

**Commission Staff Determination  
Northern Pine Snake Survey for 38 Acre Overlay Area in Ocean Acres,  
Barnegat Township  
October 2, 2009**

**BACKGROUND**

**2003 Survey**

In 2003, an applicant conducted a survey for northern pine snakes on an approximately 800 acre parcel in Barnegat Township, commonly known as Ocean Acres. The survey was performed to help determine whether Northern pine snakes, a threatened animal species afforded protection by the Pinelands Comprehensive Management Plan, frequented the area.

Five Northern pine snakes were captured during the survey. Four individual snakes were radio-tracked by the applicant across Ocean Acres and two pine snake winter den sites were identified. Two of the radio-tracked Northern pine snakes were tracked within a 38 acre area now known as the “Overlay Area.” The survey also identified one over-wintering (denning) Northern pine snake within the Overlay Area.

Based upon the presence of suitable habitat onsite and the results of the survey, the Commission staff determined that a portion of Ocean Acres, including the Overlay Area, was “critical” habitat for Northern pine snake. The applicant contended that the den found within the Overlay Area was not used for over-wintering and that the Overlay Area itself was not critical habitat.

**Conservation Plan**

In response to this survey and information from adjacent land development applications, the Commission designated a “Conservation Area” that included critical Northern pine snake habitat and other important natural resources, including wetland systems. This Conservation Area encompassed approximately 714 acres of land, including a portion of Ocean Acres, Barnegat, and adjacent areas. The Conservation Area within Ocean Acres, Barnegat, is approximately 350 acres.

In 2003, the Commission received certain permits and approvals from the applicant to build in Ocean Acres, Barnegat. In accordance with the Commission’s regulations, a Commission public hearing was scheduled to determine whether those permits and approvals met the standards of the Barnegat Township land use ordinance and the Pinelands Comprehensive Management Plan (CMP) relative to the protection of critical habitat for threatened and endangered animal species. On May 7, 2004, a Stipulation of Settlement was entered into between the applicant and the Commission. The “Settlement” protected that portion of Ocean Acres located within the Conservation Area, and allowed the applicant to proceed with development located outside of that area. The “Settlement” also noted that the applicant contended that the 38 acre Overlay Area portion of the

Conservation Area was not critical habitat for Northern pine snake and reserved a two year period for the applicant to undertake additional survey work in the Overlay Area. The "Settlement" noted that the survey protocol and necessary conclusions of the survey would be addressed in a separate agreement.

On September 13, 2004, the separate "Agreement" was entered into by the applicant, Barnegat Township and the Commission regarding this matter. The Agreement specifically reserved the right of the applicant to undertake additional Northern pine snake surveys over a two year period in an attempt to demonstrate that the 38 acre Overlay Area no longer constituted critical habitat for the Northern pine snake. The Agreement also provided that the protocols for the survey be approved by the Commission staff. Lastly, the Agreement provided that, if the Commission's staff concluded that the additional survey results demonstrated that the Overlay Area was no longer critical habitat for Northern pine snake, the 38 acre Overlay Area would be rezoned by Barnegat Township to allow for residential development.

## **2005-2007 SURVEY OF THE OVERLAY AREA**

### **Survey Results**

Thereafter, the applicant completed and submitted to the Commission a two year (2005-2007) Northern pine snake survey for the 38 acre Overlay Area. The results of the survey were negative; that is, no Northern pine snakes were found.

### **Preliminary Review of the Survey**

Before completing its review of the survey, the Commission's staff distributed the survey report to six individuals knowledgeable about snake surveys for review. The Commission staff received four substantive comments regarding the survey. The concerns were that:

1. The design of the drift fences erected on the parcel and the snake traps themselves were faulty because snakes could have climbed over the fences or avoided entry into the traps;
2. The residential development that had occurred surrounding the 38 acre Overlay Area, both prior to and during the survey period, probably negatively affected the survey;
3. The fact that snake traps were vandalized in May 2007 negatively affected the survey results; and
4. The design of the snake study did not meet the study objectives for demonstrating that no snakes were in the 38 acres because it was not designed to conclusively trap all individuals exiting or entering the Overlay Area.

## **Commission Staff Preliminary Review**

The Commission staff analyzed the concerns and preliminarily concluded that:

1. The proposed survey protocol (design), which had been approved in advance, adequately addressed drift fence and trap design.
2. The fact that residential development was occurring in a surrounding area (which had not been deemed to be critical habitat) would not render the survey results invalid.
3. The vandalism event impacted approximately two weeks of the two year survey. Since the Commission was notified promptly and the traps were relocated, it was felt that the survey was not materially affected.
4. The methodology for the survey, which exceeded that regularly used by other applicants in the Pinelands Area, was reliable.

