



## ZONE 3 ADVISORY COMMITTEE

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San Luis Obispo County Flood Control and Water Conservation District

### SPECIAL MEETING AGENDA

Thursday, November 29, 2018 6:30 P.M.  
City of Arroyo Grande Council Chambers  
300 East Branch Street, Arroyo Grande, California 93420

I. CALL TO ORDER AND ROLL CALL

II. PUBLIC COMMENT

This is an opportunity for members of the public to address the Committee on items that are not on the Agenda

III. ACTION ITEMS (Board of Supervisors Action is Subsequently Required)

- A. Motion to pursue a Cloud Seeding Program for the Winter of 2018/19, contingent on Board of Supervisors' approval and certification of a Mitigated Negative Declaration for the Cloud Seeding Program

IV. COMMITTEE MEMBER COMMENTS

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Next Regular Meeting is Tentatively Scheduled for  
January 17, 2019 at 6:30 PM at City of Grover Beach Council Chambers  
Agendas accessible online at [SLOCountyWater.org](http://SLOCountyWater.org)

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**November 29, 2018**

**TO:** Flood Control Zone 3 Advisory Committee

**FROM:** Ray Dienzo, Public Works - Water Resources Senior Engineer

**SUBJECT:** Cloud Seeding Program Update, Cost Summary, and Recommendation

**Recommendation**

It is recommended that the Zone 3 Advisory Committee vote to pursue a Cloud Seeding Program for the Winter of 2018/19, consisting of aircraft only for a 5-month period at an estimated cost of ~\$300,000 contingent on the Board of Supervisors’ approval and certification of a Mitigated Negative Declaration for the Cloud Seeding Program. The Zone 3 Technical Advisory Committee unanimously endorsed the above recommendation at their November 14, 2018 meeting.

**Discussion**

A potential cloud seeding program was introduced at the November 15, 2018 Zone 3 Advisory Committee meeting. The Committee concluded more information and discussion was needed to make a more informed recommendation. Although the recommendation at tonight’s Special Meeting has not changed from the November 15<sup>th</sup> meeting, County Public Works Staff will provide a more detailed presentation to the Committee and address some concerns that were raised.

The tables below summarize the estimated costs of a potential cloudseeding program. These estimates are excerpted from the Cloud Seeding Feasibility Study that was released on March 2017 (Study). Tables 1 - 4 show the cost estimates of ground, air, and ground-air combo program. For ground sites, Table 1 shows start up costs for site surveys, securing easements, preparing the sites, and installing and testing. Tables 2 - 4, show yearly program costs of ground stations only, aircraft only, and combination ground-aircraft. Note there are fixed and reimbursable cost components to the programs. For instance, if there are not enough rain seeding events, then flight hours or flares that are unused would be reimbursed.

Ground sites would take more time to implement due to planning and construction. Choosing this option would likely take one year to implement. The aircraft only option as shown in Table 3, can be implemented within the first available rain season after project approval. Also, there are potential partnering opportunities with neighboring agencies, such as the County of Santa Barbara, that would reduce the costs.

<b>Table 1. Start up Costs - Ground Sites</b>	<b>Costs</b>
Site Surveys, Leases, etc.	\$ 15,000
Four Ground Based Units - Fabrication, Installing and Testing - @\$30K each	\$ 140,000
<b>Total</b>	<b>\$ 155,000</b>
	<b>Costs</b>

<b>Table 2. Yearly Program Costs - Five Month with 4 Ground-sites only</b>		
Set up, Take-down, and Reporting		\$ 25,000
Five month fixed costs @\$13K each		\$ 65,000
Reimbursable costs - 200 ground flares at \$90/flare		\$ 18,000
	<b>Total</b>	<b>\$ 108,000</b>

<b>Table 3. Yearly Program Costs - Five Month Aircraft Only</b>		<b>Costs</b>
Set up, Take Down, and Reporting		\$ 53,000
Airborne operation, five month fixed cost @\$30K/month		\$ 150,000
Reimbursable Costs - 80 flight hours@\$550/hour		\$ 44,000
Reimbursable Costs - 60 hours airborne seeding @4 flares/hour, @\$90/flare		\$ 21,600
	<b>Total</b>	<b>\$ 268,600</b>

