

LEATHERBACKS OF PALM BEACH COUNTY, FLORIDA

A LOOK BACK AT 12 YEARS OF NESTING

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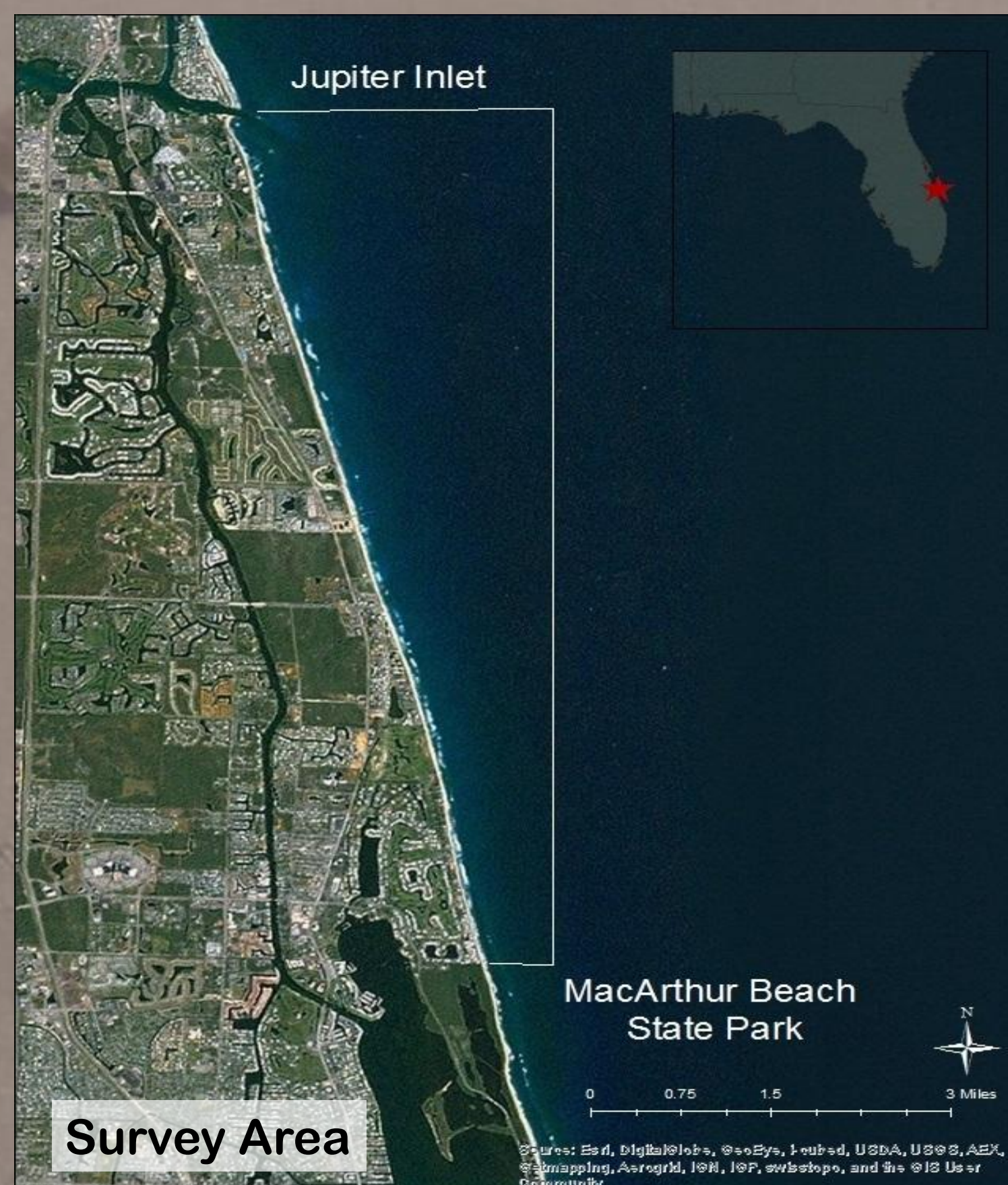
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ABSTRACT

