ASSOCIATION of FISH & WILDLIFE AGENCIES

Addressing the critique:

A recent critique the BMP program falsely claims that this program had the following inadequacies:

1) Did not properly implement the standards developed by the International Organization for Standardization (ISO) or the Agreement on International Human Trapping Standards (AIHTS):

    a. For clarification, the United States is not a signatory party to the AIHTS so any comparison between the BMP program and the AIHTS is entirely irrelevant. That those who critiqued the BMP program did not appreciate this fact reveals a very basic misunderstanding of both programs by those authors. More professional engagement with the *Wildlife Monograph* authors by those who critiqued the program could have easily informed that very basic misunderstanding.
    b. To assert that the BMP program did not properly implement ISO standards also reveals a misunderstanding of the BMP program and its use of the ISO standards. The ISO documents (ISO 10990-5:1999(E) and ISO 10990-4:1999(E)) are designed to be a framework for the evaluation of trapping systems for the parameters of animal welfare, selectivity, capture efficiency and user safety (ISO 10990-5, 1999E, Introduction). While the authors of the monograph followed ISO guidelines to evaluate those parameters, we reported those data and results that were most relevant for the BMP program because that was the subject of our article, not the ISO standards. The *Monograph* authors were in no way obligated to report on every detail described in the ISO standards even though these standards were followed meticulously. All data described in the ISO framework were collected according to its guidelines. We will detail numerous points below to address specific issues where the critique is in error.

2) Did not implement scientifically sound and replicable research protocol:

    a. Our research was published in a highly credible peer-reviewed scientific journal with a high impact factor and as such has been validated by the professional scientific community by extensive use. Our research methods are described in great detail, and the scientific community has attested that we followed the protocol recommended by the ISO which is scientifically sound and quite repeatable. The

biased opinions expressed by the authors of the critique do not diminish these facts.

3) The critique offers the following research protocol inadequacies:

    a. Assessed only individual traps rather than restraining trap systems as required by ISO;
        i. The BMP process evaluated restraining-trap systems. A trapping system is defined in ISO (ISO 10990-5,1999E, Section 2.8) and requires evaluation of the equipment (which includes the trap and trigger configuration) and set, but it leaves the selection of the specifics of the system/set to the researchers. ISO simply indicates that researchers provide "instructions" (2.8) as to the set, which we did, and which our field operatives followed. BMP protocols meticulously required very specific equipment that was standardized across projects. We standardized not only the trapping device but aspects of the system to include trap preparation, pan tension, chain type and length, inclusion of a shock-spring in the chain system, chain attachment, swivels, and anchoring method. ISO also specifies that the "set" is a part of the system. The BMP process used standardized sets based on what is normative for various species and recorded all variables associated with the set. No one set type could be expected to work for all the 23 species for which BMPs are being developed across the entire United States, but sets were standardized within species.

4) Did not use a control trapping system

    a. This is in fact accurate; we did not use a control trap because: 1) ISO does not "require" the use of a control trap. ISO 10990-5,1999E, Section 4.5, clearly states "if" a control trap is used), 2) the use of a control trap would have no bearing on the evaluation of a trapping system because we compared systems to a standard, and 3) using a control trap would require twice as many animals to be captured and killed for every field project, while testing the same control trap over and over again, which is impractical and unnecessary.
    b. It was not the goal of our research, which we detailed in the *Monograph*, to compare one trapping system to another. Our stated goal was to evaluate trapping systems against the standard. A control trap would only be needed if we were comparing performance between systems, but we were comparing all trapping systems against the common standard. Additionally, if a control trap was to be used it would have been the "most commonly used trap" (ISO 10990-5,1999E, Section 2.4). What could be designated the most commonly used trap changes over time and can vary among regions. This being the case, we determined that in order to make our results lasting, repeatable, and broadly applicable, no control trap test was needed.

5) Determination of Capture rate

    a. Capture rate (reported in the *Monograph* as efficiency): While the critique argues that a common population trend metric, catch-per-unit effort, was not reported, the stated objectives of the BMP study were to evaluate capture devices, and capture-device systems, using the BMP criteria. Population trend metrics, such as catch-per-unit effort, were outside of the scope of the objectives outlined so we did not feel compelled to report that metric. While we did collect data in such a manner that catch-per-unit-effort (defined by ISO as "capture efficiency" (ISO 10990-5, 1999E, Section 2.1) could have been reported, that metric does not equate to the capture rate (ISO 10990-5, 1999E, Section 2.2) of a trapping technique which is more important for the BMP program. Capture rate does not vary with species density, it is a quantifiable measure of the success of an opportunity of a trap to capture an animal regardless of species density, and therefore is more broadly applicable. The BMP authors are more concerned with the percent of success for a given opportunity that a trap will actually capture an animal. As a result, the capture rate is the metric we chose to report, and which ISO also recommends. This is also the metric which trap users are primarily concerned with as opposed to a metric that gauges population trends.

