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Memorandum

April 25, 2024 **Project #3333-18**

To: **Abby Thorne-Lyman, City of Alameda**

From: **Steve Rottenborn**

Subject: **Alameda Point Marine Cloud Brightening Program Testing – Assessment of Potential Ecological Impacts**

Per a request from the City of Alameda, this memorandum summarizes H. T. Harvey & Associates' evaluation of the Marine Cloud Brightening Program and testing on the deck of the *USS Hornet* at Alameda Point in Alameda, California with respect to potential effects on California least terns (*Sternula antillarum browni*) and other sensitive species in the vicinity.

I have been assisting the City of Alameda with evaluation of biological resources issues at Alameda Point since 2011, assisting the City in coordinating with the U.S. Fish and Wildlife Service regarding the Biological Opinion for transfer and reuse of former Naval Air Station Alameda; assisting with preparation of the biological resources section of the Environmental Impact Report on the Alameda Point Reuse Project; and helping the City evaluate the potential effects of various activities that are proposed at Alameda Point on the California least tern and other sensitive species.

Overview of the Testing Activity

The University of Washington's Marine Cloud Brightening Program is performing testing that involves spraying a sea salt plume from the deck of the *USS Hornet* and measuring the generated aerosol at multiple points downwind. The substances being sprayed represent the typical constituents of sea water that are combined into a solution in advance, rather than being taken from the bay. Operation occurs 4 days/week; on each day of testing, spraying occurs three times in ½-hour intervals, usually between 7am and 11am. Spraying is proposed to occur for approximately 20 weeks (through August 2024). Spraying occurs from the west end of the deck of the *Hornet*, facing toward the other end of the ship. The spray dissipates quickly and does not have sufficient velocity to reach the other end of the 814-foot long flight deck. The compressor/sprayer system produces sound levels of 92 decibels (dB) 3 feet from the sprayer; sound levels decline rapidly with increasing distance, so that at 48 feet, sound levels are approximately 81 dB, approximately the sound of a vacuum cleaner.

Assessment of Potential Effects on Sensitive Species

I do not expect the Marine Cloud Brightening Program's testing to result in any adverse effects on California least terns or other sensitive species, for the following reasons:

- The substances sprayed during this testing, which consist of the constituents of seawater and are combined in concentrations found in seawater, are not harmful to sensitive species. Given that testing

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occurs at San Francisco Bay, all sensitive species in the vicinity are well adapted to these substances. Because these substances are combined into a solution rather than taken from the bay, they lack any pollutants that might be present in the bay and therefore are "cleaner" than bay water.

- The aerosol would not reach the California least tern colony. According to the project proponent, the aerosol dissipates before it reaches the end of the 814-foot long flight deck, and it is sprayed from the west end of the flight deck facing east. The least tern colony is located 4,750 feet northwest of the *Hornet*, so no aerosol from the testing would reach the colony.
- The aerosol would likely not reach any birds, marine mammals such as harbor seals (*Phoca vitulina*), or other animals foraging in the vicinity of the *Hornet*. Given that the aerosol reportedly dissipates before it reaches the end of the 814-foot long flight deck, and it is sprayed from the west end of the flight deck facing east (along the flight deck), there is no expectation that it would affect least terns, other birds, or marine mammals foraging in waters near the *Hornet*.
- The sound produced by the testing would not be loud enough to even be heard from the least tern colony, and it would not be loud enough to disturb terns, other birds, or marine mammals that might be foraging in the vicinity of the *Hornet*.