

**Forest Service Comments on the Article
“Lynx, Lies, and Media Hype”, *Audubon Magazine* (May 2002)**

July 2002

Ted Williams’ article in the May-June 2002 issue of *Audubon* magazine, “Lynx, Lies, and Media Hype,” attempts to describe the furor over the issue of biologists submitting unauthorized samples to the National Lynx Survey. He is correct about the misinformation and misinterpretation of impacts that resulted as the story hit the media. Unfortunately, Williams perpetuates almost as much misinformation as that which he condemns.

The unauthorized samples submitted to the National Lynx Survey damaged the credibility and the integrity of federal and state agencies as science-based organizations. Regardless of what the biologists say were their motives, their actions were unprofessional and outside the scientific protocols established for the survey. Therefore, support for their wrongful and unjustified actions also damages the integrity of scientific research.

What the Investigations Found

There have been four investigations – one Forest Service investigation, two Department Inspector General investigations (Department of Agriculture and Department of the Interior), and one by the General Accounting Office. All came to the same conclusion, which is that the biologists knowingly submitted unauthorized hair samples to the laboratory.

In 1999, an employee from the Washington State Department of Fish and Wildlife sent bobcat hair from a taxidermy mount to the National Lynx Survey lab, located at the University of Montana in Missoula, and labeled the sample as if it had been collected from an official sampling point on the Wenatchee National Forest. In 2000, a Forest Service biologist submitted hair collected from a captive lynx and labeled it as a “control sample.” At approximately the same time, a biologist with the Washington Department of Fish and Wildlife and a biologist with the Fish and Wildlife Service also submitted captive lynx hair samples as if they had been collected from a wild lynx. In these two cases, field forms containing falsified data (i.e., that the hair samples had been collected from the field sampling plots) accompanied the samples. The employees who submitted unauthorized samples in 2000 testified that they knew about the 1999 sample submission.

The GAO investigation (available as GAO-02-488R and GAO-02-496T from the GAO) reported these findings and concluded that the biologists were aware that what they did was wrong. Findings by the Inspectors General of the U.S. Departments of Agriculture and Interior were similar to those by the GAO. The Inspector General for the Department of Agriculture sent its report to the U.S. Department of Justice for review for possible criminal prosecution. Although the Justice Department declined to prosecute the employees’ actions as a criminal offense, their actions are violations of ethical and professional standards for government employees.

Scientific Protocols

Drs. Kevin McKelvey and L. Scott Mills developed the scientific protocols for the National Lynx Survey. In any scientific study, the principal investigators are research scientists who have responsibility for the reliability of the methods used and the data obtained during the study. The researchers design and test methods, report data, and subject their procedures to the scrutiny of peer scientists in the peer review process before finally publishing the results of their work. The biologists who submitted the unauthorized samples were not the principal investigators, nor were they research scientists. Not only did they not have the credentials but they also did not have the authority to change the scientific protocols.

The principal investigators chose DNA analysis of hair samples over other means of identification to eliminate confusion concerning species identification. Because DNA analysis requires that hair samples be of sufficient quality to ensure proper analysis, the methods used in the National Lynx Survey were specifically designed to work on lower quality hair samples that were anticipated from the survey. These methods, which have been published in peer-reviewed journals, were fully tested prior to the analysis of any National Lynx Survey samples.

The Fish and Wildlife Service forensics lab in Ashland, Oregon, helped set up the National Lynx Survey lab at the University of Montana and used numerous geographic and blind sample tests to validate its ability to identify DNA to species. Furthermore, internal controls were run with each sample analyzed. For these reasons, the scientific protocols for the National Lynx Survey did not need nor did they authorize the submission of blind or control samples. These protocols and the details of the blind tests were explained to all who collected hair samples during training sessions prior to the summer 2000 collecting period, including the biologists who subsequently submitted the unauthorized samples. See the attached letter dated 4/20/2000 from Dr. Scott Mills, Director of the University of Montana laboratory, to "All Cooperators on the Nationwide Lynx Hair Survey." Cooperators or anyone else could have asked questions or stated concerns at any time with the survey coordinator or the lab manager.

About 20 percent of the hair samples submitted to the National Lynx Survey contained no useful or insufficient DNA to make a species identification. For example, hair that has been treated for taxidermy is damaged, and its DNA is destroyed in the process. That some hair samples could not be identified does not mean that the technique does not work or that the protocol was inadequate. Rather, the quality of the hair was too poor to identify its source. In other cases, insufficient DNA was available in the sample to do a complete analysis leading to species identification.

Domestic House Cats

In 1999, two house cat samples from Region 6 were identified. Wildlife biologists questioned these results and the lab's ability to identify hair, because they believed domestic cats could not survive in the area. The DNA analysis, however, yielded results that are consistent with domestic cat hair and which are clearly distinguishable from lynx hair. Furthermore, the

samples had been collected in the summer near the intersection of two roads leading to a large campground, where feral or abandoned cats could possibly be found.

