AGENDA
IRVINE RANCH WATER DISTRICT
SUPPLY RELIABILITY PROGRAMS COMMITTEE
TUESDAY, MARCH 24, 2020

Due to COVID-19, this meeting will be conducted as a teleconference pursuant to the provisions of the Governor's Executive Orders N-25-20 and N-29-20, which suspend certain requirements of the Ralph M. Brown Act. Members of the public may not attend this meeting in person.

Participation by Committee Members will be from remote locations. Public access and participation will only be available telephonically/electronically.

To virtually attend the meeting and to be able to view any presentations or additional materials provided at the meeting, please join online via Webex using the link and information below:

Via Web: https://irwd.my.webex.com/irwd.my/j.php?MTID=m1b3c8c56a1e926a988a931c98ff539e6
Meeting Number: 629 280 886
Password: eQXFw7m9

After joining the meeting, in order to ensure all persons can participate and observe the meeting, please select the "Call in" option and use a telephone to access the audio for the meeting by using the following call-in information:

Call-in Phone Number: (510) 338-9438
Access Code: 629 280 886 #
Attendee Number: Please enter the attendee id number, which will be provided when you connect to Webex, followed by #.

As courtesy to the other participants, please mute your phone when you are not speaking.

CALL TO ORDER 3:00 p.m.

ATTENDANCE
Committee Chair: Peer Swan _____
Member: Douglas Reinhart _____

ALSO PRESENT

Paul Cook	_____	Paul Weghorst	_____
Rob Jacobson	_____	Fiona Sanchez	_____
Kellie Welch	_____	Christine Compton	_____
Ray Bennett	_____	Jo Ann Corey	_____
Dane Johnson	_____	Natalie Palacio	_____
_____	_____	_____	_____

PUBLIC COMMENT NOTICE

If you wish to address the Committee on any item, please submit a request to speak via the "chat" feature available when joining the meeting virtually. Remarks are limited to three minutes per speaker on each subject. You may also submit a public comment in advance of the meeting by emailing comments@irwd.com before 12:00 p.m. on Tuesday, March 24, 2020.

ALL VOTES SHALL BE TAKEN BY A ROLL CALL VOTE.

COMMUNICATIONS

1. Notes: Weghorst

2. Public Comments

3. Determine the need to discuss and/or take action on item(s) introduced that came to the attention of the District subsequent to the agenda being posted.

4. Determine which items may be approved without discussion.

INFORMATION

5. WATER BANKING PROJECT FACILITIES, CAPACITIES, OPERATIONS AND PROGRAMS – JOHNSON / WELCH / SANCHEZ / WEGHORST

   Recommendation: Receive and file.

6. EXTRAORDINARY SUPPLY NEEDS FROM IRWD WATER BANKING PROJECTS IN KERN COUNTY – JOHNSON / SANCHEZ / WEGHORST

   Recommendation: That the Committee provide feedback on the assessment of IRWD's Extraordinary Supply needs presented at the meeting.

OTHER BUSINESS

7. Directors' Comments

8. Adjourn

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Availability of agenda materials: Agenda exhibits and other writings that are disclosable public records distributed to all or a majority of the members of the above-named Committee in connection with a matter subject to discussion or consideration at an open meeting of the Committee are available for public inspection in the District's office, 15600 Sand Canyon Avenue, Irvine, California ("District Office"). If such writings are distributed to members of the Committee less than 72 hours prior to the meeting, they will be available from the District Secretary of the District Office at the same time as they are distributed to Committee Members, except that if such writings are distributed one hour prior to, or during, the meeting, they will be available electronically via the Webex meeting noted. Upon request, the District will provide for written agenda materials in appropriate alternative formats, and reasonable disability-related modification or accommodation to enable individuals with disabilities to participate in and provide comments at public meetings. Please submit a request, including your name, phone number and/or email address, and a description of the modification, accommodation, or alternative format requested at least two days before the meeting. Requests should be emailed to comments@irwd.com. Requests made by mail must be received at least two days before the meeting. Requests will be granted whenever possible and resolved in favor of accessibility.

March 19, 2020
Prepared by: D. Johnson / K. Welch
Submitted by: F. Sanchez / P. Weghorst
Approved by: Paul A. Cook

SUPPLY RELIABILITY PROGRAMS COMMITTEE

WATER BANKING PROJECT FACILITIES, CAPACITIES, OPERATIONS AND PROGRAMS

SUMMARY:

Staff has prepared information related to IRWD's water banking facilities, capacities, operations and exchange programs. The information is regularly updated to reflect changes in the status of IRWD's projects, programs and operations. At the Committee meeting, staff will review this information. Staff will also provide an update on efforts to secure additional water for recharge at IRWD's water banking projects.

BACKGROUND:

To facilitate the discussion with the Committee, staff has prepared reference materials in tabular, map and schematic formats to describe IRWD's water banking facilities, capacities, operations, storage and exchange programs. The reference materials are updated regularly to reflect changes in the status of the projects, programs and operations. The following is an overview of the reference materials.

Capacity and Operations Tables:

A table presenting storage, recharge and recovery capacities of existing and planned IRWD water banking projects, including capacities available to IRWD in the Kern Water Bank, is attached as Exhibit "A". Exhibits "B" and "C" provide an update on water banking recovery and recharge operations, as well as the balance of the water stored in the Kern Water Bank. Exhibit "B" provides before-loss estimates of water recharged at the water banking projects, and Exhibit "C" provides after-loss estimates of water recharged at the projects. Both Exhibits "B" and "C" include a column that provides totals for each water type and storage location. Changes shown in red on Exhibits "B" and "C" reflect water recovered for Buena Vista Water Storage District in 2020, as well as the updated State Water Project (SWP) allocation of 15% for 2020.

Exhibit "D" graphically depicts how storage of SWP and non-SWP water has changed in the Strand and Stockdale Integrated Banking Projects through time. The table provided as Exhibit "E" shows how capacities in the water banking projects have been dedicated to IRWD's existing and proposed exchange programs.

Project Maps:

To support the tables provided as Exhibits "A", "B", "C" and "E", as well as the figure provided as Exhibit "D", staff has prepared maps that depict project wells and pipelines, recharge basins and Cross Valley Canal turnout locations, along with the most current recharge rates. These maps are provided as Exhibits "F", "G" and "H", respectively. The facilities shown on the maps

are associated with the Strand Ranch, Stockdale West, Stockdale East and Drought Relief Projects.

Program Agreement Diagrams:

Schematic diagrams have been prepared that depict the IRWD water banking and exchange programs with Rosedale-Rio Bravo Water Storage District, Buena Vista Water Storage District, Dudley Ridge, and Metropolitan Water District. These diagrams are provided as Exhibits "I", "J", "K", "L" and "M", as described in the List of Exhibits. Next month, staff will include a new schematic diagram for the 1-for-1 Exchange Program with Dudley Ridge.

Other Recharge Opportunities:

IRWD has been pursuing additional opportunities to secure water for recharge. At the Committee meeting, staff will provide an update on efforts to secure water from:

- Antelope Valley-East Kern Water Agency;
- Mojave Water Agency;
- Dudley Ridge Water District; and
- Other sources.

FISCAL IMPACTS:

None.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

RECOMMENDATION:

Receive and file.

LIST OF EXHIBITS:

Exhibit "A" – Recharge, Storage and Recovery Capacities of Current and Anticipated Water Banking Projects
Exhibit "B" – Water Banking Storage, Recharge and Recovery Operations before Losses
Exhibit "C" – Water Banking Storage, Recharge and Recovery Operations after Losses
Exhibit "D" – Historic Water Storage in Strand and Stockdale Projects
Exhibit "E" – Dedicated Capacities of Current Water Banking Projects
Exhibit "F" – Map of Water Banking Project Wells and Pipelines
Exhibit "G" – Map of Water Banking Recharge Basins and Cross Valley Canal Turnout Facilities
Exhibit "H" – Map of Water Banking Recharge Rates

Exhibit "I" – Diagram of IRWD-Rosedale Water Banking and Exchange Program Agreements
Exhibit "J" – Diagram of Long-Term Water Exchange Program with BVWSD and Diagram of One-Year Program to Augment Recharge Using Stockdale West Recharge Facilities with BVWSD
Exhibit "K" – Diagram of Unbalanced Exchange Program Diagram with DRWD
Exhibit "L" – Diagram of Coordinated Operating, Water Storage, Exchange and Delivery Agreement with Metropolitan Water District
Exhibit "M" – Diagram of Template Wheeling Agreement with Metropolitan Water District

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Exhibit "A"

TABLE 1
Current and Anticipated Water Banking Project
Recharge, Storage and Recovery Capacities
March 19, 2020

WATER BANKING PROJECT	OWNERSHIP AND WELL INFO			ALLOCATED CAPACITY (AF)					1st PRIORITY RECOVERY CONDITIONS (CFS)		2nd PRIORITY RECOVERY CONDITIONS (CFS)	
	IRWD OWNED	WELLS EXISTING	WELLS PROPOSED OR UNDER CONST.	TOTAL STORAGE CAPACITY	ANNUAL RECHARGE 1ST PRIORITY	ANNUAL RECHARGE 2ND PRIORITY	ANNUAL RECOVERY 1ST PRIORITY	ANNUAL RECOVERY 2ND PRIORITY	RECOVERY CAPACITY AS PLANNED[1]	ESTIMATED RECOVERY CAPACITY (APR. 2019 CONDITIONS)[2]	RECOVERY CAPACITY AS PLANNED	RECOVERY CAPACITY CURRENT CONDITIONS
Strand Ranch	Yes	7	-	50,000	17,500	-	17,500	-	40.0	40.0	-	-
Stockdale West	Yes	3	-	26,000	27,100	-	11,250	-	15.0	15.0	-	-
Stockdale East	No	-	2	-	-	19,000	-	7,500	-	-	10.0	-
IRWD Acquired Storage Account[3]	No	-	-	50,000	-	-	-	-	-	-	-	-
Drought Relief Project Wells[3]	No	3	-	-	-	-	-	-	15.0	15.0	-	-
Kern Water Bank Storage Account[5]	No	-	-	9,495	3,200	-	6,330	-	-	-	-	-
TOTALS		13	2	126,000	44,600	19,000	28,750	7,500	70.0	70.0	10.0	0.0
Partner Capacities[4]				38,000	22,300	9,500	10,850	0	35.5	25.0	-	-
IRWD Capacities				88,000	22,300	9,500	17,900	7,500	34.5	25.0	-	-
IRWD's recovery ***during*** 6 month partner recovery period (AF)									12,420	9,000	-	-
IRWD's recovery ***after*** 6 month partner recovery period (AF)									5,480	6,733	-	-
TOTALS (AF)									17,900	15,733	-	-
Number of months needed to recover IRWD's total AF after partners' recovery (Assumes IRWD has use of total recovery capacity after partners' recovery)									8.6	10.2	-	-
Strand Ranch monthy recharge amount assuming 0.3 ft/day average recharge rate (AF)											4,518	
Stockdale West monthy recharge amount assuming 0.3 ft/day average recharge rate (AF)											2,331	

[1] Based on designed Strand recovery capacity assuming 370' bgs. Assumes 5 cfs for each of the Stockdale West and Drought Relief wells in order to meet IRWD's Water Banking, Transfers, and Wheeling policy position. Assumes partners' water is recovered over 6 months.

[2] Strand Ranch and Stockdale West wells currently idle.

[3] IRWD has use of Acquired Storage and Drought Relief Project wells until January 12, 2039, unless the term of the agreement is extended.

[4] One half of storage capacity at Stockdale West and Strand Ranch will be allocated for partners.

[5] Kern Water Bank capacities based on 6.58% of Dudley Ridge Water District's 9.62% share of the Kern Water Bank. Annual recharge amount is based on an average of recharge rates for high and low groundwater level conditions. Not included in storage capacity, recharge, and recovery totals to match IRWD's Water Banking Policy Position Paper.

