NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF FISH AND WILDLIFE
ENDANGERED AND NONGAME SPECIES PROGRAM
ENVIRONMENTAL REVIEW

Comments and/or recommendations regarding nongame resources relative to:

PROJECT NAME: #1500-04-0001.2 - Jaylins Holdings, LLC

COUNTY: **Ocean** *MUNICIPALITY:* **Dover/Manchester**

APPLICANT: **Jaylins Holdings, LLC**

PROJECT DESCRIPTION: **Walmart**

AGENCY REQUESTING REVIEW: **LURP**

PROJECT REVIEW OFFICER: **Eric Virostek**

REVIEW DATE: **March 10, 2010**

The Department of Environmental Protection's Endangered and Nongame Species Program (ENSP) has received and reviewed the materials that were submitted to the Department by Jaylins Holdings, LLC as part of their CAFRA individual permit application (file #1500-04-0001.2). The evaluation provided below is based on the review of these materials, rare species data that is tracked by the ENSP, and the habitat assessment (and pine snake telemetry) that was provided to the Department by EcolSciences, Inc.(Dated May 2, 2006).

Determining the presence of pine snake habitat on project site:
The first step in evaluating potential impacts of the proposed project is to make a determination about the presence or absence of pine snake habitat on the site. To accomplish this we reviewed information contained within Department's Landscape Project , the Department's Biotics database, the Department's Northern Pine Snake Habitat Mapping (NJDEP 2009), a pine snake report submitted by the owners of this property (EcolScience, May 2006), and the applicant's Endangered and Threatened Species Impact Assessment (dated September 23, 2009).

Landscape Project: Based on the information available from the Landscape Project, the applicant's 43-ac site is positioned along the eastern edge of a 8,126-ac forest patch. This large forest patch is "valued" by Landscape Project for the following species: herptile species of special concern, timber rattlesnake, northern pine snake, Pine Barrens treefrog, corn snake, and Cooper's Hawk. Roughly 90% (38.7 acres) of the applicant's site is comprised of forested habitat that the Landscape Project identifies as northern pine snake habitat.

Biotics Database: The Biotics Database is the biodiversity data management software used by the department to track rare species occurrences in New Jersey. Relevant information on each

occurrence is also stored in this database. When evaluating the suitability of the applicant's property for northern pine snakes, a Biotics Database search was conducted for northern pine snake sightings in the vicinity of the applicant's property. The database contained information on seven northern pine snake occurrences within 1,500 feet of the site, with the oldest dating back to 1986. Furthermore, there is a documented northern pine snake nest site located less than 500 feet from the applicant's site.

Given the contiguous nature of the forested habitat on and around this site and the typical homerange distances of pine snakes in New Jersey (Bien et al. 2005), it is realistic to conclude that each of these seven snakes (represented by the Species Occurrence Areas in the Biotics Database; figure 3), is capable of accessing and using the habitats on the applicant's site. This supports the Landscape Project mapping, and strongly suggests that the site consists of forest habitat that is being utilized by northern pine snakes.

Northern Pine Snake Habitat Mapping: In December 2009, the Department released its "Status Assessment of the Northern Pine Snake (*Pituophis m. melanoleucus*) in New Jersey: An Evaluation of Trends and Threats" (NJDEP 2009). This document summarizes the current threats facing pine snakes in New Jersey and describes, in detail, predictive mapping methods that can be used to identify northern pine snake habitat in the state. The Department's "Species-based Patch Model" uses NJDEP LULC data to model pine snake habitat by dissolving/combining appropriate LULC level-three classes into species-specific patches of habitat. This model can therefore be used in a manner similar to the Landscape Project to help identify habitat valuable for pine snakes.

The Department's Northern Pine Snake Habitat Model identifies 32.3 acres of pine snake habitat on the applicant's site. The model captures nearly all of the undisturbed habitat on the site, with the exception of the forested wetlands that extend out from the railroad tracks on the southwestern portion of the property (figure 4). While northern pine snakes have been shown to use, and move through, forested wetlands (Bien and Smith 2005), these habitats are not considered to be preferred by this species and are therefore not included in the habitat modeled by the Department's Species-based Patch Model (NJDFW 2009). None-the-less, the majority of the applicant's site (75%) is considered to be pine snake habitat by this model.

EcolSciences Report: ENSP would be comfortable making a determination on the presence of pine snake habitat based on the information provided above. However, to supplement the information obtainable from the Landscape Project, Biotics Database, and the Northern Pine Snake Habitat Mapping, ENSP also considered the findings from a 2006 pine snake study that was submitted to the Department by the property owners. This report summarized the findings of a pine snake trapping and telemetry study conducted by EcolSciences, Inc. on the applicant's site between May and November 2005. Two pine snakes were capture on the site during this time and they were both radio tracked to determine their habitat use and hibernaculum (den) locations.

