Guam Island Snake Sampling

Island habitats are among the world's most fragile ecosystems - home to unique species that have evolved over millions of years to meet the requirements of their isolated surroundings. But in today's global economy, keeping island species protected from the outside world is a nearly impossible task. On the South Pacific island of Guam, one alien invader has wrought unimaginable havoc on native bird life, forcing scientists to seek radical measures to bring the crisis under control.

Birds on Guam evolved with few natural predators. But in the 1940's, when the island was an important military hub during and after the war, some brown tree snakes hitched a ride from a neighboring island. With no predators of their own, these powerful hunters began to systematically wipe out Guam's bird life. Today, Guam is infested with 1 or 2 million snakes, and has lost all three of its native bird species. Six other regional species are gone; three are just hanging on. Other islands, like Hawaii, could be next.

At the National Zoo in Washington, biologist Don Nichols is working on a solution to this ecological disaster. He has developed a special virus unique to snakes that kills by flooding their lungs with fluid. The hope is that the highly contagious virus will spread rapidly among the brown tree snakes on Guam, without evolving to infect the island's other reptilian life. For an animal lover like Nichols, it's a tough situation, but clearly the best way to preserve the environment in the long run.

The Scenario
You are part of an international project that is studying the population of brown tree snakes in isolated sectors of a Pacific Island. The target animals are captured in traps without injury. A tag is then implanted into each animal to help identify the individual snake when released back in the wild.

Your responsibility is to uncover the total population of brown tree snakes in the capture and release sector. Since the tagging began, there have been 750 captured snakes in a 20,000m^2 sector. You have been a part of two sampling events that occurred three weeks apart.

Here is the data from each of those events:

9/01/11

Total # originally tagged in population = 750 snakes
# of snakes in this capture = 50 snakes
# of snakes that are recaptured during this event = 30

9/22/11

Total # originally tagged in population = 750 snakes
# of snakes in this capture = 40 snakes
# of snakes that are recaptured during this event = 30

QUESTIONS

1. Calculate the estimated population of snakes from each sampling event. Show all of your work on the back of this sheet.
2. What seems to have happened to the snake population during this three-week period?

3. What factors in the real world might compromise the accuracy of this method?