APPENDIX IV:

UNIVERSITY OF ARIZONA
RESPONSE TO GOVERNOR'S ARCHAEOLOGY ADVISORY COMMISSION PUBLIC COMMENTS

Summary of and Response to Comments From the Governor's Archaeology Advisory Commission (GAAC)

1. Although ASM has responded to stakeholder input in developing a rate and fee structure that is time based rather than task based, the proposal does not adequately define how the new rate structure will be uniformly applied to projects of similar scale. For instance, the example table provided in the April 17, 2017 revised proposal identifies a Project Registration fee of $1,079 for a monitoring project (curated at ASM); however, under a time-based fee structure, a monitoring project of identical complexity may cost more or less depending on how much time an individual bills to that project. A more formal description of cost control measures is warranted. Additionally, given ASM has committed to providing project proponents scope-dependent project estimates, should significant variability in estimated costs occur for projects of identical/similar complexity, what is the process for appeal and what recourse do project proponents have?

Response: ASM appreciates the acknowledgement of our response to stakeholder input. This comment, however, seems to reflect a misunderstanding of ASM's proposed business practices associated with the proposed new rate and fee structure. The scope-dependent quote, and material variance, are based on information to be supplied by the client. If identical data are supplied to ASM, identical quotes will be issued, and consequently the same amount will be billed to the clients, assuming one does not have a material variance between information provided for the quote and the collections submitted for curation.

2. Other rate and fee models that do not appear to have been considered by ASM include a tiered system of fees based on the complexity/size of the project, (i.e., small, medium, large, extra-large, with increased task-based fees for each level).

Response: The time-based system proposed, in conjunction with scope-dependent quotes, essentially behaves like a tiered system, where the complexity/size of the project is determined by factors such as the number of sites to be excavated, number of field days, types of sites, etc., all of which are data to be provided by the client at the time the quote is requested. The use of a rigidly tiered system of fees, however, would move ASM back toward socializing the costs of projects amongst project proponents (as with task-based rather than time-based charges), and this is against the strongly expressed preference of most stakeholders. In addition, ASM would then have to define these categories of project scale such that ASM's costs are covered and stakeholders view them as logical and fair. It is much more efficient, and more in keeping with majority stakeholder input, to simply bill based on cost.

3. The proposed increases will have enormous ramifications for all project proponents with mandated responsibilities, the Cultural Resource Management (CRM) industry, as well as creating a percussive ripple effect on A) our ability to continue to research the archaeological record in scientifically adequate detail, and thus directly affecting our understanding of the past, B) endangering the CRM industry's ability to balance professional ethics and standards with cost-control measures for project proponents, C) tribal government relationships with project proponents with legally mandated responsibilities, D) the survivability of legal mandates ensuring the recovery of information from archaeological sites prior to their disturbance/destruction at the state and local levels. There will be

unintended consequences, including reduced data recovery effort, the of compromising of compliance at the local level, and loss of collections resulting from private development.

Response: ASM agrees that the proposed increases may have significant ramifications, as has been discussed in the various stakeholder fora, and ASM looks forward to continued work with stakeholders to address possible unintended consequences. This comment, however, assumes facts not in evidence, including: (1) project proponents will always choose to curate state-owned materials at ASM rather than other approved repositories; (2) project proponents will not choose to avoid more sites based on increased costs (if they choose to curate at ASM); (3) the cultural resource management/heritage preservation community will not develop better models to prioritize which sites should be excavated, modeled on those now in effect in New Mexico (see ASM's response to Comment No. 8); and (4) tribal communities prefer excavation over avoidance.

Project proponents may elect to curate state-owned materials in approved repositories other than ASM. Project proponents may elect to avoid more sites, based on increased costs, if they choose to curate at ASM. The cultural resource management/heritage preservation community has long recognized Arizona's (and the nation's) curation crisis and that the current situation is unsustainable. Recent meetings with stakeholders indicate that there is a groundswell of support for the development of broad-based approaches to better prioritizing which sites to excavate/alternative mitigation strategies based on a regional approach to research potential. Recent meetings with tribal government representatives indicate that tribal communities strongly prefer avoidance to excavation.

4. As part of the University of Arizona, ASM is required to comply with Arizona Governor's Executive Order (EO) 2006-14 "Consultation and Cooperation with Arizona Tribes." Based on information obtained from multiple presentations, it appears that ASM has not initiated consultation with individual tribal governments in accordance with EO 2006-14, which requires that "state agencies and offices shall seek input from appropriate elected or appointed tribal officials [of 22 federally recognized tribal governments in Arizona] before undertaking any action or policy that will, or is reasonably believed to, have the potential to affect a tribal community or its members." Based on the direct consequences the revised rates and fee proposal will have on the practice of archaeology and the archaeological record as a whole, government-to-government consultation with individual tribes should occur prior to adoption, as GAAC believes that these consequences have not been adequately presented to these vital stakeholder groups.

Response: The University of Arizona and ASM appreciate the importance of consultation and are committed to maintaining strong working relationships with Arizona's tribal communities. As such, tribal representatives were invited to and attended the two stakeholder briefings that were held on 20 September 2016 and 12 December 2016, as well as the public fora held 13 July, 15 July, and 20 July 2017. Tribal representatives were invited to, but did not attend the public forum held 3 August 2017.

ASM engages in ongoing dialogue with individual tribes and multi-tribe entities (such as the Four Southern Tribes Cultural Resources Working Group and the Western Apache NAGPRA Working Group), in part through ASM's Southwest Native Nations Advisory Board (SWNAAB). SWNNAB includes up to two representatives from each of the 22 federally recognized tribes in Arizona and meets twice a year to provide the museum with guidance and feedback on repatriation and other issues among ASM and tribal partners. ASM made a presentation about SB 1418 to and solicited input from SWNNAB on 12 May

2017. ASM also made a presentation to and solicited input from the Four Southern Tribes Cultural Resources Working Group on 21 July 2017.