The Weaver Study

A previous lynx survey (1998-1999) initially reported finding lynx in Oregon and Washington. Dr. Weaver, who is a wildlife biologist with the Wildlife Conservation Society and who has published a paper on the serum chemistry of captive lynx, had contracted with the Forest Service to carry out a lynx survey on national forests in Oregon and Washington. He used a lynx rubbing pad technique he developed but which remains unpublished. The Wildlife Conservation laboratory he used to identify hair samples is based in New York State and employed different DNA analysis techniques than those used by the Missoula lab for the National Lynx Survey. In his 1999 report, Dr. Weaver originally reported finding lynx from both states and in some of the same areas that were later included in the National Lynx Survey. However, when other lynx researchers and the Forest Service questioned his findings, he reanalyzed the hair samples using another lab. In a June 2001 subsequent report, Dr. Weaver admitted to the Forest Service that his earlier findings were invalid.

Impacts

The National Lynx Survey has run sampling grids in over 70 locations across the country. Hundreds of biologists employed by the Forest Service, the Bureau of Land Management, the Fish and Wildlife Service, the Park Service, the Confederated Salish-Kootenai Nation, and various States have participated in the National Lynx Survey in a professional manner. They adhered to the established protocols, maintaining the credibility of the study and conveying integrity on themselves and the agencies they represent. The incidents in Washington State were localized, isolated, and do not represent the professionalism expected of or demonstrated by the vast majority of government employees.

Because of the unprofessional actions of a few biologists, however, we have spent months answering questions and providing the facts to investigators, Congress, media, and the public. We have provided numerous briefings with Congressional Committee staff of both parties. We have testified in hearings before Congress. Testimonies from an oversight hearing, including testimony by the GAO, are available at the House Committee on Resources' website: <http://resourcescommittee.house.gov/107cong/fullcomm/2002mar06/agenda.htm>.

As small as the actions of the biologists may seem, their actions have caused a continuing storm regarding ethical conduct by employees, scientific procedures, use of scientific information, endangered species, and land management decisions.

Note: this cover letter accompanied all tables of results from the 1999 sampling season

4/20/00

TO: Cooperators on the Nationwide Lynx Hair Survey

FROM : Dr. L. Scott Mills, Associate Professor (Wildlife Biology Program, School of Forestry, University of Montana) and Director of the Wildlife Genetics Lab

RE: Update on DNA analysis

Attached are results of our analysis of hair samples collected non-invasively using hair-snag pads. The overall approach to the analysis of these samples was as follows.

When boxes containing samples arrived in Missoula, they were initially stored unopened in a locked storage room. When we were ready to begin inventory / identification of hairs, boxes were moved to my lab on the UM campus. All vials were inventoried and all hair pads were inspected in the lab to insure that all hair had been removed; any additional hair found on pads was removed and vialled. All vialled hair samples then went through a macroscopic analysis to identify those samples with potential to be lynx. In order to provide information in a timely manner, we genetically analyzed these samples first. Results from the hair samples that are not likely to be from lynx will be forthcoming this summer. The exception to this is the USFWS samples from Oregon; *all* of these samples were analyzed using the genetic protocol.

In the next stage, my lab supervisor Kristy Pilgrim extracted mitochondrial DNA (mtDNA) from the hairs. If DNA extraction is successful, (which it usually is if the protocol for collection and storage was followed), we go through a protocol we developed that identifies whether the mtDNA is from a cat (lynx, bobcat, mountain lion, or housecat) (SEE FIGURE 1). If a sample is determined to be of felid origin, we use three different DNA tests that we developed (SEE FIGURE 2) that allow the specific cat species to be distinguished.

Extracting DNA from single or a few hairs, and amplifying it through PCR (polymerase chain reaction) required the development of molecular tools (PCR primers, restriction enzymes) allowing cats in general and lynx in particular would have DNA patterns that were diagnostic beyond a doubt. We are currently working on a scientific publication that will provide details of the laboratory procedures.

The protocol we developed for identifying cats to species has been validated in several ways. First, we conducted a "geographic range" validation by ensuring that our protocol correctly identified cat species in many locations across U.S. and Canada. We tested known tissue samples of 30 lynx from locations including Western Canada, Alaska, Montana and Wyoming, and all results positively identified lynx using our protocol. Similarly, we correctly identified 21 bobcat tissue samples from Wyoming, Oregon, Utah, Colorado, Minnesota, Wisconsin and Florida; and 20 cougar tissue samples from Wyoming, Oregon,

Utah, Colorado, Washington, Montana and Florida. These results imply that intra-specific polymorphisms in cut sites or fragment length are not problematic for our protocol.

The second series of validations included “blind tests” of the reliability of the protocol. These were conducted both within our lab and by a completely independent lab (Steve Fain, U.S. Fish and Wildlife Service Forensics Lab, Ashland, OR; hereafter: “USFWS lab”). We validated the protocol internally (in our lab) with a blind test using known tissue samples. A total of 37 felid tissue samples from different individuals (13 lynx, 9 bobcats, 10 cougars, and 5 domestic cats) were tested along with 30 additional samples from individuals of a variety of species including canids, ungulates, and mustelids likely to be found in North America. In all cases the person performing the DNA analysis did not know identity of the samples. Felids were correctly identified to species (lynx, bobcat, mountain lion, or domestic cat), and non-felids were correctly identified as “other” in 67 out of 67 cases (100%).