Based upon this analysis, the fact that the survey work did not identify any Northern pine snakes within the 38 acre Overlay Area in a two year period and the absence of any other reports or information regarding Northern pine snakes within the Overlay Area, it was the Commission staff's preliminary opinion that the applicant had demonstrated that the 38 acre Overlay Area did not constitute critical habitat for Northern pine snake.

## **PUBLIC REVIEW OF THE SURVEY**

Beginning July 10, 2009, the Commission staff began accepting public comments for a 30 day period regarding the 2005-2007 Northern pine snake survey and the Commission staff's preliminary determination that the survey demonstrated that the Overlay Area could no longer be considered critical habitat for Northern pine snake. The survey and the preliminary staff determination on this matter were posted on the Commission's website and Barnegat Township posted the determination on its' website. Paper copies of the survey and the Commission staff's preliminary determination were made available for review at the Pinelands Commission office and at the Barnegat Township municipal building. Written notification was provided to over one hundred landowners within 200 feet of the Overlay Area and other interested parties, including conservation groups and the applicant. Those postings and mailings invited written comment on the matter to be submitted by August 10, 2009.

The Commission received 13 written comments. Three commenters, who owned property within the Overlay Area and who expressed an interest in developing their properties, supported rezoning the Overlay Area for development. One commenter, who remained neutral, reported that the snake fences remained in place. Other commenters opposed the rezoning on the basis that the area was valuable as open space and habitat. One commenter provided an analysis prepared by Dr. Joanna Burger of Rutgers University and Dr. Emile DeVito of the New Jersey Conservation Foundation which disagreed with the survey report's conclusions that the Overlay Area does not constitute critical habitat.

## COMMISSION STAFF ANALYSIS

After the public comment period ended, the Commission staff re-examined the survey in light of the questions and concerns raised during the preliminary review and the public review processes. These related to four primary areas of inquiry.

1. Was the survey methodology flawed because the fencing was insufficient to direct snakes to the traps, the traps were not designed correctly, the traps should have been opened earlier, snakes outside of the Overlay should have been tracked, the two year study period was too short or too few common snakes were captured?
2. Did vandalism invalidate the results of the survey?
3. Did the surrounding development negatively impact the results of the survey?
4. Is the Overlay Area critical habitat because it provides an important buffer to adjacent critical habitat?

The Commission staff analysis of each issue follows.

### **Survey Methodology**

The survey involved the installation of 3700 feet of fencing and 42 traps within this 38 acre area. The fencing was three feet in height with a minimum of four inches buried. In addition to road cruising surveys, snakes were trapped during the Spring (May through mid-July) and Fall (September through October) for a two year period.

The protocol for the survey was pre-approved by Commission staff and involved at least 50 times more fencing per acre than used in other successful surveys throughout the Pinelands and recommended by other researchers.<sup>1</sup> Because of the additional fencing, the number of traps per acre also greatly exceeded the norm. The traps' design was consistent with that typically used in other studies. Although three foot high fencing is also the norm, it is understood that this height will not guarantee that a larger snake is prevented from climbing over the fence.

The Spring and Fall survey periods were also consistent with typical periods used successfully elsewhere in the Pinelands. Although most of a pine snake's typical period of activity was surveyed, it is true that, depending on weather, pine snakes may leave their winter denning areas before May. In order for any such snakes to be missed during this survey, it must be assumed that they emerged from their dens before the end of April, left the 38 acre Overlay Area by the beginning of May and, if they returned in the Fall, did not do so until November. As for the two year duration of the survey, it was twice the length of typical surveys that successfully captured pine snakes elsewhere in the Pinelands.

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<sup>1</sup> Zappalorti and Torocco (2002)

It has been suggested that the capture of so few common snake species ( \_\_\_ during the 2005-2007 survey) raises questions as to the significance that a pine snake was not captured. It is noteworthy that the 2005-2007 survey, except for much more extensive fencing and traps, was designed consistent with the successful 2003 survey. In 2003, 64 snakes were captured, including five pine snakes ranging in length from 4.3 to 5.4 feet in length and 14 other snakes that exceeded 4 feet in length. Although it was suggested that the failure to capture a pine snake in 2005-2007 was not statistically significant, the rationale for such a conclusion is not clear since that assessment appears to combine snakes seen along the fence line with those caught in traps, uses three rather than four trap periods, reflects incorrect mathematical calculations and incorrectly compares probabilities.

