

Benefits: Buildings that suffer repetitive flood losses are typically low in elevation and near streams, rivers, or other flooding sources. These mitigation actions will help end the cycle of continuing disaster damage. It will reduce repetitive flood losses, including those to the National Flood Insurance Program.

Responsible Organization: Office of Emergency Management, Inspections and Permits

Implementation Schedule: Action to commence in 2005

Related Objectives: Objectives 1.2, 5.2, 5.3, 7.1, & 7.2

Priority: Low

Potential funding sources: Grants, general revenue

8.11 Severe Thunderstorm or Hailstorm Mitigation Actions

8.11.1 Description of Hazard

Thunderstorms affect relatively small areas when compared with hurricanes and winter storms. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Of the estimated 100,000 thunderstorms that occur each year in the United States, about 10 percent are classified as severe. The National Weather Service considers a thunderstorm severe if it produces hail at least 3/4-inch in diameter, winds of 58 mph, or a tornado.

Every thunderstorm needs:

- Moisture to form clouds and rain.
- Unstable air warm air that can rise rapidly.
- Lift cold or warm fronts, sea breezes, mountains, or the sun's heat are capable of lifting air to help form thunderstorms.

Thunderstorms typically have three phases: developing, mature, and dissipating. During the developing stage, which lasts about ten minutes, little if any rain falls. Towering cumulus clouds are visible that form from rising air warm. Occasional lightning also marks this phase.

Following the developing stage, the mature stage can bring hail, heavy rain, frequent lightning, strong winds, and tornadoes. The storm may have a black or dark green appearance and lasts an average of ten to twenty minutes.

Finally, during the dissipating stage, rainfall decreases in intensity. Although the storm diminishes in its effect, it can still produce strong bursts of wind and lightning remains a danger. Table 8-7 lists the types of alerts issued by the National Weather Service for thunderstorms.

Table 8-7. Severe Weather Alerts

Type of Alert	Trigger
Severe thunderstorm watch	Advises the public on when and where severe thunderstorms are more likely to occur. Watches are intended to heighten public awareness.
Severe thunderstorm warning	Issued when severe weather has been reported by spotters or indicated by radar. Warnings indicate imminent danger to life and property to those in the path of the storm.