<b>Table 4. Yearly Program Costs - Combination Five Month Ground and Three Month Aircraft</b>		<b>Costs</b>
Set up, Take Down, and Reporting		\$ 66,000
Ground operations, two month fixed cost @\$13K		\$ 26,000
Ground and Airborne operations, three months fixed costs @\$44K		\$ 132,000
Reimbursable costs - 50 flight hours @\$550/hr		\$ 27,500
Reimbursable costs - 40 hours airborne seeding, 4 flares/hr, @\$90/flare		\$ 15,200
Reimbursable costs - 200 ground flares @\$90/flare		\$ 18,000
	<b>Total</b>	<b>\$ 284,700</b>

Tables A and B show the estimated flow increases to the Salinas and Lopez watersheds with 9% or 17% rain increases from cloud seeding. The Study also states that a 9% rain increase can be expected from ground sites only. And a 17% rain increase would more likely result from the combination ground station and aircraft option. The aircraft only option would likely yield results somewhere between the 9 - 17% projection.

<b>Table A. Estimated Increased Flows assuming 9% Rainfall Increase</b>		<b>\$Ground only/AF</b>	<b>\$Air only/AF</b>	<b>\$Comb/AF</b>
Salinas Reservoir	3,100 AF	\$ 35	\$ 87	\$ 92
Salinas - creeks and tributaries	2,334 AF	\$ 46	\$ 115	\$ 122
Total Salinas Increase	5,434 AF	\$ 20	\$ 49	\$ 52
Lopez Reservoir	2,926 AF	\$ 37	\$ 92	\$ 97
Lopez - creeks and tributaries	2,203 AF	\$ 49	\$ 122	\$ 129
Total Lopez Increase	5,129 AF	\$ 21	\$ 52	\$ 56
<b>Overall Increase</b>	<b>10,563 AF</b>	<b>\$ 10</b>	<b>\$ 25</b>	<b>\$ 27</b>

<b>Table B. Estimated Increased Flows assuming 17% Rainfall Increase</b>		<b>\$Ground only/AF</b>	<b>\$Air only/AF</b>	<b>\$Comb/AF</b>
Salinas Reservoir	5,855 AF	\$ 18	\$ 46	\$ 49
Salinas - creeks and tributaries	4,579 AF	\$ 24	\$ 59	\$ 62
Total Salinas Increase	10,434 AF	\$ 10	\$ 26	\$ 27
Lopez Reservoir	5,527 AF	\$ 20	\$ 49	\$ 52
Lopez - creeks and tributaries	4,322 AF	\$ 25	\$ 62	\$ 66
Total Lopez Increase	9,849 AF	\$ 11	\$ 27	\$ 29
<b>Overall Increase</b>	<b>20,283 AF</b>	\$ 5	\$ 13	\$ 14

**Staff recommends the Aircraft only option as summarized in Table 3. This option would increase precipitation with minimal implementation time, and readily provide partnering opportunities.**

As requested at the November 15, 2018 meeting, the website links below are to reports that may be helpful for technical support.

Link to the Mitigated Negative Declaration and supporting documents

<http://www.slocounty.ca.gov/Departments/Public-Works/Current-Public-Works-Projects/Winter-Cloud-Seeding-Program-for-Lopez-Lake-and-Sa.aspx>

Other documents are posted on the Zone 3 website at

<https://slocountywater.org/site/Flood%20Control%20and%20Water%20Conservation%20District%20Zones/ZONE%203/> and are described as follows:

“SMUD Silver Iodide 2017” is a report that summarizes several years of silver iodide monitoring in the El Dorado county area (I mistakenly said Placer County in the meeting).

“Extra Area Effects Atmospheric Research” addresses the concern of cloud seeding taking rain away from downstream areas.

“WMA\_Santa Barbara Evaluation 2015” describes a historical analysis on how cloud seeding has affected the target watersheds of the County of Santa Barbara program.

“Geochemistry and Impacts of Silver Iodide” describes Silver Iodide and it’s use in cloud seeding. Also summarizes that past reports show Silver Iodide as low risk and is the basis for the Department of Water Resources recommending cloud seeding in its 2009 California Water Plan.

### **Financing**

Proposed funding for this unanticipated FY 18/19 budget request of ~\$300,000 will come primarily from deferral of projects budgeted in this year, as well as cost savings from prior year projects. It is anticipated that no reserves or increases to contractor billings will be needed to fund this effort.