Archaeological Synthesis:
Why & *How* CRM Should Be Involved[1]

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Coalition for
Archaeological
Synthesis

Why Synthesize? We have a Compact with the Public

- NHPA and other laws imply a compact between archaeologists & the American public

  " The preservation of this irreplaceable heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Americans."

- The Terms: Using public support, archaeology will:
    - Identify, document, and protect places of value,
    - Balance economic development with historic preservation, and
    - Share resulting knowledge about the past in ways that benefit society.
- We do #1 & #2 really well; #3, not so much

Why Synthesize? To Learn About and From the Past

- We wouldn't be archaeologists if we didn't want to learn about and from the past.
- We generate enormous amounts site and project focused documentation
    - In the US we spend ~$1.4B annually on CRM (according to the 2019 SRI Foundation Estimate of US CRM for FY2020)
    - In the 28 years from 1985 and 2012 alone, in the US we: surveyed 132,000,000+ acres; recorded 850,000+ sites; performed 800,000+ field projects; and executed 30,000+ data recovery projects.
- **Think about how much we could learn if we were to synthesize these data**:
    - that would advance our knowledge of human society and
    - that would benefit the public

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[1] Presented in the session: Perspectives on Cultural Resources: Data Mining, Data Synthesis, & Data Archiving Moderators: Daniel Cassedy & Marion Werkheiser at the 24th Annual Conference, American Cultural Resources Association 25 October 2019

Grand Challenges

- In 2012 Kintigh, Altschul and others led an NSF-funded effort to recommend [computational infrastructure needed to advance archaeology](). Ecologist Bill Michener, also on the grant steering committee, noted that if we wanted to design infrastructure to answer questions, we should know what the questions are. Archaeology at that time did not have any list of "grand challenges" so the grant team undertook to compile them.
- Through national and international professional organizations, we asked archaeologists to suggest the grand challenges. We received 186 crowd-sourced responses in Then at distinguished panel of archaeologists winnowed the crowd-sourced suggestion at a workshop at the Santa Fe Institute.

- The Results of the Grand Challenge Workshop
  - We defined and published 25 Grand Challenges for Archaeology in the *[Proceedings of the National Academy of Sciences]()* and in *[American Antiquity]()*.
  - The challenges were not archaeology questions per se, but rather synthetic social science questions who solutions needed archaeological data and perspectives.
  - There was a notable agreement that the answering these challenges should benefit the public.
  - "Although new archaeological field work will be needed, the greatest payoff will derive from exploiting the explosion in systematically collected archaeological data that has occurred since the mid-20th century".
  - **There was also agreement that we need a disciplinary effort to promote synthesis.**

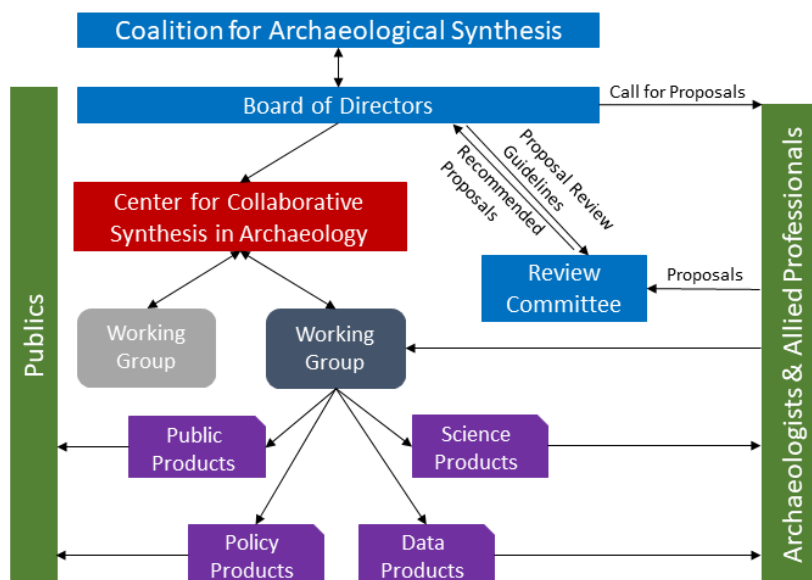**Synthesis Centers in Other Fields**

- Synthesis centers are infrastructures that support the incubation of new research communities that can transform scientific disciplines.
- The idea of a synthesis center was pioneered by the National Center for Ecological Analysis and Synthesis (NCEAS) in 1995.
- They developed a working group model as a method to address synthesis questions. In this model, a diverse, transdisciplinary working group of 8-15 researchers proposes a problem, attacks it using existing data, through 3-4 intensive week-long meetings over 2-3 years, while collaborating remotely between meetings.
- The working group research model demonstrably:
    - Increases the velocity at which new ideas are generated and vetted,
    - Increases the probability of unexpected discoveries and transformative research,
    - Contributes to evidence-based policy, and
    - Professionally benefits participants
- The synthesis center model has been copied and adapted globally. The International Synthesis Consortium now lists 13 synthesis center, mostly in biology/environment/ecology domains.

