

# TECHNICAL MEMORANDUM

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## END-OF-YEAR 2018 PLAYA EXPOSURE ESTIMATE

PREPARED FOR: Imperial Irrigation District

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DATE: February 15, 2019

### 1 SALTON SEA AIR QUALITY PROGRAM BACKGROUND

The Salton Sea Air Quality Mitigation Program (SS AQM Program; IID 2016) was developed for the Imperial Irrigation District (IID) in cooperation with the Imperial County Air Pollution Control District (ICAPCD). The SS AQM Program is a comprehensive, science-based, adaptive approach to address air quality mitigation requirements associated with the transfer of up to approximately 300,000 acre-feet per year of conserved water under the Quantification Settlement Agreement (QSA).<sup>1</sup> The conserved water transfer reduces the volume of agricultural return flow to the Salton Sea, thereby exposing the playa and increasing the potential for dust emissions that could affect communities near and around the Sea.

The objective of the SS AQM Program is to proactively detect, locate, assess, and identify options to mitigate dust emissions from exposed Salton Sea playa. It has three main components: 1) an annual Emissions Monitoring Program (IID 2018b) to map playa exposure, estimate emissions, and identify high-priority areas of exposed playa for proactive dust control, 2) an annual Proactive Dust Control Plan (PDCP) (IID 2018a) with recommendations and design for site-specific dust control measures (DCMs), and 3) implementation of DCMs (e.g., surface roughening and vegetation establishment).

Estimation of actual playa exposure is completed as a part of the Annual Emissions Monitoring Program (IID 2018b) described above. The following sections briefly describe the playa exposure mapping results for end-of-year 2018 that will be used in the Annual Emissions Estimate for the 2018/2019 dust season.

### 2 2018 PLAYA EXPOSURE ESTIMATE

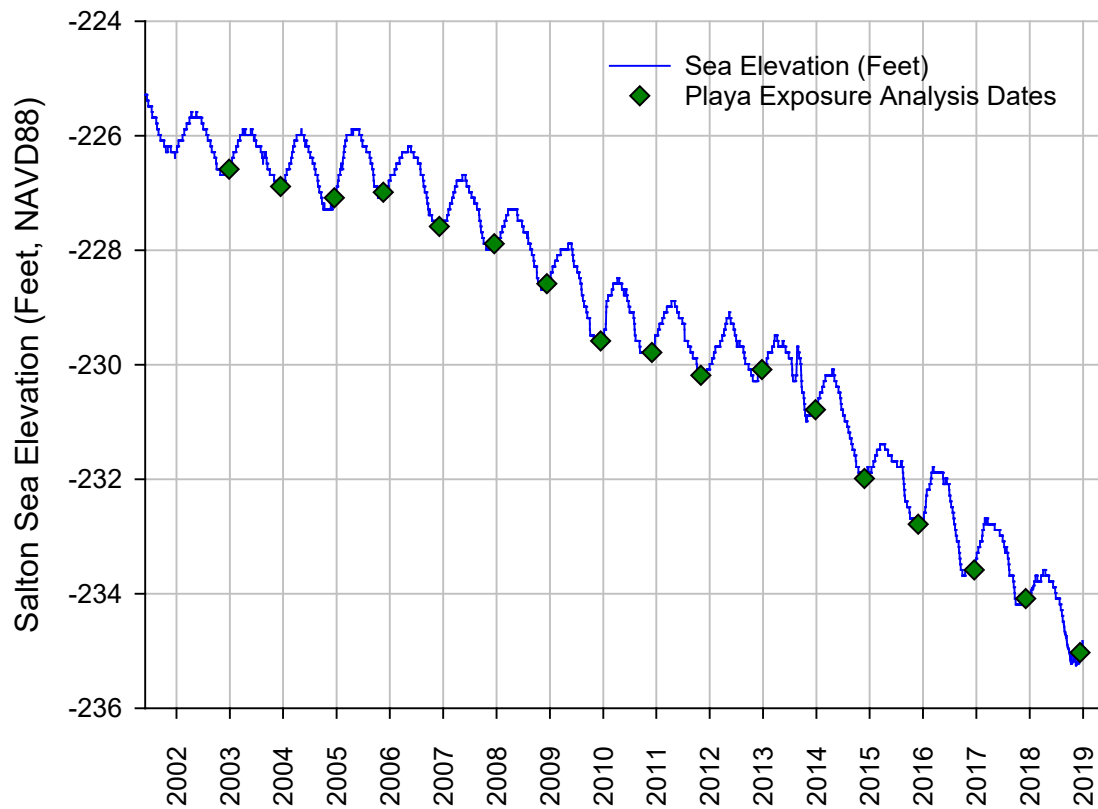
Playa exposure analysis is completed on an annual basis, at the end of each year when the Sea is at the lowest point of its hydrological cycle (Figure 1). This ensures that for any given year, the maximum extent of exposed playa is captured. Actual playa exposure is mapped using methods consistent with those described in the SS AQM Program (IID 2016) and the Annual Emissions Monitoring Report (IID