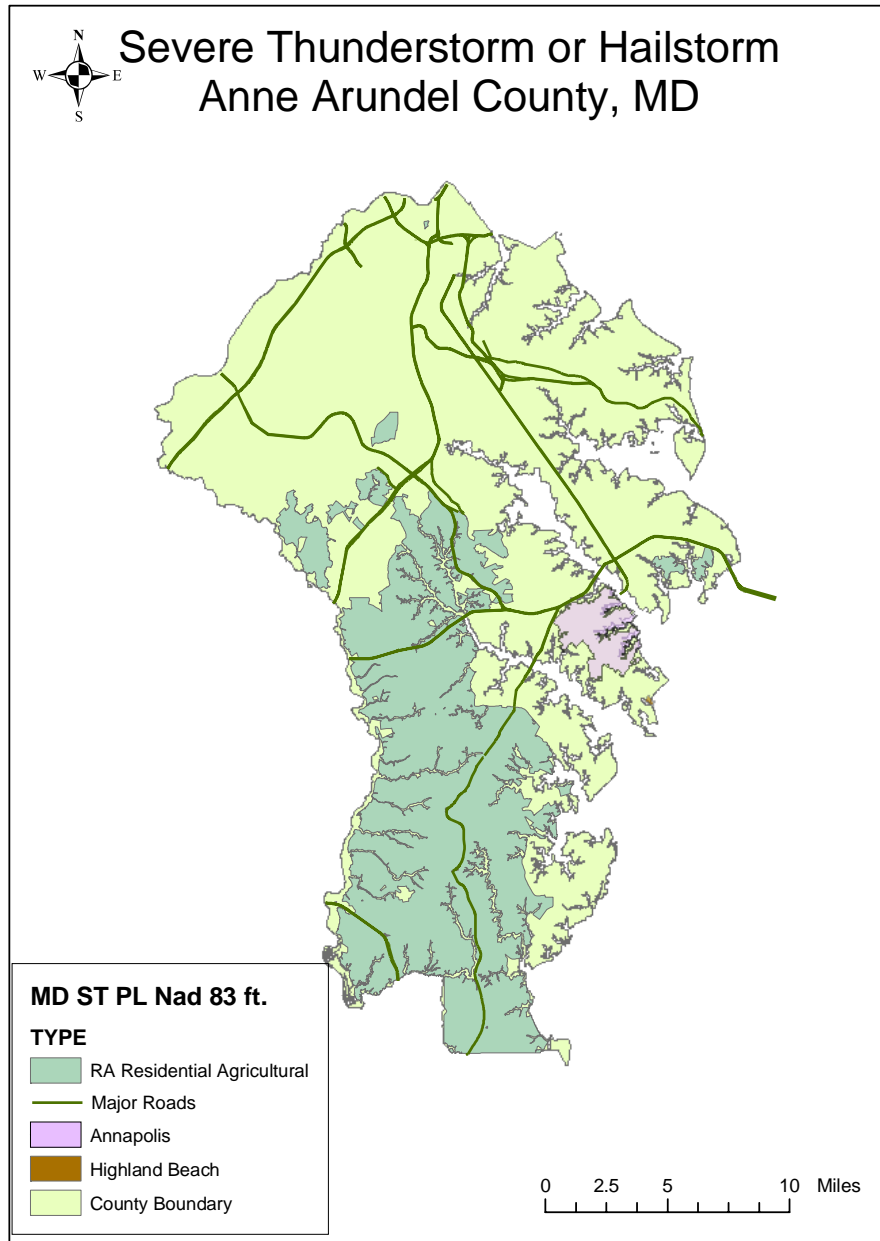
8.11.2 History

Over the past 53 years, Anne Arundel County has experienced 173 severe thunderstorms or hailstorms according to data from the National Oceanic and Atmospheric Administration (see Appendix C for additional information).

8.11.3 Vulnerability

Severe thunderstorms or hailstorm do not have particular impacts in any one geographical section of the County. However, hail and heavy rain would have the greatest impact on the agricultural community. Figure 8-7 depicts the areas of the County that are devoted to agricultural pursuits. These areas contain 74,857 people who will potentially be affected by this hazard. The economic impacts of this hazard cannot be evaluated geographically. Critical County infrastructure is unlikely to be affected by this hazard.

Figure 8-7. Severe Thunderstorm or Hailstorm



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8.11.4 Impacts/Risk

Severe thunderstorms can occur with little warning; these types of storms rarely cause loss of life, but may cause damage to property.

8.11.5 Severe Thunderstorm or Hailstorm Mitigation Actions

8.11.5.1 Mitigation Action TH-1:

Provide community outreach and education to individuals and businesses concerning actions for homes and businesses to take in preparation for severe thunderstorms and hailstorms.

Prior to the fall and spring seasons, residents should be informed about:

- What to do when a severe thunderstorm that may produce hail or lightning approaches
- What to do if caught outdoors and there is no shelter nearby
- The importance of NOAA Weather Radios that automatically alert the public when a watch or warning is issued for their area.

Estimated cost: Costs will be covered as part of the County education and outreach initiative.

Benefits: Severe storms cannot be prevented, but the impact of these storms can be reduced. Key to reducing the adverse impacts of hailstorms is preparation by individuals and building with materials that will withstand hailstorms. This action will ensure that residents understand the terminology used in severe thunderstorm alerts and are knowledgeable about measures they can take to minimize potentially life-threatening conditions.

Responsible Organization: Office of Emergency Management

Implementation Schedule: This is an on-going activity starting in 2004.

Related Objectives: Objectives 1.1, 2.1, & 2.2

Priority: High

Potential Funding Sources: General revenues, grants

8.12 Utility Disruption Mitigation Actions

8.12.1 Description of Hazard

Utility interruptions and failures may involve electrical power, natural gas, public water, and public wastewater. All of these systems or a combination of these utility systems exist throughout the County. Utilities are often dispersed over a wide area, and many have facilities located throughout their service area.

Utility systems exist everywhere and are subject to damage from digging, fire, traffic accidents, and severe weather, including flooding and other day-to-day events. Many utilities utilize emergency batteries or generators to provide back-up power for high priority equipment.

8.12.2 History

There have been 5.21 utility disruptions at critical facilities over the past three and a half years in Anne Arundel County, according to data from Baltimore Gas & Electric (see Appendix C for additional information). This figure represents an averaged number over all the County's critical facilities.