Two major conclusions came out of the SWNNAB meeting: (1) higher fees will stimulate more avoidance of archaeological sites (a good outcome from a tribal perspective); and (2) ASM and tribes should work together to encourage and support compliance with the Arizona Antiquities Act and the state's human burial protection statutes. Discussions about encouraging and supporting compliance addressed the acquisition and preservation fund (see ARS § 41-866) created when the state legislature protected human remains on private lands in Arizona (ARS § 41-865). It was agreed that ASM and other stakeholders could encourage donations to this fund to support the respectful treatment of human remains encountered in the course of development and that ASM and stakeholders should work to develop procedures for accessing these funds. It was suggested that this fund probably should assist private landowners who are conducting small-scale ground-disturbing activities, such as digging related to the installation of a septic tank, rather than benefit large-scale development projects by for-profit businesses.

At the Four Southern Tribes meeting, ASM presented background information on SB 1418 and then began a discussion of concerns already expressed by tribal representatives at public meetings and highlighted areas of likely tribal concern identified by representatives of non-tribal entities at public meetings. Concerns about unintended consequences already expressed include:

- The proposed increase in fees may make project proponents believe that they have an excuse for not complying with the Arizona Antiquities Act and/or the state's human burial protection statutes.
- Project proponents (including state agencies) may argue for the need to excavate smaller samples of archaeological sites, recovering fewer artifacts and less information (in order to reduce costs associated with curation of artifacts and associated records).
- Project proponents (including state agencies) may argue that artifact collections should be "culled" (discarded) after excavation and study, reducing the number of artifacts to be curated in a museum or a repository and, thus, the cost of curation.

Four Southern Tribes representatives expressed the following:

- They are supportive of holding a tribal summit (see below) and would also like ASM to look into ways to initiate government-to-government consultation, perhaps in the context of reviewing standard burial agreements under state law.
- The new proposed increased fees will place an additional burden on counties and smaller municipalities. Perhaps counties and cities/towns can look into recouping costs of development through their own permitting systems (e.g., Pima County grading permits). Perhaps some system of development credits or offsets can be developed.
- The Salt River Pima-Maricopa Indian Community would be interested in a tribal resolution of support for ASM's fee proposal, when the time comes and asked that ASM let the Four Southern Tribes know when letters of support might be appropriate.
- ASM should also contact/work with the Inter Tribal Council of Arizona to solicit input and support.
- The Four Southern Tribes are most concerned about compliance with the state's burial protection statutes and the respectful treatment of ancestral human remains and would like more interaction with ASM in this area.

ASM is planning a tribal summit to address these issues and others, including how best to work with tribes going forward. The Yavapai-Prescott Indian Tribe has offered to host this meeting, on 8 September 2017.

5. ASM has demonstrated consideration of only two models for sustainable in-perpetuity curation, 1) charge a one-time collections processing fee as well as an annual fee; or 2) use a funding model akin to a perpetuity due linked to an interest-bearing account, as described in ASM's initial and revised draft proposal. ASM has not adequately fulfilled its responsibility under ARS § 15-1631 D(1)(c)(iii), as it has failed to demonstrate a thorough investigation into the breadth of curation cost models being used by federally approved repositories throughout the country so as to "avoid fee increases or reduce costs and/or regulatory burden to businesses, persons and consumers directly affected by the proposed increase." ASM has not adequately fulfilled its responsibility under ARS § 15-1631 D(1)(d), as it has not provided adequate justification for the in-perpetuity calculations as they relate to recovering curation costs.

Response: ASM has considered only two models for sustainable in-perpetuity curation due to the fact that, in finance, there exist only two accepted models of collecting a stream of cash flows that goes on forever (i.e., in perpetuity). The first method is to collect fees on a periodic basis every period, from the time of the transaction, extending infinitely into the future. Under this model, the sum total of these costs is infinite, regardless of the amount of periodic cost (i.e., the sum of infinite pennies is still infinity). The second accepted model is a one-time fee based on the net present value of the same infinite stream of cash flows. The formula utilized, also given in the Revised Draft Proposal to Increase Fees for Services, is the basis of the formula utilized to value bonds within every financial market worldwide. Bonds and other annuities are the mathematical equivalent of the difference between a perpetuity that begins at the time of sale or initiation, and a perpetuity that begins at the end of the contractual period defined in the terms of the bond. Given that project proponents, CRM firms and other stakeholders wished to avoid fees extending into the future for projects that have been completed, the second model was chosen.

ARS § 15-1631 D(1)(c)(iii) requires "[a] description of any efforts to avoid fee increases or to reduce the costs or regulatory burden, or both, to the businesses, persons and consumers that will be directly affected by the proposed fee increases. Nowhere within the statute does it establish a requirement to investigate other institutions' fee models. Furthermore, what other institutions charge has no bearing on the costs incurred within ASM to curate artifacts, or meet its obligations under the law. This portion of ARS § 15-1631 solely establishes a requirement for ASM to look inward and examine its own business processes in order to mitigate costs, which are then passed on to its clients. This requirement has been met, and is well documented within the section "Efforts to Avoid Fee Increases or Reduce Costs and/or Regulatory Burden" on page 14 of the Revised Draft Proposal to Increase Fees for Services.

All costs and calculations pertaining to the in-perpetuity calculations have been provided. ASM assumes a basic understanding of business and finance on the part of stakeholders, and has heretofore not provided a step-by-step guide on how to calculate a perpetuity.

ASM used the results of recent research on curation fees nationwide in the process of evaluating its current practices and developing its new rate and fee proposal (Childs and Kagan 2008; Childs and Kinsey 2003; Childs et al. 2010). The following excerpts from Childs et al. (2010), based on their study of

repositories in 2007-2008, demonstrate that ASM is in the mainstream, nationally, in terms of its curation practices, the way it proposes to structure rates and fees, and the costs that drive the charges in its proposals:

