

# NEW WORLD SECTION



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## STATE OF NEW JERSEY INVESTS IN SHOREBIRD CONSERVATION: A MILLION CLAMS FOR HORSESHOE CRABS

by J.P. Myers

Over the past decade conservation research has identified the Delaware Bay as the single most important spring stopover for shorebirds migrating along the Atlantic coast of North America (Dunne *et al.* 1982, Harrington 1982, Myers 1986). Over one million shorebirds pass through this estuary each spring, among them large percentages of the Western Hemisphere's Red Knots *Calidris canutus*, Ruddy Turnstones *Arenaria interpres*, Sanderlings *Calidris alba*, and Semipalmated Sandpipers *Calidris semipalmatus*. The birds utilize a single resource during their stay upon the Delaware Bay, eggs of the horseshoe crabs *Limulus polyphemus*, and they restrict their activities to a small number of open sandy beaches on the bay's shores.

In early October 1985 the State of New Jersey signed an agreement with Public Service Gas and Electric (PSGE), a New Jersey utility company, transferring \$1 000 000 US to the State to be used exclusively for shorebird conservation in the Delaware Bay. This transfer completed more than a year's negotiations and planning, orchestrated chiefly by Paul D. McLain, Deputy Director of New Jersey's Department of Fish, Game, and Wildlife, and James Shissias, PSGE representative. Several research and conservation organizations were deeply involved in the process, principally The Academy of Natural Sciences, World Wildlife Fund-US, and Manomet Bird Observatory. Important international support for the effort was provided by CEMAVE (Brazil), Canadian Wildlife Service, ICBP-Cambridge, ICBP-Pan American, INFOR (Peru), National Audubon Society, US Fish and Wildlife Service, the Wader Study Group, and a number of individual scientists actively involved in wader research and conservation from throughout the world.

The principal and thorniest negotiating point rose out of the money's source. In expanding road access to the Salem Nuclear Power Plant in southern New Jersey, PSGE needed to fill several acres of *Phragmites* intertidal marsh. To obtain federal and state permits for altering these intertidal lands, PSGE agreed to underwrite mitigation steps that would place an equivalent acreage of marsh elsewhere. Estimates for this totaled \$1 000 000. PSGE's money, thus, was destined for mitigation work. Much of the needed shorebird conservation program, however, entailed acquisition of new

lands. In the eyes of US and State regulatory agencies, these two objects - mitigation and acquisition - are immiscible. The Army Corp, while sympathizing with the biological and conservation merit of the shorebird conservation plan, did not want to establish a precedent for diverting mitigation money to acquisition. McLain, Shissias, and others' coup thus lay in working out an agreement with the Army Corp of Engineers that would satisfy the Army's permit requirements for PSGE while also allowing significant land acquisition.

The management plan developed by McLain calls for (i) restoration of intertidal lands damaged by coastal construction, (ii) acquisition of several key miles of Delaware Bay shoreland, and (iii) placing reserve wardens on site during the migration seasons. These steps will accomplish three goals. The restoration will return several hundred meters of disturbed beach to something approximating its original condition while also satisfying Army Corp permit requirements. Acquisition will halt the gradual usurpation of land for resort and commercial development that has done in so much of New Jersey's shore over the past two centuries. And the warden will reduce the growing harassment suffered by the birds during their stopover in Delaware Bay.

The steps taken by New Jersey and PSGE are historic ones for conservation. At the simplest level, a large sum of money is being applied to protect a wildlife resource - migratory shorebirds - which heretofore had usually lost out in the steps between conservation research and management plan implementation. This may be one of the largest single steps ever taken in the name of shorebird conservation (or more positively, it may be the first of many....).

More fundamentally, reaching the final agreement required prolonged collaboration of parties often at odds with one another: industry, conservation groups, regulatory agencies and wildlife agencies. Each contributed their own strengths, each tolerated the other's foibles, and in the long-run, the shorebirds won. Now the burden is on the State and collaborating private groups to make the most of a singular opportunity.

