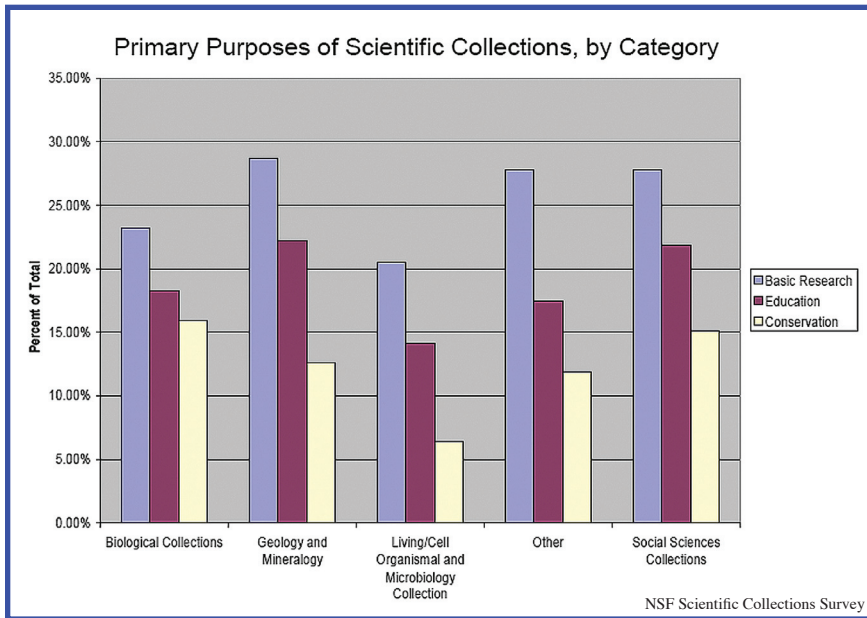


NATURAL SCIENCE COLLECTIONS

America's Great Scientific Resource

Natural science collections are essential infrastructure supporting the nation's scientific research and development enterprise. The collections gathered and held by many institutions over the past half millennium are fundamental reference points for measuring and monitoring human health, safety, and the state of our planet. They are essential to the advancement of research in the biological, earth, environmental, and social sciences.



Natural science collections are vital research infrastructure that outlast the projects that created them.

- Collections **provide irreplaceable evidence of historical trends and unique historic events.** Specimens sometimes have been collected from areas that are no longer accessible, making their collection and storage essential for future scientific studies in certain subject areas.

- Scientific research may be called into question years after their publication and only well-maintained collections will allow researchers to replicate experiments and **successfully review past findings.**

- **Replacing existing collections would have enormous costs or be altogether impossible** for many specimens, such as moon rocks, deep sea organisms, pandemics, singular events, and extinctions.

Collections Advance Medical Research

Natural science collections contribute to medical research.

- Materials extracted from ancient bones are routinely used to study **the evolution of viruses**, informing the development of models that can predict the spread of modern diseases.

- **The prevention of future outbreaks can be enhanced by understanding past pandemics.** Smithsonian researchers recently compared preserved bird specimens with human tissue samples from 1918 to confirm that the deadly Spanish flu was not the result of bird-to-human transmission.



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- Research on rodent specimens from the Museum of Texas Tech University and the Museum of Southwestern Biology at the University of New Mexico showed that **hantavirus has long been present in local rodent populations, but that it poses the greatest threat to humans during wet El Niño years.**



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Collections and Cross-cutting Research

In many cases, specimens collected for one research purpose have proven to be valuable to other disciplines.

- **Two thousand obsidian artifacts in federally sponsored collections were analyzed to map ancient trade routes between Russia and Alaska**, showing that human migrations between the two continents occurred much earlier than previously thought.
- In 2007, FBI agents brought an insect-splattered radiator and air filter from a murder case to the UC Davis Bohart Museum. Using the 7-million-specimen collection at the museum, **expert entomologists were able to identify California as the geographical home of the insects in the radiator**. This finding conflicted with the alibi of Vincent Brothers, the defendant in a 2003 murder trial in Bakersfield, California.



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Understanding Biodiversity and Extinction

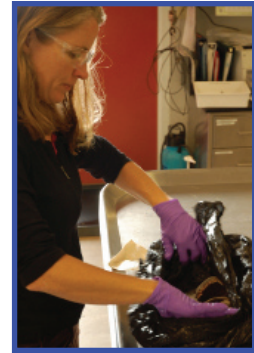
Investigations of evolutionary relationships, biodiversity, and environmental change often depend on natural science collections.

- In 2006, National Museum of Natural History specimens of woodpecker toes collected 145 years ago were used to confirm that the Cuban and the North American Ivory-Billed Woodpeckers are two separate species. Such a finding has **important conservation implications for the nearly extinct North American species**.



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- Using museum specimens, researchers at the Florida Museum of Natural History found that *Homo erectus* shared lice with *Homo sapiens*, indicating that the two species came into direct contact 25,000 years ago. This discovery **overturned previous assumptions about the time of contact between the two species, and partially rewrote human history**.
- Scientists at the Louisiana State University Museum of Natural History, which holds one of the world's largest genetic resource collections, **recently rewrote the evolutionary history of birds by showing that shorebirds are not ancestral to all other bird groups**.



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What Can Be Done

Several recent surveys have assessed the condition of US science collections. These reports have noted that many science collections need greater funding to improve curation and to maintain appropriate staff. Roughly 59% of museums have had budget cuts in the past year, 40% reported declining numbers of staff, and only 27% have budget lines to maintain collections. In this environment, collections-based research and education are hindered and some collections are being abandoned or permanently closed, risking loss of specimens and data that are important to our ability to understand how the world around us functions. To improve this situation, better federal coordination and a national commitment to governmental and nongovernmental science collections are required.

To learn more about natural science collections and how you can support initiatives that will increase the utility of collections for society, please visit www.NSCAlliance.org.

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Natural Science Collections Alliance
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