We are drowning in information while starving for wisdom. The world henceforth will be run by synthesizers, people able to put together the right information at the right time, think critically about it, and make important choices wisely. —Edward O. Wilson, *Consilience: The Unity of Knowledge*

Coalition for Archaeological Synthesis

- Following the Grand Challenge recommendation, in 2017 the SRI Foundation, Arizona State University, and the University of Arizona, sponsored a workshop at the School for Advanced Research to devise a disciplinary strategy to foster archaeological synthesis. The constraint was that archaeology is not going to get large scale NSF funding that the biological sciences centers have received.

- The results of this workshop were to:
  - Create a Coalition for Archaeological Synthesis composed of *partner organizations* and individual *associates*. The Coalition will leverage the capacities of the partners to acquire funding, accomplish synthesis research, disseminate the results in scholarly and public policy fora.
  - The design for the Coalition was published in the *Proceedings of the National Academy of Sciences* and *Advances in Archaeological Practice*.
  - Establish a University-based center for administration, support, and communication of the Coalition's efforts.
  - Adopt the NCEAS working group model because it is demonstrably successful and relatively inexpensive (because no new data are collected).
  - We began forming the Coalition in the summer 2017, and now a bit over two years later we have 40 partner organizations and more than 250 associates. , 200 Associates.

- Partners now include: 11 professional organizations (all of the major ones); 5 CRM firms; 7 academic units; 11 NGOs; and 6 archaeological cyberinfrastructure providers. A full list is included at the end of this presentation.

Goals of the Coalition for Archaeological Synthesis

- Rapidly advance knowledge through analysis and synthesis of existing archaeological and related data to answer intellectual challenges in ways that influence policy and benefit the public;
- Develop and apply methodological and theoretical approaches effective in integrating diverse approaches and data sources;
- Supply computing support for scientific collaboration and data integration by providing leadership and leveraging innovation in informatics;
- Promote a collaborative culture necessary for synthesis among archaeologists, allied scientists, policy-makers, and resource managers; and
- Communicate results in ways that advance knowledge and affect public policy.

Coalition for Archaeological Synthesis Initiatives:

CfAS issued an open call for proposals for working group research and has funded two ongoing projects, now in their second years.

1. **ArchaeoEcology Project**
   - The question asked by the first project is "How do human interactions with biodiversity shape socio-ecological dynamics and sustainability?"
   - It is synthesizing archaeological; and ecological data across 6 cross-cultural cases.

   - It includes professionals with expertise in anthropology, archaeology, ecology, food webs, network theory, and informatics, and uses network modeling and tools for food web research.
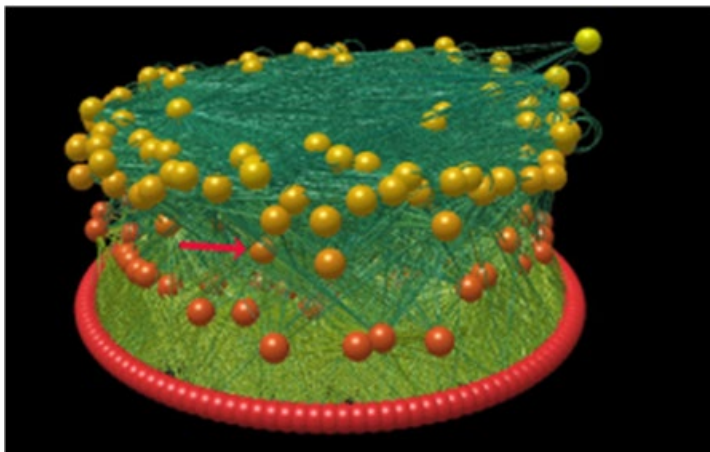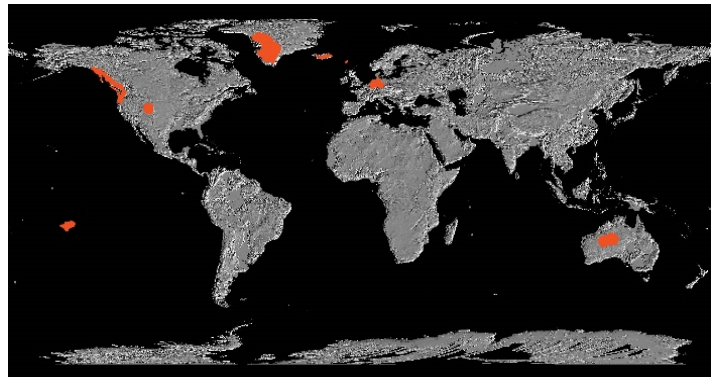
A human-centered food web, for the ecosystem of Ancestral Pueblo people (red arrow). Each ball indicates a species, green lines indicate feeding links. Examining this network enables better understandings of how human choices lead to sustainable relationships.

2. **People, Fire, and Pines in the Border Lakes Region of North America Project**
- This project is driven by US & Canada practitioners in forest management, not academics. It involves forest managers, archaeologists, and native people.
- It asks "How to effectively manage 'wilderness' in a way that takes into account the important long-term human role in regulating forest dynamics."