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<sup>1</sup> Impact AQ-7 is identified in the Final Imperial Irrigation District Water Conservation and Transfer Project, Draft Habitat Conservation Plan Environmental Impact Report/Environmental Impact Statement, State Clearinghouse #99091142 (Final EIR/EIS; IID N.D.), and the associated mitigation requirements are found in the Imperial Irrigation District Water Conservation and Transfer Project Mitigation, Monitoring and Reporting Program, dated September 2003 (MMRP; IID 2003).

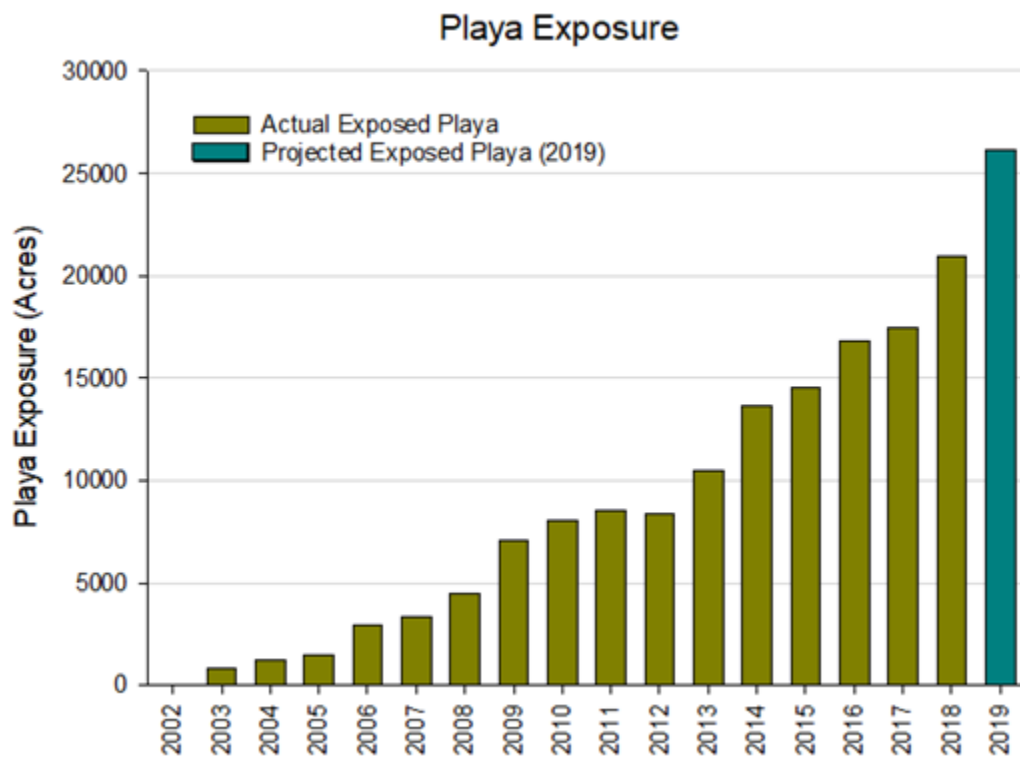
2018b). This includes analysis of satellite imagery and a combination of United States Geological Survey (USGS) gauge elevation data and high-resolution bathymetric data. The end-of-year 2002 shoreline (prior to the start of the conserved water transfer) serves as the baseline from which subsequent years are compared (IID 2016). Therefore, exposed playa for 2018 is defined as the total area of exposed land between the former Salton Sea shoreline at the end of 2002 and the shoreline at the end of 2018.