> The primary fee for artifacts is for curation; in other words, the primary curatorial activities required for the care of the artifacts. In 2007/08, 85 percent of the repositories based this fee on the cubic foot or archival box (1.3 ft^3) holding the artifacts. Ninety-nine percent of the repositories charged a one-time, in-perpetuity fee to cover all the required actions taken on a collection, forever. Twenty-four percent also assessed an annual fee, usually by the cubic foot, for care of a collection on a yearly basis. This annual fee is typically for federal agencies that pay by the year that services are provided. Accordingly, a small, but increasing number of repositories, mostly state museums, had an in-perpetuity fee structure for state collections and an annual fee for federal collections. Another group of repositories charged a curation fee in five or ten year increments and renegotiated the fee with every new increment of services (Childs et al. 2010:194-195).
>
> The most frequent criterion now used to determine fees is the various costs to care for the collections according to federal standards, including building management and maintenance, processing collections, and computerization to maintain the collection accession and catalog records. Other factors include professional staff salaries, auxiliary storage fees, new equipment, and to cover increasing utility costs for environmental controls and general inflation. This development is important because the primary criterion used to determine fees in the 1997/98 study was the fee structure of neighboring institutions. As a general rule, repository staff did not know their real costs and were not beginning to cover the true costs of curation in their fees. The staffs at 60 (63 percent) repositories acknowledged in the 2007/08 study that the in-perpetuity fees did not pay for the long-term upkeep of the collections, particularly regular inventory and inspection against physical degradation. The current trend for many repositories, however, is to know their real costs, but to keep their fees comparable to their neighbors. This decision may be a realistic business strategy, but what happens to the collections if repositories do not charge the full costs of curation and are forced to close down for financial reasons (Childs et al. 2010:199)?

The following excerpts from Childs et al. (2010), demonstrate that ASM is actually a leader in attempting to create a sustainable business model (i.e., through the proposed use of an interest-bearing account to cover in-perpetuity costs, by using curation agreements and assessing project registration fees, by charging for the in-perpetuity curation of associated records, and by proposing and enforcing collections submission standards linked to institutional curation requirements set by state and federal laws and regulations):

> The three studies also reveal that repositories are working hard to find new ways to be as sustainable as possible, other than merely increasing their fees. One means is to deposit the fees collected into an interest-bearing account, including trusts and endowments, so that the repository can use the interest accrued to benefit the collections. Several repositories had interest-bearing accounts in the 1997/98 study and 19 (20 percent) had one by the 2007/08 study. We were surprised that more repositories are not taking advantage of this money-raising strategy first proposed by Marquardt et al. (1982) (Childs et al. 2010:200).

Many repositories are coping by being increasingly careful when accepting collections. Most now have a collecting policy, which identifies specific criteria that a collection must meet to be accepted, such as a regional and cultural focus (see Sullivan 1992). Most repositories that assess a fee also require a collections agreement signed by the repository management and the party that will deposit a new collection. This agreement is linked to a collections acceptance policy or guidance that states the standards and conditions under which a collection must comply upon delivery to the repository, such as storage box size and bag type, labeling specifications, and cataloging requirements. The agreement may also be tied to a project registration fee. The collections acceptance policy is an important development in recent years. It places full responsibility on the archaeological project leadership or the collection owner to budget for and then properly prepare a collection for deposit at the repository, or additional fees will be assessed (Childs et al. 2010:200).

Another way that repositories are attempting to remain sustainable relates to the fees for associated records. Repositories consistently have had two general types of in-perpetuity curation fee structures over the decade of study: 1) separate fees for the associated records and artifacts, and 2) a single, combined fee for both the artifacts and associated records (Table 4). Over 50 percent of the repositories assessed separate fees for artifacts and associated records in 1997/98 and 2002. Of interest is the fact that over 70 percent of the latter repositories charged the same fee amount for both, while the remainder charged a lower fee for records than for artifacts (Table 5). These circumstances changed by the 2007/08 study. First, the number of repositories with separate fees dropped to 45 percent (Table 5), perhaps to simplify the bookkeeping. Second, only 47 percent of those with separate fees charged the same fee for both artifacts and associated records, which is a noticeable drop. Third, 57 percent of these repositories still charged less for the associated records than for artifacts, but 43 percent charged more. We believe the change to charge more for records is significant and relates to a growing understanding that the proper curation of associated records is generally more expensive than artifacts, especially when finding aids are prepared to facilitate long-term access and use of all types of associated records (Drew 2004; this volume). This presumption was corroborated by repository employees in the 2007/08 study, including several with a combined fee for artifacts and associated records, who said they increased the cubic foot box fee to cover the different and greater costs of the associated records (Childs et al. 2010:201-202).

Despite the variety of creative strategies that repositories are now using to manage and fund their curation responsibilities over the long term, the three studies reconfirm a disturbing trend in the number of repositories that either have run out of space to curate new collections or are in the process of running out of space. The space problem was identified as early as the 1970s (Ford 1977; Lindsay et al. 1979; Lipe 1974; Marquardt et al. 1982) and has been a key component of the curation crisis in the United States ever since (Sullivan and Childs 2003). The states of Colorado (Nepstad-Thornberry et al. 2002) and Arizona (Lyons et al. 2006; Lyons and Vokes this volume), for example, have struggled with lack of curation space in recent years with little resolution to date. In the 2007/08 survey, 99 (56 percent) of the responding repositories reported a space crunch of which at least 13 stopped accepting new collections for a fee because of lack of space. An informal 2006 survey of 29 repositories in California revealed that only five had curation space (Stankowski 2008) (Childs et al. 2010:202-203).

Regarding the comment that ASM has not provided adequate justification for the in-perpetuity calculations as they relate to recovering curation costs, the costs identified match those discussed in the

national study by Childs et al. (2010; also see Lyons and Vokes 2010). The initial draft proposal and the revised draft proposal included ample justification and explanation. The following is from the final proposal:

> In addition to the three hourly service rates developed for the various labor classes, fees for the curation of documents and artifacts in perpetuity also were developed. The vast majority of the artifacts curated within the museum are stored within standard one-cubic-foot boxes. Multiple artifacts will typically fit within a single box, and artifacts from up to two construction sites, or projects, may be co-located within a single box in the museum, in situations where ASM deems this to be appropriate and feasible based on best practices. Projects can, therefore, be assessed a flat fee for each box, or half-box, required to store in perpetuity the artifacts found within their respective construction sites. Artifacts too large for boxes are infrequent statistical outliers in likelihood, and will simply be charged the per-box fee for curation in perpetuity. Per fact 8 above, paper records also must be kept in perpetuity. Based on this fact, the fee for curation of documentation in perpetuity was developed on a per-linear-foot basis, a standard archival measure. Fees assessed for curation of documentation will be based on each linear inch submitted. These fees (per box and linear inch of documentation) were calculated based on the formula for a perpetuity due:

$$Fee = current\ year\ costs + \frac{periodic\ storage\ costs}{periodic\ discount\ rate}$$

> See the Costs Wholly Allocable to Fee for In-Perpetuity Curation of a Box of Artifacts section and the Costs Wholly Allocable to the Fee for In Perpetuity Curation of Documents section below for a list of the expenses included within current year costs and periodic storage costs, as well as the discount rate used in this calculation….

