

**REPRODUCTIVE SUCCESS OF BALD EAGLES
(*HALIAEETUS LEUCOCEPHALUS*) NESTING IN THE
VICINITY OF THE CHALK POINT OIL SPILL**

**Final Report
April 11, 2001**

Introduction

On April 7, 2000 an underground pipeline transporting a mixture of #2 and #6 fuel oil to the Chalk Point PEPCO plant located near the town of Aquasco, in Prince George's County, Maryland ruptured. The fractured pipeline released approximately 126,000 gallons of product into a *Spartina spp.* dominated brackish wetland located in Swanson Creek, a tidal tributary of the Patuxent River. Extensive oiling of the wetlands within Swanson Creek took place during the first two days of the spill. In addition, high winds with gusts in excess of 50 mph passed through the area on April 8 and 9, resulting in oil escaping from Swanson Creek and entering the mainstem of the Patuxent River and several of its tributaries. Primary habitats impacted during the spill were wetlands, sandy beaches and open water areas associated with these habitats. Several avian species that are dependent on aquatic habitats were nesting in the area at the time of the spill, including osprey (*Pandion haliaetus*), federally threatened bald eagles (*Haliaeetus leucocephalus*), and great blue herons (*Ardea herodias*). The foraging strategy of these species and willingness to enter water and wetlands make them susceptible to oiling. Several oiled osprey and great blue herons were observed by wildlife survey teams during the response effort.

The Natural Resource Trustees for the Chalk Point Oil Spill were concerned about the potential effects of the oil spill on the reproductive success of these avian species. To this end, the objective of the present study was to evaluate the potential effects of the oil spill on the nesting success of bald eagles. Other reports describe results of monitoring nesting great blue herons and osprey.

Study Organism and Susceptibility to Oiling

The bald eagle is the largest raptor species found within the Patuxent River region, with 12 nesting pairs documented along the river and its tributaries in 2000 (Glenn Therres, Maryland Department of Natural Resources, personal communication). Bald eagles are a species vulnerable to oil spills because of their dependence on aquatic habitats for foraging. Shallow water areas with abundant fish, followed by wooded shorelines, and extensive marshes are key habitat elements required by bald eagles (Robbins and Blom, 1996). Many of these habitats were observed to be oiled during the Chalk Point spill. Bald eagles feed exclusively on fish when they are abundant. During times of low fish abundance, bald eagles will prey on waterfowl and scavenge carcasses taken from the water and along shorelines. During an oil spill, foraging eagles may become directly contaminated with oil or feed on contaminated prey.

Adults that become oiled may transfer the oil from their plumage to their eggs during incubation. Refined oil may be highly toxic to avian embryos depending on the species; stage of embryonic development; and type, weathering, and dose of oil. Small quantities of oil on eggs can lead to embryo mortality, or cause deformities, especially during the early incubation phase (Albers 1991, 1995, Hoopes *et al.* 1994). Studies have shown that as little as 1-20 uL of some types of oil can have lethal effects on developing embryos (Parnell *et al.* 1984, Hoffman 1990). Louisiana heron (*Hydranassa tricolor*) eggs treated with 10 uL of weathered crude oil had a reduced hatchability of 17% (Macko and King, 1980). In addition, the oil spill may have reduced or contaminated prey species, such as fish and waterfowl, with subsequent effects on reproductive success. Several studies have reported reproductive effects on avian species due to dietary exposure to petroleum-derived products (Coon and Dieter 1981, Ainley, *et al.* 1981). Finally, human disturbance related to cleanup activities has been shown to impact the reproductive success of bald eagles. During the 1989 Exxon Valdez spill in Alaska, bald eagles nesting in oiled areas with high cleanup activities had low reproductive success with only 200 young being produced. In 1990, in the same area, cleanup activities were reduced and greater than 1,000 young eagles were produced (Baker *et al.*, 1991).

Because bald eagles are susceptible to human disturbance, especially during the nesting season, attempts were made to minimize this stress during the Chalk Point oil spill. The U.S. Fish and Wildlife Service (USFWS) requested on April 10 that the Federal On-Scene Coordinator contact the Federal Aviation Administration and establish a no-fly zone around the two bald eagle nests within Swanson Creek. Because no bald eagles were known to nest along the eastern shoreline of the Patuxent River, the USFWS also recommended that daily aerial surveys of the Patuxent River be conducted from along the eastern shoreline of the river rather than along the western shoreline. The no-fly zone included a 0.25 mile radius around each nest, and a minimum of 1,500 vertical distance above each nest. These guidelines were based on recommendations from USFWS law enforcement agents and Maryland Department of Natural Resources (MDNR) Wildlife and Heritage personnel.

