

Source: CBS News

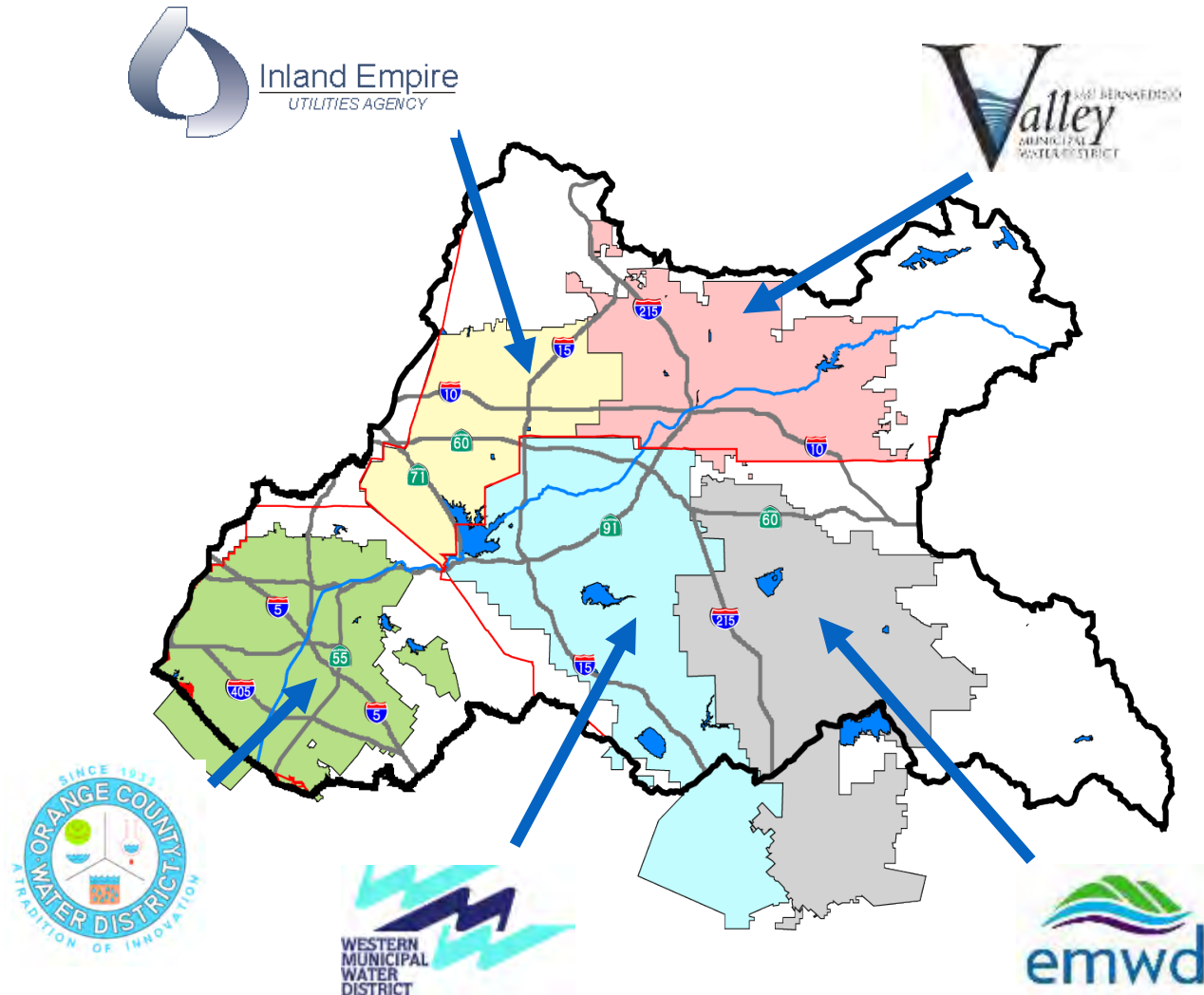
# Santa Ana River Watershed Weather Modification Pilot Program

Mark Norton PE

Water Resources & Planning Manager  
Santa Ana Watershed Project Authority



# SAWPA: Joint Powers Authority with five Member Agencies



## Stakeholders:

- 97 Water-related Agencies
- 4 Counties
- 63 Cities
- State, environmental, and regulatory agencies
- Federal agencies
- Other special districts
- Special interest groups

# How cloud seeding works

**1**

Silver iodide mixed with acetone is vaporized, releasing particles into the atmosphere.