Costs Wholly Allocable to Fee for In-Perpetuity Curation of a Box of Artifacts

Current Year Costs

Shelving cost per box, assuming 80% long-term efficiency, and based on historic cost of shelving units.

Space cost per box, assuming 80% long-term efficiency, and based on the Responsibility Centered Management (RCM) Budget Model utilized uniformly across all university units.

Costs of box, bags, acid free cardstock, archival pens, curation supplies, etc.

Periodic Costs

Cost recovery for shelving (est. 20-year useful life), space and inventory labor in perpetuity.

Costs Wholly Allocable to the Fee for In-Perpetuity Curation of Documents

Current Year Costs

Shelving cost per linear foot of documents, assuming 80% long-term efficiency, and based on historic cost of shelving units.

Space costs per linear foot of documents, assuming 80% long-term efficiency, and based on the cost per square foot under the RCM model.

Costs of boxes, folders, curation supplies, etc.

Periodic Costs

Cost recovery for shelving (est. 20-year useful life), space, and inventory labor in perpetuity.

Applicable Interest Rates for Calculation of Perpetuities

The discount rate of 7.2% was used in calculation of the perpetuities due associated with curation of both boxes of artifacts and documentation. This rate was deemed appropriate, as it is approximately the average annual return of the S and P 500 Index over the period of 1950 to 2009. [1, 2] The inflation rate of 1.7% was used based on projections from tradingeconomics.com. Similar sites predict higher inflation rates, but the 1.7% figure has been used to produce more conservative costs for ASM customers. [3]

Sensitivity of Curation Fees to Applicable Discount Rate

7.0% Net Discount Rate: $1,200.50 per half-box and $172.42 per linear inch of documentation
5.5% Net Discount Rate: $1,502.00 per half-box and $214.75 per linear inch of documentation
4.0% Net Discount Rate: $2,030.50 per half-box and $289.00 per linear inch of documentation
2.0% Net Discount Rate: $3,967.00 per half-box and $561.00 per linear inch of documentation [4]

References Cited in ASM's Response to Comment No. 5

Childs, S. Terry, and Seth Kagan
2008 *A Decade of Study into Repository Fees for Archeological Curation*. Studies in Archeology and Ethnography #6. Archeology Program National Park Service, Washington, DC.
http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1097&context=natlpark

Childs, S. Terry and Karolyn Kinsey
2003 *Costs of Curating Archeological Collections: A Study of Repository Fees in 2002 and 1997/98*. Studies in Archeology and Ethnography #1. Archeology and Ethnography Program, National Park Service, Washington, DC.
http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1056&context=natlpark

Childs, S. Terry, Karolyn Kinsey, and Seth Kagan
2010 Repository Fees for Archaeological Collections. *Heritage Management* 3(2):189-212.

available online **for a fee** at:
http://www.tandfonline.com/doi/abs/10.1179/hma.2010.3.2.189

6. ASM did not inquire of regional institutions as to how they continue to maintain such comparatively lower fees, given ASM's claim that "these repositories are clearly not recovering costs." The extreme disparity of curation costs suggests that either the salary for the staff person performing the annual inventory is far greater as compared to other federally approved repositories, or that the cost of the space in which collections and documents are housed is far greater than these other institutions.

[1] http://www.simplestockinvesting.com/SP500-historical-real-total-returns.htm
[2] http://www.thesimpledollar.com/where-does-7-come-from-when-it-comes-to-long-term-stock-returns/
[3] http://www.tradingeconomics.com/united-states/inflation-cpi/forecast
[4] This is the average rate of return on Operating Funds within the University of Arizona, per the Comptroller.

Response: ASM is legally required to recover costs associated with providing mandated services and legally prevented from subsidizing the activities of project proponents. Regarding what other institutions charge, none of those held up as comparable to ASM truly are. None are required to comply with the Arizona State Constitution and Arizona State Law. As noted by Childs et al. (and as discussed above):

> [t]he current trend for many repositories…is to know their real costs, but to keep their fees comparable to their neighbors. This decision may be a realistic business strategy, but what happens to the collections if repositories do not charge the full costs of curation and are forced to close down for financial reasons (Childs et al. 2010:199)?

ASM repeats its assertion (based on research at the national level; see references cited under ASM's response to Comment No. 5) that any repository that is not (1) making use of a funding model akin to a perpetuity due linked to an interest-bearing account, as described in the initial and revised draft proposals; or (2) charging a one-time processing fee as well as periodic (annual) maintenance fees, is not actually covering its costs in perpetuity. It is clear from stakeholder input that periodic maintenance fees are unworkable for most project proponents and CRM companies. Any repository would have to charge, as a one-time fee, many thousands of dollars per box in order to avoid charging periodic maintenance fees. The use of an interest-bearing account allows ASM to charge project proponents less overall.

7. ASM has failed to demonstrate adequately that the costs for in-perpetuity curation of future collections, specifically with regard to costs associated with maintaining a space that meets federal standards, are equally divided among all boxes that share such space, both existing and new. Based on the initial statement, if 99 boxes currently exist within ASM collections, the fee for the 100th box under the new fee structure should be limited to no more than 1/100th the total cost for that space on the year of intake, and subsequently smaller fractions annually as more boxes of collections are received.

Response: ASM's proposed fee structure is substantially more generous than what is proposed herein by GAAC. ASM's model does not divide all space costs amongst the population of boxes, as herein proposed. It was developed only to include space costs necessary for carrying a single box, regardless of the total population of boxes (i.e. under ASM's model, costs apportionable to unoccupied space or previously acquired boxes are not included).