**FIGURE 1. SALTON SEA ELEVATION VERSUS PLAYA EXPOSURE SATELLITE IMAGERY ANALYSIS DATES**



End-of-year 2018 playa exposure was estimated using Sentinel-2B satellite imagery from the European Space Agency (ESA) collected on December 12, 2018. Analysis results identified 20,911 acres of exposed playa. This represents an increase of approximately 2,260 acres from the 18,651 mapped end-of-year 2017. This increase was expected given the cessation of mitigation water at the end of 2017 (IID 2002). Projected playa exposure for end-of-year 2019 is estimated at over 26,000 acres (IID 2018c). Figure 2 shows actual playa exposure levels from 2003 through 2018, as well as the exposure projected at the end of 2019.

FIGURE 2. ACTUAL PLAYA EXPOSURE FROM 2003 THROUGH 2018, AND PROJECTED PLAYA EXPOSURE FOR 2019

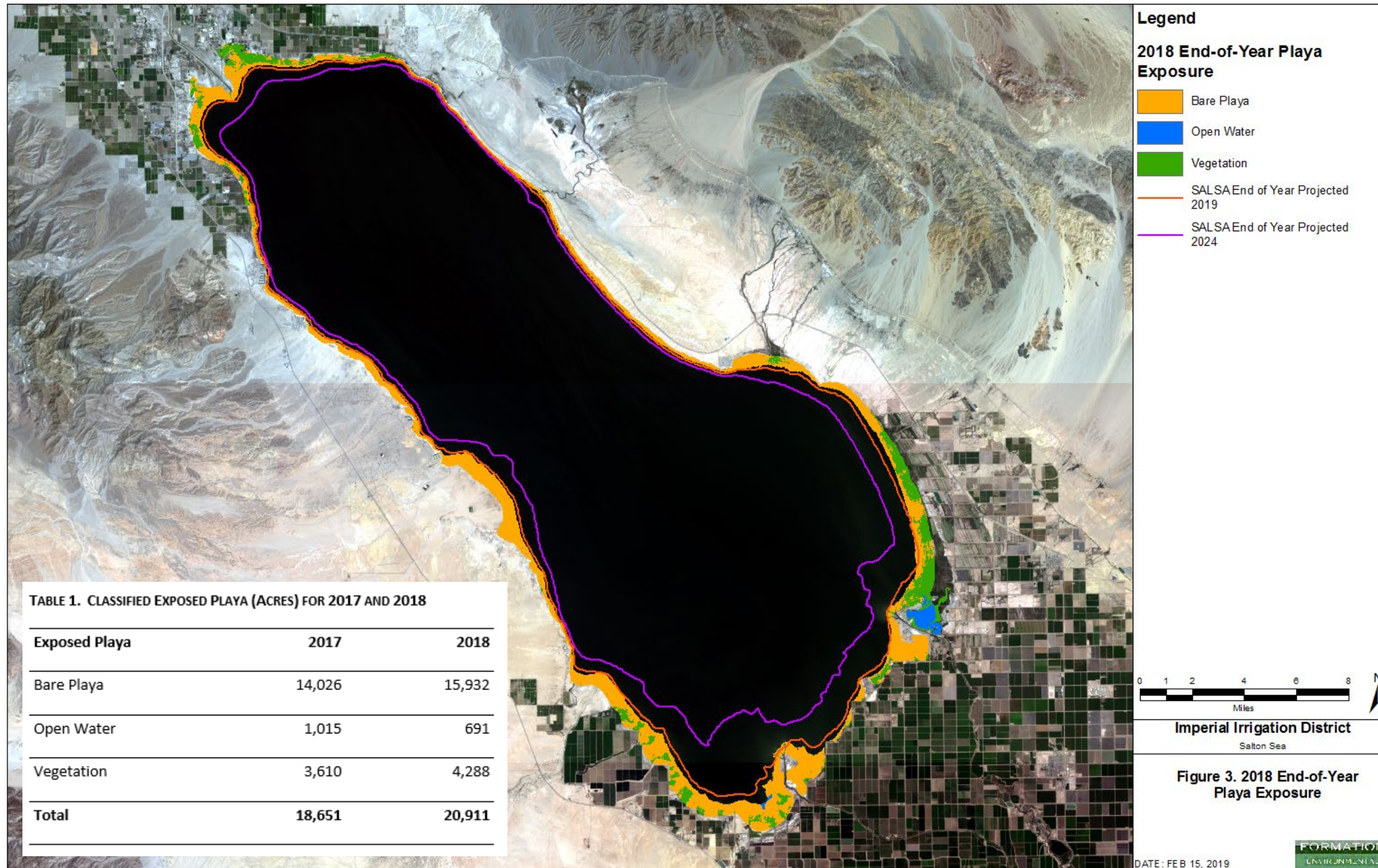


To provide additional context to exposed playa estimates, the playa was subdivided into three general classes: bare playa, open water, and vegetation (Figure 3). Open water is not a dominant feature, but it was mapped to define small pools, drains, and sheet flow commonly found in small depressions at or near the confluence of the direct drains and/or rivers to the Sea. These general classes were mapped using remotely sensed data resources and methods consistent with those described in the SS AQM Program (IID 2016). Results demonstrated that the bare playa class increased by ~1,900 acres to 15,932; open water decreased by ~320 acres to 691; and heavily vegetated playa increased by ~680 acres to 4,288 (Figure 3; Table 1).<sup>2</sup>