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Exhibit "B"

TABLE 2
IRWD's Water Banking Storage, Recharge and Recovery Operations - BEFORE LOSSES
March 19, 2020

TRANSACTIONS	WATER BANKING ENTITY					TOTAL BY WATER TYPE AND STORAGE LOCATION
	IRWD		BUENA VISTA (BVWSD)	CENTRAL COAST (CCWA)	DUDLEY RIDGE WATER DISTRICT (DRWD)[3]	
	SWP[1]	NON-SWP[2]	NON-SWP	SWP	SWP	
BEGINNING WATER IN STORAGE 2019 (AF)						
Total Kern Water Bank	-	4,656	-	-	-	4,656
Total MWD System[4]	8,349	-	-	-	879	9,228
Total Kern County	3,567	17,704	5,202	289	2,698	29,460
TOTAL STORED WATER (1/1/2019)	11,916	22,360	5,202	289	3,577	43,344
(RECOVERY) AND RECHARGE IN 2019 (AF)						
MWD Water to Jackson Ranch[5]	-	-	-	-	(440)	(440)
Kern Water Bank Deliveries[6]		97				97
2019 SWP Allocation (75%)[3]	656	-	-	-	656	1,311
Kern River Water	-	5,975	5,975	-	-	11,949
SWP Table A (CCWA 2019 Exch.)	350			350	-	700
TOTAL 2019 TRANSACTIONS	1,006	6,072	5,975	350	216	13,617
Total Kern Water Bank	-	4,753	-	-	-	4,753
Total MWD System	8,349	-	-	-	439	8,788
Total Kern County	4,573	23,679	11,177	639	3,354	43,420
TOTAL STORED WATER (1/1/2020)	12,922	28,432	11,177	639	3,793	56,961
(RECOVERY) AND RECHARGE IN 2020 (AF)						
MWD Water to Jackson Ranch (estimated)	-	-	-	-	-	-
Kern Water Bank Deliveries	-	-	-	-	-	-
2020 SWP Allocation (15 %)[3]	262	-	-	-	262	524
Kern River Water	-	-	(1,270)	-	-	(1,270)
TOTAL ESTIMATED 2020 TRANSACTIONS	262	-	(1,270)	-	262	(746)
ESTIMATED WATER IN STORAGE 2020 (AF)						
Total Kern Water Bank	-	4,753	-	-	-	4,753
Total MWD System	8,349	-	-	-	439	8,788
Total Kern County	4,835	23,679	9,907	639	3,616	42,674
TOTAL ESTIMATED STORED WATER TO DATE	13,184	28,432	9,907	639	4,055	56,215

NOTES:
-MWD = Metropolitan Water District of Southern California.
[1] IRWD's SWP includes 437 AF from CVWD that stays in Kern County.
[2] IRWD's Non-SWP total includes 3,158 AF of Kern County Water Agency Article 21 Water.
[3] DRWD water supply will be returned by MWD or IRWD's Strand Ranch to IRWD's Jackson Ranch. IRWD's 2013-2016 SWP allocation amounts are stored in the MWD system. IRWD's 2017 through 2019 SWP allocation water is stored in Kern County. It is assumed that IRWD's 2020 SWP allocation will be stored in Kern County.
[4] Beginning balance of water stored in MWD system includes: 4,494 AF from 2014 Exchange, 3,206 AF of 2014 borrowed SWP, 649 AF of IRWD's 2013-2016 SWP allocations through DRWD.
[5]Water returned to DRWD by MWD for use on IRWD's Jackson Ranch.
[6]A portion of IRWD's 2019 SWP deliveries from DRWD include 97 AF of Article 21 water, which was delivered to the Kern Water Bank.

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Exhibit "C"

TABLE 3
IRWD's Water Banking Storage, Recharge and Recovery Operations - AFTER LOSSES
March 19, 2020

TRANSACTIONS	WATER BANKING ENTITY					TOTAL BY WATER TYPE AND STORAGE LOCATION
	IRWD		BUENA VISTA (BVWSD)	CENTRAL COAST (CCWA)	DUDLEY RIDGE WATER DISTRICT (DRWD)[3]	
	SWP[1]	NON-SWP[2]	NON-SWP	SWP	SWP	
BEGINNING WATER IN STORAGE 2019 (AF)						
Total Kern Water Bank	-	4,233	-	-	-	4,233
Total MWD System[4]	7,393	-	-	-	879	8,272
Total Kern County	3,046	15,564	4,532	246	2,395	25,783
TOTAL STORED WATER (1/1/2019)	10,439	19,797	4,532	246	3,274	38,288
(RECOVERY) AND RECHARGE IN 2019 (AF)						
MWD Water to Jackson Ranch[5]	-	-	-	-	(440)	(440)
Kern Water Bank Deliveries[7]	-	87	-	-	-	87
2019 SWP Allocation (75%)[3]	557	-	-	-	557	1,114
Kern River Water	-	5,078	5,377	-	-	10,455
SWP Table A (CCWA 2019 Exch.)	298		-	298	-	595
TOTAL 2019 TRANSACTIONS	855	5,166	5,377	298	117	11,812
Total Kern Water Bank	-	4,320	-	-	-	4,320
Total MWD System	7,393	-	-	-	439	7,832
Total Kern County	3,901	20,642	9,909	543	2,952	37,947
TOTAL STORED WATER (1/1/2020)	11,294	24,963	9,909	543	3,391	50,100
(RECOVERY) AND RECHARGE IN 2020 (AF)						
MWD Water to Jackson Ranch (estimated)	-	-	-	-	-	-
Kern Water Bank Deliveries	-	-	-	-	-	-
2020 SWP Allocation (15%)[3]	111	-	-	-	111	223
Kern River Water	-	-	(1,270)	-	-	(1,270)
TOTAL ESTIMATED 2020 TRANSACTIONS[6]	111	-	(1,270)	-	111	(1,047)
ESTIMATED WATER IN STORAGE 2020 (AF)						
Total Kern Water Bank	-	4,320	-	-	-	4,320
Total MWD System	7,393	-	-	-	439	7,832
Total Kern County	4,012	20,642	8,639	543	3,064	36,900
TOTAL ESTIMATED STORED WATER TO DATE	11,405	24,963	8,639	543	3,503	49,053

NOTES:
-Water in storage has been adjusted to account for losses. IRWD's water stored in Kern County is adjusted 15% for losses (5% for out of county loss, 6% surface loss, and 4% reserve loss); Water stored for DRWD and BVWSD in Kern County is adjusted 10% (6% for surface loss and 4% for reserve loss); KWB losses are 10%; no losses for water directly delivered to MWD system.
-MWD = Metropolitan Water District of Southern California.
[1] IRWD's SWP includes 389 AF from CVWD that stays in Kern County.
[2] IRWD's Non-SWP total includes 2,842 AF of Kern County Water Agency Article 21 Water.
[3] DRWD water supply will be returned by MWD or IRWD's Strand Ranch to IRWD's Jackson Ranch. IRWD's 2013-2016 SWP allocation amounts are stored in the MWD system. IRWD's 2017 through 2019 SWP allocation water is stored in Kern County. It is assumed that IRWD's 2020 SWP allocation will be stored in Kern County.
[4] Beginning balance of water stored in MWD system includes (net of CVC losses): 3,920 AF of 2014 Exchange, 2,824 AF of 2014 borrowed SWP, 649 AF of IRWD's 2013-2016 SWP allocations through DRWD.
[5]Water returned to DRWD by MWD for use on IRWD's Jackson Ranch.
[6]2020 transactions may be adjusted for conveyance losses in CVC.
[7]A portion of IRWD's 2019 SWP deliveries from DRWD include 97 AF of Article 21 water, which was delivered to the Kern Water Bank.

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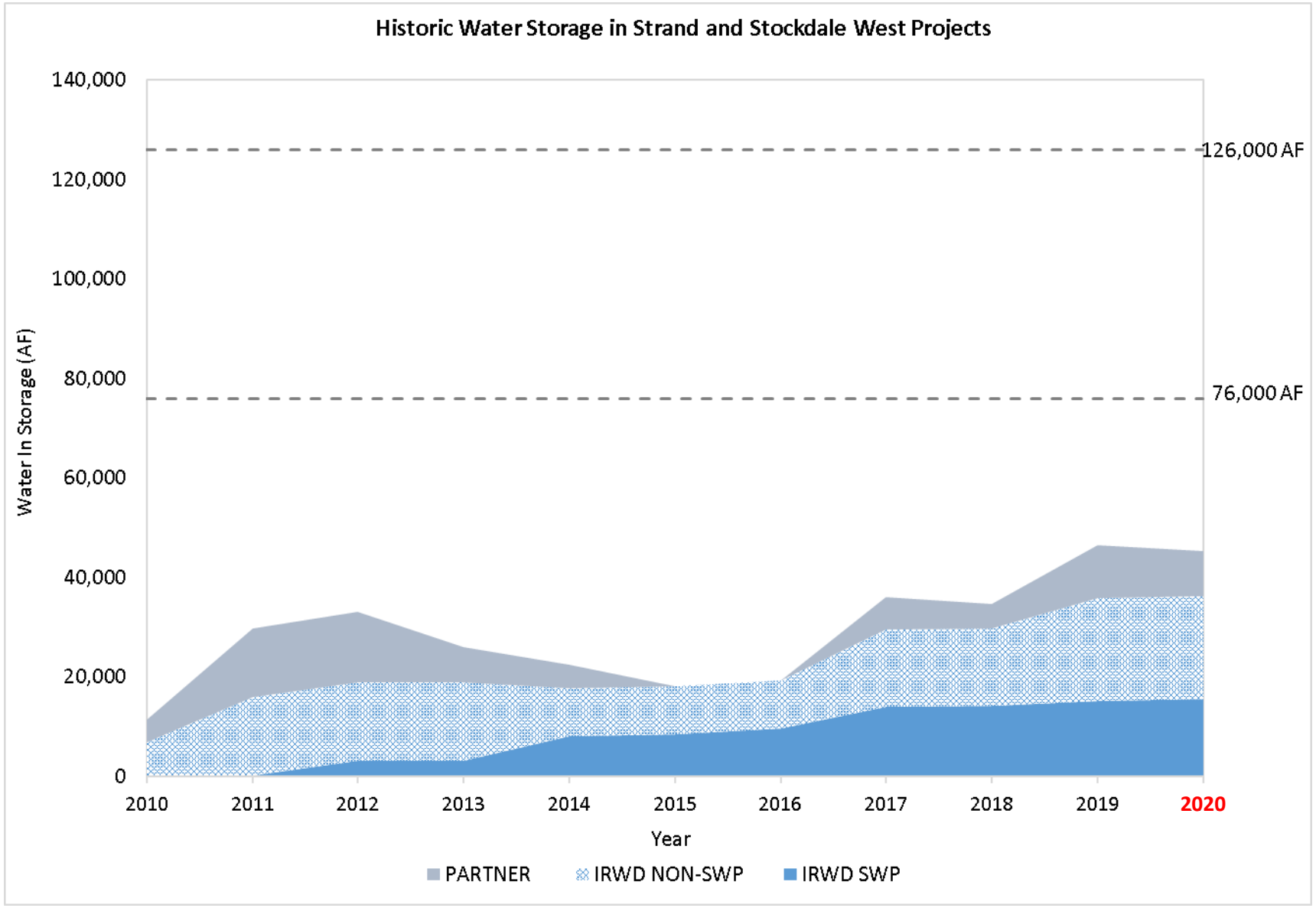
Exhibit “D”



*After losses

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Exhibit "E"

Program	Dedicated Storage Capacity Strand Ranch (AF)	Dedicated Storage Capacity Stockdale West (AF)	Dedicated Storage Capacity Leased Storage Account (AF)	Kern Water Bank Storage Capacity (AF)
Total Capacity	50,000	26,000	50,000	9,495
BVWSD	40,000	-	-	-
DRWD	10,000	-	-	-
AVEK	-	20,000	-	-
CVWD	-	5,000	-	-
Total Dedicated	50,000	25,000	-	-
Total Remaining	-	1,000	50,000	9,495

RECHARGE CAPACITY

Program	Dedicated Recharge Capacity Strand Ranch (AF)	Dedicated Recharge Capacity Stockdale West (AF)	Dedicated Recharge Capacity Leased Storage Account (AF)	Kern Water Bank Recharge Capacity (AF)
Total Capacity	17,500	27,100	-	3,200
BVWSD	17,500	-	-	-
DRWD	-	-	-	-
AVEK	-	20,000	-	-
CVWD	-	5,000	-	-
Total Dedicated	17,500	25,000	-	-
Total Remaining	-	2,100	-	3,200