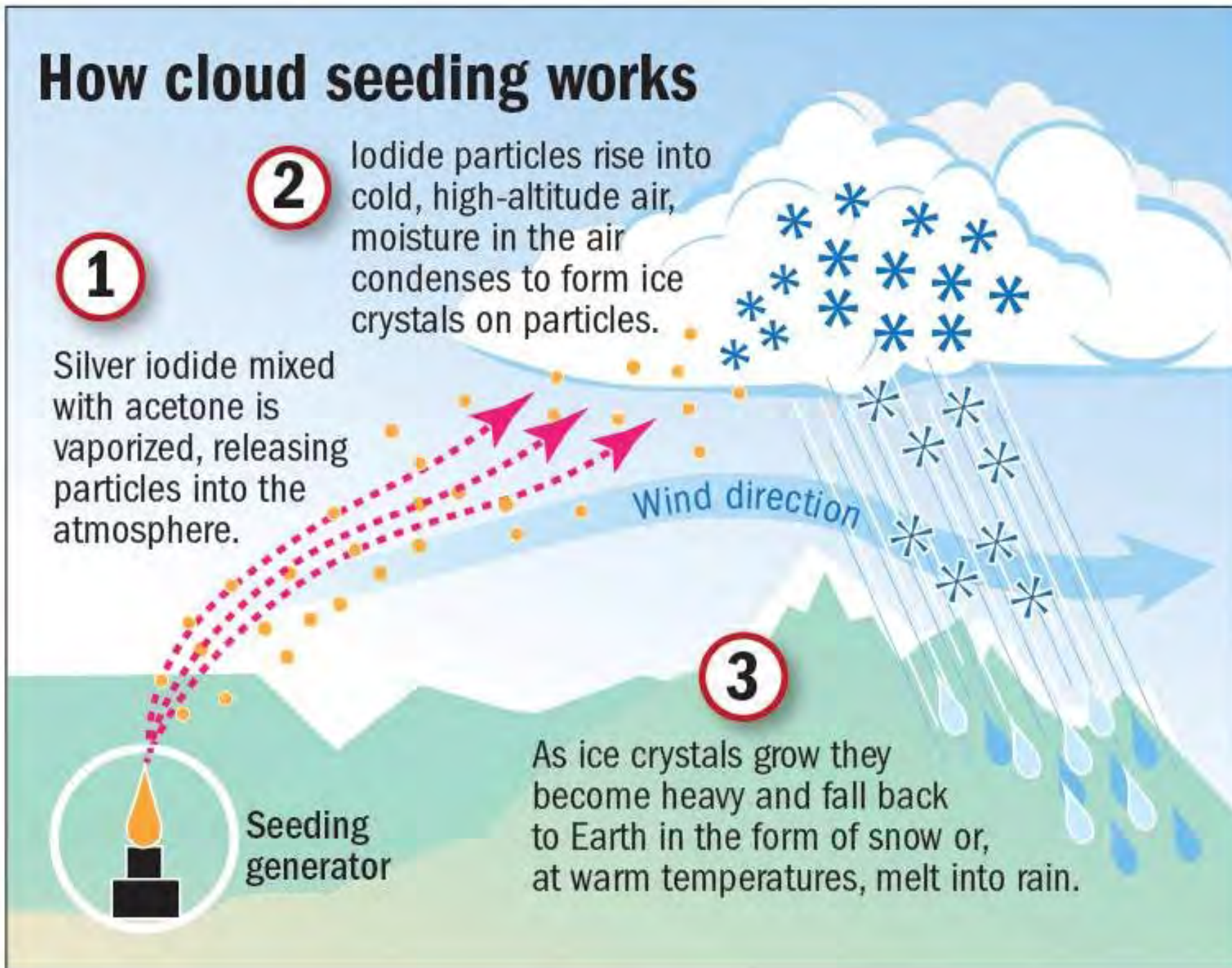


**2**

Iodide particles rise into cold, high-altitude air, moisture in the air condenses to form ice crystals on particles.

**3**

As ice crystals grow they become heavy and fall back to Earth in the form of snow or, at warm temperatures, melt into rain.



Source: The Fact Site



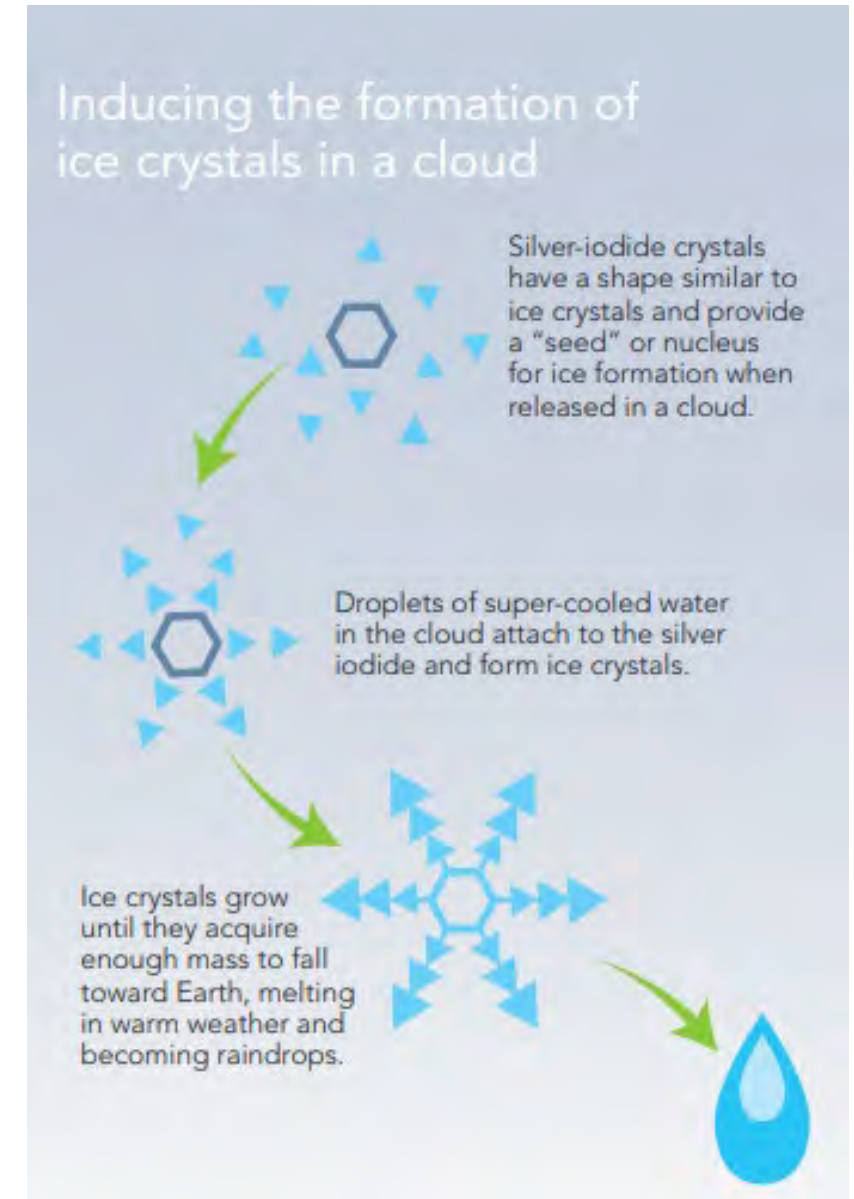
# Cloud Seeding History

## Background

- Physics is well known
- Started in the U.S. in the 1940s
- Challenges: Overselling, limited science
- Misconceptions remain