<sup>2</sup> Note that acreage for isolated bodies of open water on exposed playa were not included for analysis to determine emissions in the 2016/2017 Annual Report and Emissions Estimates (IID 2018b).

**FIGURE 3. END-OF-YEAR 2018 PLAYA EXPOSURE MAP AND ACREAGE ESTIMATES**

The SALSA model is described below in Section 3.



**TABLE 1. CLASSIFIED EXPOSED PLAYA (ACRES) FOR 2017 AND 2018**

Exposed Playa	2017	2018
Bare Playa	14,026	15,932
Open Water	1,015	691
Vegetation	3,610	4,288
<b>Total</b>	<b>18,651</b>	<b>20,911</b>

### 3 ACTUAL PLAYA EXPOSURE VS. PROJECTED PLAYA EXPOSURE

The timing and location of future playa exposure is a function of the hydrologic response of the Salton Sea to external forces, such as inflows, salt loads, and evaporation rates. The Salton Sea Accounting Model (SSAM) was originally developed by the United States Bureau of Reclamation to simulate the effects of the water transfers under the QSA on Salton Sea surface elevation and salinity. In 2006, the hydrologic modeling framework was revised to incorporate additional data and water balance improvements, and to add flexibility to the model. The updated model is called the Salton Sea Analysis model (or SALSA model), developed for the Programmatic Environmental Impact Report (PEIR) for the Salton Sea Ecosystem Restoration Program, which was prepared under the direction of the California Department of Water Resources and the California Department of Fish and Wildlife<sup>3</sup> on behalf of the Natural Resources Agency.<sup>4</sup> The SALSA model has since been updated further and results were recently published by IID (IID 2018c).

