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by cloacal morphology [5], and whose serum samples had no visible hemolysis.

2.2. Sample Handling and Processing. A portable (6.9 kg, 29.2 cm long, 15.3 cm wide, 24.2 cm high) analytical chemistry analyzer (VetScan, Sunnyvale, CA) operated off 110 V service supplied by the boat's generator was used to obtain serum chemistry values onboard a chartered fishing boat. Prepackaged disposable reagent rotors included tests for potassium, glucose, alanine aminotransferase (ALT), albumin, alkaline phosphatase (ALP), amylase, calcium, cholesterol, creatinine, total bilirubin, total protein, and urea nitrogen. The device also evaluated and reported the amount of hemolysis and lipemia in the sample on a scale of 0 to 3+. Preliminary trials using mallard duck (*Anas platyrhynchos*) blood suggested the system developed for mammalian blood could be used with avian whole blood, plasma, or serum.

Blood samples were drawn from the jugular vein of harlequin ducks immediately after collecting morphometric data including body weight in grams, and limb and bill measurements in millimeters from each newly captured duck. Fresh blood was analyzed when the burden of transmitter implantation surgeries allowed. Thirteen samples were suitable for comparison of whole blood with serum, meeting the criteria of no lipemia, icterus, or hemolysis greater than 1+ as determined by the VetScan equipment for the serum samples. All other samples were allowed to clot for 30 minutes prior to centrifugation at approximately 1000 G for 5 minutes for serum separation. Each serum sample was divided into two aliquots. Fresh serum was analyzed within 2 hours of sample collection using the VetScan system. The other aliquot was frozen at –10 C and transported to North Caroline State University. A matching panel of chemistries was performed for comparison on samples with no visible hemolysis using a Monarch 2000 (Instrumentation Laboratories, Lexington, MA).

Samples with no visible hemolysis would occasionally result in a VetScan hemolysis rating of one plus. To evaluate the effect of sample hemolysis as rated by the VetScan, data from the 25 samples in the baseline cohort with hemolysis scores of 1+ were compared with data from the 64 samples with zero hemolysis reported by the VetScan and then against the combined cohort of 89 samples. Fifty two samples with hemolysis scores of 2+ and 15 samples with hemolysis scores of 3+ were compared separately with the 64 hemolysis score 0 samples in the baseline cohort.

Occasionally, individual chemistry determinations analyzed by one or the other system would fail or would report a concentration below detection limits. When this occurred, the data from each analyzer were excluded from comparisons for that sample parameter, resulting in different sample sizes for different parameters.

The only time birds were detected with serum chemistry parameters sufficiently outside of expected ranges to warrant clinical concern was following a three-day storm characterized by high winds, which diminished sufficiently to permit capturing duckaTf 0 -0.00it capturhicm7.3(s)2004T(t)6i-0.0008T(hic)7(mJ /F41h)0.1(igm) -1.4 -0.00it capturet(T.1(7t)8.9.7(c

Table 1: Female harlequin duck serum chemistry baseline reference values as determined on paired samples analyzed using the portable

Table 3: Comparison of median serum calcium (mmol/L), potassium (mmol/L), and total protein (g/L), glucose (mmol/L), cholesterol (mmol/L), and alkaline phosphatase (IU/L) of female harlequin ducks from before ($N = 10$), immediately after ($N = 10$), and one day after ($N = 9$) exposure to a three-day storm (median winds exceeding 15 knots).

Parameter	Calcium (mmol/L)	Potassium (mmol/L)	Total Protein (g/L)	Glucose (mmol/L)	Cholesterol (mmol/L)	Alkaline phosphatase (U/L)
Prestorm	2.3	2.6	37	18.3	5.6	499.5
Immediately after storm abated	2.4	2.0	42	17.7	6.4	666.0
24 hrs after storm abated	2.4	2.7	39	19.3	4.2	500.0
Baseline	2.3	2.7	39	18.6	5.6	506.5

4. D c

Analysis of blood samples taken from free-ranging wildlife is usually deferred until the samples can be sent to an analytical laboratory. Vagaries of initial processing, storage in the field, the unpredictable conditions and hazards of transportation, and storage and delays in the analytical laboratory can introduce unwanted variations in the data obtained. Also, results are typically not obtained until after the fieldwork is finished. The VetScan analyzer provided immediate results for a useful series of serum parameters. Samples were run as whole blood or serum, with a slightly higher, but acceptable, failure rate when whole blood was used. The small size of the equipment, its ability to use 12 V or 110 V power supplies, its automatic operation, and its durability to being moved and to field environmental conditions make real-time screening of surgical candidates possible.