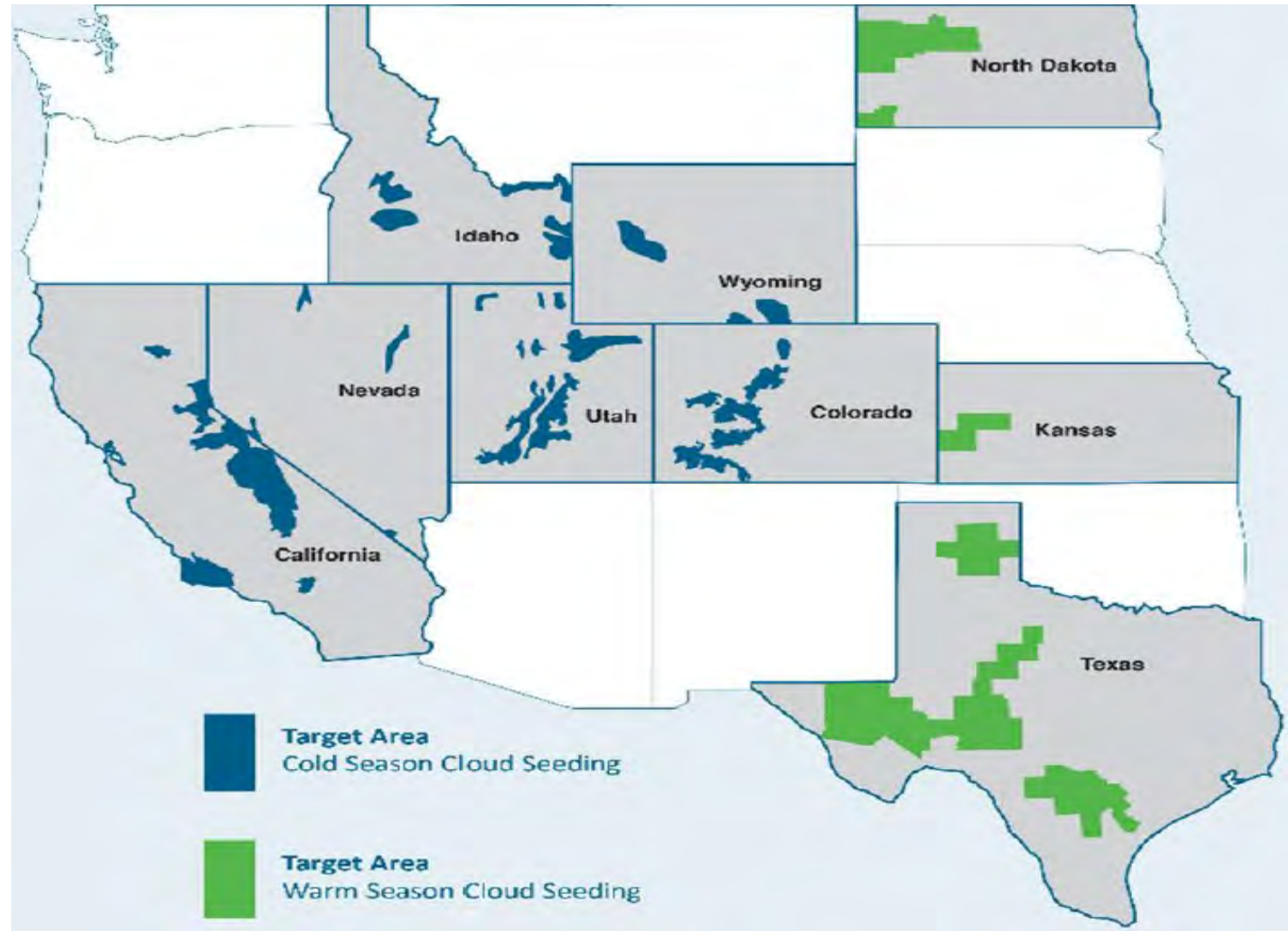
## Recent Advances

- Weather forecasting
- Computing / Modeling
- Seeding methods
- Scientific validation studies



# U.S. Projects

- ◆ Cold Season Cloud Seeding Leaders
  - CA, CO, ID, UT, WY, NV
- ◆ Applications
  - Power Utilities (hydropower)
  - Ski areas
  - Water Resource Agencies
  - Irrigation Districts
- ◆ California Projects
  - Santa Barbara County
  - San Luis Obispo
  - Sacramento Municipal Water District
- ◆ CA DWR
  - Cloud seeding is a “safe and effective means of augmenting local water supplies.”



Source: North American Weather Modification Council

# Ground Based Seeding Methods

## CNG's (Cloud Nuclei Generators)



- Ideal for orographic lift (winds caused by land barriers)
- Create a continuous plume
- Inexpensive to install and operate

## AHOGS (Automated High Output Ground Seeding) Systems



- Ideal for strong convective storm attributes (turbulence)
- Delivers higher concentration of silver iodide
- Operated remotely – rapid release

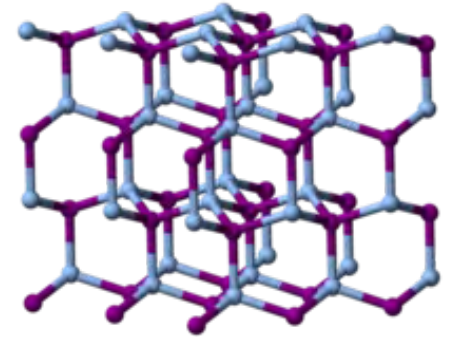
# Licensing and Permitting

- Operators are licensed and carry liability insurance
- Suspension criteria turns off program during high precipitation/flood conditions
- No CA state permit required
- CEQA mitigated negative declaration will be conducted
- There have been no successful legal challenges to any operation in US for over 50 years



# Safety of Silver Iodide (AgI)

- Silver Iodide:
  - Inert mineral salt
  - Not soluble in water
  - Does not break down into Ag and I
  - Is not carcinogenic to humans or animals
- In the environment:
  - Concentrations in soil due to cloud seeding are within the range of background levels



AgI particle



# Why consider cloud seeding in the Santa Ana River Watershed?

## Precipitation – and flows in the Santa Ana River – have been trending down

- Cloud seeding increases precipitation (with an emphasis as snow in upper elevations)
- Produces a local supply
- Potential to reduce the use of imported water

## Dry years and droughts occur

- Cloud seeding works in both dry and wet years

## Cost effective

- Costs for 8%-11% increase in streamflow is a fraction of the cost of imported water

## Supports local water storage

- Natural infiltration
- Takes advantage of existing stormwater capture infrastructure