8.12.3 Vulnerability

This section has been removed for security purposes.

8.12.4 Impacts/Risk

A utility disruption has the potential to negatively affect the economy or the environment.

8.12.5 Utility Disruption Mitigation Actions

None for this version.

8.13 Wildfire Mitigation Actions

8.13.1 Description of Hazard

Wildfire is one of the most destructive natural forces known to mankind. While sometimes caused by lightning, nine out of ten wildfires are human-caused. Put simply, "wildfire" is the term applied to any unwanted and unplanned fire burning in forest, shrub, or grass.

Fire is the naturally occurring companion of energy released in the form of heat and light when oxygen combines with a combustible, or burnable, material at a suitably high temperature (about 617 degrees F, 325 degrees C for wood to burn).



Fuel, heat and oxygen are all needed in the right combination to produce fire. Combined, they're called the "fire triangle." Take away one of the sides, and the triangle collapses. The same is true of fire. Take away any of the three components of fire – fuel, heat or oxygen – the fire collapses, meaning that it can't burn.

Forest and grassland fires can occur any day throughout the year. Most of the fires occur during the spring season. The length and severity of burning periods largely depend on the weather conditions. Low humidity, high winds, below-normal precipitation, and high temperatures that are frequently present during the spring result in extremely high fire danger. Drought conditions can also hamper efforts to suppress wild fires as decreased water supplies may not prove adequate to quickly contain the fire.

The second most critical period of the year is fall. Depending on the weather conditions, a sizeable number of fires may occur between mid-October and late November.

As more people choose to build homes, operate businesses, and engage in recreational activities in areas where wildlands border more urban areas, the threat to private property from wildland fire increases. Creating "defensible" or "survivable" space around structures can make the difference between returning to an intact home or a smoldering pile of ashes if a wildfire moves through the area.

8.13.2 History

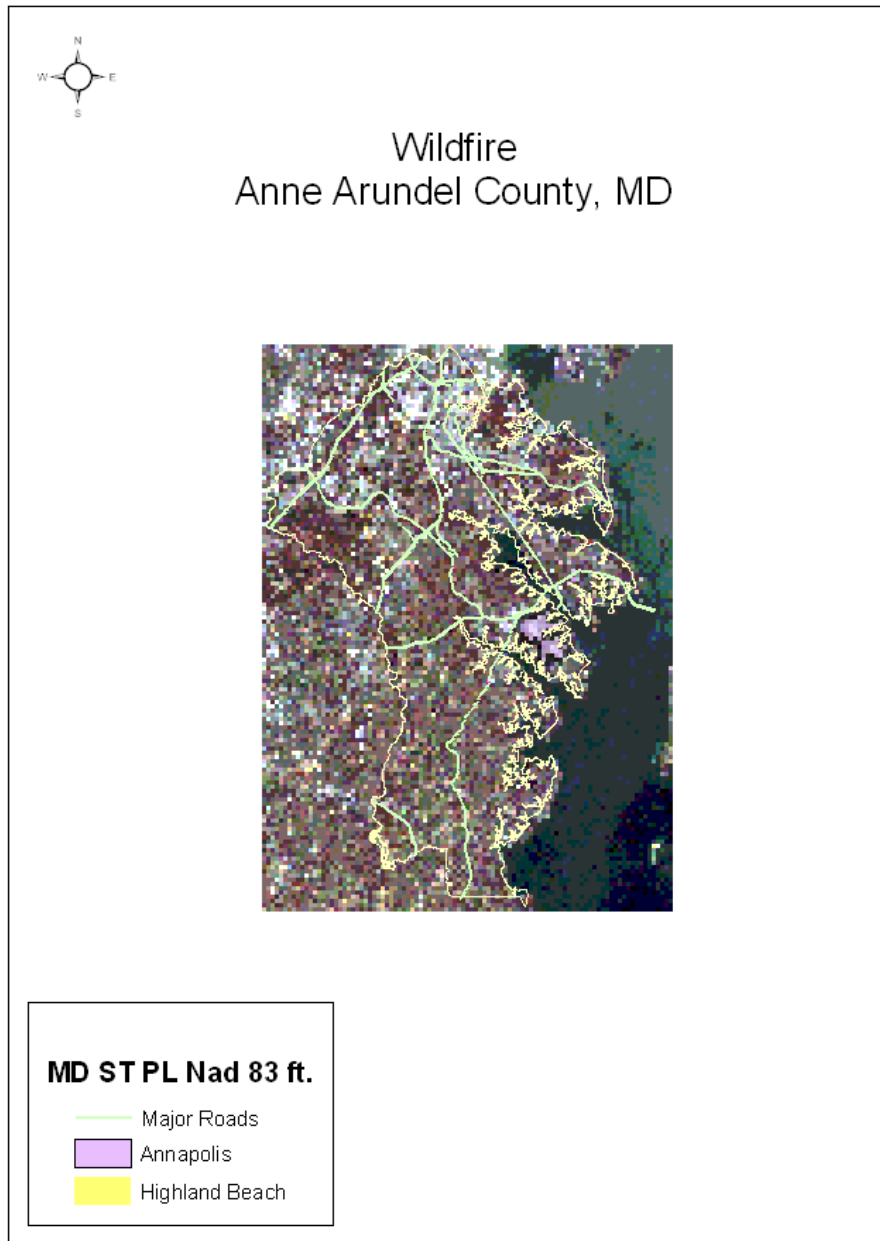
Over the past three years, there have been 2,368 brush or wildfires in Anne Arundel County, according to data from the Anne Arundel County Fire Department (see Appendix C for additional information).

