Extended Abstract

Infrared Thermography as a Tool in Oiled Wildlife Rehabilitation and Research

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All objects with a surface temperature above absolute zero emit electromagnetic radiation. This electromagnetic energy is characterized by its wavelength and intensity, characteristics that can be used to measure the object's surface temperature as the intensity of emitted radiation increases with temperature according to Planck's law of blackbody radiation. Digital infrared cameras are capable of recording images whose colors represent precise gradations in the surface temperature of a photographed object. The accuracy of these recorded temperatures is a function of several factors, one of which is the object's ability to emit electromagnetic radiation, or emissivity. Variations in pelage and feather coat make animals imperfect emitters of radiation, but static infrared thermography has been used to successfully detect subclinical evidence of bumblefoot in poultry,[1] and pressures sores caused by leg casts in horses.[2]

When marine species like seabirds or sea otters are contaminated with petroleum, the insulating capacity of their feather or fur coat is immediately compromised. The resulting loss of body heat places an increased metabolic demand on the animal. Therefore, it is imperative that any defect in an animal's waterproofing is detected quickly so it may be appropriately treated. Traditionally rehabilitators have relied upon observation of an animal's behavior and physical examination to detect changes in waterproofing, but thermography may prove to be a less stressful way to yield similar – and possibly more sensitive – results. Thermographic evidence of heat loss associated with feather and fur contamination has been demonstrated previously in studies performed by staff from the UC Davis Wildlife Health Center[3] and the California Department of Fish and Game[4].

These research projects proved that static thermography may be used to detect changes in the functional integrity of feathers and fur, but equally important may be its ability to discover early evidence of secondary problems such as pressure lesions over bony areas like the feet, keel and hock joints in birds - similar to the work cited above in poultry and horses. In humans, thermography also has been used to assess the depth of burn injuries.[5] Because contact with more highly refined petroleum products often results in chemical burns to the skin of affected animals, thermography may prove to be valuable method of predicting the long-term impact of these injuries and ultimately providing better and more humane care for these animals.

We are just beginning to discover the many uses of thermography in the field of oiled wildlife response and rehabilitation. Early work shows the technology holds great promise

to improve our efforts in both the field and rehabilitation facility, but only continued research will determine whether this promise is realized. The UC Davis staff of the Oiled Wildlife Care Network hopes to discover the true value of thermography as we continue to investigate the many ways it can be integrated into oiled wildlife responses.

References

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