# Santa Ana River Watershed Weather Modification Pilot Program

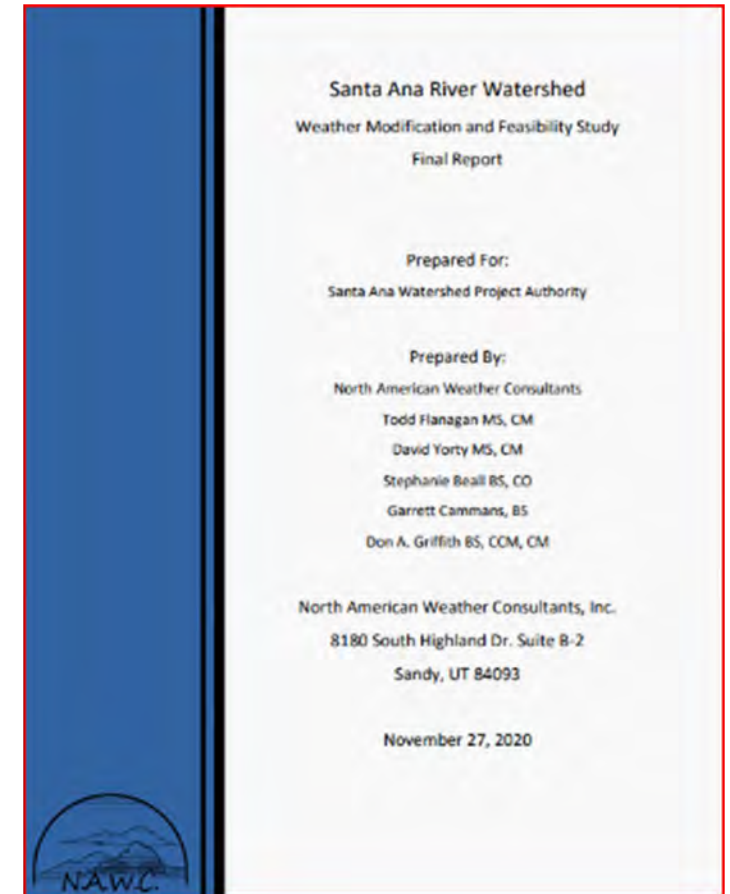
Feasibility Study (2020)

CEQA and Ground Seeding  
Siting (2021-2022)

Outreach and Public  
Engagement (2021-2025)

Prop 1 Round 2 Grant  
Application (2022)

4-Year Pilot Study (2022-  
2025)



Feasibility Study (2020)

<https://sawpa.org/latest-info/watershed-cloud-seeding-feasibility-study/>



# Feasibility Study Outcomes

Ground Based Seeding Dispersion Model:

- Agl Dispersion

4 seeding areas:


- Northwest
- Northeast
- Southwest
- Southeast



# Projected Increases in Precipitation and Streamflow (annual averages)

## Ground Only Seeding:

Target Area	Seasonal Precip. Increase (inches)	Percent Increase	Avg. Natural Streamflow (AF)	Streamflow Increase (AF)	Percent Increase
NW	0.41	3.5%	25,000	2,043	8.2%
NE	0.49	4.1%	65,000	4,330	6.7%
SW	0.59	3.7%	5,000	447	9.0%
SE	0.49	4.5%	10,000	1,373	13.7%
<b>TOTAL w/ Ground Only</b>			<b>105,000</b>	<b>8,193</b>	<b>7.8%</b>

 Remember this number.



# “Annual” Cost Estimates for Pilot – Ground Based Seeding

	Rate	Frequency	
<b>Annual Operations</b>			
Set Up	\$ 33,500	1	\$ 33,500
Take Down	\$ 24,000	1	\$ 24,000
Reporting	\$ 10,000	1	\$ 10,000
<b>Monthly Operations</b>			
Fixed Services	\$ 24,500	5	\$ 122,500
<b>Variable Items (timed expenses are billed on a per hour basis)</b>			
Ground Flares	\$ 110	60	\$ 6,600
Generator Run Time	\$ 19.50	600	\$ 11,700
Flight Time	\$ 375	N/A	-
Aerial Flares	\$ 110	N/A	-
<b>TOTAL</b>			<b>\$ 208,300</b>
<b>COST PER ACRE-FOOT</b>			<b>\$ 25.42</b>
<b>Benefit to Cost</b>			<b>10.03</b>

**Cost per acre-foot (AF) =**  
Total Program Cost / Estimated AF produced

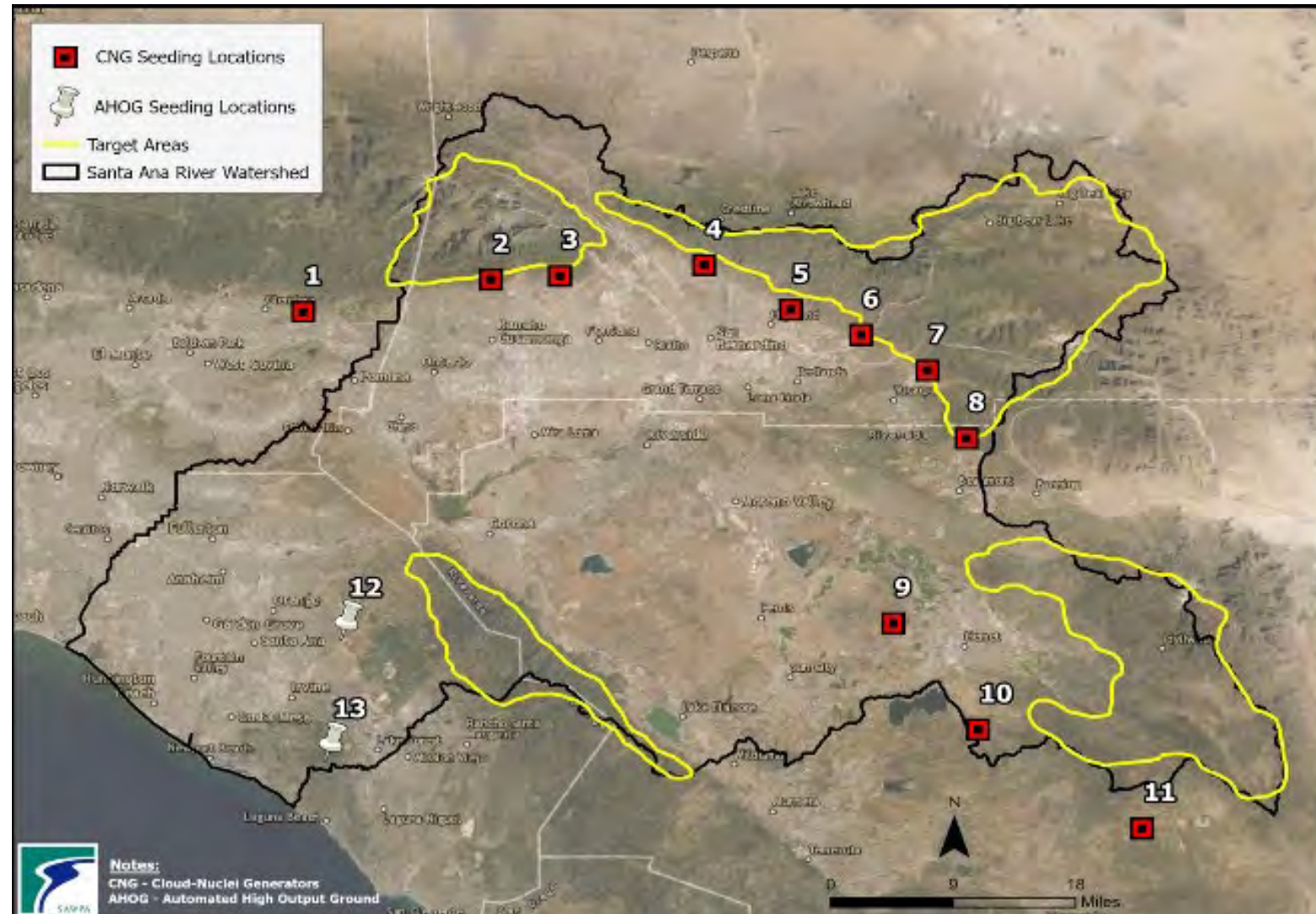
$$\$208,300 / 8,193 \text{ AF} = \mathbf{\$25.42 \text{ per AF}}$$