Under ASM's model, the square footage per box is calculated based on the footprint of the current compactor shelving installed within ASM's main building, a schematic of which was provided on page 38 of Appendix III - UA Rate Study. This schematic, which is an addendum to the Purchase Order through which the shelving was procured, shows that the floor space for the compactor shelving is 53' 4" by 24' 6⅛ ", or a total of 1,305.85 square feet. This same schematic shows that the total system can potentially hold up to a maximum of 6,026 archive boxes (i.e., cubic foot boxes), assuming the additional nine carriages are procured. Given these figures, a simple calculation of space per box at maximum capacity yields a measure of 0.21670262 square feet per box (1,305.85 feet ÷ 6,026 boxes). This is the absolute minimum number of square feet of space necessary to house a single cubic foot box within ASM's current facility. It is not merely impractical to operate a storage facility at maximum efficiency, but impossible in the long run, as there would never be room to expand. Given this fact, ASM has estimated

a long-term efficiency ratio within this space of 80%. This reduces the space and associated costs apportioned to each box within the calculation far below what GAAC has herein proposed, while providing a practical amount of expansion space to properly manage the collection. Based on 80% efficiency, the per-box square footage is calculated as 1,305.85 feet ÷ (80% x 6,026 boxes) = 0.270878277 square feet per box. The net effect of this is that each box is apportioned approximately 1/4,820.8th of the costs associated with the current storage space, despite the fact that it is currently far below capacity, and will be for the foreseeable future.

This schema is preferential to what GAAC proposes, as it makes the fees assessed to ASM's clients consistent and predictable over time, regardless of the population density within the storage facility. It also has the effect of disincentivizing overcrowding, which could potentially lead to damage of the collection, and does not charge ASM's clients for empty space within the facility that they are not utilizing/benefiting from.

8. GAAC recommends that ASM establish a Curation Advisory Committee, comprising representatives from ASM, ABOR, a federal agency, a state agency, a local government, a tribal government, the academic community, the CRM industry, a private entity [a non-agency project proponent?], and a museum other than ASM. This committee should have the following charges:
    - a national investigation of curation models employed by other federally approved repositories and long-term curation planning that maximizes cost-saving measures
    - approaching repository practices in a way that ensures that a greater proportion of project expenditures is on aspects of archaeology that deliver on the promise of promoting heritage in ways that increase the quality of life for Americans
    - amending ABOR rules and ASM procedures so as to provide cost-effective solutions that allow for maintaining or increasing the level of archaeological research as a result of any newly adopted curation fee model
        - developing guidelines for digital documentation of artifacts
        - developing guidelines and standards for culling collections prior to curation
        - developing cost-saving measures in the ASM curation protocols through better use of databases and other digital tools
        - considering a move from paper to digital records
        - lead a statewide discussion regarding any potential changes in archaeological standards or practices that may result as unintended consequences of ASM's changes in rates, fees, and policies

Response: ASM will be happy to help organize and participate in a broad-based, community effort to scientifically and ethically stem the unsustainable flow of collections into repositories. ASM asserts, however, that focusing effort solely on curation, at the downstream end of the cultural resource management process, rather than decisions made upstream, such as which sites are chosen for excavation and how much of each is subjected to data recovery, is a mistake. Professional consensus in the field, at a national level, has settled on the principle that if one cannot adequately care for collections to be generated by a proposed archaeological project, the project should not be undertaken or should be scaled back to a manageable size. Best practices demand that plans be made, well before fieldwork, to properly accommodate curation of collections in perpetuity (see, e.g., Childs and Benden 2017; Childs and Sullivan 2004; Christenson 1979; Fitzhugh 1977; Ford 1984; Sonderman 2004; Sullivan 1993; Sullivan and Childs 2003; Trimble and Marino 2003).

For decades, the archaeological community, including museums, state and federal agencies, and CRM firms, has been wrestling with the best response to the nation's curation crisis (e.g., Bawaya 2007; Childs 1995, 2011; Childs and Sullivan 2004; Davis 1972; Ford 1977; Lindsay et al. 1980; Lipe 1974; Lyons et al. 2006; Lyons and Vokes 2010; Marquardt et al. 1982; Thompson 2000). Put simply, the critical needs are to increase appropriate space available for curation, to increase funding for curation, and to scientifically and ethically manage the growth of curated collections. Three proposals dominate the policy discussions that have emerged: (1) archaeologists should excavate smaller samples of sites but curate everything that is recovered; (2) agencies responsible for the management of cultural resources should develop formal policies for the culling of collections to produce representative samples of materials collected during fieldwork; and (3) more in-field analysis should be conducted, with artifacts either left in place or reburied on site. A fourth, related strategy, is the development of overarching, regional mitigation plans that prioritize sites to be excavated based on, for example, rarity and research potential, in the context of existing gaps in knowledge.

ASM's (ABOR's) extant policies represent *de facto* acceptance of the first proposal discussed above, the premise that, if cost is an issue, archaeologists should excavate or collect smaller samples from sites but submit for curation all items collected (with the exception of mass-produced objects, as discussed in ASM's repository manual; see Griset et al. 2004). The reason to prevent culling (the second proposal listed above) is to preserve the long-term research potential of collections.

From a strictly scientific standpoint, the Society for Historical Archaeology (1993; see also, Christenson 1979; Childs 1995; Fitzhugh 1977; Ford 1984) asserts that "the discarding of archaeological materials…is not recommended…because current levels of knowledge may not adequately recognize the research value of certain artifact classes." This statement reflects the fact that changing research foci and ever-improving analytical methods in archaeology necessitate returning to existing collections. New techniques are rapidly developed, allowing more precise determination of the ages of artifacts and sites, how artifacts were made and used, and where artifacts were made. These techniques allow archaeologists to return to old collections and ask new questions or to revisit old questions from new perspectives. Given the rapid pace of change in the discipline, it is quite difficult to anticipate the needs of future researchers. Indeed, it is impossible, given the constraints of money and time in the world of cultural resources management, for researchers to conduct all the different types of analyses that are currently available:

> Cultural resource management is often considered to end when endangered resources are collected or excavated. Actually, this is an early step in the process. An increasing proportion of our preserved cultural heritage is being managed in museums, and it is in museums that much future archaeological research will have to be done (Christenson 1979:161).

Although published and unpublished reports document the conclusions of archaeological research, these conclusions represent inferences based on material traces of behavior. Museum collections represent the empirical data underlying these inferences – the proof of archaeological discoveries:

> If curation resources are not adequate, then reinterpretation and reproduction of results – fundamental tenets of science – become impossible (Trimble and Marino 2003:100).