Loggerhead Marinelife Center (LMC) has been conducting one of the longest running sea turtle monitoring programs in the state of Florida. The nesting survey program was started in 1989 and included Juno Beach in Palm Beach County. It has expanded to include Jupiter Beach, Tequesta Beaches and Coral Cove Park. Loggerhead (*Caretta caretta*), green (*Chelonia mydas*) and leatherback (*Dermochelys coriacea*) turtles are the primary species documented nesting along these beaches. This area hosts the highest leatherback nest counts in Florida, accounting for 38.7% of nesting (Stewart et al., 2011). Although high inter-annual variability has been observed, there was an average of 86 leatherback nests per year from 2001-2005. The average increased to 208 nests per year from 2009-2013. In 2001, the survey program expanded to a night time leatherback tagging study to identify individuals and better understand the local population size. A total of 503 individual females have been identified and 50% are remigrants to North Palm Beach County. Along the study beach, 126 leatherbacks have been documented nesting during three or more seasons. Using the data collected from the remigrants, LMC is assessing morphometric trends, nesting site selection and reproductive success. This poster presentation is focused upon the reproductive success of the leatherbacks within the survey area. In the future, additional work will be presented that highlights the data collected on the remigrant females and morphometric trends. The continued collection of data on a high density nesting beach like this will prove beneficial to developing appropriate policies and management programs in the future.



METHODS

Since 2001, LMC staff biologists and technicians have conducted nightly surveys from early March through mid-June. The surveys are conducted from 21:00 to 5:00 on all-terrain vehicles along 12.2 km of beach. In conjunction with the nightly surveys, a morning survey was conducted to document and mark all nest sites along the same stretch of beach.

During nightly survey, if a turtle was encountered, it was measured, checked for flipper tags, PIT tag, injuries, scars, epibiota, and other diagnostic markings. If the turtle was untagged, researchers applied two flipper tags to the soft skin along the medial edge of the rear flippers and a PIT tag to the right shoulder (NMFS, 2008).

Each morning, the LMC survey crew would document and mark the clutch location for each leatherback crawl from the previous night. All nests were marked and excavated 72 hours post-emergence or at 80 days incubation. Nest contents were sorted into the following categories and recorded: live hatchlings, dead hatchlings, unhatched eggs, hatched shells, pipped live, pipped dead and unyolked eggs.

DATA ANALYSIS

Information from nests over the last ten years was used to perform a parametric analysis to isolate factors that could influence the success of the nests. Success was measured by the total number of eggs laid and the total number of hatchlings that successfully exited the nest without human intervention (emergence success). Prior to analysis of the data set, all nests that had some type of environmental disturbance, including predation, washout by storms, and lost nests due to unknown factors were removed. For this analysis, the influence of the mother was not included since the physical aspects of the nests itself were being investigated. Two models were found to have significant influence:

Total # Eggs = Depth to Bottom (cm) + High Water Line (m) + Toe of Dune (m) + Latitude (° N) (Figure 2)

% Survival = Depth to Bottom (cm) + High Water Line (m) + Toe of Dune (m) + Latitude (°N) + Total # Eggs