**Benefit to Cost Ratio =**  
Cost of Untreated Imported Water per AF / Cost of Cloud Seeding per AF

$$\$255 \text{ per AF} / \$25.42 = \mathbf{10.03}$$

# Purpose of Weather Modification Pilot Program

- Verify increases in precipitation
  - Compare Target areas to Control areas
  - 3-4 years needed
- Evaluate increases by areas in watershed
- Review:
  - Benefit/Cost evaluation
  - Operations
  - Suspension criteria
  - Permitting

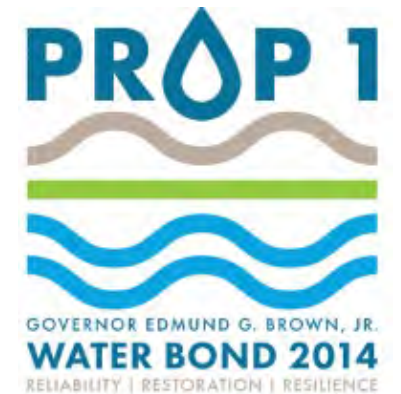


# Santa Ana River Weather Modification Pilot Program

Program Element	2020	2021	2022	2023	2024	2025	2026
Feasibility Study	Active						
Outreach on Local Cost Share (for grant)		Active	Active				
Ground Seeding Site Analysis		Active	Active				
CEQA			Active	Active			
Prop 1 Round 2 Grant Application (50% of cost)				Active			
<b>Pilot Program</b>					Active	Active	Active
Outreach/Public Engagement		Active	Active	Active	Active	Active	Active

# Pilot Program – Next Steps

- SAWPA Commission has authorized:
  - Study of Ground Based Seeding Unit Sites and Access
  - CEQA Mitigated Negative Declaration
- Prepare proposal for Prop 1 Round 2 Grant (IRWM)
  - DWR grant to cover 50% of pilot program
- Outreach is essential
  - Briefings to agencies and the public in the watershed
  - CEQA public meetings
- Cost share for Grant
  - Opportunities for support from interested agencies





# Thank You!

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951.354.4221

# **Disadvantaged Community Involvement Program**

## **STATUS UPDATE**

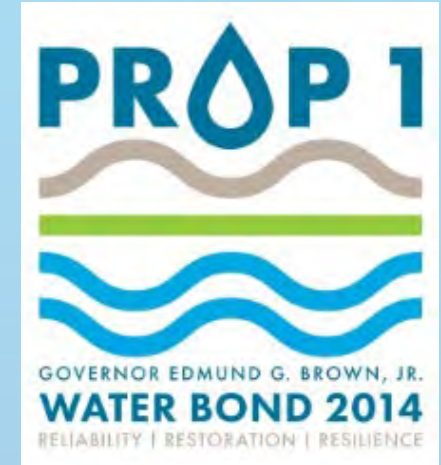
### **2021 Urban and Multibenefit Drought Relief Grant Program**

**Rick Whetsel, Senior Watershed Manager  
OWOW Steering Committee | January 27, 2022  
Item No. 4.B.**



# Disadvantaged Community Involvement (DCI) Program

- **July 2021** – SAWPA completes Prop 1 IRWM DCI Grant
- **August 2021** – Discussions with DWR on use of DCI funds to implement “Technical Assistance Projects”
- **July/October 2021** – Grant Agreement extended term of SAWPA’s DCI Program



# 2021 Urban and Multi-benefit Drought Relief Grant Program (DWR)

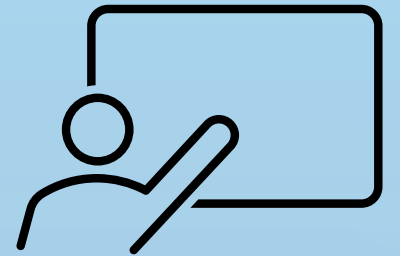
- Grant Program:
  - September 2021 – Draft Guidelines and Proposal Solicitation Package (PSP) released
  - October 2021 – Final Guidelines and Proposal Solicitation Package released
  - Provides at least \$190 million in drought relief funding
- Fund projects that respond to drought, including:
  - Loss or contamination of water supplies
  - Impacts on human health and safety
  - Protect fish and wildlife resources
- Set-Aside:
  - \$50 million statewide
  - Support Underrepresented Communities and Native American Tribes
  - Use Prop 1 IRWM DCI Program





# 2021 Urban and Multi-benefit Drought Relief Grant Program - \$5 million Set-Aside for SAWPA

- SAWPA:
  - Grantee of the DACI Program for our IRWM region
  - Eligible for up to **\$5 million** (use of existing DACI grant agreement)
- Program details:
  - Fund eligible drought relief projects
  - Benefits to Underrepresented Communities or Tribes
  - No local cost share match required for grant
  - Projects to be bundled together in a single application
  - Deadline for application: February 2022