RECOVERY CAPACITY

Program Partner	Dedicated Recovery Capacity Strand Ranch (AF)	Dedicated Recovery Capacity Stockdale West (AF)	Dedicated Recovery Capacity Leased Storage Account (AF)	Kern Water Bank Recovery Capacity (AF)
Total Capacity	17,500	11,250	-	6,330
BVWSD	6,667	-	-	-
DRWD	-	-	-	-
AVEK	-	3,333	-	-
CVWD	-	833	-	-
IRWD	10,833	7,084	-	6,330
Total Dedicated	17,500	11,250	-	6,330
Total Remaining	-	-	-	-

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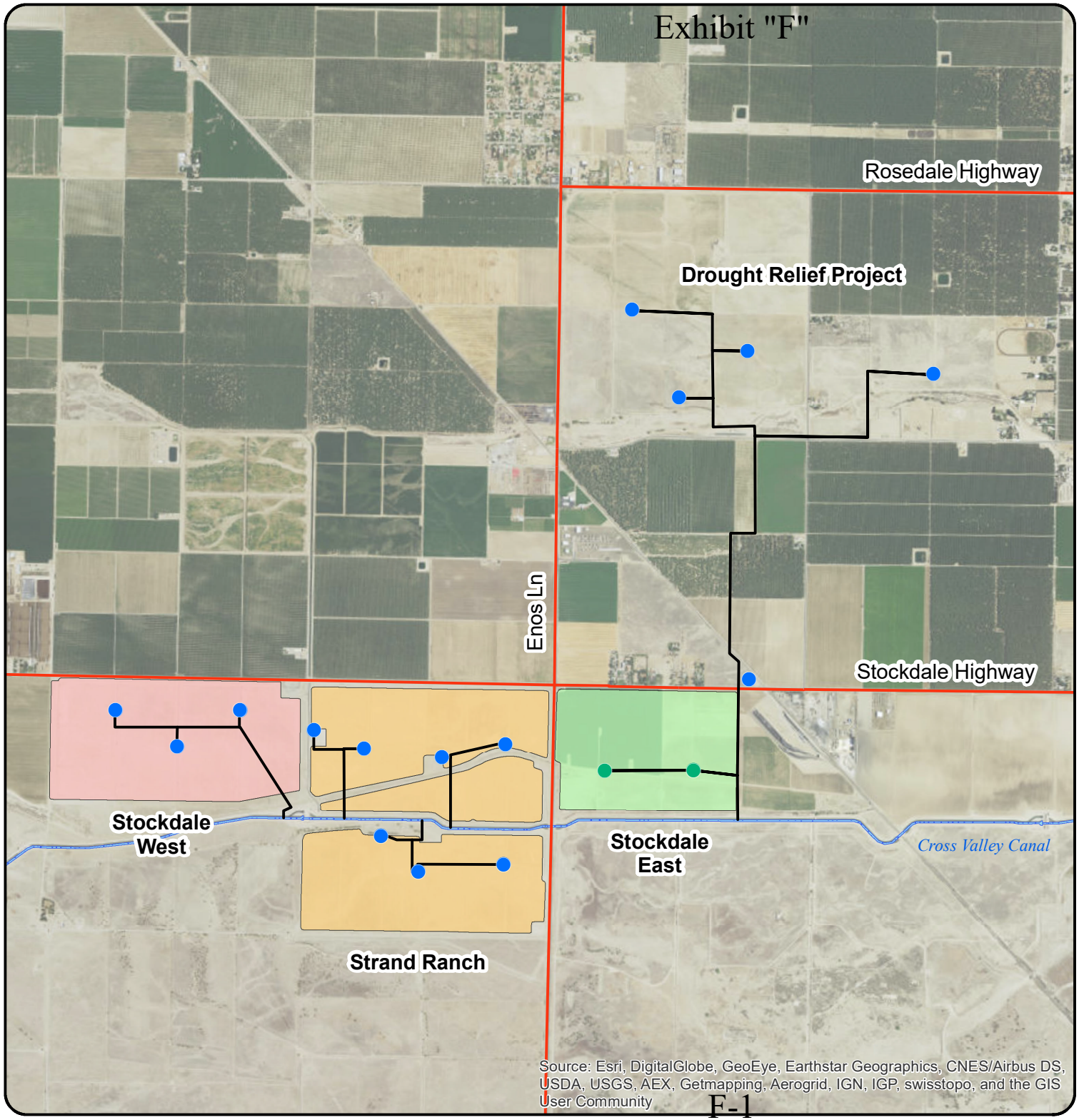
Exhibit "F"



Irvine Ranch WATER DISTRICT

Location Map:
IRWD Water Banking Projects
Wells and Turnin Pipelines

MAP FEATURES

- Existing Extraction Well
- Planned Extraction Well
- Well Discharge Pipelines
- Stockdale East
- Stockdale West
- Strand Ranch

This figure shows the location of IRWD's water banking project sites as well as existing and proposed extraction wells.

0 0.25 0.5 1 Miles

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NAD 83 State Plane Zone 5 (feet)
Central Meridian: -118

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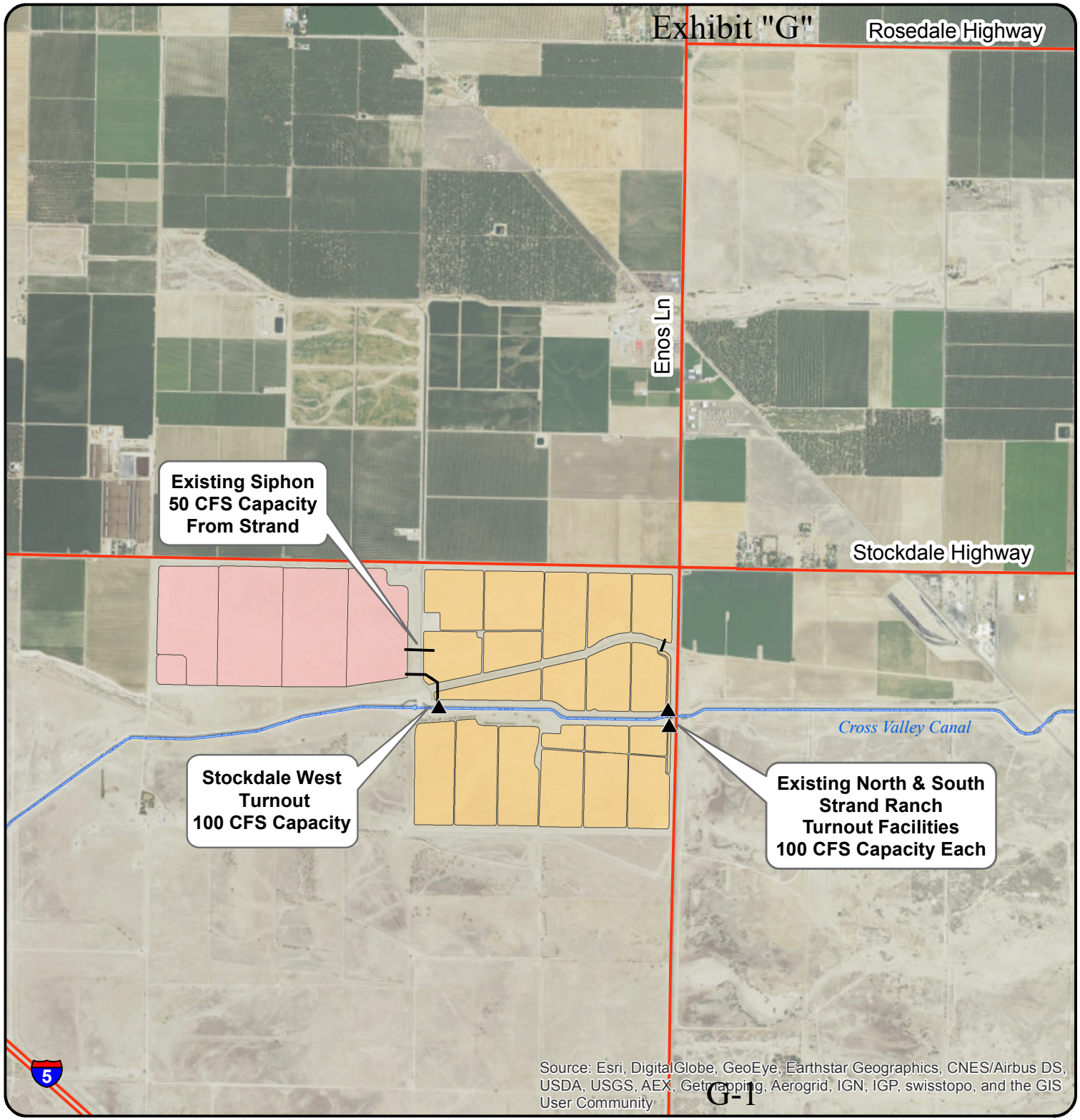

Irvine Ranch
WATER DISTRICT

Location Map:
IRWD Water Banking Projects
Recharge Basins &Turnout Facilities

MAP FEATURES

- Turnouts
- Stockdale West
- Strand Ranch

This figure shows the location of recharge basins as well as existing and anticipated pipelines and turnout facilities.

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0 0.25 0.5 1
Miles

NAD 83 State Plane Zone 5 (feet)
Central Meridian: -118

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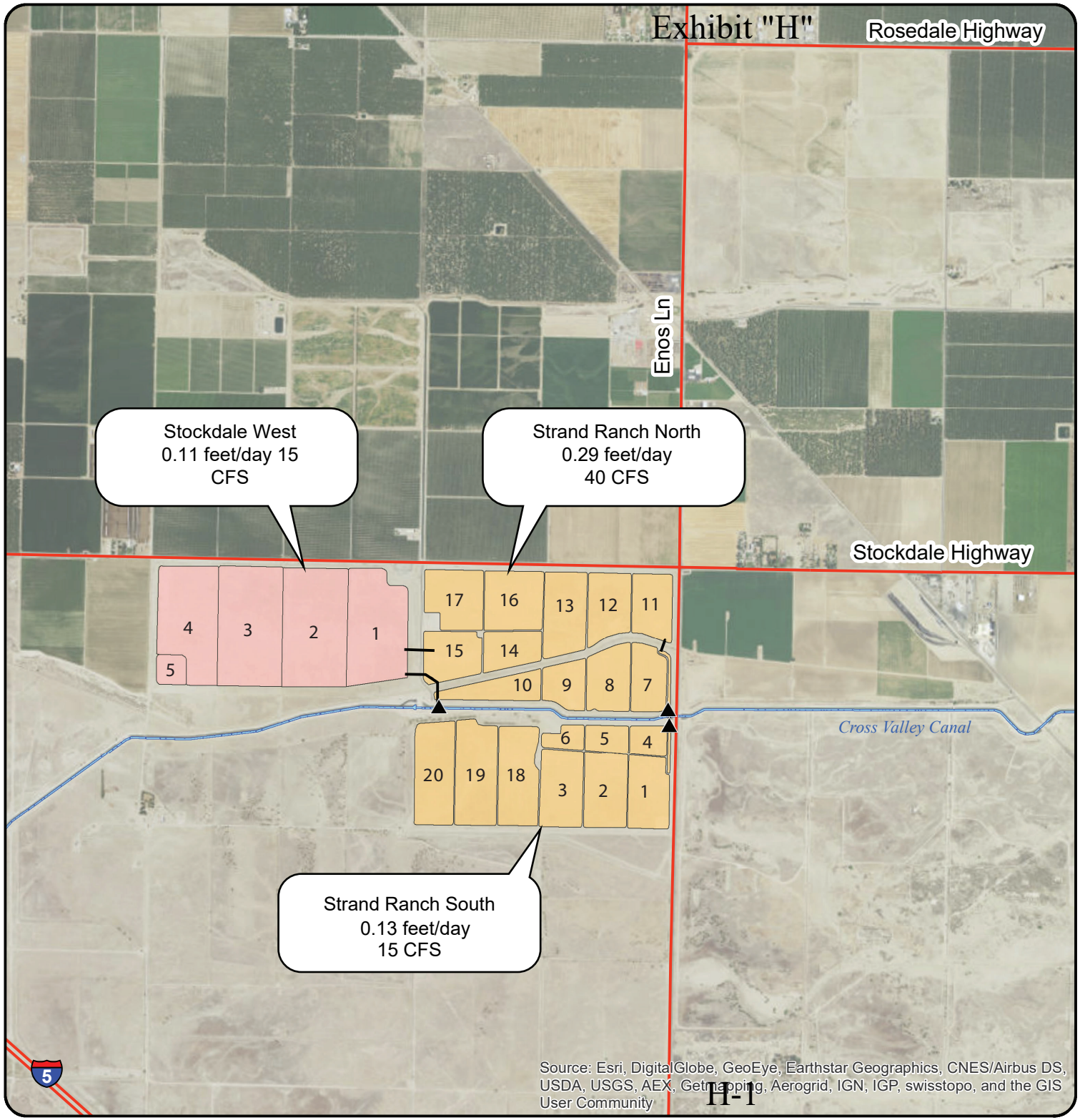

Irvine Ranch
WATER DISTRICT

Location Map:
IRWD Water Banking Projects
Recharge Rates

MAP FEATURES

- Turnouts
- Stockdale West
- Strand Ranch

This figure shows the location of recharge basins and their associated recharge rates as of June 18, 2019.