> *Wilderness, like the national park system, was an American idea – Stuart Udall*

- It integrates science, including tree-ring research and archaeology, management, and traditional knowledge. At the two in-person meetings this working group has had, they have found that archaeology works as a translator across the three knowledge systems (management, traditional, and scientific).

Charred and dead trunks of once-open grown pines burned in the severe fires of the early 2000s after a century without fire. This foreshadows a different forest emerging from the ashes and a departure from historic-period forests that developed in close relationship with human land use.

In collaboration with the Society for American Archaeology and the European Association of Archaeologists, the Coalition for Archaeological Synthesis has also organized a "Design Workshop." The idea there is to bring together a diver team of individual interested in a topic to develop proposals for working group research on that topic.

EAA-SAA Sponsored Workshop:
Long-term Human Migration as Understood from a Perspective
The goal of this design workshop was to write proposals "to develop long-term, comparative and synthetic understandings of the factors stimulating human migration, the conditions and processes implicated in the success of the incorporation of immigrant groups at their destination, and how these new understandings might inform contemporary public policy."

- CfAS and numerous professional societies distributed a request for information to solicit those interested in participating. We received 52 applications from 20 countries. A SAA/SHA/EAA selection panel chose 15 participants from 6 countries, mostly postdocs to mid-career archaeologists.

- The design workshop was held in September 2019 at the Amerind Foundation in Dragoon, Arizona.

- Three proposal drafts for working group research were prepared and are in the process of being refined for submission to funding agencies:
    1. Using a crowd-sourced database, across the Holocene, what factors exacerbate or ameliorate vulnerabilities associated with mobility due to extreme climate processes?
    2. Based on historic migration statistics and archaeological strontium isotope data, how do contemporary migration rates compare with those in the past?
    3. Using a database of migration case studies from deep time to the present, what are the long-term effects of different types of migrations on human securities?

The Coalition for Archaeological Synthesis: What's in it for CRM?

- It's good for business:
  - All CRM firms need to distinguish themselves in the marketplace
  - Federal and State agencies must demonstrate that CRM programs are in the best interest of the public
  - You can form networks with all parts of the discipline
- It empowers employees
  - In synthesis, those creating archaeological data should have a lot to say about how to use those data and what problems should be studied.
  - It improves employee morale.
- It's cheap!

Please Contribute to Synthesis

ACRA is a CfAS Partner and the ACRA board encourages member firms to become partners and to propose and participate in CfAS synthesis studies*

- Visit the Coalition for Archaeological Synthesis website: http://archsynth.org

- Have your firm join as a Partner organization ($200/year)
- Become and encourage your employees and colleagues to become Individual CfAS Associates (free)
- Participate in CfAS Working Groups
- Make your data available for synthesis via tDAR, the Digital Archaeological Record

*ACRA Communication Strategy for "Promoting Synergy Between the Academy and the CRM Industry" 2019

Coalition for Archaeological Synthesis
Partner Organizations
2019-11-21

Professional Organizations
- American Cultural Resources Organization (ACRA)
- Archaeology Division, American Anthropological Association
- Archaeological Institute of America (AIA)
- Chartered Institute for Archaeologists (CIfA)
- European Association of Archaeologists (EAA)
- International Scientific Committee on Archaeological Heritage Management (ICAHM)
- International Council for Archaeozoology (ICAZ)
- PanAfrican Archaeological Association (PAA)
- Society for American Archaeology (SAA)
- Society for Historical Archaeology (SHA)

Cultural Heritage Firms
- Alpine Archaeology, Inc.
- Cultural Heritage Partners
- Cultural Resource Analysts, Inc.
- Desert Archaeology, Inc.
- PaleoWest Archaeology
- Statistical Research, Inc.

Cyberinfrastructure Providers
- Archaeological Data Service (ADS; University of York)
- ARIADNE
- ASU, Center for Digital Antiquity (Arizona State University)
- Network for Computational Modeling in Social & Ecological Sciences (CoMSES Net)
- OCHRE Data Services
- Open Context

Academic Units
- Center for Ancient Cultural Heritage & Environment (CACHE; Macquarie University)
- Center for Archaeology & Society (Arizona State University)
- Cotsen Institute of Archaeology (University of California, Los Angeles)
- Eurasia Institute of Earth Sciences, Department of Ecology and Evolution (Istanbul Technical University)
- Institute for European and Mediterranean Archaeology (University at Buffalo)
- Phoebe A. Hearst Museum of Anthropology (University of California, Berkeley)
- Santa Fe Institute (SFI)
- University of Arizona, School of Anthropology

Non-governmental Organizations
- Amerind Foundation
- Archaeology Southwest
- Center for American Archaeology
- Crow Canyon Archaeological Center
- The Field Museum
- Institute for Field Research (IFR)
- Integrated History & Future of People on Earth (IHOPE)
- School for Advanced Research (SAR)
- SRI Foundation
- Wenner-Gren Foundation for Anthropological Research