# SAWPA: Call For Project Applications

- Use of an on-line “Call For Project Applications” Form
- DWR Grant Requirements
  - Respond to drought
  - Two quantifiable benefits
- SAWPA DCI Program Goals
  - Technical Assistance Criteria for rating and ranking projects
- Approach:
  - Target projects previously awarded “Technical Assistance Funding” under SAWPA DCI program



# List of Targeted Projects

<b>Project Proponent:</b>	<b>Project Title:</b>
<b>Big Bear Area Regional Wastewater Agency</b>	Replenish Big Bear
<b>City of Fullerton</b>	Fullerton's Water Future - Ensuring Delivery of Clean, Safe Drinking Water
<b>City of Santa Ana</b>	Washington Avenue Well Project
<b>Box Springs Mutual Water Company</b>	Rehabilitation, Removal or Replacement of Water Storage Reservoirs with SCADA
<b>City of Colton</b>	Two New Potable Wells with Generators
<b>Devore Water Company</b>	New Reservoir, Distribution System Upgrades and New Well
<b>Idyllwild Water District</b>	Water Treatment Plant Upgrade with SCADA
<b>Marygold Mutual Water Company</b>	New Well and Generator Project
<b>Terrace Mutual Water Company</b>	New Potable Well
<b>Soboba Band of Luiseno Indians</b>	Residential Asbestos Cement Pipe Abandonment and Replacement Project

# Submitted Project Proposals

<b>Project Proponent:</b>	<b>Project Title:</b>
<b>Big Bear Area Regional Wastewater Agency</b>	Replenish Big Bear
<b>City of Fullerton</b>	Well 3A Rehabilitation
<b>City of Fullerton</b>	Well 6 Rehabilitation
<b>Box Springs Mutual Water Company</b>	Reservoir and Well Improvement
<b>City of Colton</b>	Production Well 32
<b>Devore Water Company</b>	Booster Pump Station and Valve Vault
<b>Marygold Mutual Water Company</b>	Well 7 Rehabilitation and Systems Upgrade





# Timeline

- **December 22** – SAWPA Releases on-line Call for Project Application Form
- **January 4** – SAWPA Informational Workshop
- **January 21** – Applications Due to SAWPA
- **January 27** – Status Report to OWOW Steering Committee
- **February 15** – SAWPA Commission Authorize Recommended list of projects
- **February 16 to 28** – Submit Grant Application to DWR



# Questions



# Prop 1 Round 2 IRWM Call for Projects Update

Ian Achimore, Senior Watershed Manager  
OWOW Steering Committee | January 27, 2022  
Item No. 4.C.





# Purpose of Presentation

- ▶ Announce release of Call for Projects, and
- ▶ Address items included in the Department of Water Resources' Prop 1 Round 2 draft guidelines and proposal solicitation package (PSP).

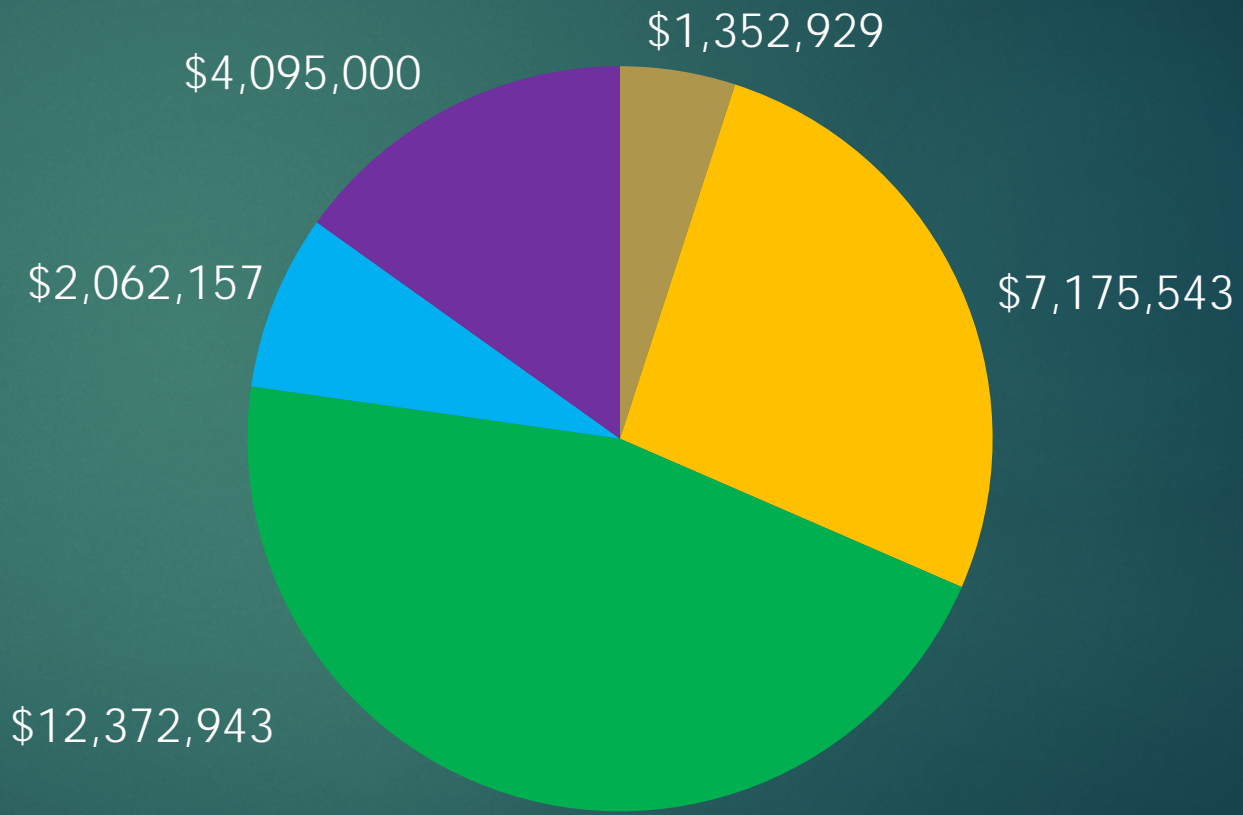


# Prop 1 Round 2 Amounts by Category

## Santa Ana River Watershed

Categories created by Agreement executed with North Orange County IRWM Group in 2019:

- Grant Admin
- North Orange County\*
- Upper Watershed
- Watershed Wide
- DAC Implementation