N

0 0.25 0.5 1
Miles

NAD 83 State Plane Zone 5 (feet)
Central Meridian: -118

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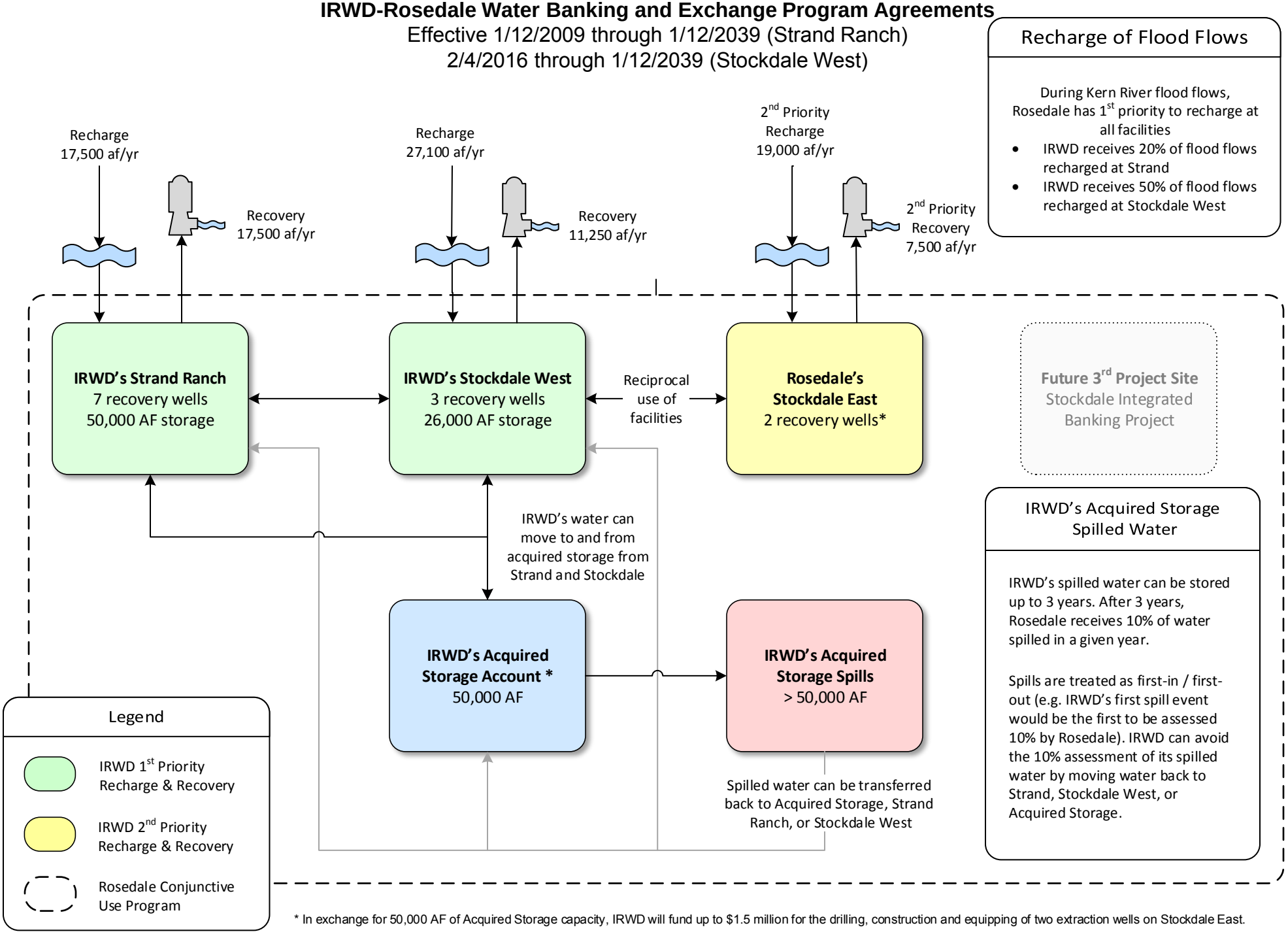
Exhibit "I"

IRWD-Rosedale Water Banking and Exchange Program Agreements

Effective 1/12/2009 through 1/12/2039 (Strand Ranch)
2/4/2016 through 1/12/2039 (Stockdale West)



Recharge of Flood Flows

During Kern River flood flows, Rosedale has 1st priority to recharge at all facilities

- IRWD receives 20% of flood flows recharged at Strand
- IRWD receives 50% of flood flows recharged at Stockdale West

IRWD's Acquired Storage Spilled Water

IRWD's spilled water can be stored up to 3 years. After 3 years, Rosedale receives 10% of water spilled in a given year.

Spills are treated as first-in / first-out (e.g. IRWD's first spill event would be the first to be assessed 10% by Rosedale). IRWD can avoid the 10% assessment of its spilled water by moving water back to Strand, Stockdale West, or Acquired Storage.

* In exchange for 50,000 AF of Acquired Storage capacity, IRWD will fund up to $1.5 million for the drilling, construction and equipping of two extraction wells on Stockdale East.

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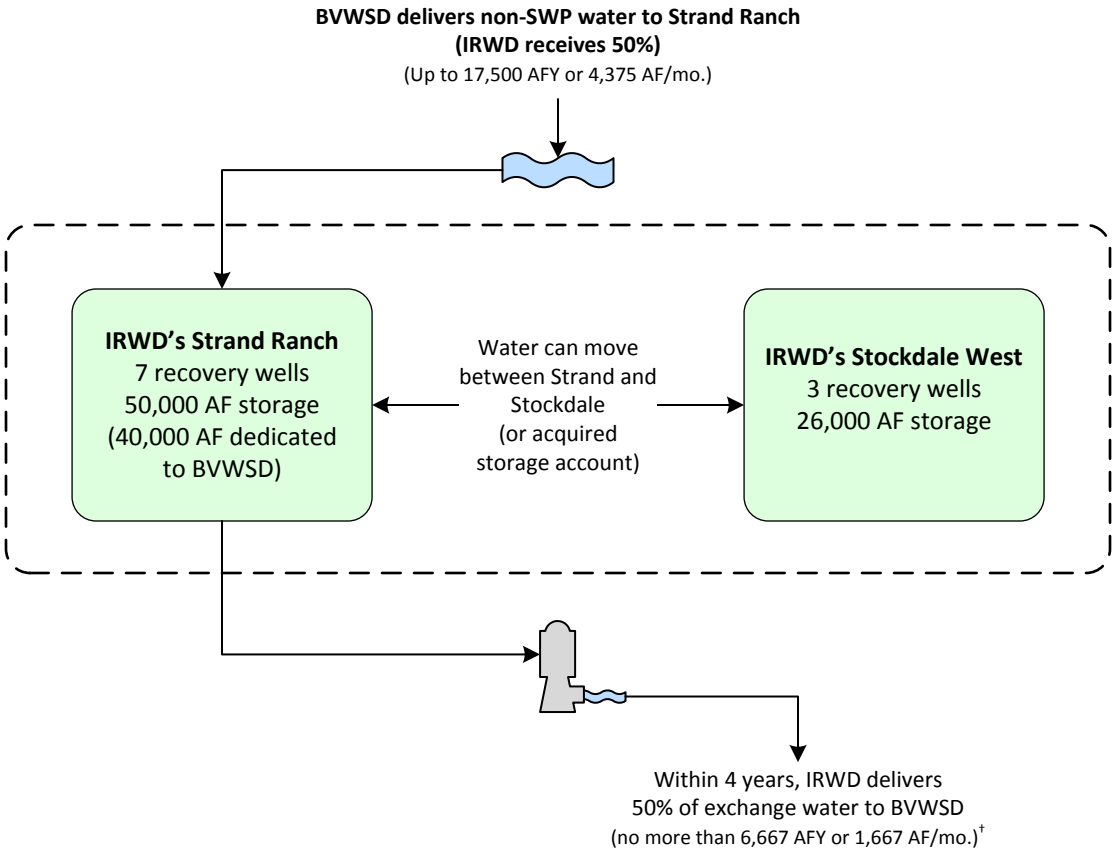
Exhibit "J"

Buena Vista Water Storage District Long Term Water Exchange Program

Effective 1/1/2011 through 1/12/2039



Legend

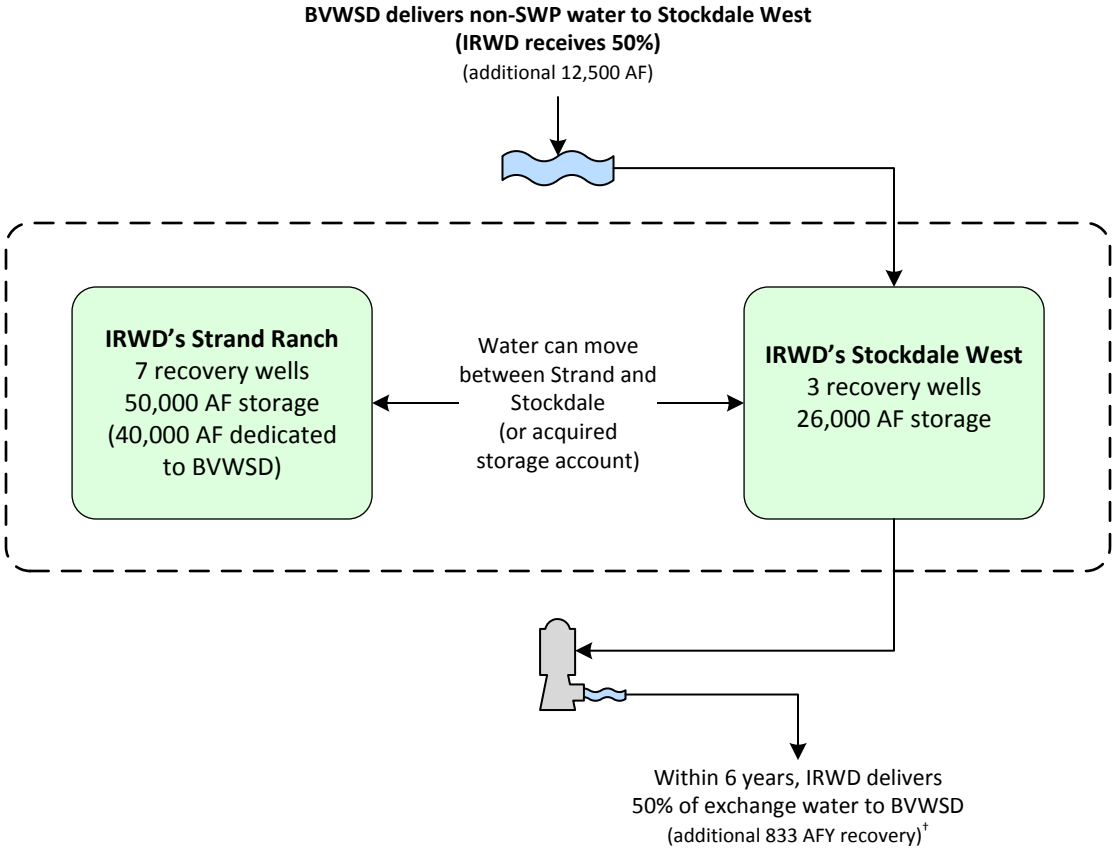
- IRWD 1st Priority Recharge & Recovery
- Rosedale Conjunctive Use Program & Coordinated Operation

