

Dear xxx,

Speaking on behalf of the American Society of Parasitologists (ASP), through the Society's elected officers and governing council, we are writing to express our grave concerns about the future of the U.S. National Parasite Collection (USNPC), currently housed within the Agricultural Research Service, Department of Agriculture, Beltsville, Maryland (<http://www.ars.usda.gov/is/np/systematics/animalpar.htm>). After highlighting the importance of the USNPC below, we identify some specific actions we feel are necessary if the USNPC is to continue to serve as an invaluable research resource. For your information, the ASP is a diverse group of over 800 scientists from industry, government, and academia who are interested in the study and teaching of parasitology. Founded in 1924, ASP and its members have contributed not only to the development of parasitology as a discipline, but also to primary research in systematics, medicine, molecular biology, immunology, physiology, ecology, biochemistry, behavior, and more (<http://amsocparasit.org/>).

The USNPC is important and benefits the U.S. taxpayer in the following ways:

- In the 120 years since its founding, it has become the largest parasite collection in existence. It is a vital part of the federally-funded research activities of many members of ASP, and of scientists from around the globe
- The specimens housed there, many found nowhere else in the world, allow us to better understand the origins and causes of emerging diseases that regularly threaten animal and human health
- Its collections enable us to identify potential controls for introduced, invasive plants and animals that threaten U.S. agriculture and forestry
- Parasites and the information they embody play a critical role in understanding the nexus of concerns about changing environments, disease emergence and biodiversity. We urge you to read the attached statement from one of our members that provides a compelling summary of why complete global biological inventories of species, as assisted by museum collections such as the USNPC, are so vitally important
- Whereas other organisms like birds are represented in many collections, the USNPC is one of only three parasite collections in the U.S., and is by far the largest. We are concerned that a continued lack of support and vision for the flagship parasite collection in the U.S. will cause a cascade of responses that will result in similar fates for the few other parasite collections that exist in the U.S.
- The collection when appropriately modernized will represent a vast genetic repository that will allow us to mine from parasites novel genes with therapeutic potential for our domestic animals and for human health
- The collections have immense value for studies of basic science bound to impact our understanding of the world in fundamental ways. For example, they can be exploited to complete a much broader spectrum of parasite genomes that will provide information key to understanding parasitism and solving parasite-related problems

We feel the following actions are now urgently needed, to avoid further erosion of the museum's collections, to modernize the holdings and make them more accessible to users through appropriate modern interfaces, to deal with a backlog of material to be accessioned, and to accommodate and safely store parasite genetic material.

1. The operating budget of the museum currently averages about \$10,000 per year, a sum that is simply inadequate to do anything other than maintain the most basic of services. Accordingly, we request the museum's annual operating budget be significantly increased to: avoid further erosion of the museum's collections and allow restoration of specimens to continue; to clear up the back-log of accessions (numbering about 60,000); and to initiate new means to improve, expand and modernize the collection.
2. The parasitological community needs clarity from the USDA with respect to its intentions regarding maintaining the stability, continuity and future development of USNPC, especially given that it has been common knowledge that the collection has been under review for possible transfer. If this is to happen, then we urge that appropriate steps be taken to insure that it is safely transitioned to a new home, wherever that might be. We feel it is vital that the collection's curator be encouraged to accompany the collection to its new home, to help to ease the transition to a new environment. The curator is both an expert on the collection and its holdings and on ways to use parasitological collections as baseline reference points for studies of biodiversity, disease emergence and biological invasions.
3. When the time comes to secure a better future for the USNPC (and we hope it comes soon), we urge the process be handled in a way that engages and seeks the advice of the broader community of systematists, parasitologists and other biologists with expertise in biological collections, that is as open and transparent as possible, and that will ensure maximum access and ease of use by the community for many years to come.

Action on these issues is already past due. We would be happy to discuss these matters further, and to work with you to identify ways to ensure a secure future for this unique resource. I can be contacted at [esloker@unm.edu](mailto:esloker@unm.edu), or 505-227-3326.

Yours sincerely,

Eric S. Loker  
ASP President

The human population grows daily, it's on the move and it's carving a deep technological footprint on this planet. We alter landscapes and perturb ecosystems, inserting ourselves and other species into novel regions of the world, leading to potentially irreversible changes in the biosphere. We are also in the midst of an epidemiological crisis. Climate change alters movements and geographic distributions for myriad species. Transporting people and goods carries countless pathogens around the globe. This brings isolated species into sudden contact. Pathogens encounter hosts with no resistance and no time to evolve any. Maladies rare or unknown two or three decades ago, like HIV and Ebola, West Nile Virus and Avian Influenza — have become commonplace. In such a world – this world – events like these are ongoing. Scarcely a week passes without news of some freshly-discovered strain of pathogen trading up to a human host. This is the crisis of Emerging Infectious Disease (EID).