**Total = \$27,058,572**

\*Includes \$989,072 carry over from Round 1

# High-Level Round 2 (R2) Schedule

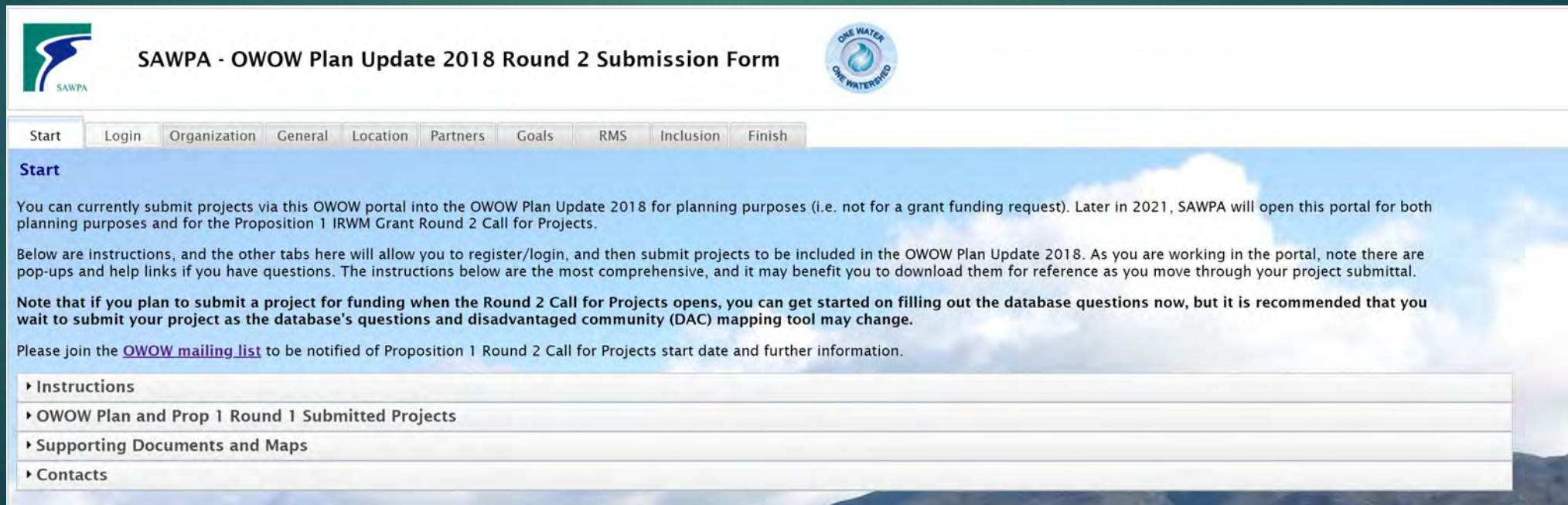


\*March 25, 2022 is the close of the call for projects.



# Call for Projects Form

- ▶ Form available: <https://sawpa.org/owow/future-funding-opportunities/>
- ▶ Workshops to be held every two to three weeks to assist interested project applicants.



The screenshot shows the top of a web portal. On the left is the SAWPA logo, and on the right is the 'ONE WATER ONE WATERSHED' logo. The main title is 'SAWPA - OWOW Plan Update 2018 Round 2 Submission Form'. Below the title is a navigation bar with tabs: Start, Login, Organization, General, Location, Partners, Goals, RMS, Inclusion, and Finish. The 'Start' tab is active. The main content area has a blue header with the word 'Start' and a background image of a cloudy sky. The text below explains that users can currently submit projects for planning purposes and provides instructions on how to use the portal, including a note about submitting projects for funding when the Round 2 Call for Projects opens. At the bottom, there is a list of links: Instructions, OWOW Plan and Prop 1 Round 1 Submitted Projects, Supporting Documents and Maps, and Contacts.

**SAWPA - OWOW Plan Update 2018 Round 2 Submission Form**

Start Login Organization General Location Partners Goals RMS Inclusion Finish

**Start**

You can currently submit projects via this OWOW portal into the OWOW Plan Update 2018 for planning purposes (i.e. not for a grant funding request). Later in 2021, SAWPA will open this portal for both planning purposes and for the Proposition 1 IRWM Grant Round 2 Call for Projects.

Below are instructions, and the other tabs here will allow you to register/login, and then submit projects to be included in the OWOW Plan Update 2018. As you are working in the portal, note there are pop-ups and help links if you have questions. The instructions below are the most comprehensive, and it may benefit you to download them for reference as you move through your project submittal.

**Note that if you plan to submit a project for funding when the Round 2 Call for Projects opens, you can get started on filling out the database questions now, but it is recommended that you wait to submit your project as the database's questions and disadvantaged community (DAC) mapping tool may change.**

Please join the [OWOW mailing list](#) to be notified of Proposition 1 Round 2 Call for Projects start date and further information.

- ▶ Instructions
- ▶ OWOW Plan and Prop 1 Round 1 Submitted Projects
- ▶ Supporting Documents and Maps
- ▶ Contacts

# Groups SAWPA Connecting with Regarding the Call for Projects Announcement

## Entity from Approved Round 2 Communication Plan

Council of governments

Flood control districts

SAWPA member agencies and large to mid-sized retail water agencies

Small water agencies (mutual water companies, investor-owned utilities)

Tribes

Non-governmental organizations

Disadvantaged communities

Resource conservation districts

Forest related groups (National Forests, fire safe councils, Cal-Fire)



# Draft PSP Items to Update Steering Committee

DWR Policy from Draft PSP	Method for Incorporation into OWOW Process
<p>Local application processes must prioritize projects that will have all California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and permitting completed within an estimated 12 months of the funding award date (Note: that award date is estimated to be May 2023).</p>	<p>During the participatory budgeting phase of the OWOW process, which occurs after projects are initially ranked, projects with an estimated schedule that reflects DWR's timeline will be also prioritized for funding.</p>
<p>Disadvantaged Community (DAC) Implementation projects may request that they be considered for General Implementation funding if DAC Implementation funds are completely utilized.</p>	<p>During the participatory budgeting phase of the OWOW process, which occurs after projects are initially ranked, if certain DAC Implementation projects are not initially within the top tier of their funding category, they may request General Implementation funding.</p>

# Competition Pools for Round 2

Disadvantaged  
Community  
Implementation  
(\$4,095,000)