8.13.3 Vulnerability

Wildfires have the potential to affect those parts of the County that are forested or at the interface between forest and other land cover. Figure 8-8 depicts the land coverage of the County. According to a 1999 inventory by the USDA Forest

Service, there are 87,797 forested acres of the County that could be affected by this hazard.

Figure 8-8. Wildfire



Taylor 8/26/04

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8.13.4 Impacts/Risk

Wildfires can occur with little or no warning, and have the potential to cause property damage and loss of life.

8.13.5 Wildfire Mitigation Actions

8.13.5.1 Mitigation Action WF-1:

Design and implement a comprehensive community awareness and educational campaign on the wildland fire danger, targeted at areas of highest risk.

Estimated Cost: Costs will be covered as part of the County education and outreach initiative (see MH-8) and Fire Department budget.

Benefits: Many residents in high wildland fire risk areas of the County may be unaware of the risk and its severity; they do not understand how to mitigate the risk to their property; or what to do if a fire should occur. A concerted educational campaign targeted at high-risk areas will focus on the nature of the risk, how to reduce the risk, and what to do in the event of a fire. Components of the educational program will include risk awareness, defensible space/housekeeping, neighborhood evacuation procedures, ignition control, and reporting procedures. This action is intended to save lives and property from wildland fires.

Responsible Organization: Anne Arundel County Fire Department

Implementation Schedule: This is an on-going activity starting in 2005.

Related Objectives: Objectives 1.1, 1.2, 2.1, & 2.2

Priority: High

Potential Funding Sources: General revenues, grants

8.13.5.2 Mitigation Action WF-2:

Conduct a wildland fire study for the entire County using GIS to map responses.

Estimated cost: To be determined.

Benefits: This action will result in a more comprehensive assessment of the urban-wildland interface fire risk across the entire County. The assessment will permit better planning and staging of emergency services personnel, which will reduce the risk to property and prevent injuries and deaths.

Responsible Organization: Anne Arundel County Fire Department

Implementation Schedule: Implementation is planned for 2005 – 2006.

Related Objectives: Objectives 1.4 & 1.5

Priority: Low

8.14 Animal Disease Outbreak, Blight, or Infestation Mitigation Actions

8.14.1 Description of Hazard

An epidemic refers to the outbreak and rapid spread of a disease in a community that affects a significant number of people or animals in a relatively short period of time. Since many diseases that are generally considered animal diseases can be transmitted to humans, this section focuses first on those diseases that affect animals, and secondly on those that affect humans.

Diseases, which can cause epidemics in animals, can gain a foothold in a number of ways. A disease may be something exotic brought in with animals imported, either legally or illegally, from some other part of the country or world. Other disease vectors include infected animals wandering across the border from neighboring states. Avian diseases can be brought in by birds on their annual migration between Canada on the north to southern areas in the United States, or other countries as far away as South America.

Tables 8-8 and 8-9 illustrate the types and quantities of agricultural crops and livestock that are present in the County.