Number of Leatherback Crawls

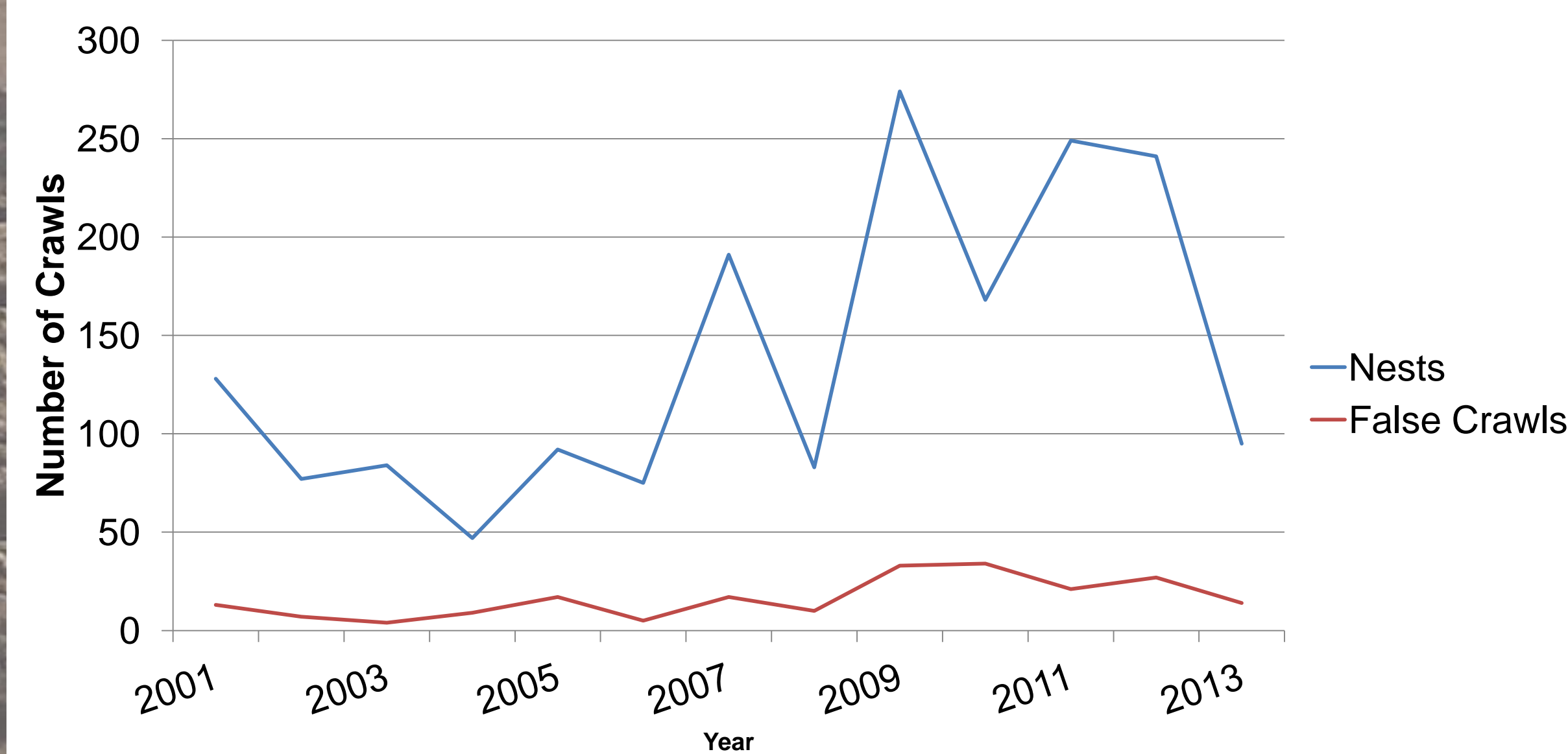


Figure 1. The number of leatherback nests and false crawls (2001 – 2013) on Juno and Jupiter beaches.

RESULTS

Although there are year to year variations, leatherback nesting on Juno and Jupiter beaches have been increasing since 2001. The 2013 season, however, proved to be a surprisingly low year for leatherback nesting (Figure 1). The mean nesting success for leatherbacks over the twelve years of data was 89.44%.

Excavation data obtained from 2007-2013 of leatherback nests laid on Juno and Jupiter beaches yielded an average incubation time of 64.95 days, an average clutch size of 73.98 eggs, a mean hatch success of 46.33%, and a mean emergence success of 41.29%. Interestingly, in 2013, the clutch size was significantly larger at 83.02 eggs per nest.

From the parametric analysis, clutch size was found to increase at higher latitudes. It was also found that nests located in the mid-beach had a greater clutch size ($p < 0.0001$). Emergence success was affected positively by the size of the nest. This indicates that the most successful nests are larger, shallower nests located in higher latitudes at mid-beach ($p = 0.001$).

DISCUSSION

The leatherback nesting trends found on Juno and Jupiter beaches mirror the trends found across the state of Florida (FWC, 2013). This beach host an average 10-15% of leatherback nests documented in the state of Florida each year making these beaches crucial nesting habitat for leatherbacks.

The parametric analyses show a correlation in which mid-beach, shallower, larger nests have a higher rate of emergence success. Further analysis is required to be able to account for confounding factors such as storms and sand conditions. Also, since larger mothers have a tendency to produce larger clutches (McGinley, 1989), these effects could be related to maternal preference of nesting sites, in which larger mothers prefer to nest further up the beach. We intend to further investigate the relation of clutch size to mother size and nest location.

