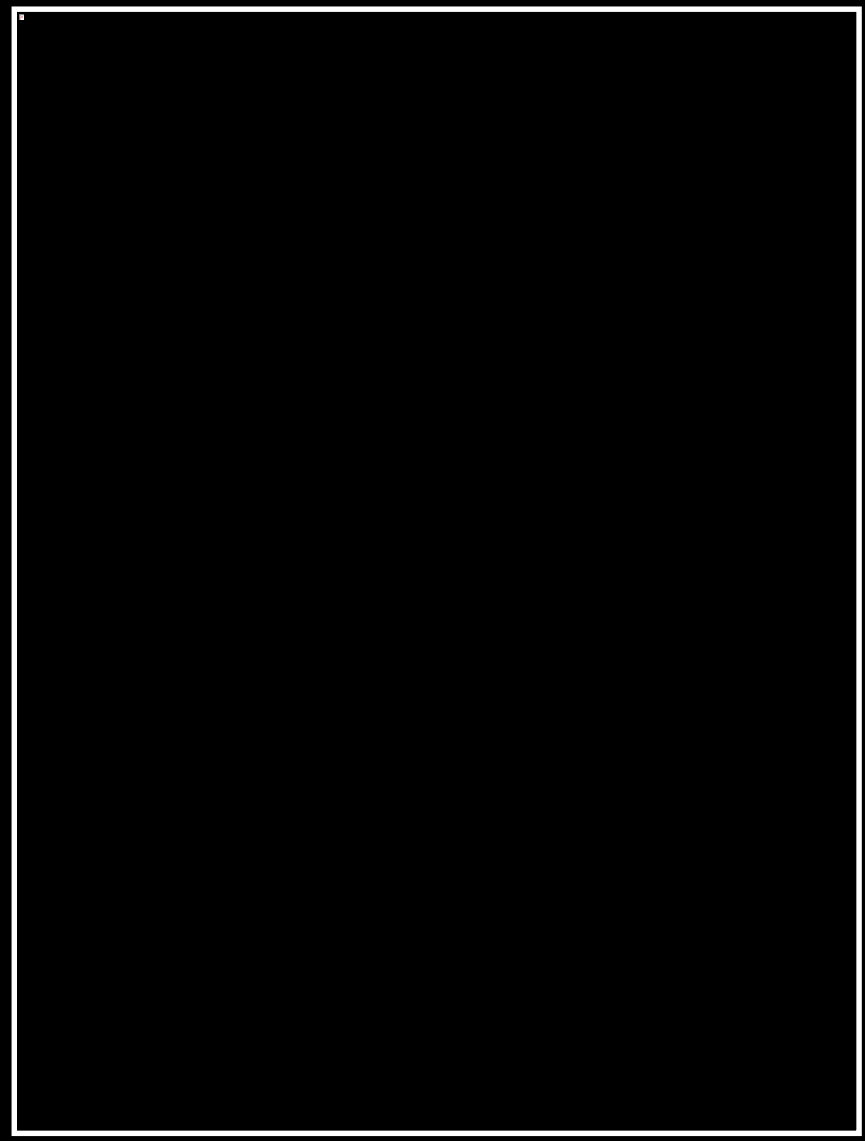
- Identify the victim
- Identify symptoms and signs
- Inspect the whole tree
- Inspect the site
- Look for abnormal patterns
- Interview property owner or manager
- If necessary take soil and plant samples for testing
- Identify the suspects and determine the motive (stressors)



WHY ARE THE TREES IN DECLINE????



2000



2005


Matlock

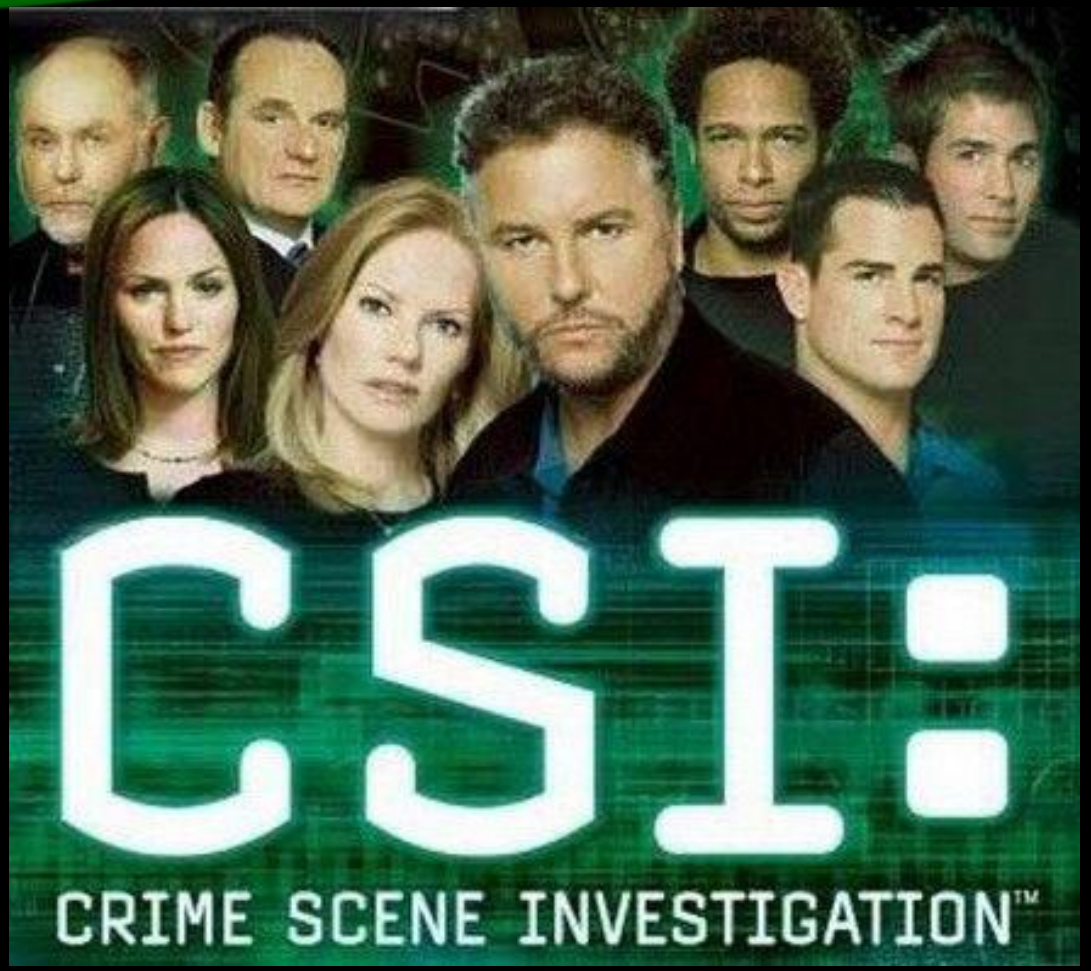

WANTED
DEAD OR ALIVE
ACTUAL SIZE

INVESTIGATIVE PROCESS

- Identify the victim
- Identify symptoms and signs
- Inspect the whole tree
- Inspect the site
- Look for abnormal patterns
- Interview property owner or manager
- If necessary take soil and plant samples for testing
- Determine the motive (stressors)

LAW & ORDER

https://www.youtube.com/watch?v=J2qUULhZTuI



Questions?

THANK YOU!!

Amy Seiler,
Western Community
Forestry Specialist

NEBRASKA FOREST SERVICE
University of Nebraska-Lincoln