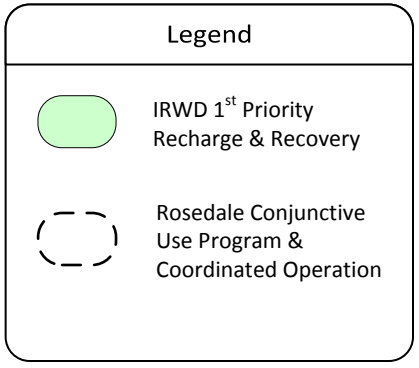
†IRWD shall remit one-half of the exchanged supply less one-half of reasonable losses back to BV no later than December 31st of the 4th year following the associated recharge event. IRWD pays for recovery of water returned to BV. Water to be remitted back to BV may remain in storage at Strand Ranch beyond the 4th year, in exchange for a greater percent being transferred to IRWD as compensation per the table shown to the right:

Year Following Recharge Event	Percent Transferred to IRWD	Percent Returned to BV During or Before Indicated Year
1	50%	50%
2	50%	50%
3	50%	50%
4	50%	50%
5	60%	40%
6	70%	30%
7	80%	20%
8	90%	10%
9	100%	0%

Buena Vista Water Storage District One-Year Program to Augment Recharge Using Stockdale West Recharge Facilities

Effective 4/1/2017 through 3/30/2018





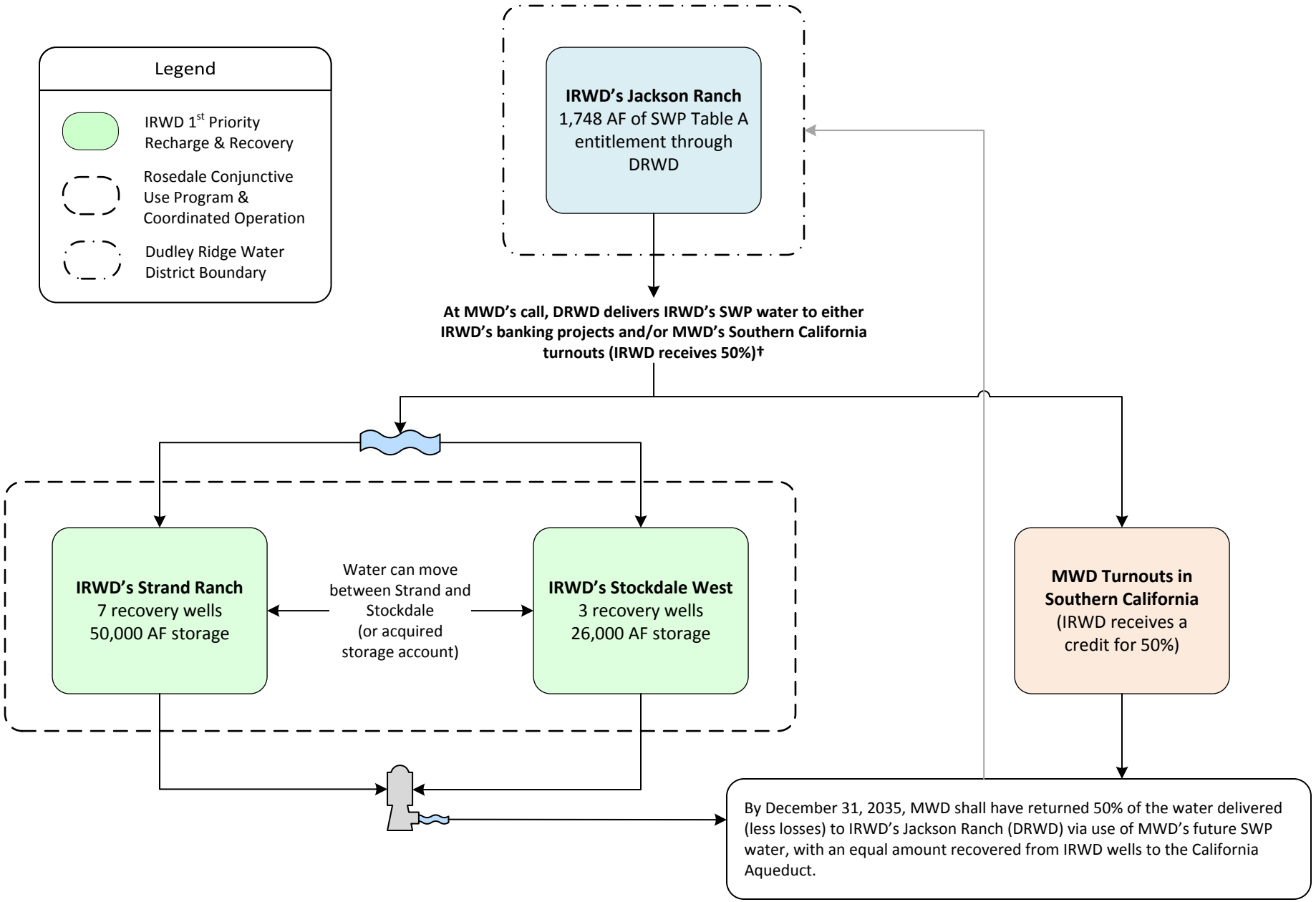
†IRWD shall remit one-half of the exchanged supply less one-half of reasonable losses back to BV no later than December 31st of the 6th year following the associated recharge event. IRWD pays for recovery of water returned to BV. Water to be remitted back to BV may remain in storage at Strand Ranch beyond the 6th year, in exchange for a greater percent being transferred to IRWD as compensation per the table shown to the right:

Year Following Recharge Event	Percent Transferred to IRWD	Percent Returned to BV During or Before Indicated Year
1	50%	50%
2	50%	50%
3	50%	50%
4	50%	50%
5	50%	50%
6	50%	50%
7	75%	25%
8	100%	0%
9	100%	0%

Exhibit "K"

Dudley Ridge Water District (DRWD) Unbalanced Exchange Program

Up to 12,240 AF delivered from 6/7/2018 through 12/31/2027



†Consistent with IRWD-MWD coordinated operating agreement.

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Exhibit "L"

Coordinated Operating, Water Storage, Exchange and Delivery Agreement Between MWD, MWDOC and IRWD

Effective 5/1/2011 through 11/4/2035

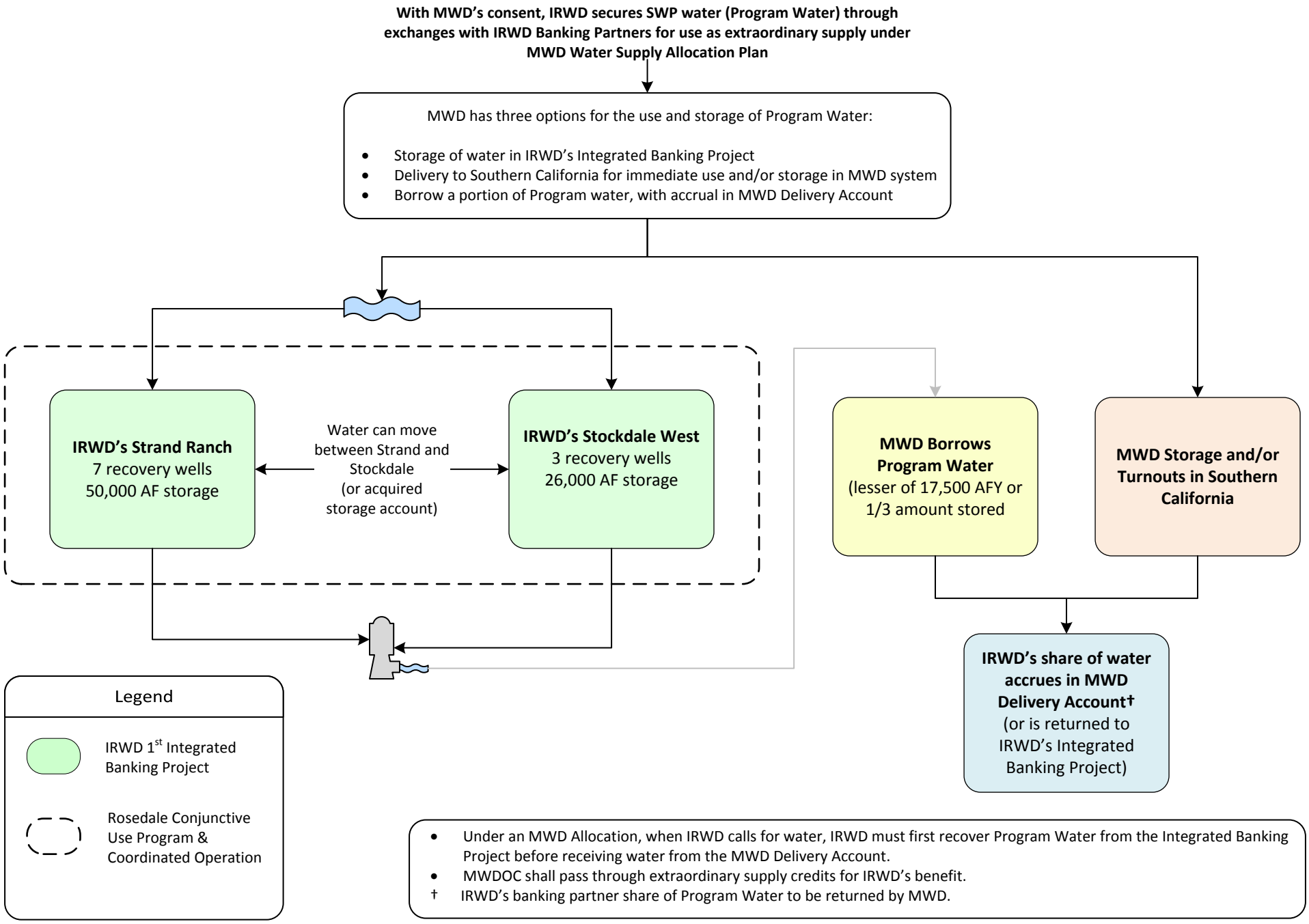

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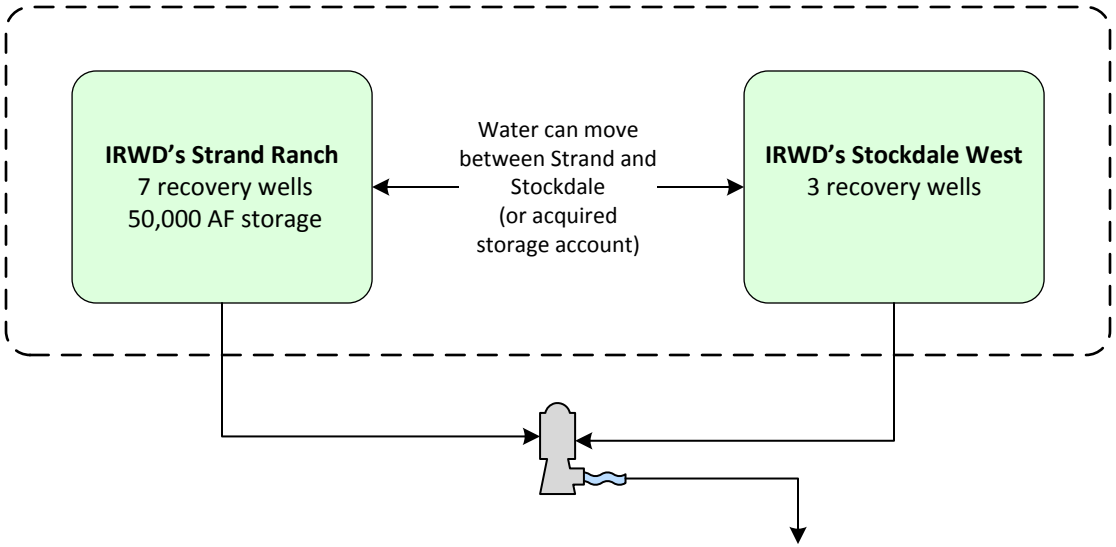
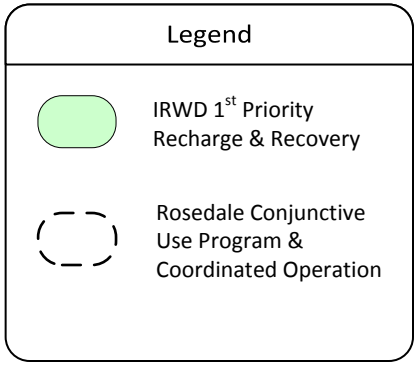
Exhibit "M"

Agreement for Conveyance of Water Between MWD, MWDOC, and IRWD (Wheeling Agreement)

Template for future agreements



IRWD recovers its share of non-SWP water from its Integrated Banking Projects for use as extraordinary supply under a declared MWD Water Supply Allocation. MWD will coordinate the conveyance and delivery of recovered water to be used within IRWD's Service Area. Delivery can also occur through an operational exchange.*



*The recovered water must be used within IRWD's service area. IRWD to pay MWD wheeling charges, including system access rate, water stewardship rate, and treatment surcharge (if applicable), for each acre foot of recovered water wheeled by MWD. IRWD will pay the actual costs of power incurred by MWD to convey recovered water in the California Aqueduct to IRWD delivery points.