Lastly, the survey did not seek to track pine snakes that did not utilize the Overlay Area. However, the survey was designed to capture snakes that may have originated outside the Overlay Area but entered the Overlay Area for nesting, foraging or denning.

### **Vandalism**

The traps were vandalized in May 2007. According to the consultant's report of the incident, it appeared that the soil in front of the traps was treated with a chemical mixture. The Commission staff was promptly notified and the traps were moved. Since the event affected about two weeks of the four season survey, it is not likely that the efficacy of the survey was compromised.

### **Impact of Surrounding Development on the Overlay Area**

The 38 acre Overlay Area extends in a northerly direction from the remainder of the Conservation Area. It is bounded on two sides by areas zoned for residential development.

When the Conservation Area was established, it was intended to incorporate critical habitat for pine snakes, including buffers to nesting and denning sites and foraging areas. The area outside the Conservation Area was and still is zoned for residential development. Some development in that surrounding has since occurred.

The "domino" effect (development within the surrounding area might indirectly impact the Overlay Area) was considered when the boundaries of the Conservation Area were drawn; however, there was no specific method in place at the time to measure the effect. It is, therefore, possible that these domino effects were under-estimated. If that was the case and the habitat value of the Overlay Area has already been compromised, it would be difficult to conclude that it constitutes critical habitat.

## **Impact of Development Within the Overlay Area on the Remaining Conservation Area**

If the Overlay Area is removed from the Conservation Area and allowed to be developed, it too will have some effect on the remaining Conservation Area, which will then total approximately 676 acres. If this effect is significant, it could be concluded that the Overlay Area is critical habitat because of its importance in buffering the Conservation Area.

Commission staff used the Pinelands Commission's 2008 Ecological Integrity Assessment methodology to test this effect. To do so, the entirety of the surrounding areas currently zoned for residential development was labeled as developed. A composite ecological integrity score (out of a possible score of 100) was then calculated for the entire Conservation Area, including the Overlay Area. The score was re-calculated assuming the Overlay Area was developed. The score for the Conservation Area dropped from 65.7 to 64.6 if the Overlay Area is fully developed. Since the composite ecological integrity score reflects landscape, watershed and wetlands integrity, a separate landscape integrity score, which is more directly related to habitat value for wide-ranging animals, was also calculated. The score for the Conservation Area dropped from 56.1 to 55.0 if the Overlay Area is not protected. Focusing solely on a very small part of the Conservation Area that is immediately adjacent to the Overlay Area, the landscape integrity score for that adjacent area drops from 42.0 to 36.4.

The Ecological Integrity Assessment reported that fifty-one percent of the Pinelands Area fell within the highest ecological-integrity class between 90 and 100. Only 5.2 percent of the Pinelands displayed scores of 60 or less and 2.6 percent had scores of 50 or less. In terms of the correlation of ecological integrity scores to the distribution of threatened and endangered animal species records, 2.4 percent of Northern pine snake records were located in areas with scores of 50 or less.

### **CONCLUSION**

Even though the Overlay Area provides open space benefits and possesses some ecological value, the question before the Commission staff is whether the area represents critical habitat essential for the protection of Northern pine snakes. It is this standard which is set forth in the Agreement and which the Commission staff must seek to address.

Although it is virtually impossible to prove a negative (in this case demonstrating with absolute certainty that no Northern pine snakes would ever make use of the Overlay Area), the survey methodology was based on methodologies successfully used in Ocean Acres and elsewhere throughout the Pinelands. However, because it was felt that this survey needed to be much more rigorous than the norm, the duration, length of fencing and number of traps went well beyond standard practice. In light of the survey's negative findings, it is difficult to conclude that the Overlay Area itself represents critical habitat for Northern pine snakes.

An examination of the Overlay Area in relation to the Conservation Area does not suggest that rezoning the Overlay Area for development will have a material effect on the integrity of the remaining Conservation Area. Thus, it is difficult to conclude that the Overlay Area is critical because it provides a buffer that is essential to the protection of other critical habitat for Northern pine snakes.

Therefore, the Commission staff must conclude that, in accord with the terms of the Agreement, the Overlay Area does not constitute critical habitat for Northern pine snakes.