USGS
science for a changing world

Manatee captures and health assessment

Florida Manatee in Crystal River National Wildife Refuge

Over the last decade, the USGS has successfully captured, examined, and released over 300 manatees, creating an extensive sample and data archive. Research in greater Crystal River, Florida is providing needed baseline health information of West Indian manatees. This is the fourth year of the wild manatee study at the Crystal River National Wildlife Refuge.

Health assessments are a valuable tool to determine the fitness, specifically related to environmental and medical issues, of any population of wildlife. Marine mammals, such as manatees, are often used as sentinels for emerging threats to the ocean environment and human health.

A two-team approach is used to capture and exam manatees. The Capture Team and Assessment Team both consist of biologists and veterinarians representing federal, state and local government agencies. All procedures are conducted by experienced biologists and veterinary personnel. Manatees selected for capture are circled with a large net and pulled onto the beach by an experienced capture team.

Once on shore, the manatees will receive a complete medical examination by veterinarians on the assessment team. Blood is drawn under sterile conditions from a flipper, centrifuged for plasma and serum separation, and submitted for routine blood analyses. Other laboratory tests are employed when necessary. A manatee physical exam includes the following:

- General Appearance
- Body Condition
- Photo-documentation of lesions and wounds
- Heart/Pulse Rate
- Respiratory Rate
- Temperature
- Body weight
- Complete body measurements (body length and girths)
- Eye exam
- Implantation of PIT tag
- Subcutaneous fat layer exam
- Analysis of blood, feces, urine and skin
- Reproductive parameters

Improvements in the handling of wild manatees are possible by monitoring individuals using ECG and evaluating inflammatory response to injury or disease during capture. Blood biochemistry and hematology research has benefited manatee clinical medicine by establishing normal ranges for veterinary evaluations of healthy wild manatees.

Other published studies incorporating capture data include research on several biological subjects including:

- Hormone levels for determining pregnancy
- Capture stress levels in wild manatees
- Epiphytes (living organisms that grow on manatees)
- Trace element contaminants in manatee tissues compared to levels in the local environment

Selected References

Bonde, R. K., A. A. Aguirre and J. Powell. 2004. Manatees as sentinels of marine ecosystem health: are they the 2000-pound canaries? EcoHealth 1:255-262.

Bossart, G. D. 2007. Emerging diseases in marine mammals: from dolphins to manatees. Microbe 2:544-549.

Harr, K., J. Harvey, R. Bonde, D. Murphy, M. Lowe, M. Menchaca, E. Haubold and R. Francis-Floyd. 2006. Comparison of methods used to diagnose generalized inflammatory disease in manatees (*Trichechus manatus latirostris*). Journal of Zoo and Wildlife Medicine 37(2):151-159.

Harr, K. E., N. J. Szabo, M. Cichra and E. Phlips. 2008a. Debromoaphysiatoxin in *Lyngbya*-dominated mats on manatees (*Trichechus manatus latirostris*) in the Florida King's Bay ecosystem. Toxicon 52:385-388.

Harr, K. E., K. Allison, R. K. Bonde, D. Murphy and J. W. Harvey. 2008b. Comparison of blood aminotransferase methods for assessment of myopathy and hepatopathy in Florida manatees (*Trichechus manatus latirostris*). Journal of Zoo and Wildlife Medicine 39(4):180-187.

Harvey, J. W., K. E. Harr, D. Murphy, M. T. Walsh, E. J. Chittick, R. K. Bonde, M. G. Pate, C. J. Deutsch, H. H. Edwards and E. M. Haubold. 2007. Clinical biochemistry in healthy manatees (*Trichechus manatus latirostris*). Journal of Zoo and Wildlife Medicine 38(2):269-279.

Harvey, J. W., K. E. Harr, D. Murphy, M. T. Walsh, E. C. Nolan, R. K. Bonde, M. G. Pate, C. J. Deutsch, H. H. Edwards and W. L. Clapp. In press. Hematology of healthy manatees (*Trichechus manatus*). Veterinary Clinical Pathology.

Moore, S. E. 2008. Marine mammals as ecosystem sentinels. Journal of Mammalogy 89:534-540.

O'Shea, T. J. and D. K. Odell. 2008. Large-scale marine ecosystem change and the conservation of marine mammals. Journal of Mammalogy 89:529-533.

Siegal-Willott, J., A. Estrada, R. Bonde, A. Wong, D. J. Estrada and K. Harr. 2006. Electrocardiography in two subspecies of manatee (*Trichechus manatus latirostris* and *T. m. manatus*). Journal of Zoo and Wildlife Medicine 37(4):447-453.

Stavros, H-C.W., R. K. Bonde and P.A. Fair. 2008. Concentrations of trace elements in blood and skin of Florida manatees (*Trichechus manatus latirostris*). Marine Pollution Bulletin 56:1221-1225.

Tripp, K. M., J. P. Verstegen, R. K. Bonde, C. J. Deutsch, M. Rodriguez, C. Manire, J. Gaspard and K. E. Harr. In press. Peracute and chronic stress analysis in Florida manatees (*Trichechus manatus latirostris*). General and Comparative Endocrinology.

Tripp, K. M., J. P. Verstegen, C. J. Deutsch, R. K. Bonde, M. Rodriguez, B. Morales, D. L. Schmitt and K. E. Harr. 2008. Validation of a serum immunoassay to measure progesterone and diagnose pregnancy in the West Indian manatee (*Trichechus manatus*). Theriogenology 70:1030-1040.

Swimmer and a wild manatee in Crystal River National Wildlife Refuge, Fla

For additional information, please contact:
Robert K. Bonde
USGS Florida Integrated Science Center
2201 NW 40th Terrace
Gainesville, FL 32605-3574
Phone: 352-264-3555
Fax: 352-374-8080
rbonde@usgs.gov