GPS/GIS for Problem Solving and Critical Thinking

Use Global Positioning System (GPS) and Geographic Information System (GIS) to engage in inquiry and critical thinking. Hand-held GPS units are used to gather environmental data that can be viewed and analyzed using GIS computer software programs.

What can be done about EAB?

Problem

EAB is an exotic species that has attacked ash trees in Michigan, Ohio, Illinois, Indiana, Maryland, Pennsylvania, West Virginia, and Ontario, Canada. Once infested, a tree will die within 3-5 years. The spread of this insect will potentially wipe out huge populations of ash trees. With answers to the right questions the insects can be monitored and the devastation can be slowed.

Goals

Early detection is the key to controlling the Emerald Ash Borer and the inevitable damage that occurs. Generate an ash tree inventory by visually inspecting trees on public lands and private property, with the appropriate permission.

Results

Know where the ash trees are located. Know the condition, healthy or unhealthy, of the ash trees in your area. Keep local authorities updated on the status of EAB as it is located and moves throughout Ohio. Estimate and predict the spread of EAB. Prepare for the outcomes.

Action

1. **Define the problem:** Ask geographic questions.
   - Are there ash trees in the area? Divide your community or county into areas that can be surveyed.
   - What is the estimated number of ash trees in a square mile (640 acres). Calculate how many ash trees there are in a designated area based on the survey sample.

2. **Prioritize and investigate:** Acquire geographic information.
   - What are the attributes of the ash trees in each area? Record the size, location, abundance, spatial distribution, land use type (urban vs. rural), signs of stress, and evidence of EAB.
   - How can the data be entered and organized into geodatabases or datasets? Use the GPS tools to record specific locations of trees, ends of tree lines or edges/corners to woodlots, and/or features in the landscape created by humans. Consider non-natural influences such as major highways, human population density, campgrounds, and locations of wood products industries.

3. **Determine the solution:** Explore geographic data.
   - What is the topography of the area? Are there nearby forest populations? Is the area fragmented by agricultural or urban/suburban land?
   - Layer in other environmental GIS data that you think is important (such as hydrology, elevation, climate and/or soil and nutrient level).
   - Consider adding aerial and satellite imagery to get a better visual of the world around you.

4. **Present solutions:** Analyze geographic knowledge.
   - Is EAB currently a problem in the area? Is it a potential problem?
   - What geographic factors can help predict the spread to the area?
   - What human activity will potentially spread EAB to the area?
   - Outline some ways that you can help.

5. **Take action steps:** Act on geographic information.
   - How will EAB affect my community? How can a community use tree inventory data to prepare for EAB?
   - Consider the consequences of reduced tree canopy: aesthetics, wildlife habitat, air quality, heating and cooling implications. Report your research. Tell others.
   - Enlist help from the community.

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