## REFERENCES

- Dunne, P., Sibley, D., Sutton, C., and Wander, W. 1982. Aerial surveys in Delaware Bay: confirming an enormous spring staging area for shorebirds. *Wader Study Group Bull.* 35: 32-33.
- Harrington, B.H. 1982. Untying the enigma of the Red Knot. *The Living Bird Quarterly* 1: 4-7.
- Myers, J.P. 1986. Chaos, sex, and gluttony: the spring frenzy of shorebirds in Delaware Bay. *Natural History* in press.
- J.P. Myers, *Academy of Natural Sciences, 19th and the Parkway, Philadelphia, PA 19103, USA.*

## ABSTRACTS OF PAPERS PRESENTED AT THE AMERICAN ORNITHOLOGISTS' UNION MEETING, TEMPE, ARIZONA, 1985

### Seasonal changes in prolactin and luteinizing hormone in the Spotted Sandpiper.

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Prolactin (Prl) and luteinizing hormone (LH) were analyzed in plasma samples obtained serially from individuals across different stages of the breeding season. Males tended to have higher plasma Prl levels than females. Prl was significantly elevated in both sexes by the first few days of incubation. In males Prl continued to rise during incubation. Higher levels of Prl in males than females, especially late in incubation, reflects the greater contribution of males to incubation. LH declined markedly in males and females from prelaying to early incubation. There was a significant negative correlation between Prl and LH among males, especially from the prelaying to early incubation phases of the season. There was no such correlation among females.

### Variable mating strategies of monogamous Piping Plovers (*Charadrius melodus*) breeding in a changing environment.

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Mate choice, breeding site fidelity and reproductive success were monitored for four years on individually marked Piping Plovers at two sites in Manitoba. Frequent nest destruction by storms, predators and humans on Lake Manitoba sand beaches and West Shoal Lake alkali flats facilitated frequent reneesting opportunities. Following nest loss, males remained on territories significantly more often than leaving, while females dispersed to one of three local sites. Both sexes chose new mates significantly more often than remain with old mates. With the exception of one polyandrous female, all birds were monogamous. Perennial monogamy, however, was observed in less than 10% of the pairs. Other studies of Piping Plovers breeding in less variable habitat have not reported intraseasonal mate-switching. Comparison of reproductive success between individuals utilizing different strategies will be made.

### Monogamy in Killdeer: Do the sexes invest equally in parental care?

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Evolution has presumably resulted in individuals exhibiting optimal strategies of allocating time to energy demanding and

obtaining activities, strategies which can be measured in the time-activity pattern of an individual. Trivers (1972) predicted that, for monogamous bird species, females should invest more in parental effort than males. If sexes have different strategies to maximize fitness, then time and energy budgets should reflect these differences. More than 450 hours of time-activity data were collected during 1984/5 for more than 20 breeding Killdeer. These data have been used to generate time activity budgets in terms of sex and stage of reproduction. In addition, a set of bird removal experiments were also carried out. Four males and four females were removed and the time-activity budgets of the remaining parent were assessed. Initial results indicate that males invest more in parental care than females. Males 'injury feign' towards potential predators more often and more intensely than females. For both sexes the intensity of this display varied with the type of predator, the predator/offspring distance, and offspring age. The conditions favoring high males parental care are discussed.

### The impact of oilfield facility density on shorebirds, Prudhoe Bay, Alaska.

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Densities of representative shorebird species were estimated in the Prudhoe Bay Oilfield and compared to densities predicted from habitat availability. Shorebird densities decrease with increasing density of oilfield development and human activity. A significant, negative correlation was shown between shorebird densities and a measure of oilfield facility density. The effect of increased facility density may be due to subtle impacts associated with a single facility that intensify as the distance between facilities decreases. The results of this study demonstrate an indirect effect of large-scale development in the wetlands of the Alaskan North Slope that extends beyond direct habitat loss due to facility placement. This effect may be minimized by consolidating oilfield facilities and minimizing human activity and disturbance.

### Sex ratios, intrasexual competition, and polyandry in Wilson's Phalarope (*Phalaropus tricolor*).

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I calculated Operational Sex Ratios for nonterritorial, sex-role reversed Wilson's Phalarope using data from nest initiations and daily censuses. During the 2-month breeding season sex ratios began strongly female-biased, approached unity as most males arrived, and became female-biased again as females