Appendix A - Executive Summary: Methodology and Process

The 2012 Record of Decision (ROD) and the Final RMP/EIS pertaining to livestock use on the Sonoran Desert National Monument (SDNM), north of Interstate 8 (I-8), was challenged in the U.S. District Court, District of Arizona. The court found that the Bureau of Land Management (BLM) did not adequately explain the process that led to the 2012 land health evaluation (LHE) and the compatibility determination used to inform the 2012 ROD and Final RMP/EIS. The court cited issues with 1) identifying desired plant community (DPC) objectives, 2) determining whether DPC objectives are being met, and 3) determining whether livestock grazing was the causal factor for the non-achievement of DPC objectives. Therefore, due to the SDNM's high level of scrutiny, the BLM implemented new methods and analysis to address the issues brought forth from the previous analysis.

In the 2012 LHE, the BLM used data from a variety of sources to set DPC objectives. Generally, ranges of values defined in Natural Resources Conservation Service (NRCS) ecological site descriptions (ESDs) are used to inform site specific DPC objectives. ESDs are organized by major land resource areas (MLRA) where soil types are broken out into precipitation zones to describe unique ecological sites. They often contain descriptions of vegetation community attributes, natural variability of those attributes, and state and transition models describing different vegetation communities an ecological site may produce given different management and or disturbance. The SDNM spans a transition zone between two MLRAs as defined by average annual precipitation and elevation. The ESDs describing the most prominent ecological sites on the SDNM, between the two MLRAs, are considered "provisional" by the NRCS, meaning the information within "represents the lowest tier of documentation that is releasable to the public" but contains enough information to distinguish between different ecological sites and have undergone quality control and quality assurance protocols. Due to these factors, the BLM determined the ESDs required supplemental data to develop the DPC objectives for the 2012 LHE.

The BLM attempted to supplement the information in the ESDs with data from ungrazed reference areas on the Barry M. Goldwater Air Force Range/Area A (BMGR/Area A), south of I-8. The BLM and Pacific Biodiversity Institute (PBI) collected data from BMGR/Area A on key areas that represented ecological sites also present on the SDNM north of I-8. However, the ecological sites north of I-8 receive, on average, less annual precipitation than ecological sites south of I-8. The vegetation community data collected from the key areas south of I-8 were averaged, by ecological site, and used to develop site specific DPC objectives with the consideration of less annual precipitation on sites north of I-8. The site specific reductions of DPC objectives between ecological site types varied widely because of site specific potentials. The court determined that the reductions were not adequately explained in the LHE or administrative record (AR) and were determined to be "arbitrary and capricious."

Monitoring was conducted on the SDNM by the BLM and PBI between 2002 and 2009 to inform the 2012 LHE where the monitoring plots visited and monitoring methods varied between years and observers. The BLM used the "best available data" at the time, which included a mix of BLM and PBI data, but was unable to use the data from every sample

collected between 2002 and 2009 because of differing monitoring styles between years and observers. The BLM monitored plots using the key area concept and PBI monitored plots along disturbance gradients extending from known livestock congregation areas. Additionally, the BLM and PBI used differing monitoring protocols at their respective monitoring plots. In the 2012 LHE, the BLM used PBI monitoring plots that fit the key area concept and compared them to the same DPC objectives, but were unable to determine if grazing was the causal factor for non-achievement of DPC objectives because utilization data was not collected on PBI plots. Despite the amount of data collected between 2002 and 2009, the BLM was only able to use one year of data at each monitoring plot because plots either lacked more than one year of data or had monitoring protocol inconsistencies between years. Peer reviewers of the 2012 LHE indicated that multiple years of vegetation and utilization data are ideal and would result in a stronger analysis and determination of livestock grazing as the causal factor for non-achievement of DPC objectives.

The absence of livestock grazing on the majority of the allotments that make up the SDNM since the 2012 LHE, inconsistencies of monitoring protocols, and incomplete documentation of monitoring protocols has continued to prevent the BLM from ascertaining the trend of potential livestock impacts on the SDNM. The 2012 LHE evaluated the SDNM portions of allotments, which are often unfenced portions of larger pastures, and are potentially affected by the overall management of the allotment. The BLM determined additional data collected on a broad scale would be necessary to adequately assess potential livestock grazing impacts on the SDNM.

Between 2012 and 2014 the BLM collected additional key area monitoring data on the allotments that make up the SDNM. This data was used to inform the Maricopa Mountains Allotment Complex LHE (2014) which was used to address the SDNM allotments at a broader scale, inside and outside the SDNM. However, this LHE relied on similar methods as the 2012 LHE including incomplete ESDs and contained monitoring inconsistencies which made it infeasible to set defensible DPC objectives and ascertain trend. For these reasons the 2014 LHE was not used to inform management decisions on the allotments that make up the SDNM.

Between 2016 and 2018, the BLM re-inventoried the soils and vegetation and collected additional monitoring data to assess land health and provide well documented and repeatable monitoring data to inform the development of new DPC objectives for the seven most prevalent ecological sites within the allotments that make up the SDNM (SDNM Complex). ESD reports and ecological site maps are periodically reviewed and modified by NRCS. For this reason, the ESDs and ecological site map used in 2016-2018 differ slightly from previous studies. Stratified random monitoring plots were monitored across the SDNM Complex with new protocols that limited variability and report statistically valid data that was used to develop new DPC objectives. The new DPC objectives provided a local representation of the vegetation data and natural variability of the data eliminating the need to develop DPC objectives from provisional ESDs or reference areas. Due to the unique nature of the SDNM existing between two MLRAs, no specific precipitation zone could be assigned to the ecological sites for which the new DPC objectives were developed. The new DPC objectives were used to determine the achievement of Standard 3 of the

Arizona Standards for Rangeland Health (Standards) on the stratified random plots but were incomparable with data collected on key area plots because of differing monitoring protocols, vegetation attributes collected, and ecological site definitions. Achievement of Standard 1 was assessed on the stratified random plots in a similar fashion as the key areas of the 2012 LHE where the most complete reference sheet between the 3-7" and 7-10" precipitation zones was used for the corresponding ecological site. The absence of livestock grazing on the majority of the SDNM Complex required detailed field observations of past livestock use at the stratified random plots and the development of a livestock use probability map to assist in determining if livestock grazing, current or historical, was the causal factor for the non-achievement of Standards.

The BLM has implemented these new methods to evaluate land health and provide a rationalized basis for grazing management decisions on the SDNM Complex. Methods like these, such as assessment inventory and monitoring (AIM) protocols, have been adopted by the BLM, across the west, to inform decision making in areas with similar levels of scrutiny and has successfully implemented management actions informed by data reported from these methods. Standardized landscape approaches like these can be scaled at multiple levels and can be easily re-monitored in the future to determine the trend of resource conditions.