In this sense, museum collections are like books in a library; researchers constantly return to them as knowledge expands (Christenson 1979; Farnsworth and Struever 1977; Lindsay et al. 1979). Objects recovered by professional archaeologists using proper techniques are more valuable, in terms of information potential, than objects recovered otherwise. They have the value of provenience and association added to them (i.e., precise documentation of the locations in which they were found and what other types of evidence were found nearby). Taxpayers have invested them with additional value by recovering, documenting, and curating them properly. Indeed, "curated collections…represent a growing resources whose long-term integrity and utility is enhanced…by responsible use (Barker 2003:71). This is because collections research is an additive process. As new analytical techniques are developed and applied (i.e., methods not available when a given collection was recovered and initially studied) and as more data accumulate, more and higher quality information is associated with curated objects. In addition, the results of discussions with Arizona's tribal communities indicate that many feel quite strongly that once materials have been collected as a result of archaeological excavation, they should not be discarded (i.e., such objects should be retained for research and educational purposes, shedding light on the lives of their ancestors).

In-field analysis (the third proposal) is problematic from a number of perspectives, as detailed in a report by the Governor's Archaeology Advisory Commission (Lyons et al. 2006) and number of more recent studies (see, e.g., Childs and Benden 2017). The quality of information generated through in-field analysis is generally unacceptably low and, even when the information is high in quality, additional research cannot be done to confirm the initial conclusions of the project or to ask new questions based on the collection, as the collection is no longer accessible (also see Childs et al. 2010).

In a series of public meetings held between mid July and early August of 2017, stakeholders proposed and discussed the fourth strategy discussed above, the development of overarching, regional mitigation plans that prioritize sites to be excavated. Examples include the Fruitland Project Mitigation Plan and the Permian Basin Mitigation Program, both designed to prioritize archaeological data recovery in large portions of New Mexico (Larralde et al. 2016; McManamon et al. 2016; Schlanger et al. 2011).

Such overarching, regional plans take a landscape-scale approach to archaeological resources, rather than continuing to manage and treat sites on a project-by-project basis. Landscape-level planning gets around piecemeal decision-making at the project or site level by taking a step back and considering research priorities and how certain types of sites might best contribute to the advancement of scientific knowledge. In the case of the Fruitland Project Mitigation Plan, project proponents contributed funds toward data recovery from sites not directly impacted in order to further research about ancestral Puebloan and Navajo sites in the general project area. Regarding the latter group of resources, this was particularly important, as the project area is the Dinetah, where the Navajo emerged as a unique cultural entity. Project proponents were particularly supportive of this plan because they could see the value in illuminating the earliest archaeology of the Navajo people, compared to digging a few trenches in sites that would yield very little new or meaningful information about the past. In short, project proponents could point to substantive contributions to society as a whole, rather than the archaeological clearance of well pads, pipelines, and roads. Such plans move CRM archaeology clearly in the direction of good science and away from the previous model of "salvage."

Stakeholders at the 3 August 2017 meeting suggested that overarching plans (and Arizona, like New Mexico, would need multiple regional plans), with clearly defined research priorities, could be very

helpful to land-managing agencies, in that it would be easier to determine where proposed development projects are likely to be most expensive or least expensive (i.e., where such projects would be in the best economic interest of a land-managing agency, for example, the Arizona State Land Department). ASM pointed out that these sorts of plans, which place the decision-making in a sound scientific context at the beginning of the management process (planning), prevent situations where, at the end of the management process (curation), stakeholders are put in the position of discussing and making plans about the possible culling of collections. ASM contends that the best legal, scientific, and ethical approach is to make the best scientifically informed decisions about which sites and which portions of sites to excavate and to then curate the resulting samples in perpetuity to preserve research potential.

Thus, ASM suggests, rather than creating a committee focused on ASM's practices as a repository (which are codified in existing federal and state statute and regulations and are situated at the downstream end of the cultural resource management process), it would be much more effective for ASM to work with GAAC to organize a committee focused on managing collections growth through the development of overarching regional research plans and alternative mitigation strategies, such as work with existing museum collections. Stakeholder meetings held between mid-June and early August of 2017 indicate a groundswell of support for this approach. ASM will also continue to be open to, when possible, modifying its business practices to better align them with the needs of other stakeholders, and ASM remains committed to seeking the most efficient and lowest-cost means of providing curation services that meet all relevant legal requirements and best professional standards.

GAAC specifically suggests that ASM pursue a national investigation of curation models and cost-saving measures employed by other repositories. As discussed above, in response to Comment No. 5, ASM used the results of recent research on curation fees nationwide in developing its proposed rate and fee structure. ASM is in the mainstream, nationally, in terms of its curation practices, the way it proposes to structure rates and fees, and the costs that drive the charges in its proposals. Furthermore, ASM is a leader in attempting to create a sustainable business model (i.e., through the proposed use of an interest-bearing account to cover in-perpetuity costs, by using curation agreements and assessing project registration fees, by charging for the in-perpetuity curation of associated records, and by proposing and enforcing collections submission standards linked to institutional curation requirements set by state and federal law and regulations).

Regarding GAAC's suggestion that ASM "approach repository practices in a way that ensures that a greater proportion of project expenditures is on aspects of archaeology that deliver on the promise of promoting heritage in ways that increase the quality of life for Americans," ASM's primary focus must be on providing curation services that meet all relevant legal requirements and best professional standards, using the most efficient and lowest-cost means available. ASM argues that meeting GAAC's goal depends on the development of overarching, regional research plans, as discussed above.

GAAC also calls for amending ABOR rules and ASM procedures "so as to provide cost-effective solutions that allow for maintaining or increasing the level of archaeological research as a result of any newly adopted curation fee model." Under this heading, GAAC specifically mentions "digital documentation of artifacts." This seems to relate to recent proposals that digital images of artifacts are just as good as artifacts themselves. This is incorrect, for the reasons enumerated above in the discussion of culling. In addition, curation of digital images presents its own logistical difficulties and is not free.