6) Times of trap setting and checking unknown

    a. Technicians working with trappers meticulously recorded all data required by ISO included when traps were set and when (date/time) traps were checked each day. According to the ISO protocol ISO 10990-5, 1999E, Section 4.5) traps are to be checked daily or once within a 24-hour period. It is clearly stated in the monographs that trapper/technician teams were required to check traps daily, before 12:00 PM.

7) Duration of captivity unknown

    a. The ISO protocol (ISO 10990-5, 1999E, Section 4.5) recommends that traps checks occur daily/once within each 24-hour period. There is no requirement that traps use trap monitors to evaluate the amount of time an animal is in the trap. Based on the protocol it should only be possible for an animal to be in a trap for 24 hours. To say that the BMP protocol is flawed because we did not know exactly how long an animal was held by a trapping system is nothing more than an opinion of the authors of the critique. Obviously, the use of monitors could provide some useful information, but such use was in no way required by the ISO protocol and beyond what was cost effective and practical for the size and duration of the BMP study.

8) Selectivity of the traps not determined

a. Selectivity is an easily quantifiable metric, and we collected all data necessary to calculate that statistic. We reported selectivity for furbearer species for which we were developing species specific BMPs. Again, it was never our stated or intended goal to report other selectivity metrics though we did collect data to quantify these measures per the ISO protocol.

9) Small sample size with unknown selection criteria
   a. Our minimum sample size of 20 specimens has been validated through the peer reviewed process.
   b. All animals of a given species captured in the trap being tested were included in the sample. We did not exclude animals from the sample except for those few that died in a live restraint trap that had been obviously (as determined during postmortem examination) killed by other animals. For example, we would have excluded animals that, while held in a trap, had obviously been killed by dogs or shot by a passing hunter. These incidents are unfortunate, but they do not accurately reflect the injuries directly caused by the trapping system.

10) Humanness of traps based on injuries only
   a. ISO 10990-5,1999E, Section 1.2 reads "It is recognized that injury is only one component of animal welfare. However, there are insufficient data collected in a scientific manner on the additional components to allow for the complete assessment of animal welfare. Several areas of investigation are presented for evaluation in annex A. Selection of the data collection methodology is left to the investigator. However, it is assumed that such collection methods will follow accepted practices. It should also be understood that data collected in any, or all, of the suggested areas will probably not provide an absolute measure of welfare. Rather, the compilation of such data over time should provide a mechanism for comparing the relative animal welfare impacts of different restraint methods. "
   b. The ISO protocol recognizes that injury is an important component of animal welfare and that it is in fact the only component for which sufficient data exists to make an actual determination about welfare. In other words, evaluating physical injury is the best available method. No other methodology or parameters are agreed upon by the scientific community. As such, the BMP program did not deviate from what is clearly allowed by ISO. However, we do encourage the investigation of additional methodologies for assessing welfare, but we do not believe that the lack of these evaluations in any way diminishes the validity and value of our results.

11) Assessments did not include self-inflicted injuries and deaths
   a. The ISO standards provide objective, quantitative scores and trauma classes for 34 potential injuries. Individual injury scores range from 2-100 points, increasing with severity (ISO 10990-5, 1999E, Annex C). The ISO standards also classify these same injures into trauma categories (mild, moderate, moderately severe, severe), ranging from very mild to severe. All these scores, cumulative scores, and trauma class percentages were reported in the results. Accusations that rare severe injuries,

such as injuries created by self-directed biting or death were under reported are false and misleading. All injuries that an animal could receive from a capture event, including death are listed in the Annex C, and were noted, scored and used in the evaluation of all trapping devices for all species. We did exclude animals from the sample that died in a live restraint trap that had obviously been killed by other animals (i.e., that were not self-inflicted). Postmortem examinations conducted by wildlife veterinarians can easily determine whether an injury occurred pre or postmortem. For example, we would have excluded an animal that, while held in a trap, had obviously been killed by dogs or shot and killed by a passing hunter. These incidents are unfortunate, but they do not accurately reflect the injuries directly caused by the trapping system.

b. The published monograph details that over 40% of capture devices, and capture device systems evaluated failed to meet the pre-established BMP criteria. The authors published results of the work to date, regardless of the ramifications for agencies.

12) Acceptation of traps based on mean injury scores affected by extreme values

a. Research selected, a priori, a minimum sample size of 20 to determine the mean injury scores. This sample size was selected to minimize the impact of outliers, consistent with the central-limit theorem. The mean injury scores were compared to a pre-established threshold as opposed to pairwise comparisons of these mean scores between traps (a method that relies on measures of variance that are influenced by extreme values). The sample size, and methodology employed, guard against spurious conclusions.

13) Minimum acceptation level of 62% of animals

a. This is false. Our evaluation system was twofold; 1) mean injury score, and 2) % of injuries in the lower trauma classes. Relative to trauma class, for a trapping system to meet the BMP criteria, $\geq$70% of the animals in the sample can have no injuries described as moderately severe or severe. When we calculate the actual percentage, for traps that met all BMP criteria (i.e., traps recommended), over 91% of animals had no injuries described as moderately severe or severe.