A snake referred to as "Dover 1" in the report was captured on the site on May 30, 2005, equipped with a radio transmitter, and released back at the point of capture on June 15, 2005. The snake spent the next week and a half on the site before moving to the "off-site" forested habitat to the south. Between June 27, 2005 and August 13, 2005, "Dover 1" used a small forested patch off-site, but returned back onto the applicant's site on August 15, 2005 where it remained until entering its

hibernaculum on October 31, 2005. EcolSciences' radio-tracking results for "Dover 1" reveal that this pine snake used nearly all of the available forested habitat on the applicant's site, including portions close to Route 37.

The second snake radio tracked by EcolSciences (Dover 2), spent far less time on the applicant's property in 2005. "Dover 2" was capture on the site on June 15, 2005, equipped with a radio transmitter and released at the point of capture on June 22, 2005. This snake was never relocated on the site after its initial release on June 22, but instead spent the remainder of the year southwest of the railroad tracks on a property known as the "Heritage Mineral Site."

Ecolsciences' pine snake telemetry findings support the Department's initial determination that the forested habitat on the applicant's property is, in fact, habitat for the northern pine snake. Furthermore, this study identified a pine snake hibernaculum that had previously not be identified by the Department.

E&T Impact Assessment: In September 23, 2009 the applicant submitted a "E&T Impact Assessment" to NJDEP, which summarizes the applicant's findings of rare species habitat for the site. In this report, the applicant acknowledges that two pine snakes were captured on site in 2005 and that radio-tracking data indicates extensive use of the site by at least one of these snakes. Furthermore, the applicant's E&T Impact Assessment describes the portion of the site that will be developed as consisting of "pitch pine/oak forested uplands upon a substrate of Lakehurst and Lakewood sands" and goes on to accept this habitat type as "primary pine snake habitat."

Summary of Habitat Determination: There appears to be no debate as to whether or not this site constitutes habitat for the state threatened northern pine snake. ENSP therefore concludes that all of the vegetated (non-impervious) habitat on the applicant's site is northern pine snake habitat and that a portion of the site is critical habitat for this species since it contains an active pine snake hibernaculum. We estimate pine snake habitat exists on a minimum of 90% (or 38.7 acres) of the site, but request that the applicant provide a more accurate estimate of "non-impervious" acreage for permitting and impact assessment purposes.

Determining Impact of Proposed Activities: Working from a starting point that the entire vegetated portion of the site exists as pine snake habitat we can easily assess the direct impacts that the proposed development will have on pine snake habitat simply by calculated the acreage of this habitat that will be converted to impervious surfaces associated with the proposed development. More difficult to calculate, however, are the indirect impacts on pine snakes and their habitats that might be associated with the proposed development. Indirect impacts could include noise and other disturbance, increased public access, increased subsidized predator abundance, increased potential for snake mortality along roads and parking lots, and degradation of surrounding habitats from stormwater runoff and trash.

Footprint of Disturbance: Based on the site plans and the E&T Impact Assessment provided by the applicant, it appears that the proposed development would result in a total of 14.9 acres of impervious surface on the site. These 14.9 acres of impervious surfaces would directly impact pine snake habitat by converting to something that is unusable by this species. Therefore, at an absolute minimum, the proposed development will adversely impact 14.9 acres of pine snake habitat.

Additional losses of habitat associated with this development also seem likely, even though they are not direct conversions of habitat to impervious surface and therefore are not included in the 14.9-acre calculation that was provided to the Department. For example, in the extreme northeast portion of the site the site plan shows the construction of an above-ground detention basin (basin #5), which appears to be roughly 1 acre. Existing pine snake habitat will be disturbed to create this basin and, under the proposed plan, the basin would be so isolated from any remaining pine snake habitat that it would functionally no longer serve any value to pine snakes; pine snakes simply could not access this basin. Therefore, even though this basin is not included in the applicant's calculation of impervious surface, it should be included in the amount of pine snake habitat that would be directly impacted as a result of the proposed development. A similar scenario exists for basin #6 and basin #7. Therefore, the acreage of these basins should be added to the calculation of impacted pine snake habitat. For the purposes of this review, the size of each basin is being estimated at 1 acre (roughly estimated using the scale provided on the site plan).

Two additional above-ground detention basins are shown on the site plan, one in the southeast portion of the site (basin #2) and a larger one just to the west of the parking lot (basin #1). Unlike basins #5, #6, and #7, these basins may be accessible to the pine snakes after the proposed development is constructed. However, the habitat that currently exists where these basins are proposed is more suitable for pine snakes in its current form than the proposed above-ground basins would provide. Therefore, there is an additional loss of habitat quality that would result from the construction of these basins. The possibility also exists that these areas may be temporarily unusable for pine snakes due to the potential for them to retain water during (and for periods after) heavy rains. This would be most detrimental during the months of April through October when pine snakes are active. Therefore, we consider these basins, in their final state, to be marginally suitable to unsuitable for pine snakes. Estimated from the site plan, it appears that basin #1 is roughly 1.5 acres and basin #2 is 1 acre. These calculations, along with the calculation for basin #5, #6, and #7 should be confirmed with the applicant.

The final "footprint of disturbance" losses in habitat are summarized below.

