

Assessing the Economic Impacts of Scientific Collections:

A Study by the NSTC Interagency Working
Group on Scientific Collections

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Interagency Working Group on Scientific Collections (IWGSC)

- Established 2005, covering all disciplines, “microbes to moon rocks”
- USDA and Smithsonian co-chairs; 15 departments/agencies
- 2009 “Green Report” with 7 recommendations
- OSTP and America COMPETES Act mandated implementation of three (one on establishing cost of collections)
- Economic Study
 - Considers NET costs - expenses and returns on investment
 - Goal of 25 page report by September
 - Study group of 25 from IWGSC agencies, includes economists, policy and collections staff
 - 14 online meetings since November 2018

Approach 1. Success Stories

- **“Winning lottery ticket”**: Rare events in which collections play a pivotal role
- Enormous (but hard to calculate) socioeconomic impact
 - Biomedical and wildlife collections that help predict epidemics
 - Collections of agricultural pests that help prevent crop failure
- Impossible to predict occurrence or anticipated economic benefits
- Doesn't reflect the normal, everyday activity of collections
- Impact of collections may be indirect, delayed, hard to trace causality
- HHS/FDA Foodborne Pathogen collection
 - Used for developing methods for detection of naturally occurring pathogens in seafood
 - State health agencies responsible for response to disease outbreaks
 - States use FDA's samples to identify sources of outbreaks
 - What portion of the cost of a curtailed epidemic can be claimed as an impact of the collection?

Approach 2. Tech/Knowledge Transfer

- **“Value chain”**: Something from a collection provides a starting point in wealth generation
 - Drug development
 - Bio-inspired design
 - Forensic evidence
- Objects in collections lead to research, application, development, licensing, market value
- Collections are only one part of value chain; how to partition benefits among parts of the chain?
- Hard to document process due to delays, multiple components in value chain
- USDA Tech Transfer Reports:
 - National Plant Germplasm System, used for plant breeding
 - Culture Collection: Microbes with industrial users

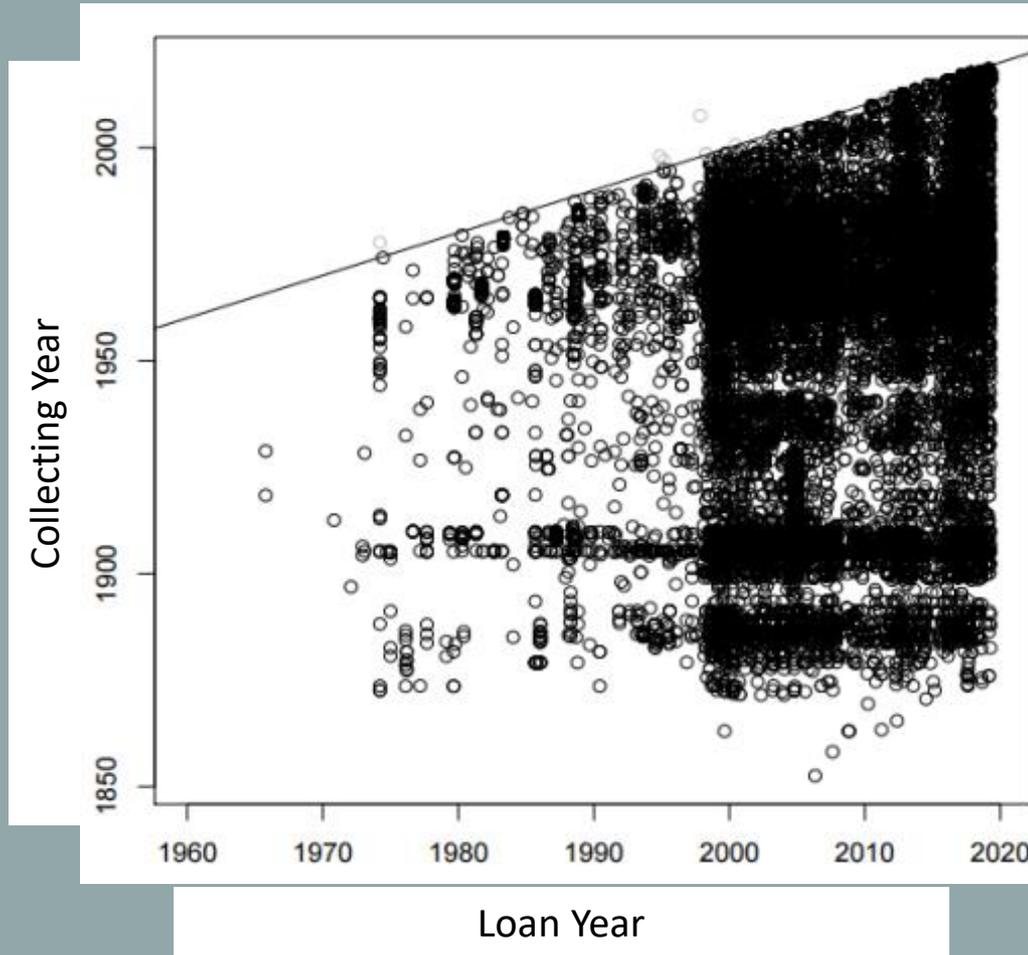
Approach 3. Counter-factual Scenarios

- **“It’s a Wonderful Life”**: What would the user do if the collection didn’t exist?
- NIST Standard Reference Materials
 - Enables companies to meet regulatory standards
 - Survey of users’ estimates of cost and delay to create or find an alternative
 - Paperwork Reduction Act limits sample size, reliability of results
- USDA Plant Protection and Quarantine
 - Reference collections used for border inspection of plant imports for pests, invasive species
 - Of imports with insects, fungi, etc., which are safe or can be treated?
 - Calculate value of all imports in which insects, fungi, etc. were found

Approach 4. Value Added by Users

- **“Co-Investment”** by users makes the collection more valuable
- Results in greater: reliability; discoverability; diversity and volume of uses; cost of replacement through:
 - Data curation by users is an unpaid service
 - Analytical data and research publications linked to collection record
 - Preparations returned to collection (e.g., rock thin sections, DNA extracts)
- USGS Core Research Center
 - Rock cores from intramural research and donated by companies
 - No user fees, but users must provide analytical data, thin sections produced, publications within time limit
- Does co-investment decline as a sample age?
- No, co-investment is independent of sample age according to data from:
 - Smithsonian National Museum of Natural History
 - USDA Culture Collection
 - USGS Core Research Center

Users Request Loan of Items Independent of Collection Date



Data from National Museum of Natural History
Invertebrate Zoology Department

Main Conclusions

- Agencies have a choice of several methods for estimating the value and impact of their scientific collections
- Choice of methods should consider cost and effort, delays, assumptions and preferences of primary audience (e.g., surveys/program data; qualitative/quantitative; retrospective/prospective)
- User surveys can be useful but may be limited by Paperwork Reduction Act