Regarding GAAC's call for cost-savings through better use of databases and other digital tools, in July of 2016, ASM faculty re-submitted a grant proposal to the National Endowment for the Humanities. If funded, this grant will provide $289,502 towards the total estimated cost of $625,628 needed to replace ASM's antiquated collections information system with a modern, consolidated system. This new system will enable ASM staff to more efficiently, accurately, and adequately complete the process of cataloguing its holdings, thereby minimizing costs passed on to project proponents. The simplified infrastructure of the new consolidated system is also anticipated to drive reductions in IT costs associated with server maintenance and storage. Again, if realized, these cost reductions will be built into the rates and fees for mandated programs and the benefit passed through to project sponsors. In addition, ASM has recently completed time-saving upgrades to its existing collections database (while awaiting acquisition and implementation of a new system) and has planned additional upgrades to be implemented before 1 July 2018; and RDI has initiated the transition of ASM's digital collections to less expensive storage models.

GAAC suggests ASM consider a move from paper to digital records. However, as ASM indicated in its response to the first round of public comments, it is required, under state and federal law, to curate the original, paper versions of the documents it currently cares for and has invested in infrastructure appropriate to this task. Moving to an all-digital system for new submissions would require significant investments in new infrastructure, increasing costs, both for ASM and for project proponents. Furthermore, there is no national, industry-wide consensus regarding digital curation standards at this time (e.g., archival digital document file formats). Finally, ASM believes that GAAC's suggestion that the community have "a statewide discussion regarding any potential changes in archaeological standards or practices that may result as unintended consequences of ASM's changes in rates, fees, and policies" will be addressed by ASM working with GAAC to organize a committee (discussed above) focused on managing collections growth through the development of overarching regional research plans and alternative mitigation strategies.

References Cited in ASM's Response to Comment No. 8

Barker, Alex W.
2003 Archaeological Ethics: Museums and Collections. In *Ethical Issues in Archaeology*, edited by Larry J. Zimmerman, Karen D. Vitelli, and Julie Hollowell-Zimmer, pp. 71-83. AltaMira Press, Walnut Creek, California.

Bawaya, Michael
2007 Archaeology: Curation in Crisis. *Science* 317(5841):1025-1026.

Childs, S. Terry
1995 The Curation Crisis: What's Being Done? *Federal Archeology* 7(4):11-15. https://www.nps.gov/archeology/cg/fd_vol7_num4/crisis.htm

2011 Archaeological Collections Management in the United States: Developing a Path to Sustainability. In *Caring for Our Collections: Papers from the Symposium: Developing Sustainable, Strategic Collection Management Approaches for Archaeological Assemblages*, edited by Charlotte H. F. Smith and Tim Murray, pp. 19–36. Museum Victoria Publishing and La Trobe University, Melbourne.

Childs, S. Terry, and Danielle M. Benden
2017 A Checklist for Sustainable Management of Archaeological Collections. *Advances in Archaeological Practice* 5(1):12-25.

available online **for a fee** at:
https://www.cambridge.org/core/journals/advances-in-archaeological-practice/article/div-classtitlea-checklist-for-sustainable-management-of-archaeological-collectionsdiv/D4B309C185404132CE10E894917958CF

Childs, S. Terry, and Lynne P. Sullivan
2004 Archaeological Stewardship: It's About Both Collections and Sites. In *Our Collective Responsibility: The Ethics and Practice of Archaeological Collections Stewardship*, edited by S. Terry Childs, pp. 3-21. Society for American Archaeology, Washington, D.C.

Christenson, Andrew L.
1979 The Role of Museums in Cultural Resource Management. *American Antiquity* 44(1):161-163.

Davis, Hester A.
1972 The Crisis in American Archaeology. *Science* 175(4019):267-272.

Farnsworth, Kenneth B., and Stuart Struever
1977 Ideas on Archaeological Curation and its Role in Regional Centers. In *Regional Centers in Archaeology: Prospects and Problems*, edited by William H. Marquardt, pp. 13-15. Missouri Archaeological Society Research Series No. 14. Missouri Archaeological Society, Columbia.

Fitzhugh, William W.
1977 Regional Repositories: A View from the Smithsonian. In *Regional Centers in Archaeology: Prospects and Problems*, edited by William H. Marquardt, pp. 18-19. Missouri Archaeological Society Research Series No. 14. Missouri Archaeological Society, Columbia.

Ford, Richard I.
1977 *Systematic Research Collections in Anthropology: An Irreplaceable National Resource*. Peabody Museum, Harvard University, Cambridge.

1984 Ethics and the Museum Archaeologist. In *Ethics and Values in Archaeology*, edited by Ernestine L. Green, pp. 133-142. The Free Press, New York.

Griset, Suzanne, Arthur W. Vokes, and Catherine Sarther, with contributions by Teresa Moreno
2004 *Requirements for the Preparation of Archaeological Project Collections for Submission to the Arizona State Museum*. Collections Division, Arizona State Museum, University of Arizona, Tucson
http://www.statemuseum.arizona.edu/media/statemuseum/_file/repository_manual.pdf

Larralde, Martin Stein, and Sarah H. Schlanger
2016 The Permian Basin Programmatic Agreement after Seven Years of Implementation. *Advances in Archaeological Practice* 4(2):149-160.

https://www.cambridge.org/core/services/aop-cambridge-core/content/view/196A11A758BEEA4C5EFE6BF1269DBFAB/S2326376800000735a.pdf/div-class-title-the-permian-basin-programmatic-agreement-after-seven-years-of-implementation-div.pdf

Lindsay, Alexander J., Jr., Glenna Williams-Dean, and Jonathan Haas
1979 *The Curation and Management of Archeological Collections: A Pilot Study*. American Anthropological Association, Washington, D.C.

1980 *The Curation and Management of Archeological Collections: A Pilot Study*. Cultural Resource Management Series. U.S. Department of the Interior, Heritage Conservation and Recreation Service, Washington, D.C.

Lipe, William D.
1974 A Conservation Model for American Archaeology. *The Kiva* 39(3-4):213-245.