Impervious surfaces: 14.9 acres
Above-ground basins: 6.5 acres (estimated from site plan)

Total direct habitat losses to pine snake habitat = **21.4 acres**

Secondary Impacts:

Disturbance: Activity and noise in close proximity to pine snake habitats, hibernacula, and nesting sites can cause individuals of this species to abandon these areas (Luckenbach and Bury 1983, Burger et al. 2007, NJDEP 2009). Forman et al. (2003) report that the noise and activity from a roadway may create a disturbance to snakes that extends up to 200 m into the habitats adjacent to the road. This finding has relevance to the proposed development of this site since the site plan shows a proposed roadway is to be constructed to provide access to the proposed shopping center. This roadway enters the site from the west and wraps around the known pine snake den, encircling the den a full 270°. Currently, the on-site den is positioned within 75 m of Route 37 (a highly

traveled state route). However, Route 37 does not encircle the den to the extent that the proposed roadway would, but rather runs only to the north of the den. The fact the proposed roadway would come within 50-m of the den and wrap around the den on the northwest, north, northeast, east, southeast, and south sides creates great concern. Noise and disturbance from the roadway would "penetrate" in from 270° around the den. It is unlikely that the pine snakes currently using this hibernaculum would tolerate this amount of constant disturbance. Therefore, ENSP believes the construction of the proposed roadway would cause the pine snakes to abandon the known hibernaculum. ENSP recognizes hibernacula as critical habitat for pine snakes and recommends that activities and developments that jeopardize these sites be avoided (NJDEP 2009).

The applicant is proposing a narrow finger of vegetated habitat to would connect the den to the undisturbed habitat south of the site. This strip of habitat is being proposed in the hopes that the pine snakes will use it as a travel corridor to and from the den. The likelihood of snakes actually using this travel corridor seems extremely low for multiple reasons. First, this narrow corridor is almost completely bounded on its eastern side by the proposed shopping center, parking lot, and the access road. Therefore, the same "disturbance concerns" expressed relative to the den site apply to this travel corridor; snake behavior will be altered and their presence hindered by the disturbance created by the human activity associated with the road, parking lot and shopping center. Second, a large portion of the travel corridor is comprised of basin #1, which may be impassable for pine snakes, during times of water retention, and only marginally suitable during other times of the year.

Roads: Roads represent a major threat to snakes and other wildlife. In addition to the disturbance associated with roads (described above), roads can also lead to direct mortality of wildlife as a result of vehicular traffic. The applicant is proposing to install a 4-foot high snake barrier (with a 4" over hanging lip) that extends for 3,319 feet along the proposed roadway that encircles the den, and extending south along the parking lot. Details of this barrier are contained with the applicant's E&T Impact Assessment (Ecolsciences 2009). The proposed barrier would be constructed of a solid material (i.e. not mesh fencing) and designed create a barrier to snake movement in one direction, which would be as snakes move towards the road. Therefore, the proposed barrier would likely be successful at keeping snakes off of the roadway if they were to approach the barrier from the "front" toward the road. Snakes could still circumvent the barrier, however, and end up on the road or parking lot. Furthermore, while such a barrier could prevent snakes from getting onto the proposed roadway it does not mitigate the issues of disturbance created by the roadway (described above).

Illegal Collection: For reasons described in the Department's pine snake status assessment (NJDEP 2009) pine snakes are at risk of illegal collection, with poachers targeting den and nest sites. The configuration of the proposed roadway certainly draws attention to the presence and location of the pine snake den on the site. Therefore, there is some concern that collectors could target this area as a site for poaching if the roadway was constructed. Over time, however, this concern would likely diminish since we expect that the pine snakes would eventually abandon the den site due to the daily disturbances (noise, motion, etc.) associated with the road and shopping center.

Summary of Impacts: ENSP concludes that the proposed development will have a direct adverse impact 22.4 acres of pine snake habitat. Secondary impacts will adversely affect nearly all of the remaining habitat on the site and the proposed roadway will cause the pine snakes to abandon the existing hibernaculum.

References:

Burger, J, RT Zappalorti, M Gochfeld and E DeVito. 2007. Effects of Off-road Vehicles on Reproduction Success of Pine Snakes (*Pituophis melanoleucus*) in the New Jersey Pinelands. Urban Ecosystems. Springer Science. 10:275-284.

Forman, RTT, D Sperling, JA Bissonette, AP Clevenger, CD Cutshall, VH Dale, L Fahrig, R France, CR Goldman, K Heanue, JA Jones, FJ Swanson, T Turrentine, and TC Winter. 2003. Road Ecology: Science and Solutions. Island Press, Washington, DC. 481 pp.

Luckenbach, RA and RB Bury. 1983. Effects of Off-Road Vehicles on the Biota of the Algodones Dunes, Imperial County, California. Journal of Applied Ecology 20(4): 265-286.

Smith, RM and WF Bien. 2005. Monitoring Home Range Movements and Identifying the Location of Hibernacula of the Timber Rattlesnake (*Crotalus horridus*) and Northern Pine Snake (*Pituophis melanoleucus*) at Warren Grove Gunnery Range, Drexel University, Unpublished manuscript.