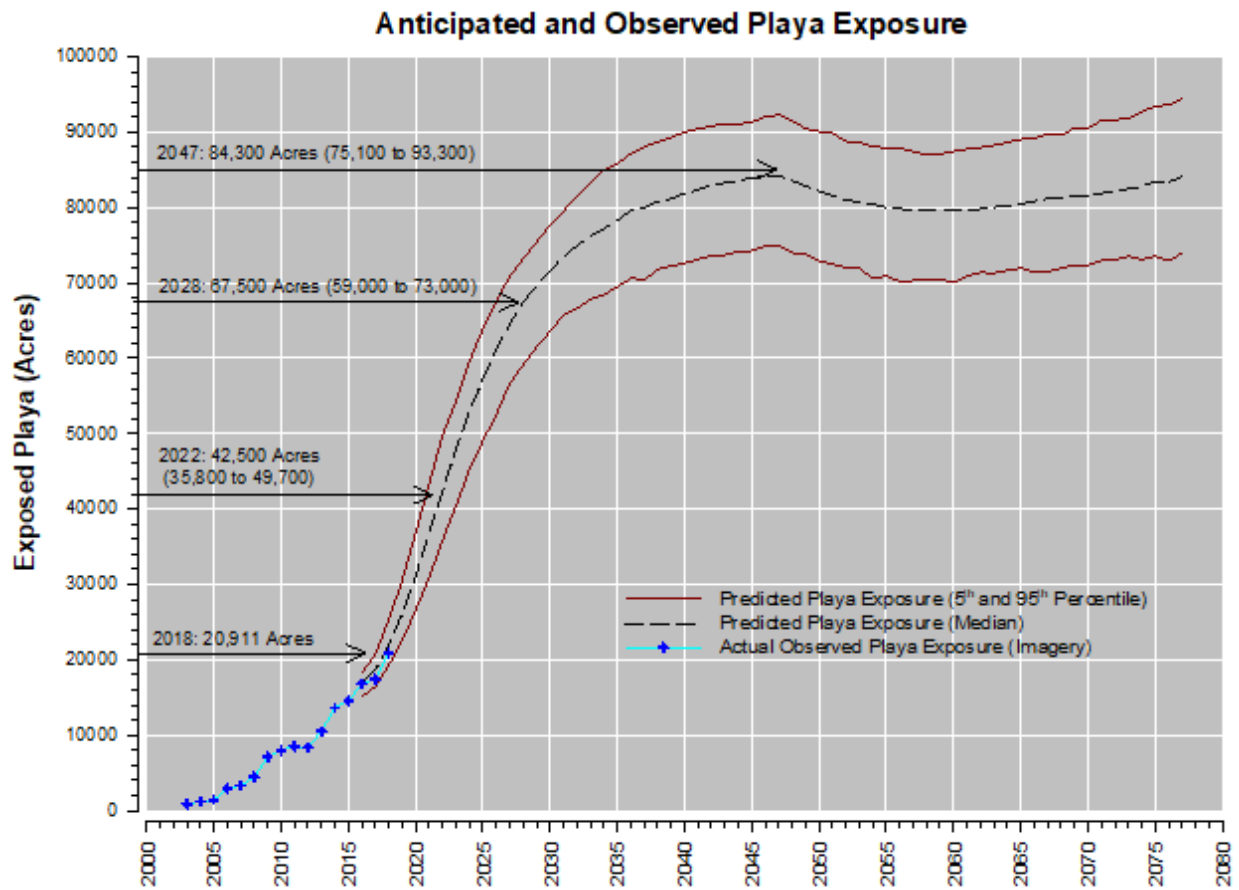
Projected playa exposure using the “median” model run from the SALSA2 model was compared to actual playa exposure from satellite imagery. Results indicate that actual playa exposure and the projected playa exposure from SALSA2 were very close and well within the “prediction envelope” of the 5<sup>th</sup> and 95<sup>th</sup> percentiles (Figure 4). Specifically, the SALSA2 model predicted 22,029 acres compared to actual exposure of 20,911 in 2018 (a difference of 1,118 acres). Projected versus actual playa exposure will continue to be monitored in subsequent years to track the SALSA2 model predictions and identify if they diverge from actual conditions on the ground.

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<sup>3</sup> Formerly the California Department of Fish and Game

<sup>4</sup> Formerly the California Resources Agency

**FIGURE 4. ACTUAL PLAYA EXPOSURE FROM SATELLITE IMAGERY VERSUS SALSA2 MODEL PROJECTED PLAYA EXPOSURE**



## 4 REFERENCES

- IID. N.D. Final Imperial Irrigation District Water Conservation and Transfer Project, Draft Habitat Conservation Plan Environmental Impact Report/Environmental Impact Statement. State Clearinghouse #99091142.
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- IID. 2003. Imperial Irrigation District Water Conservation and Transfer Project Mitigation, Monitoring and Reporting Program. September.
- IID. 2016. Salton Sea Air Quality Mitigation Program. Prepared by the Salton Sea Air Quality Team for the Imperial Irrigation District in coordination with the County of Imperial. July.

- IID. 2018a. Proactive Dust Control Plan 2017/2018 Annual Plan. Prepared by the Salton Sea Air Quality Team for the Imperial Irrigation District in coordination with the County of Imperial.
- IID. 2018b. Salton Sea Emissions Monitoring Program 2016/2017 Annual Report and Emissions Estimates. Prepared by the Salton Sea Air Quality Team for the Imperial Irrigation District in coordination with the County of Imperial.
- IID. 2018c. Salton Sea Hydrological Modeling and Results. Prepared by CH2M HILL for the Imperial Irrigation District. October.