We think of EID as isolated events, and react only after the fact. We allocate massive resources to pathogens that have already made themselves known, while ignoring the far greater threat posed by those waiting in the wings. The ones we know are just the tip of the iceberg – 80-90% percent of the world's pathogens haven't been discovered yet. They're discovering us easily enough – weekly outbreaks and endlessly-mutating strains of recent years are ample evidence of that. This *succession of crises* is the new *status quo*. They're far better at finding us than we have been at finding them. Why?

The current EID crisis is a new manifestation of an old and repeating phenomenon. The rules have not changed. Every episode of global climate change and ecological perturbation throughout earth history has produced new pathogens.

More than a million years ago, our African ancestors moved from forest to savannah. Adopting a predatory lifestyle, sharing prey with grassland carnivores, early humans acquired pathogens previously found in hyenas, large cats and African hunting dogs. They carried those pathogens out of Africa where they added native hosts in new environments, while native pathogens returned the favor, infecting the newly arrived humans. Agriculture and urbanization brought people and animals into even closer contact, making infection and transmission easier than ever.

In the past 100,000 years agriculture, domestication and urbanization disseminated EID risk on a global scale. If doctors had existed in those times, they would have remarked on a worrisome surge in the number of EID, responding to the crisis as best they could, after the fact.

In the past 50 years, exploding human population, rapid transit and climate change made produced the real time crisis you see on television daily.

The EID crisis is a medical issue in only a superficial sense. It's more fundamentally a basic biological issue, a predictable consequence of separated species brought into close contact. The difference today is that human activity accelerates the rate of introductions, so outbreaks occur more frequently and over a wider geographic range than ever before. The potential for EID is a “built-in feature” of the biology of parasites. Research shows that those species best at surviving climate change will be

the primary sources of EID. Pathogens are not only good at finding us, they are really good at surviving. There are many, not a few, biological “accidents waiting to happen” out there, requiring only the catalyst of climate change, species introductions, and the intrusion of humans into areas they have never inhabited before.

Today’s crisis stems directly from fundamental ignorance about the biosphere: we simply don’t know what’s out there. And what you don’t know can hurt you. Undiscovered pathogens and their vectors lurk beneath our feet like evolutionary land mines as we move into novel habitats, trans-locate species and alter ecosystems. More than 50% of the species on this planet are parasites of some form. They threaten human health, agriculture, natural systems, conservation practices and the global economy. Each EID will exact an economic cost, and even when host immune systems catch up to a particular “new” pathogen, it will not go away. It will persist as *pathogen pollution*. West Nile Virus is no longer an acute problem in North America. But now that it’s here, it’ll always be a chronic problem, seen most recently in large the outbreaks during the summer of 2012. Others will follow, each repeating that pattern.

Information about the diversity and distribution of known and potential pathogens is critical for limiting their socio-economic impacts. Yet, our knowledge of the identities, geographic locations and threat potential for the world’s pathogens can only be called fragmentary. At most, 10% of the world’s pathogens have been documented – the rest remain utterly unknown.

This massive ignorance is reason to be concerned about our preparedness to handle the crisis. It’s impossible to prepare for a threat whose very existence is unknown. You can’t monitor, much less seek cures or develop vaccines for undiscovered maladies. We act as if EID were a rare phenomenon and engage in crisis response mode. The evidence is that the potential for EID is large, and climate change will make more of the world accessible to more pathogens. This makes the planet an evolutionary minefield into which millions of people, not to mention their crops, livestock and pets, wander daily. In the near future - if it’s not already true – our crisis response abilities will be overwhelmed.

We need strategic planning based on solving the problem rather than managing it. We must learn the lessons of the past if we are to cope with the future in a timely and economical manner. We need to monitor pathogens so we can assess EID risk before medical or veterinary clinicians see their symptoms. We need evolutionary models that tie together climate change, biodiversity and EID.

Nothing substantial can be accomplished until we know what we’re up against. It’s essential that we complete a global inventory of species rapidly. It sounds daunting. But 500,000 years of experience in hunting and gathering; cheaper, faster DNA analysis; faster, cheaper computers—all this makes the task feasible. It’s a massive undertaking, but it must be done. It’ll be costly, but it’ll never be cheaper, and the alternative is to let this chance slip away, passively accepting the consequences. As Voltaire said, “There is a certain inevitability about inaction.”

To be useful in the real world, the information from that inventory must be online. This will require massive societal support for natural history collections and the taxonomic specialists who can identify each species by name, using those names as indices of information. *No name, no information, wrong name, wrong information.* An incorrect diagnosis by a clinician is a taxonomic mistake with devastating consequences. It's as simple and critical as that.

And the database has to grow fast. It's the middle of the fourth quarter and we're 13 points behind. Two touchdowns will do it, but we need focus and sense of urgency.