Table 8-8. Crop Acreage and Production, Selected Crops, 2002, Anne Arundel County

Crop	Acres	Yield	Production	Rank (of MD counties)
Corn for grain, Bu.	5700	64.9	370000	20
Corn for Silage, Tons	*	*	*	*
Soybeans, Bu.	5200	21.0	109000	19
Wheat, Bu.	2500	64.8	162000	18
Hay, Tons	3800	1.5	5500	17
Barley, Bu.	*	*	*	*
Tobacco, Lbs.	100	1300	130000	5
* Data insufficient to publish separately. Source: Agriculture in Maryland Summary for 2002, p. 52. Maryland Department of Agriculture, 50 Harry S. Truman Parkway, Annapolis, MD 21401.				

Table 8-9. Census of Agriculture, 1997 Anne Arundel County

Number of Farms	412
Average size, acres	84
Land in Farms, acres	34,679
Cropland, acres	23,227
Cattle Inventory	2,149
Milk Cow Inventory	*
Hog Inventory	203
Poultry Inventory	698
Value of Land and Buildings	\$218,995,000
Value of Sales	
All Products	\$12,621,000
Crops	\$10,040,000
Livestock, Poultry, and Poultry Products	\$2,582,000
* Data insufficient to publish separately. Source: Agriculture in Maryland Summary for 2002, p. 52. Maryland Department of Agriculture, 50 Harry S. Truman Parkway, Annapolis, MD 21401.	