Lyons, Patrick D., E. Charles Adams, Jeffrey H. Altschul, C. Michael Barton, and Chris M. Roll
2006 *The Archaeological Curation Crisis In Arizona: Analysis and Possible Solutions*. Report Prepared by the Governor's Archaeology Advisory Commission Curation Subcommittee, State Historic Preservation Office, Phoenix.
https://d2umhuunwbec1r.cloudfront.net/gallery/asp-archive/committees/downloads/GAAC_Curation_Crisis_Full.pdf

Lyons, Patrick D., and Arthur W. Vokes
2010 The Role of Fee Structures in Repository Sustainability. *Heritage Management* 3(2):213-232.

available online **for a fee** at:
http://www.tandfonline.com/doi/abs/10.1179/hma.2010.3.2.213

McManamon, Francis P., John Doershuk, William D. Lipe, Tom McCulloch, Christopher Polglase, Sarah Schlanger, Lynne Sebastian, and Lynne Sullivan
2016 Values-Based Management of Archaeological Resources at a Landscape Scale. *Advances in Archaeological Practice* 4(2):132-148.
https://www.cambridge.org/core/journals/advances-in-archaeological-practice/article/div-classtitlevalues-based-management-of-archaeological-resources-at-a-landscape-scalediv/FC7AAE375D4CFEFD0DD479437C12185B

Marquardt, William H., Anta Monet-White, and Sandra C. Scholtz
1982 Resolving the Crisis in Archaeological Collections Curation. *American Antiquity* 47(2):409-418.

Schlanger, Sarah, George MacDonell, and Signa Larralde
2011 Going Big: The Permian Basin Memorandum of Agreement as a Fundamental Shift in Section 106 Compliance. *Advances in Archaeological Practice* (1):13-23.
http://www.saa.org/portals/0/saa/publications/amantiq/articleschlanger.pdf

Society for Historical Archaeology
1993 Standards and Guidelines for the Curation of Archaeological Collections. *Society for Historical Archaeology Newsletter* 26(4):3-5.
https://sha.org/resources/curation-standards-guidelines/

Sonderman, Robert C.
2004 Before You Start That Project, Do You Know What to Do with the Collection?, in *Our Collective Responsibility: The Ethics and Practice of Archaeological Collections Stewardship*, edited by S. Terry Childs, pp. 107-120. Society for American Archaeology, Washington, DC.

Sullivan, Lynne P.
1993 *Managing Archeological Resources from the Museum Perspective*. Technical Brief #13. Archeology Program, National Park Service, Washington, D.C.
http://www.nps.gov/archeology/pubs/techbr/tch13A.htm

Sullivan, Lynne P., and S. Terry Childs
2003 *Curating Archaeological Collections: From the Field to the Repository*. Archaeologist's Toolkit Volume 6. AltaMira Press, Walnut Creek, California.

Thompson, Raymond H.
2000 The Crisis in Archaeological Collection Management. *CRM* 23(5):4-6.
https://www.nps.gov/crmjournal/CRM/v23n5.pdf

Trimble, Michael K., and Eugene A. Marino
2003 Archaeological Curation: An Ethical Imperative for the Twenty-First Century. In *Ethical Issues in Archaeology*, edited by Larry J. Zimmerman, Karen D. Vitelli, and Julie Hollowell-Zimmer, pp. 99-112. AltaMira Press, Walnut Creek, California.
http://faculty.washington.edu/plape/pubarchspr14/READINGS/Trimble%202003.pdf

9. GACC recommends that ASM revise its rules, policies, and procedures to allow for systematic culling of archaeological collections prior to curation. The current, revised fee proposal should not be adopted until such time that a Curation Advisory Committee is formed and has the opportunity to work on revising ASM's policies.

Response: See ASM's response to Comment No. 8, above.

10. GAAC recommends a phased, multi-year approach to implementation of a new rate and fee structure.

Response: ASM has responded to stakeholder input by delaying the implementation of the proposed rate and fee structure until 1 July 2018 to provide a transition. There is no source of funding to defray the differential between actual costs incurred throughout any "phase-in" period and costs recovered.

11. Several of the repositories GAAC interviewed identified federal grants that have the potential of assisting in subsidizing costs associated with ASM mandated responsibilities.

Response: ASM has long been successful in fundraising to support the care of collections, completing multi-million-dollar upgrades over the last decade. In particular, ASM has a long track record of receiving federal grants in this area. Indeed, ASM plans to apply for federal grant funds to help support the purchase of space-saving compactor shelving to outfit the new off-campus archaeological repository and research facility at the heart of ASM's current fundraising campaign. ASM will continue these efforts and will also continue to engage in collections rehabilitation contracts funded by federal agencies with legal control and financial responsibility for a portion of ASM's holdings.

ASM's final rate and fee proposal (posted 25 August 2017) adds updated information on ASM's efforts in fundraising to support the creation of an off-campus archaeological repository:

> To date, ASM has raised more than $245,000 and has submitted five grant proposals requesting a total of $1M toward the estimated $1.6M necessary to secure and outfit 30,000 square feet of archaeological collections curation and research space in an off-campus facility. Once ASM is able to secure the remaining funding, this off-campus facility will be retrofitted to meet ASM's specific storage needs. This off-campus site will enable ASM to continue to meet its mission relating to the curation of artifacts and documents even as its historical space reaches capacity, and it is anticipated that this off-campus location can be operated at lower cost than the historical buildings that currently serve as the storage space. If realized, these cost reductions will be built into the rates and fees for mandated programs and the benefit passed through to project sponsors.

Also, as discussed in ASM's response to Comment No. 8, ASM recently re-submitted a grant proposal to the National Endowment for the Humanities. If funded, this grant will provide $289,502 towards the $625,628 needed to replace ASM's antiquated collections information system. This new system will enable ASM staff to more efficiently complete the process of cataloguing its holdings, thereby minimizing costs passed on to project proponents. The simplified infrastructure of the new system is also anticipated to drive reductions in IT costs associated with server maintenance and storage. Again, if realized, these cost reductions will be built into the rates and fees for mandated programs and the benefit passed through to project proponents.

ASM's funding model cannot, however, be predicated upon subsidization, per ARS § 41-844 (project proponents must bear the costs of projects). Furthermore, federal grant funds are awarded on a competitive basis (for specific institutional projects) and, thus, are not a guaranteed operational revenue stream.

12. GAAC recognizes that neither the state of Arizona nor the University of Arizona provide adequate support to ASM for mandated services. The importance of ASM's mission and the value of the remarkable collections held by ASM should be recognized through a significantly higher level of financial support for ASM.

Response: ASM appreciates this recognition of its funding challenges. However, federal and state cultural resource law and regulations clearly place financial responsibility for development-related legal compliance with the project proponent.