The external validation consisted of sending to the USFWS lab both our protocol and 20 DNA samples: 6 samples previously tested in the double blind in our lab, and 14 samples not previously tested. All samples were numbered but the identity of the species was known only to us. The 20 samples included 5 lynx, 4 bobcats, 2 cougars, 2 domestic cats, and 7 other species. The USFWS lab assessment of species identification was correct using our protocol in 20 of our 20 cases. Together, the blind tests within and outside our lab resulted in correct identification (felid to species and non-felid as “other”) for a total of 87 samples including 50 cat samples.

Attached you will find both the figures showing the DNA test and specific results.

Mitochondrial DNA Test to Distinguish Felids from Other Species

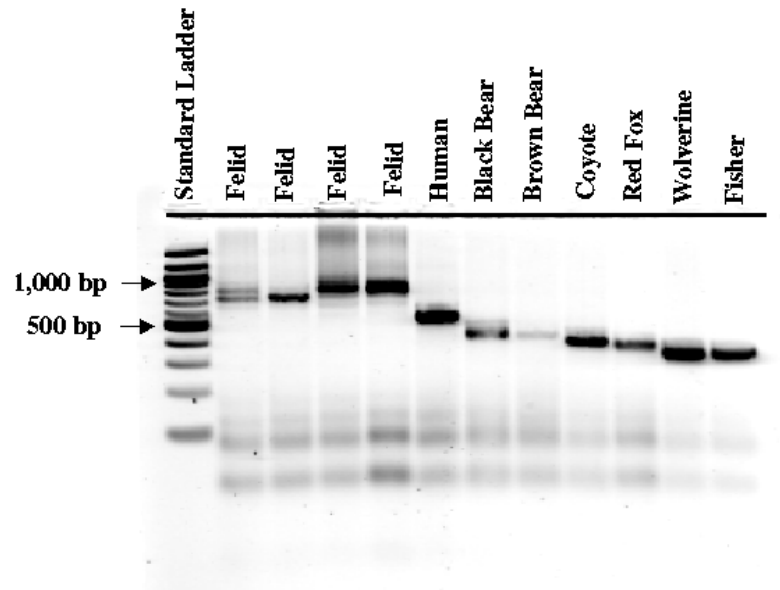


Fig 1.

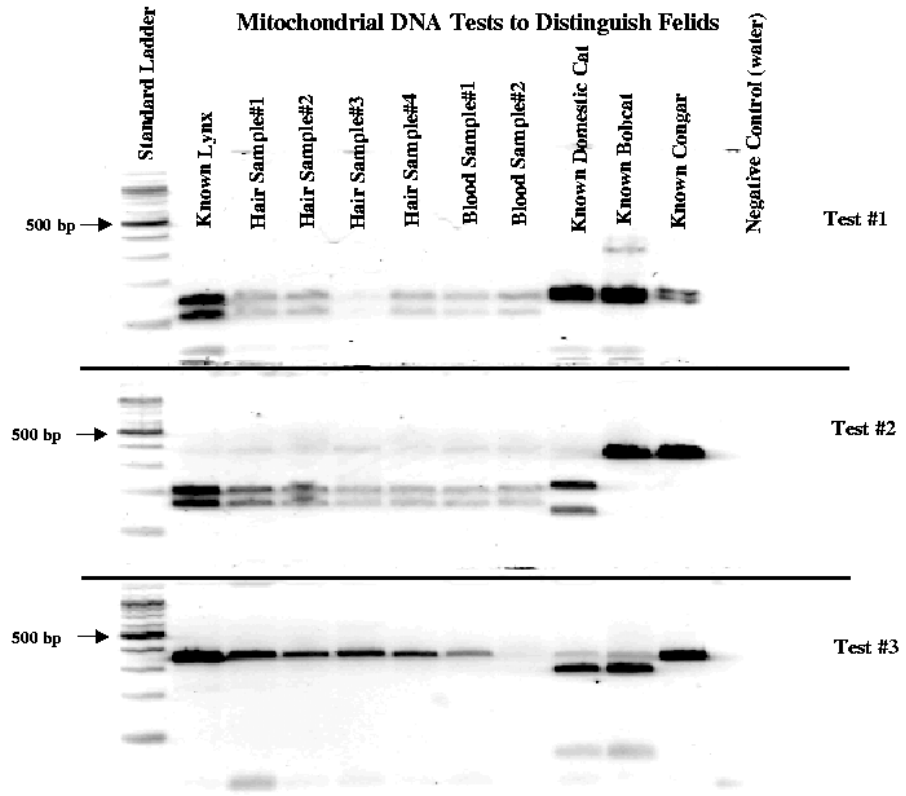


Fig 2.