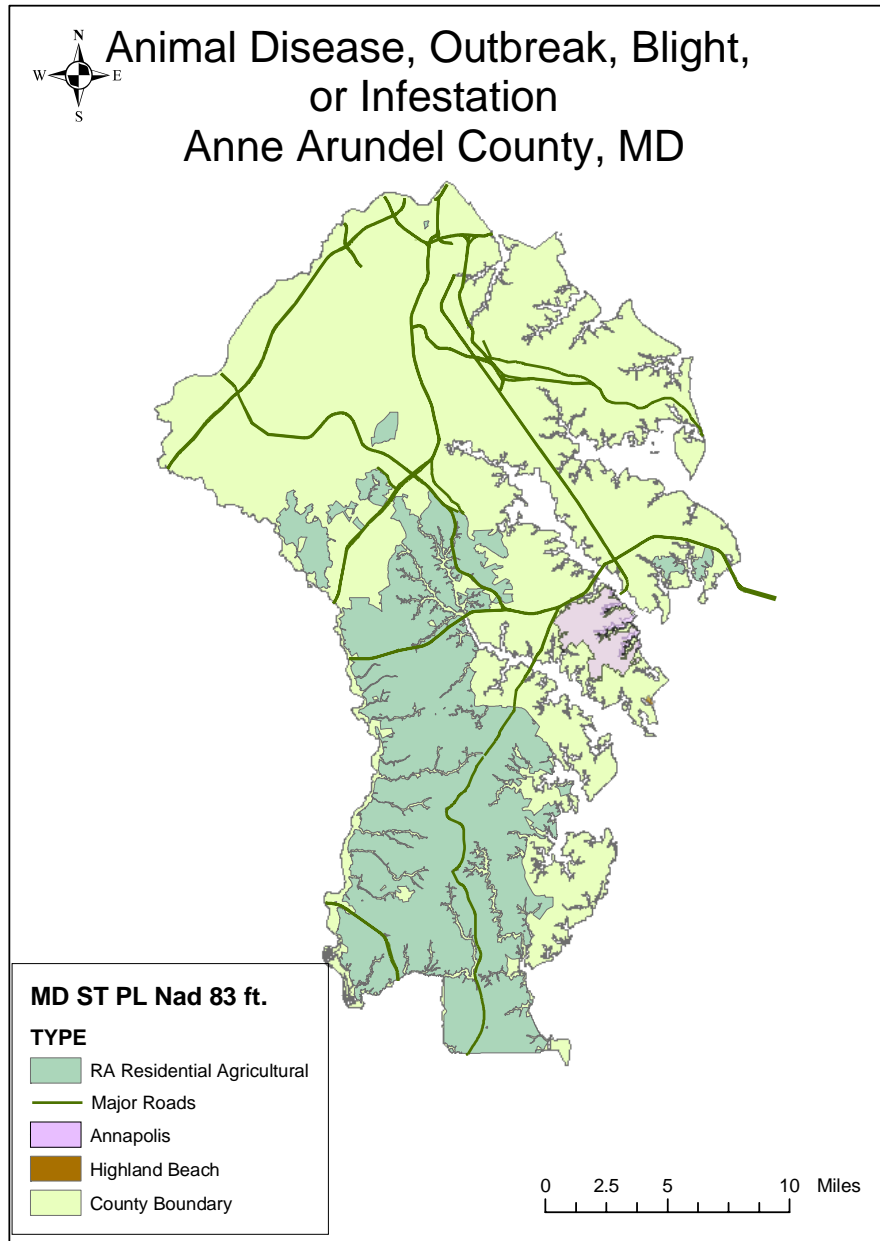
8.14.2 History

Within the past ten years, no reported episodes of disease, outbreak, blight, or infestation were reported to the Maryland Department of Agriculture (see Appendix C for additional information).

8.14.3 Vulnerability

Animal disease, outbreaks, blight, or infestation do not have particular impacts in any one geographical section of the county. However, these hazards would have the greatest impact on the agricultural community. Figure 8-9 depicts the areas of the County that are devoted to agricultural pursuits. These areas contain 74,857 people who will potentially be affected by this hazard. The economic impacts of this hazard cannot be evaluated geographically. Critical County infrastructure is unlikely to be affected by this hazard.

Figure 8-9. Animal Disease, Outbreak, Blight, or Infestation



Taylor 8/23/04

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8.14.4 Impacts/Risk

Blights often occur without warning. The greatest impact would probably be in South County, where the largest agricultural acreage is located. Human lives may not be lost, but life styles could be dramatically altered and the economic effects felt Countywide.

8.14.5 Animal Disease Outbreak Mitigation Actions

8.14.5.1 Mitigation Action AD-1:

Ensure that existing monitoring capabilities at the state and County level are integrated to provide an early warning of an outbreak, blight, or infestation in the County's animal or plant populations.

Estimated Costs: To be determined. Should be minimal with staff time being the primary component.

Benefits: Diseases, blights, or infestations can gain a foothold in the County in a number of ways. They may be something exotic brought in with animals or plants imported, either legally or illegally, from some other part of the country or world. Other vectors include infected animals or insects wandering across the border from neighboring states or counties. Birds on their annual migration can bring in avian diseases.

In many cases animal epidemics are the result of either homegrown diseases or factors that can be controlled through proper animal husbandry.

The effects of animal epidemics, blight, or infestation include such diverse problems as economic loss due to either the direct death of livestock and/or the necessity of euthanasia to living albeit infected or exposed animals; the need for disposal of the carcasses before they become a secondary health hazard; destruction of crops; loss of primary food supplies, loss of animal byproducts; and the loss of recreation.

Another effect is the possibility that an animal epidemic may not just be relegated to the animal population. Rather it might be zoonotic, or transferable to the human population. Three examples of zoonotic diseases are Lyme disease, West Nile virus, and rabies.

An early warning system has the benefit of allowing contaminated or diseased animals or affected plant species to be quarantined. This would prevent a widespread panic or spread of the disease outbreak, blight, or infestation.

Moreover, this would eliminate or reduce the potential for contamination of, or fear of contamination of, the County's food supply, which could cause illness or death to significant portions of the population.

Responsible Organization: Health department, Maryland Cooperative Extension Service, Veterinarians

Related Objectives: 1.4, & 5.1

Implementation Schedule: This activity is ongoing and will continue into the foreseeable future.

Priority: High

Potential Funding Sources: General revenue

8.14.5.2 Mitigation Action AD-2:

Initiate an animal disease, blight, or infestation public awareness and educational campaign under the County education and outreach program. Topics to be addressed include:

- Targeted messages designed for the agricultural community as well as the general public
- Partnering with existing agencies to coordinate and spread the message
- Symptoms of an animal disease, blight, or infestation
- Steps to take during an event

Estimated Cost: Costs will be covered as part of the County education and outreach initiative.

Benefits: This action will help ensure that County residents are aware of steps they can take to be better prepared and prevent the spread of animal diseases, blights, or infestation.

Responsible Organizations: Office of Emergency Management

Related Objectives: Objectives 1.1, 2.1, & 2.2

Priority: High

Funding Sources: General revenues, grants