

CASE STUDY:

REDUCING WILDFIRE RISK ANCHORAGE, ALASKA



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ANCHORAGE REDUCING WILDFIRE RISK WITH ERDAS IMAGINE®

Alaska, the 49th state to join the United States, is known for its picturesque landscapes, pristine bodies of water, and abundant wildlife. What isn't widely known is that over the last few years, insects about the size of a grain of rice were aggressively wiping out spruce trees in south central Alaska.

SPRUCE BARK BEETLES

Spruce bark beetles (*Dendroctonus rufipennis*) bore into the bark and feed on the layer of tissue that provides the tree with nutrients. Eventually the tree starves from lack of nutrients and dies. The spread of the spruce bark beetle has infested over 3.2 million acres in Alaska. This includes 85,000 acres within the Municipality of Anchorage (MOA), where 260,000 residents live in the wake of this epidemic. Although the epidemic is waning, the dead and dying spruce trees increase the threat of wildfire in the community. This resulted in the MOA being named a community at risk by the USDA Forest Service in 2001; and prompted the Municipality to take action to reduce its wildfire risk using remote sensing technology.

WILDFIRE MITIGATION

The Wildfire Mitigation Project became a collaborative effort between the MOA Data/GIS Resources Division, Anchorage Fire Department, Alaska Department of Natural Resources Division of Forestry, Bureau of Land Management, Anchorage Soil and Water Conservation District,

and the University of Alaska Anchorage. The Municipality contracted IGIS Technologies (IGIST), Inc., a GPS, GIS and remote sensing solutions company from San Diego, California, to evaluate the forest fuel structure in Anchorage's wild land/urban interface areas, develop predictive fire behavior models, and assess wildfire risks.

MAPPING FIRE HAZARD

IGIST created a land cover map and fire hazard map of the wild land/urban interface around Anchorage. Using ERDAS IMAGINE® Professional, IGIST ran an unsupervised classification on a Landsat TM image of Anchorage taken in 2000. Forestry inventory labels were determined using data from multiple resolutions, including one-meter aerial photos, 4-meter IKONOS, 50-meter USGS land cover, and GPS transects adjacent to the classified imagery.

The classified imagery was used as the central component in creating a spatial model to determine fire hazard. In conjunction with the MOA, Department of Natural Resources, and the Anchorage Fire Department, IGIST created a spatial model consisting of seven key inputs:

- Vegetation classification
- Slope
- Aspect
- Beetle spruce kill areas
- Distance to roads
- Distance to nearest water source
- Population density

These inputs were combined within ERDAS IMAGINE. The final output ranked each class with numerical weights that related to fire risk level. For example, if an infested area is close to a water source, it was given a low fire risk weight; if the area is far away from water, it was given a larger weight, meaning that area has a moderate-to-high fire risk.

The Department of Natural Resources Division of Forestry combined land cover layers with FARSITE, a GIS-based program that simulates growth and behavior of fires as they spread through different terrain under changing weather conditions.

Vegetation layers were incorporated into FARSITE and the results were converted into fuel models; fuels include grass, shrub or timber that escalates the threat of wildfire. Analysts manipulated and analyzed the classification process to help develop custom fire behavior models that best represent forestland conditions in Anchorage.

CONTINUING PROCESS

The MOA will continue to acquire better images and data over the years, as forestland conditions will continue changing over time. The steps of this project will be repeated to ensure the Municipality has the most up-to-date information needed to minimize wildfire threat to human life, property, and natural resources. Anchorage is successfully combining GIS software and procedures with effective firefighting policies. The MOA now has the information and guidelines needed to improve forest health management, pinpoint wildfire risk hazards, and keep the public informed.

For more information about IGIST or its services, contact: +1 619 287 9922, e-mail: info@igist.com, or visit: www.igist.com.

For more information about the Municipality of Anchorage, visit: www.muni.org.

For more information about ERDAS' products and services, contact: +1 770 776 3400, toll free: +1 877 GO ERDAS, visit www.erdas.com or e-mail info@erdas.com.

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