

❖ Conservation Measures and Adaptive Management

Case Study: Invasive Species Aerial Monitoring in Florida

By: Cheryl Millett, Biologist, Lake Wales Ridge, FL; Kristina Serbesoff-King, Scientist, Florida Chapter

Purpose and region of analysis:

This monitoring study was completed along the Lake Wales Ridge in Florida every two years from 2004-2010. The primary goal of the study was to locate new populations of invasive climbing fern (*Lygodium microphyllum* and *Lygodium japonicum*). Additionally, other major concentrations of invasive species were noted when feasible. The project was a collaborative effort with federal, state and local agencies in the region, with helicopter support provided by the local water management district. After the 2004 survey the region had very active hurricane seasons. Thus, in 2006 the survey was repeated because of the increased chance that the climbing vine had spread. The study's methods changed somewhat each time, and the survey area changed to include new areas of interest, which limited the ability to discern and make conclusions on population level trends. The study resulted in plenty of information generated about the size and number of climbing vine occurrences and how they changed over time in a limited area. It also led to significant management efforts to control them on the ground, which proved very successful.

Criteria/Methods:

The survey method for invasive climbing ferns changed a few times. This methodology description is that used after changes were made in anticipation for the 2006 survey. On the positive side this allows the reader to see important changes that refined the methodology to make it more useful for land managers. Climbing fern was the focus of the surveys, with other species only being logged when large infestations were seen. The helicopter flew 1000m transects and only deviated from this when necessary to assess the coverage of infestation. Transects were reduced to 250 or 500 meters in the southernmost region in 2006 but observers determined that 1000m surveys were more time-efficient and provided sufficient information, allowing for more area to be covered. There were always two observers on the helicopter and an additional person to run the GPS unit and log points. Another observer was added when the transects were reduced to 250 or 500 meters. In 2010, the helicopter was no longer an option and use of a fixed-wing aircraft was provided by the Avon Park Air Force Range. Because of the magnitude of change in this method (higher and

faster flight), data collected in 2010 are useful only for on-the-ground follow-up and comparisons with previous years are not possible.

After the first year of monitoring the GPS classes used were changed. Several new habitat types were added, and the number of cover classes was increased from two to 5. These classes were: dense canopy, scattered mixed heavy, scattered mixed light, single tree, and ground cover. Finally, the acreage classes were adjusted. Previously, the highest acreage class had been greater than 10 acres, which proved to be optimistic. This was increased to over 100 acres and the lowest was less than 1 acre.

Products/Outcomes:

The study results in products that would be very valuable to on the ground efforts. Reports for the monitoring years were generated with a basic scientific method outline. GIS layers for invasive species, particularly climbing fern, locations with associated categorical cover, acreage and habitat characterizations were created as well as a layer of the logged path. Finally, a PowerPoint presentation was made that showed the locations of climbing fern locations and contained statistical analysis of climbing fern population changes over time, including the number and size of patches.

Tools and Data:

The primary tool enabling this survey is the partnership of federal, state and local agencies that had the will to organize it and provided the observers. The availability of the helicopter was the most important tool, making aerial monitoring much easier than a plane, albeit more expensive. When the helicopter was not available, the availability of the fixed-wing aircraft was key in continuing the effort. This highlights the importance of forming the partnership with the water management district and Air Force facility. Additionally, how the helicopter was used and the methods that worked for this study should also be considered because they proved successful. The data summary and analysis comparing the number of infestation points and acreages was performed in ArcMap, an application within ArcGIS. So, while not a new tool, I believe the amount of manpower on the helicopter, methods of monitoring from the helicopter, and the partnership in order to obtain use of a helicopter as money is often a limiting factor, should be the take away points of the tools and data.

Strengths and Weaknesses:

There are two strengths of this monitoring study. First, it created extremely useful information for land managers. Second, it generated an extensive amount of spatial data on invasive species. The monitoring was able to identify numerous locations of climbing vine infestations and generally pinpoint where large infestations were. This helped land managers grasp the magnitude of the infestation and inform their

decisions on how to control the species and what tools to use. Additionally, it helped them decide which areas they should focus on. So, as an invasive species land management tool on a landscape level, this approach worked very well.

A weakness of this study was in the development of the methods. While the study could be used to examine changes in the number and acreages of points over time, the area in which the study was able to do that and the acreage categories used across the 1st 3 years were limited. This was due to the overly-optimistic categories that ended at >10 acres. It was believed that control efforts would result in a decrease in the number of points overall over time, but that did not prove to be the case. The study also predicted that the distribution of points by size class would change toward fewer in the large acreages, and that did turn out to be true.

Suggestions for Others:

The most important lesson to take away from this study is that monitoring methods should be carefully thought out before implementing a monitoring program. One of the hindrances in this study was the changing methods used. This limited the program from being able to fully document change in climbing fern populations over time. Obviously it is not always possible to plan for every possible contingency, but it is worth the extra time investment in the case of aerial invasive species monitoring if you want to be able to accurately report how populations of controlled species may have changed over a set period of time. It was a strong desire of the partners to meet their primary objective of getting locations of remote infestations to guide their treatment efforts that resulted in changing methods.