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March 19, 2020
Prepared by: D. Johnson
Submitted by: F. Sanchez / P. Weghorst
Approved by: Paul A. Cook

SUPPLY RELIABILITY PROGRAMS COMMITTEE

EXTRAORDINARY SUPPLY NEEDS FROM IRWD WATER BANKING PROJECTS IN KERN COUNTY

SUMMARY:

The purpose of IRWD's water banking projects in Kern County is to store water that is available in wet years that can be recovered and used in IRWD's service area as Extraordinary Supply during major supply interruptions and shortage conditions. Staff has completed a detailed assessment of IRWD's needs for Extraordinary Supply that would result from a major drought that coincides with Sacramento-San Joaquin River Delta levee failures and prolonged water supply shortages. At the Committee meeting, staff will provide a presentation on the assessment. Staff recommends that the Committee provide feedback on the information presented at the meeting.

BACKGROUND:

In 2017, IRWD completed a Water Supply Reliability Evaluation that affirmed the importance of IRWD's water banking projects in meeting IRWD demands during future droughts and major water supply interruptions. The evaluation identified that there is a 66% probability of at least one magnitude 6.7 or greater earthquake in the Bay Area before 2032. Such an earthquake could cause failures of many Delta levees, likely resulting in seawater intrusion into the Delta. After the seismic event, repairs to the levees could take 25 months or longer. During this period, there would be significant and prolonged reductions in State Water Project (SWP) water available to Metropolitan Water District. In response to such an event, Metropolitan would implement its Water Supply Allocation Plan (WSAP), which is provided as Exhibit "A". If this were to occur during a multi-year drought on the Colorado River, the impact to Metropolitan's water supplies could be extensive. To ensure that IRWD can continue to meet its customers' needs under such shortage conditions, the District has developed its water banking projects.

Metropolitan Water Supply Allocation Plan:

Metropolitan's WSAP includes a specific methodology for allocating water supplies in times of water shortages. The method balances the impacts of a shortage at the retail level while maintaining equity on the wholesale level by considering growth, local supply investments, changes in supply conditions and demand hardening. In the application of the WSAP methodology, local supplies are designated as either "Planned Supply" or "Extraordinary Supply". Supplies classified as Extraordinary are only partially included as local supplies and have the effect of providing significantly more water to a retail agency during an allocation period. Accordingly, Metropolitan defines an "Extraordinary Supply Project" as a deliberate action taken by an agency to augment its water supply when Metropolitan is allocating water through its WSAP.

IRWD's Water Banking Projects:

The purpose of IRWD's Strand and Stockdale Integrated Banking Projects, along with the future Kern Fan Project is to secure, is to recharge and store water that is available in wet years that can be recovered and used in IRWD's service area during major droughts and supply interruptions. The projects are a cost-effective and environmentally sound method of ensuring long-term water supply reliability to IRWD.

In the event of major shortage events, IRWD's banked water is intended to fulfill IRWD's needs for imported water over extended periods of time when Metropolitan is allocating water to its member agencies. Under water shortage conditions, water from IRWD's water banking projects would qualify as Extraordinary Supply. IRWD's current policy position on water banking, transfers and wheeling (dated September 25, 2017), which is provided as Exhibit "B", guides the development of IRWD's water banking projects and associated partnerships.

IRWD Water Banking Partners:

IRWD has implemented its banking projects through mutually beneficial partnerships. Partnerships involving the operations of IRWD's projects have been implemented in the Kern County area with Rosedale-Rio Bravo Water Storage District. Exchange partnerships that result in water supplies for storage in IRWD's water banking projects have been implemented with Buena Vista Water Storage District, Dudley Ridge Water District, Central Coast Water Authority and Antelope Valley-East Kern Water Agency. Partnerships that facilitate the conveyance of Extraordinary Supply to IRWD's service area have been implemented with Metropolitan and the Municipal Water District of Orange County (MWDOC). Other major stakeholders in the projects include the Kern County Water Agency and the California Department of Water Resources.

Proposed Kern Fan Groundwater Storage Project:

IRWD is in the process of forming a Joint Powers Authority with Rosedale to develop the proposed Kern Fan Project, which will significantly improve the ability of IRWD's water banking projects to meet IRWD's Extraordinary Supply needs when Metropolitan implements its WSAP. IRWD's cost share of the project will be 50% after IRWD and Rosedale receive $67.5 million that has been conditionally approved from the California Water Commission and up to $50 million that the agencies are pursuing through the United States Bureau of Reclamation. IRWD's share of the cost of Kern Fan Project is expected to be between $30 and $55 million. IRWD may implement additional partnerships that will result in reductions in the cost of the Kern Fan Project to IRWD.

Assessment of Need for Extraordinary Supply:

Staff has completed a detailed assessment of IRWD's needs for Extraordinary Supply that would result from a major drought on the Colorado River that coincides with a major earthquake in the Delta. The results of staff's analysis are presented in Exhibit "C". At the meeting, staff will

provide a presentation on the analysis presented in Exhibit "C". The analysis considers the following:

- IRWD's 2017 Water Resources Master Plan;
- IRWD's 2018 Groundwater Work Plan;
- IRWD's 2018 Water Shortage Contingency Plan;
- Metropolitan's WSAP and allocation formulas;
- MWDOC's method for allocating water to its member agencies;
- Storage and recovery capacities in the Strand and Stockdale Integrated Banking Project;
- Capacities that are allocated to existing exchange partners; and
- Expected storage and recovery capacities in the Kern Fan Project.

Assessment Scenarios:

Staff has analyzed three scenarios which have been modeled considering the items listed above. Each scenario evaluates the requirements for Extraordinary Supply with and without the Syphon Reservoir Improvement Project, as well as with and without the Recycled Water Penalty that is imposed by Orange County Water District on IRWD groundwater pumping. The three scenarios consider a worst case major multi-year drought assuming a 10% Metropolitan allocation, a stressed Orange County Groundwater Basin (Basin Production Percentage of 60%) and with Delta levee failures occurring as a result of a major earthquake. Three different scenarios represent the following stages of IRWD's Water Shortage Contingency Plan:

- Level 1 with 10% demand reduction
- Level 2 with 30% demand reduction
- Level 3 with 50% demand reduction

A comparison of the assessment results provided in Exhibit "C" for the three scenarios illustrates how actions taken by IRWD's Board of Directors or possible emergency mandates by the State of California could impact the use of Emergency Supply. Staff recommends that the Committee provide feedback on the results presented in Exhibit "C" and information presented at the meeting.

FISCAL IMPACTS:

None.

ENVIRONMENTAL COMPLIANCE:

Not applicable.

RECOMMENDATION:

That the Committee provide feedback on the assessment of IRWD's Extraordinary Supply needs presented at the meeting.

LIST OF EXHIBITS:

Exhibit "A" – Metropolitan's 2014 Water Supply Allocation Plan

Exhibit "B" – Irvine Ranch Water District Policy Position Water Banking, Transfers and Wheeling dated September 25, 2017

Exhibit "C" – Forecasted Need for Extraordinary Supply Considering IRWD Water Banking Contingency Storage and Recovery Capacities in Response to a Major Multi-Year Drought with Delta Levee Failures

Water Supply Allocation Plan

December 2014 Revision

Metropolitan Water District of Southern California

Inside cover: Photo courtesy of Cora Edmonds/ArtXchange for the Healing Planet

Water Supply Allocation Plan

Table of Contents

List of Tables and Figures

List of Acronyms

AF – Acre-feet
CUP – Groundwater Conjunctive Use Program
CWD – County Water District
DWP – Drought Management Plan
IAWP – Interim Agricultural Water Program Reductions and Rates
IICP – Incremental Interruption and Conservation Plan
IRP – Integrated Resources Plan
GPCD – Gallons per Capita per Day
M&I – Municipal and Industrial
MWD – Municipal Water District
RUWMP – Regional Urban Water Management Plan
SWP – State Water Project
WSAP – Water Supply Allocation Plan
WSDM – Water Surplus and Drought Management

Definitions

Extraordinary Supplies- Deliberate actions taken by member agencies to augment the total regional water supply only when Metropolitan is allocating supplies through the WSAP.

Groundwater Recovery- The extraction and treatment of groundwater making it usable for a variety of applications by removing high levels of chemicals and/or salts.

In-lieu deliveries- Metropolitan-supplied water bought to replace water that would otherwise be pumped from the groundwater basins.

Seawater Barrier- The injection of fresh water into wells along the coast to protect coastal groundwater basins from seawater intrusion. The injected fresh water acts like a wall, blocking seawater that would otherwise seep into groundwater basins as a result of pumping.

Section 1: Introduction

Calendar Year 2007 introduced a number of water supply challenges for the Metropolitan Water District of Southern California (Metropolitan) and its service area. Critically dry conditions affected all of Metropolitan's main supply sources. In addition, a ruling in the Federal Courts in August 2007 provided protective measures for the Delta Smelt in the Sacramento-San Joaquin River Delta which brought uncertainty about future pumping operations from the State Water Project. This uncertainty, along with the impacts of dry conditions, raised the possibility that Metropolitan would not have access to the supplies necessary to meet total firm demands[1] and would have to allocate shortages in supplies to the member agencies.[2]

In preparing for this possibility, Metropolitan staff worked jointly with the member agency managers and staff to develop a Water Supply Allocation Plan (WSAP). The WSAP includes the specific formulas for calculating member agency supply allocations and the key implementation elements needed for administering an allocation should a shortage be declared. The WSAP became the foundation for the urban water shortage contingency analysis required under Water Code Section 10632 and was incorporated into Metropolitan's 2010 Regional Urban Water Management Plan (RUWMP).

Section 2: Development Process

Member Agency Input

Between July 2007 and February 2008, Metropolitan staff worked cooperatively with the member agencies through a series of member agency manager meetings and workgroups to develop a formula and implementation plan to allocate supplies in case of shortage. These workgroups provided an arena for in-depth discussion of the objectives, mechanics, and policy aspects of the different parts of the WSAP. Metropolitan staff also met individually with fifteen member agencies for detailed discussions of the elements of the recommended proposal. Metropolitan introduced the elements of the proposal to many nonmember retail agencies in its service area by providing presentations and feedback to a number of member agency caucuses, working groups, and governing boards. The discussions, suggestions, and comments expressed by the member agencies during this process contributed significantly to the development of this WSAP.

Board of Directors Input

Throughout the development process Metropolitan's Board of Directors was provided with regular progress reports on the status of this WSAP, with oral reports in September, October, and December 2007, an Information Board of Directors Letter with a draft of the WSAP in November 2007, and a Board of Directors Report with staff recommendations in January 2008. Based on Water Planning and Stewardship Committee discussion of the staff recommendations and further review of the report by

[1] Firm demands are also referred to as uninterruptable demands; likewise non-firm demands are also called interruptible demands.
[2] See Appendix A: Metropolitan Member Agencies.

the member agencies, refinements were incorporated into the WSAP for final consideration and action in February 2008. The WSAP was adopted at the February 12, 2008 Board of Directors meeting.[3]

The 12-Month Review Process

When the Board adopted the WSAP in February 2008, the decision specified a formal revisit of the WSAP commencing in February 2010. The scheduled revisit was meant to ensure the opportunity for Metropolitan staff and the member agencies to re-evaluate the WSAP and recommend appropriate changes to the Board of Directors.

In April 2009, the Board voted to implement the WSAP for the first time. The WSAP was implemented at a Level 2 allocation level, and was in effect for the period of July 1, 2009, through June 30, 2010. Since implementation of the 2009/10 WSAP began in July 2009, a number of practical issues relating to the WSAP were identified by staff and the member agencies for further consideration during the 12-Month Review Process. Metropolitan staff engaged with the member agencies in a formal review of the WSAP from January through May 2010. During the review process the member agency managers participated in a series of six workshops. The focus of these workshops was to facilitate in-depth discussion on WSAP-related issues and lessons learned since the WSAP was implemented in July 2009. The proposed adjustments to the WSAP developed during the review process were adopted at the August 17, 2010 Board of Directors meeting[4].