Methods

Study Area

Two active bald eagle nests were located within Swanson Creek, a third nest active nest was identified near Cremona Creek, approximately 7.0 miles downstream of the spill release. The nests were identified as: Stanley Run, Swanson Creek, and Cremona Creek. All three nests were determined to be active during the first week of the spill. On April 9, the Chalk Point Natural Resource Trustee Council determined that PEPCO personnel with the assistance of the USFWS would monitor the three active nests for reproductive success on a regular basis until young had left the area.

Results

Stanley Run

This nest was located in a large red maple (*Acer rubrum*) tree located on PEPCO's property near Stanley Run. The nest had been active for approximately 5 years previous to the spill (based on observations during wood duck monitoring by PEPCO personnel). On April 11, USFWS personnel

observed, from the ground, one nestling and an adult female. Both birds appeared to be normal, based on behavioral observations. The USFWS estimated the nestling was approximately 12 days old. On April 13, USFWS personnel climbed the nest and documented the presence of two eaglets approximately 4 weeks old.

On May 2, the nest was revisited by USFWS personnel, including Law Enforcement, and a PEPCO representative, with the intention of banding the young. Upon arrival to the nest site it was observed that the nest had been destroyed, presumably by high winds that were experienced earlier in the week. The banding team picked through the nesting material and broken branches and found feather sheathings from the young. Based on the development of the feathers, USFWS personnel concluded that the nest had fallen soon after the visit on April 13th. Samples of the sheathings were collected and maintained by the USFWS. As a result of the nest destruction, the nest was eliminated from the reproductive monitoring study.

Swanson Creek

The second nest identified within the vicinity of the spill was located in a Virginia pine (*Pinus virginiana*) tree near the mouth of Swanson Creek in Charles County. The nest had been observed during an earlier field reconnaissance conducted by USFWS Law Enforcement agents. USFWS Law Enforcement agents noted that a pair of birds had been hanging around the nest and were acting abnormally. Based on the behavior exhibited by the birds it was thought that there were eggs or young present at that time. On April 16, USFWS personnel climbed the nest and found no evidence of young or eggs. However, it was noted that the nest had been somewhat active based on the linings of the nest with feathers. The USFWS concluded that the nest belonged to a young pair of eagles and the nest had failed naturally. This nest, like the Stanley Run nest, was removed from the reproductive monitoring study.

Cremona Creek

This nest was located on a farm in Cremona, MD (St. Mary's County) approximately 7 nautical miles south of Swanson Creek. The nest was located in a large sycamore (*Platanus occidentalis*) on the edge of an active farm field about 5,000 feet inland. The nest was observed from the ground by USFWS and PEPCO personnel on April 20. The observations revealed that two nestlings were present. The nest was revisited by USFWS and PEPCO personnel on April 24. At this time the nest was climbed by USFWS personnel, and the nestlings banded. It was noted by the USFWS that the coloring of the eaglets was "a little off".

Regular monitoring was initiated May 17 and continued until October 16. Monitoring was conducted from the ground using binoculars. All observations were made within a 10 minute time frame. The following observations were recorded: number of young and adults present, each bird's location with respect to nest, and any unusual circumstances.

The two eaglets that were observed in the Cremona nest initially on April 20 were observed in the nest until June 6, which was also the first time they were seen off the nest. From this date on, the eaglets were always observed to be within 30 feet of the nest, this behavior continued until the third week of

September. On September 27, which was the last time the eaglets were observed, the juvenile eagles were seen some distance from the nest across an adjacent field. The last time an adult eagle was observed was October 2. Table 1 provides a summary of observations noted during the monitoring period.

Table 1. Summary of Cremona Creek bald eagle monitoring data

May 17	both young, both adults
May 25	both young, one adult
May 31	both young, both adults
June 6	both young (one off nest), one adult
June 14	both young, didn't see adults
July 10	both young (one off nest), no adults
July 20	both young off nest, no adults
August 8	both young off nest, no adults
August 23	both young off nest, both adults
September 6	no young, one adult
September 27	both young in field away from nest, no adults
October 2	one adult
<u>October 16</u>	<u>none</u>

Conclusion

Based on the observations conducted by USFWS and PEPCO personnel, there were no apparent effects of the oil spill on the Cremona Creek bald eagles. The Cremona Creek eagles successfully fledged 2 eagles in 2000. The average number of young per breeding pair in this study was 1.0 (assuming breeding pairs at Cremona and Stanley Run), a value above the 0.7 young per breeding pair thought to be required to maintain a stable population within the Chesapeake Bay region (USFWS 1990). In addition, this value approaches the recovery target of 1.1 young per breeding pair established by the Chesapeake Bay Region Bald Eagle Recovery Team (USFWS 1990).

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