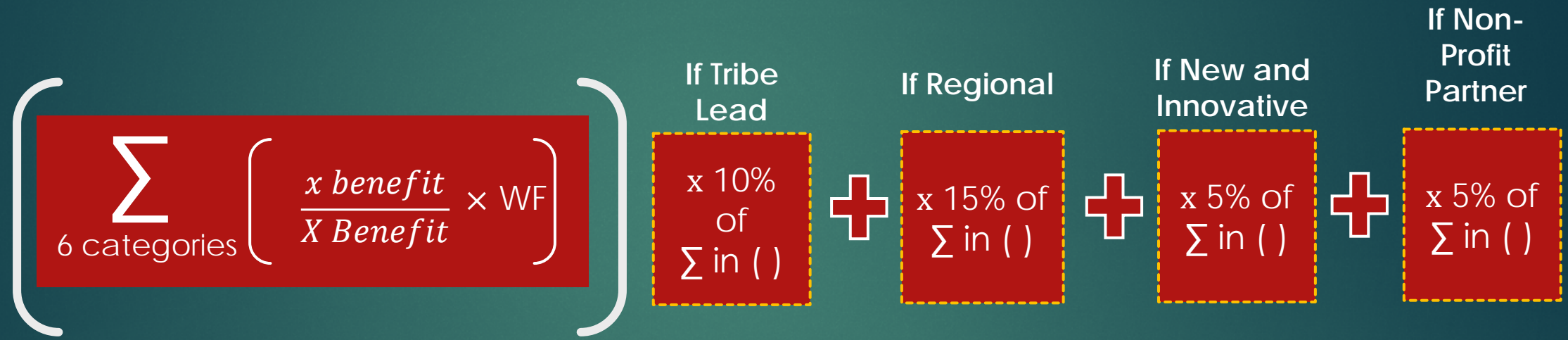


General  
Implementation  
(\$14,435,100)



WF = Weighting Factor

# Ranking Formula



\*DAC competition pool has just 3 categories and the Tribal/NGO extra %. DAC also has 10% extra for an NGO that is the project lead (and not just a partner).

# Detailed General Implementation Categories

Benefit Category	Weighting Factor	Category Information	Unit
Water Supply	9	Amount of water supply provided through innovation and optimization. <i>Can be recycled water.</i>	Acre Feet
Water Quality Improvement	8	Amount of water quality improved for people or the environment. <i>Can be wastewater.</i>	Million Gallons Per Day
Stormwater Protection	8	Amount of acres protected from flooding	Acres
Habitat Improvement	7	Amount of preserved or enhanced natural habitat	Acres
Percentage of DAC/EDA Area	6	Share of Benefit Area that is DAC/EDA (from +0% to 100%)	Percentage
Climate Change Adaptation/Mitigation	7	Amount of greenhouse gases removed/avoided from project implementation	Tons of CO2
Tribal Benefit	NA - Extra 10%	Lead applicant is federally recognized Indian Tribe or CA State Indian Tribe listed on the Native American Heritage Commission's CA Tribal Consultation List	Yes/No
Regional Benefit	NA - Extra 15%	Benefit area (or equivalent impact) covers at least approximately 75% of IRWM Funding Area, including adjacent IRWM Regions	Yes/No
New and Innovative Decision Support Tools	NA - Extra 5%	Project employs new or innovative technology or practices, or is a pilot project.	Yes/No
Non-Profit Partner or Lead (501c3)	NA - Extra 5%	Non-profit provides labor, land value, and/or resources, toward implementation of the project. If they are the lead (and not just a partner), project is also eligible for this 5%.	Yes/No



# Detailed DAC Categories

Benefit Category*	Weighting Factor	Category Information	Unit
Water Supply	9	Amount of water supply provided	Acre Feet
Water Quality Improvement	8	Amount of water quality improved	Million Gallons Per Day
Stormwater Protection	8	Amount of acres protected from flooding	Acres
Tribal Benefit	NA – Extra 10%	Lead applicant is federally recognized Indian Tribe or CA State Indian Tribe listed on the Native American Heritage Commission’s CA Tribal Consultation List	Yes/No
Non-Profit Partner or Lead (501c3)	NA – Extra 5% (or 10%)	Non-profit provides work, land value, and/or resources toward implementation of the project. If they are the lead, project receives 10% total	Yes/No

\*No DAC-related weight; instead DAC tract will have a DAC-related gate whereby at least 75% of the benefit area must be DAC.

# After Ranking Process → OWOW Participatory Budgeting Process

12

- ▶ After rankings, OWOW workshops are to be held via the “Participatory Budgeting” Process.
  - ▶ Developed with the goals of **transparency**, objectivity, and deliberation.
- ▶ Purpose is to receive input on the projects proposed in both competition pools.
  - ▶ Is the project eligible for OWOW/Prop 1?
  - ▶ Are the benefits claimed realistic?
  - ▶ Is watershed improved without unreasonable expense/detriment to others?
  - ▶ Includes active participation of multiple agencies?



# Ensuring 12-Month Ready Projects Are Prioritized

- ▶ Step 1 - Allocate funding to those top projects based on those top projects share of the sum of the weighted scores,
- ▶ Step 2 - Ensure any projects that meet DWR's schedule priority are prioritized:
  - ▶ 12-month schedule (starting after DWR award date) for CEQA/NEPA/Permitting.
  - ▶ This would apply to both general implementation and DAC competition pools.

Ensure any 12-month schedule projects are prioritized.

Top project threshold, Initial allocation.

Project ID	Score
1	699
2	643
3	526
4	424
5	401
6	298
7	246
8	244
9	170
10	143
11	101
12	93

Project 8 would move up with other high-ranking project.



# Ensuring DAC Projects Can Potentially Receive General Impl. Funding

- ▶ During the participatory budgeting phase, if certain DAC projects are not within the top tier of their funding category, they may request General Implementation funding.

DAC Competition Pool

Project ID	Score
1	799
2	620
3	525
4	500
5	301
6	280
7	240
8	232

General Implementation Pool

Project ID	Score
1	699
2	643
3	526
4	424
5	401
6	298
7	246
8	244
9	170
10	143
11	101
12	93

DAC projects below funding threshold can request to be considered in General Implementation pool's scores.



# High-Level Round 2 (R2) Schedule



\*March 25, 2022 is the close of the call for projects.

# Questions