The Three-Year Review Process

The Board action to adopt of the WSAP in February 2008 also directed staff to review the WSAP formula three years after the February 2008 adoption. February 2011 marked the three-year anniversary since the adoption of the WSAP. Similar to the 12-Month Review Process, the purpose of the Three-Year Review Process was to provide an opportunity for Metropolitan staff and the member agencies to re-evaluate the plan and recommend appropriate changes for board consideration.

Metropolitan staff met with the member agencies in a formal review of the WSAP from February through August 2011. Staff and member agency managers participated in a series of eleven workshops. Proposed adjustments to the WSAP developed during the process were adopted at the September 13, 2011 Board of Directors meeting.[5]

[3] A complete listing of member agency meetings and Board of Directors reporting activities is contained in Appendix B: Water Supply Allocation Plan Process Timeline.

[4] A complete listing of member agency meetings and Board of Directors reporting activities is contained in Appendix C: 12-Month Review Process and Results.

[5] A complete listing of member agency meetings and Board of Directors reporting activities is contained in Appendix D: Three-Year Review Process and Results.

2014 Review Process

In 2014, California was challenged with a third year of severe drought.[6] Metropolitan managed its operations through significant use of regional storage reserves. It was anticipated that end of year total dry storage reserves would approach levels similar to those when the WSAP was last implemented in 2009.

Following discussion at the June 2014 Water Planning and Stewardship Committee, Metropolitan staff convened a member agency working group to revisit the WSAP. The purpose of the working group was to collaborate with member agencies to identify potential revisions to the WSAP in preparation for mandatory supply allocations in 2015. There were eight working group meetings and three discussions at the monthly Member Agency Managers' Meetings.

The process focused on three areas of the WSAP: the Base Period, the Allocation Formula, and the Allocation enforcement mechanism. Proposed adjustments to the WSAP developed during the process were adopted at the December 9, 2014 Board of Directors meeting. [7]

[6] The Governor of California proclaimed a State of Emergency due to drought conditions on January 17, 2014 and, on April 24, 2014 issued an Executive Order proclaiming a continued State of Emergency noting drought conditions have persisted for the last three years and authorizing adoption and implementation of emergency regulations.

[7] A complete listing of member agency meetings and Board of Directors reporting activities is contained in Appendix E: 2014 Review Process and Results.

Section 3: Review of Historical Shortage Plans[8]

The WSAP incorporates key features and principles from the following historical shortage allocation plans but will supersede them as the primary and overarching decision tool for water shortage allocation.

Interruptible Water Service Program

As part of the new rate structure implemented in 1981, Metropolitan's Board of Directors adopted the Interruptible Water Service Program (Interruptible Program) which was designed to address short-term shortages of imported supplies. Under the Interruptible Program, Metropolitan delivered water for particular types of use to its member agencies at a discounted rate. In return for this discounted rate, Metropolitan reserved the right to interrupt delivery of this Interruptible Program water so that available supplies could be used to meet municipal and industrial demands.

Incremental Interruption and Conservation Plan

The ability to interrupt specific deliveries was an important element of Metropolitan's strategy for addressing shortage conditions when it adopted the Incremental Interruption and Conservation Plan (IICP) in December 1990. Reductions in IICP deliveries were used in concert with specific objectives for conservation savings to meet needs during shortages. The IICP reduced Interruptible Service deliveries in stages and provided a pricing incentive program to insure that reasonable conservation measures were implemented.

1995 Drought Management Plan

The 1995 Drought Management Plan (DMP) was a water management and allocation strategy designed to match supply and demand in the event that available imported water supplies were less than projected demands. Adopted by the Metropolitan Board of Directors in November 1994, the 1995 DMP was a short-term plan designed to provide for the 1995 calendar year only. The primary objective of the 1995 DMP was to identify methods to avoid implementation of mandatory reductions. The 1995 DMP included various phases and a step-by-step strategy for evaluating supply and demand conditions and utilizing Metropolitan's available options, with the final phase being implementation of the revised IICP.

1999 Water Surplus and Drought Management Plan

Metropolitan staff began work on the Water Surplus and Drought Management (WSDM) Plan in March 1997 as part of the Integrated Water Resources Plan (IRP), which was adopted by Metropolitan's Board of Directors in January 1996. The IRP established regional water resource targets, identifying the need for developing resource management policy to guide annual operations. The WSDM Plan defined Metropolitan's resource management policy by establishing priorities for the use of regional resources to achieve the region's reliability goal identified in the IRP. In April 1999, Metropolitan's Board of Directors adopted the WSDM Plan.

[8] A summary of the key elements in the following allocation plan is found in Appendix F: Summary of Historical Shortage Plans.

The WSDM Plan also included a set of principles and considerations for staff to address when developing specific allocation methods. The WSDM Plan stated the following guiding principle to be followed in developing any future allocation scheme:

> *"Metropolitan will encourage storage of water during periods of surplus and work jointly with its member agencies to minimize the impacts of water shortages on the region's retail consumers and economy during periods of shortage."*[9]

This principle reflects a central desire for allocation methods that are both equitable and minimize regional hardship to retail water consumers. The specific considerations postulated by the WSDM Plan to accomplish this principle include the following:[10]

- The impact on retail customers and the economy
- Allowance for population and growth
- Change and/or loss of local supply
- Reclamation/Recycling
- Conservation
- Investment in local resources
- Participation in Metropolitan's interruptible programs
- Investment in Metropolitan's facilities.

Section 4: Water Supply Allocation Formula

Based on the guiding principle and considerations described in the WSDM Plan, Metropolitan staff and the member agencies developed a specific formula for allocating water supplies in times of shortage. The formula seeks to balance the impacts of a shortage at the retail level while maintaining equity on the wholesale level, and takes into account growth, local investments, changes in supply conditions and the demand hardening[11] aspects of non-potable recycled water use and the implementation of conservation savings programs. The formula, described below, is calculated in three steps: base period calculations, allocation year calculations, and supply allocation calculations.[12] The first two steps involve standard computations, while the third section contains specific methodology developed for this WSAP.

Base Period Calculations

The first step in calculating a water supply allocation is to estimate water supply and demand using a historical base period with established water supply and delivery data. The base period for each of the different categories of demand and supply is calculated using data from the fiscal years (July through June) ending 2013 and 2014.[13]

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[9] WSDM Plan, p. 1. Emphasis added.
[10] WSDM Plan, p. 2.
[11] Demand hardening is the effect that occurs when all low-cost methods of decreasing overall water demand have been applied (e.g., low-flow toilets, water recycling) and the remaining options to further decrease demand become increasingly expensive and difficult to implement.
[12] Detailed operational elements of these objectives and a numerical example are discussed in Appendix G: Water Supply Allocation Formula Example.
[13] Exceptions to this methodology are noted in the descriptions of base period calculations.

Base Period Local Supplies: Local supplies for the base period are calculated using a two-year average of groundwater production, groundwater recovery, Los Angeles Aqueduct supply, surface water production, and other imported supplies. Non-potable recycling production is not included in this calculation due to its demand hardening effect.

Base Period Wholesale Demands: Demands on Metropolitan for the base period are calculated using a two-year average of firm purchases and in-lieu deliveries to long-term groundwater replenishment, conjunctive use, cyclic, and supplemental storage programs.

Base Period Retail Demands: Total retail-level municipal and industrial (M&I) demands for the base period are calculated by adding the Base Period Wholesale Demands and the Base Period Local Supplies. This estimates an average total demand for water from each agency.

Base Period Mandatory Conservation Credit: Metropolitan allows a consultation process that enables member agencies to describe mandatory water use restrictions and/or rationing restrictions that were in place within their service areas during the Base Period. Restrictions may vary among agencies but include restricted water uses, fines, and water budget or penalty based rate structures that are enacted by the governing body of the member agency or retail agency. Following the consultation process, Metropolitan staff will recommend adjustments based on evidence of reduced GPCD. To qualify for an adjustment, GPCD reductions would have to be observed that are beyond those expected from the agency's ongoing conservation efforts and trends.

Allocation Year Calculations

The next step in calculating the water supply allocation is estimating water needs in the allocation year. This is done by adjusting the base period estimates of retail demand for population or economic growth and changes in local supplies.

Allocation Year Retail Demands: Total retail M&I demands for the allocation year are calculated by adjusting the Base Period Retail Demands for baseline inflation and growth.

Baseline Inflation Adjustment: Baseline inflation occurs when non-potable recycling or conservation is developed after the Base Period. The development of these supplies reduces actual demands for water in the Allocation Year. Because non-potable-recycling and conservation are excluded from the WSAP formula, the actual need for water in the Allocation year is overestimated. The Baseline Inflation Adjustment removes increases in non-potable recycling and conservation annually from the Base Period forward to better reflect the true need for water in the Allocation Year.

Growth Adjustment: The growth adjustment is calculated using the estimated actual annual rate of population growth at the county level, as generated by the California Department of Finance, whenever possible. For years without complete data, the growth rate is calculated using an average of the three most recent years available. Growth will be allocated based on historical per capita water use during the Base Period, with a cap equal to Metropolitan's IRP Target for Water Use Efficiency. For

allocation years up to and including 2014, the cap will be 163 GPCD, and for allocation years 2015-2020 the cap will reduce linearly from 163 to 145 GPCD. On an appeals basis, member agencies may request that their adjustment be calculated using member agency level population growth. A weighted combination of actual population and actual employment growth rates may also be requested.

Allocation Year Local Supplies: Allocation Year Local Supplies include groundwater production, groundwater recovery, Los Angeles Aqueduct supply, surface water production, seawater desalination, and other imported supplies. Estimates of Allocation Year Local Supplies are provided by the member agencies upon implementation of a WSAP. If estimates are not provided, Metropolitan will use the sum of the Base Period Local Supplies and Base Period In-Lieu Deliveries as a default. Agencies may provide updated estimates at any time during the Allocation Year to more accurately reflect their demand for Metropolitan supplies.

Extraordinary Supplies: Under the WSAP formula, local supply production in the Allocation Year can either be designated as a "planned" supply, or as an "extraordinary" supply.[14] This is an important designation for a member agency because the two types of supplies are accounted for differently in the WSAP formula. Local supplies classified at Extraordinary Supply are only partially included (scaled depending on the WSAP Level) as local supplies. This has the effect of providing significantly more benefit to the member agency in terms of total water supply that is available to the retail customer.[15]

Allocation Year Wholesale Demands: Demands on Metropolitan for the allocation year are calculated by subtracting the Allocation Year Local Supplies from the Allocation Year Retail Demands.

Water Supply Allocation Calculations

The final step is calculating the water supply allocation for each member agency based on the allocation year water needs identified in Step 2. The following table displays the elements that form the basis for calculating the supply allocation. Each element and its application in the allocation formula are discussed below.

Table 1: Shortage Allocation Index

(a) Regional Shortage Level	(b) Wholesale Minimum Percentage	(c) Maximum Retail Impact Adjustment Percentage
1	92.5%	2.5%
2	85.0%	5.0%
3	77.5%	7.5%
4	70.0%	10.0%

[14] Appendix H: Board Policy Principles on Determining the Status of Extraordinary Supply lists the key Board principles used in determining if a supply qualifies as an Extraordinary Supply.

[15] See Appendix G: Water Supply Allocation Formula Example for specific allocation formulae.

5	62.5%	12.5%
6	55.0%	15.0%
7	47.5%	17.5%
8	40.0%	20.0%
9	32.5%	22.5%
10	25.0%	25.0%

Regional Shortage Level: The WSAP formula allocates shortages of Metropolitan supplies over ten levels.

Wholesale Minimum Allocation: The Wholesale Minimum Allocation ensures a minimum level of Metropolitan supplied wholesale water service to each member agency.

Maximum Retail Impact Adjustment: The purpose of this adjustment is to ensure that agencies with a high level of dependence on Metropolitan do not experience disparate shortages at the retail level compared to other agencies when faced with a reduction in wholesale water supplies. The Maximum Retail Impact Percentage is prorated on a linear scale based on each member agency's dependence on Metropolitan at the retail level. This percentage is then multiplied by the agency's Allocation Year Wholesale Demand to determine an additional allocation.