The 2013 five-year review of the Leatherback Recovery Plan indicates that although our knowledge of the leatherback population is increasing, the continuation of long-term data collection is essential in determining the health of the population (NMFS, 2013). Loggerhead Marinelife Center intends to continue the protection and monitoring of this important nesting population.

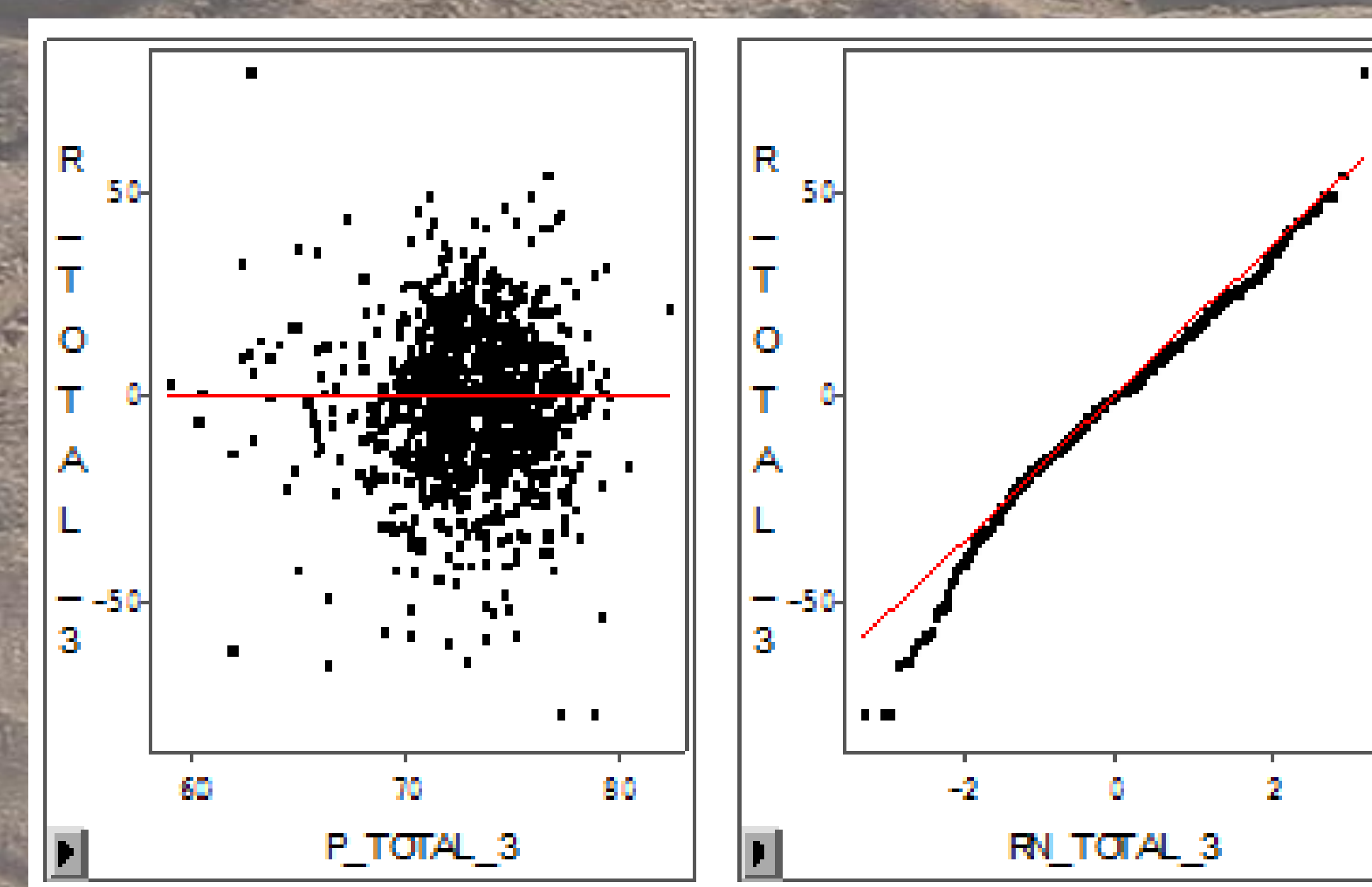


Figure 2. Sample Scatter Plot and Q-Q Plot for Total # Eggs

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