

APHIS / BLM

**Thermal Profile Assessment
Project for WH&B**

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Thermal Profile Assessment Project for WH&B

• collaborative project

- BLM WH&B Program
- APHIS/BLM WH&B Partnership
 - APHIS Veterinary Services
 - APHIS Center for Animal Welfare

Thermal Profile Assessment Project for WH&B

● APHIS Center for Animal Welfare

- established in Fall 2010, Kansas City, MO
 - serves as a resource for science and technology in support of policy development and analysis for animal welfare
 - provide best-practices advice to federal, state and local agencies and stakeholders on the safety and well-being of animals using the latest in animal welfare science and technology to help with the analysis of animal care policies

Thermal Profile Assessment Project for WH&B

● APHIS Center for Animal Welfare

- Dr. Nora Wineland, Center Director
- Dr. Vaughan Langman, Field Specialist Biophysics
 - PhD in physiology studying thermoregulation
 - experienced with the management and welfare of exotic and wildlife species in field and captive settings

Thermal Profile Assessment

Objectives:

1) evaluate the summertime thermal profiles of light, medium and dark colored wild horses and burros in a typical BLM holding facility in the western US

- includes measuring and evaluating solar radiation being reflected or absorbed by the animals' coat to quantify the effects of solar heat
- measure all heat gained and lost including metabolic, solar and radiative heat in both full sun and shade

Thermal Profile Assessment

Objectives:

2) examine the potential effects of shade for these animals in this environment

- see if shade is needed to reduce heat loads during midday, help the animals maintain a normal thermal profile or prevent problems associated with over heating

Thermal Profile Assessment

- Daily Evaluation Protocol

- 1) measure solar absorbance of hair coat in sun

- 2) measure insulation properties of hair coat

- 3) measurements of thermal zone in environment at different times of the day and night

- 4) adjustments as indicated based on questions generated by the measurements and/or desire to expand to other locations or times of the year

Thermal Profile Assessment

- methodology well established and has been used in zoos and game parks
 - Przewalski horses, yaks, giraffes, sea otters, etc.
- all measurements are noninvasive
- 2-3 days at a facility, time for data processing, analysis and modeling

Thermal Profile Assessment

- final product will be a report to BLM describing the thermal profiles and potential effects of shade for these animals
 - will include recommendations on the use of shade in BLM facilities

Thermal Profile Assessment

References

Hutchinson, J.C.D. et al. Measurement of the reflectance for solar radiation from the coats of live animals. *Compar Biochem Physio.* 1975;A52:343-349

Langman, V.A. et al. Thermal Assessment of Zoological Exhibits I: Sea Lion Enclosure at the Audubon Zoo. *Zoo Bio.* 1996;15:403-411

Langman, V.A. et al. 2003. Quantifying Shade Using a Standard Environment. *Zoo Bio.* 2003;22:253-260