Conservation Demand Hardening Credit: The Conservation Demand Hardening Credit addresses the increased difficulty in achieving additional water savings at the retail level that comes as a result of successful implementation of water conserving devices and conservation savings programs. To estimate conservation savings, each member agency will establish a historical baseline Gallons Per Person Per Day (GPCD) calculated in a manner consistent with California Senate Bill SBx7-7.[16] Reductions from the baseline GPCD to the Allocation Year are used to calculate the equivalent conservation savings in acre-feet. The Conservation Demand Hardening Credit is based on an initial 10 percent of the GPCD-based Conservation savings plus an additional 5 percent for each level of Regional Shortage set by the Board during implementation of the WSAP. The credit will also be adjusted for:

- The overall percentage reduction in retail water demand
- The member agency's dependence on Metropolitan

The credit is calculated using the following formula:

Conservation Demand Harding Credit = Conservation Savings x (10% + Regional Shortage Level Percentage) x (1 +((Baseline GPCD – Allocation Year GPCD)/Baseline GCPD)) x Dependence on MWD Percentage

[16] California Department of Water Resources, February 2011, "Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use. Available at: http://www.water.ca.gov/wateruseefficiency/sb7/docs/MethodologiesCalculatingBaseline_Final_03_01_2011.pdf

This provides a base demand hardening credit equal to 10 percent of conservation savings and increases the credit as deeper shortages occur, which is when conservation demand hardening has a bigger impact on the retail consumer. The credit also increases based on the percentage of an agency's demand that was reduced through conservation. This accounts for increased hardening that occurs as increasing amounts of conservation are implemented. Lastly, the credit is scaled to the member agency's dependence on Metropolitan to ensure that credits are being applied to the proportion of water demand that is being affected by reductions in Metropolitan supply.

Minimum Per-Capita Water Use Credit: This adjustment creates a minimum per capita water use threshold. Member agencies' retail-level water use is compared to two different thresholds. The proposed minimum thresholds are based upon compliance guidelines established under Senate Bill X7-7.

- 100 GPCD total water use
- 55 GPCD residential water use

Agencies that fall below either threshold under the WSAP will receive additional allocation from Metropolitan to bring them up to the minimum GPCD water use level. If an agency qualifies under both thresholds, the one resulting in the maximum allocation adjustment will be given.[17] To qualify for this credit, member agencies must provide documentation of the total agency level population and the percent of retail level demands that are residential; no appeal is necessary.

Total WSAP Allocation: The allocation to an agency for its M&I retail demand is the sum of the Wholesale Minimum Allocation, the Retail Impact Adjustment, the Conservation Demand Hardening Credit, and the Minimum Per-Capita Water Use Credit.[18]

Total Metropolitan Supply Allocations: In addition to the WSAP Allocation described above, agencies may also receive separate allocations of supplies for and seawater barrier and groundwater replenishment demands. Allocations of supplies to meet seawater barrier demands are to be determined by the Board of Directors independently but in conjunction with the WSAP. Separating the seawater barrier allocation from the WSAP allocation allows the Board to consider actual barrier requirements in the Allocation Year and address the demand hardening issues associated with cutting seawater barrier deliveries. According to the principles outlined for allocating seawater barrier demands, allocations should be no deeper than the WSAP Wholesale Minimum Percentage implemented at that time.

The WSAP also provides a limited allocation for drought-impacted groundwater basins based on the following framework:[19]

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[17] See Appendix J: Per Capita Water Use Minimum Example for specific minimum per-capita water use credit formulae and example.

[18] See Appendix G: Water Supply Allocation Formula Example for specific allocation formulae.

[19] See Appendix L: Groundwater Replenishment Allocation for more information.

1. Metropolitan staff will hold a consultation with the requesting member agency and the appropriate groundwater basin manager to document whether the basin is in one of the following conditions:
    a. Groundwater basin overdraft conditions that will result in water levels being outside normal operating ranges during the WSAP allocation period; or
    b. Violations of groundwater basin water quality and/or regulatory parameters that would occur without imported deliveries
2. An allocation is provided based on the verified need for groundwater replenishment. The allocation would start with a member agency's ten-year average purchases of imported groundwater replenishment supplies (excluding years in which deliveries were curtailed). The amount would then be reduced by the declared WSAP Regional Shortage Level.

Section 5: WSAP Implementation

The WSAP will take effect if a regional shortage is declared by the Board of Directors. The following implementation elements are necessary for administering the WSAP during a time of shortage. These elements cover the processes needed to declare a regional shortage level as well as provide information pertaining to the allocation surcharge.

Allocation Period

The allocation period covers twelve consecutive months, from July of a given year through the following June. This period was selected to minimize the impacts of varying State Water Project (SWP) allocations and to provide member agencies with sufficient time to implement their outreach strategies and rate modifications.

Setting the Regional Shortage Level

Metropolitan staff is responsible for recommending a Regional Shortage Level for the Board of Directors' consideration. The recommendation shall be based on water supply availability, and the implementation of Metropolitan's water management actions as outlined in the WSDM Plan. Metropolitan staff will keep the Board of Directors apprised to the status of water supply conditions and management actions through monthly reports to the Water Planning and Stewardship Committee. To further facilitate staff in the development of a recommended regional shortage level, member agency requests for local supply adjustments shall be submitted by April 1st.

Metropolitan's Board of Directors, through the Water Planning and Stewardship Committee, is responsible for approving the final Regional Shortage Level at its April meeting. By the April meeting, the majority of the winter snowfall accumulation period will have passed and will allow staff to make an allocation based on more stable water supply estimates. Barring unforeseen large-scale circumstances, the Regional Shortage Level will be set for the entire allocation period, which will provide the member agencies an established water supply level for their planning.

Exit Strategy

While the Board ultimately has discretion to implement or lift and allocation at any point of time during the year; the WSAP includes a two-part exit strategy that is meant to streamline the WSAP implementation decision making process.

- If the Board decides to implement the WSAP, then any current WSAP allocation would remain in place until the end of the Allocation Year.
- If the Board decides not to implement the WSAP, then any current WSAP allocation would be terminated concurrent with the Board decision.

Allocation Appeals Process

An appeals process is necessary for the administration of any changes or corrections to an agency's allocation. Metropolitan's General Manager will designate, subsequent to a declaration of an allocation by the Board of Directors, an Appeals Liaison as the official point of contact for all information and inquiries regarding appeals. All member agency General Managers will be notified in writing of the name and contact information of the Appeals Liaison. Only appeals that are made through the Appeals Liaison and in accordance with the provisions outlined in Appendix N: Allocation Appeals Process will be evaluated. Basis for appeals claims can include but are not limited to:

- Adjusting erroneous historical data used in base period calculations
- Adjusting for population growth rates
- Determining if a local supply qualifies as Extraordinary Supply

Additional details and a checklist for the appeals process are available in Appendix N: Allocation Appeals Process and Appendix O: Appeals Submittal Checklist.

Allocation Surcharge

Member agency allocations are supported by an Allocation Surcharge. The Allocation Surcharge is charged to water use above the Member Agency allocation and is charged in addition to Metropolitan's standard rates for water service. Allocation Surcharges will only be assessed to the extent that an agency's total annual usage exceeds its total annual allocation. Any revenues collected through the Allocation Surcharge will be applied towards Metropolitan's Water Management Fund, which is used to in part to fund expenditures in dry-year conservation. No billing or assessment of allocation surcharges rates will take place until the end of the twelve-month allocation period.

Allocation Surcharge: The application of the Allocation Surcharge structure is a two tier structure that provides a lower level of Allocation Surcharge for minor overuse of allocations and a higher level of Allocation Surcharge for major overuse of allocations. The structure and applicable Allocation Surcharges are listed in Table 2.

Table 2: Allocation Surcharge			
Water Use	Base Water Rate[20]	Allocation Surcharge[21]	Total Rate
100% of Allocation	Tier 1	0	Tier 1
Between 100% and 115%	Tier 1	$1,480	Tier 1 + ($1,480)
Greater than 115%	Tier 1	$2,960	Tier 1 + ($2,960)

Qualifying Income-Based Rate Allocation Surcharge Adjustment:[22] Any Allocation Surcharges incurred by a member agency under the WSAP will be adjusted to reflect the extent to which retail customers within a member agency's service area are served under a "lifeline" or similar qualified discounted rate program based on income or ability to pay ("Income-Based Rate").

Any member agency who is assessed Allocation Surcharges under the WSAP may submit an acre-foot equivalent of water used by retail customers served under a qualifying Income-Based Rate.[23] This amount of water use would be multiplied by the percentage of retail-level reduction in allocation year demand necessary for that member agency to avoid exceeding its WSAP allocation. The monetary amounts resulting from these acre feet are subtracted from the total monetary amounts incurred by an agency for exceeding its allocation. In the case that the monetary amounts associated with the Income-Based Rate are greater than the total Allocation Surcharges an agency incurs, no Allocation Surcharges will be incurred. The end result of this adjustment is that the member agency will not be subject to Allocation Surcharges for the use of water by their retail customers served under a qualifying Income-Based Rate.

Growth Rate Allocation Surcharge Adjustment": In recognition of member agency differences in geography and climate, a Growth Rate Allocation Surcharge Adjustment will be given to any agency that exceeds its WSAP Allocation. The Allocation Surcharge reduction will be based on the difference in acre-feet between the Growth Adjustment applied at Metropolitan's IRP planning goal rate, and the greater of the following:

- The IRP planning goal rate adjusted for the member agency's ETo, or
- The member agency's certified and documented 20x2020 targeted GPCD

If both of these alternatives result in a lower growth adjustment than the IRP planning goal, no Allocation Surcharge reduction will be made.

[20] The base water rate shall be the applicable water rate for the water being purchased. In most cases, it will be the Tier 1 rate (plus Treatment Surcharge for treated water deliveries). However, it is possible that the water being purchased would be in the amount that would put an agency beyond its Tier 1 limit. In that case, the base water rate will be the Tier 2 rate (plus Treatment Surcharge for treated water deliveries).

[21] Allocation Surcharge is applied to water use in excess of an agency's WSAP allocation.

[22] See Appendix K: Qualifying Income-Based Rate Allocation Surcharge Adjustment Example for specific penalty adjustment formulae and example.

[23] Appropriate documentation and certification will be required.

Tracking and Reporting

Subsequent to a declared regional shortage by the Board of Directors, Metropolitan staff will produce monthly reports of each member agency's water use compared to its allocations based on monthly delivery patterns to be submitted by the member agency. In order to produce these reports, member agencies are requested to submit their local supply use on a monthly basis and certify end of allocation year local supply use. These reports and comparisons are to be used for the purposes of tracking and communicating potential underage/overage of an agency's annual allocations.

Key Dates for Water Supply Allocation Implementation

The timeline for implementation of an allocation is shown in Table 3. A brief description of this timeline follows:

January to March: Water Surplus and Drought Management reporting occurs at Metropolitan's Water Planning and Stewardship Committee meetings. These reports will provide updated information on storage reserve levels and projected supply and demand conditions.

April: Member agencies report their projected local supplies for the coming allocation year. This information is incorporated in staff analysis of storage reserves and projected supply and demand conditions in order to provide an allocation recommendation to the Board. Metropolitan's Board will consider whether an allocation is needed. A declaration of an allocation will include the level of allocation to be in effect for the allocation year. Likewise, member agencies will report their projected demands and local supplies needed to meet seawater barrier and groundwater replenishment requirements for the allocation year. Metropolitan's Board will consider whether allocations for seawater barrier demands and groundwater replenishment demands are needed independently from the WSAP allocation decision.**July 1st**: If the Board declared an allocation in April, then it will be effective starting July 1st. The allocation level will be held through June 30th, barring unforeseen circumstances. Member agencies will now be requested to submit their local supply use on a monthly basis and certify end of allocation year local supply use. Local production data must be reported to Metropolitan by the end of the month following the month of use (use in July must be reported by the end of August). This information will be combined with Metropolitan sales information in order to track retail water use throughout Metropolitan's service area. Each month Metropolitan will report on member agency water sales compared to their allocation amounts.

June 30th: The allocation year is complete.

July: Member agency local supplies must be certified for the month of June, the last month of the previous allocation year.

August: Metropolitan will calculate each member agency's total potable water use based on local supply certifications and actual sales data for the allocation year of July through June. Allocation surcharges will be assessed for usage above a given member agency's final adjusted allocation (reflecting the actual local supply and imported water use that occurred in the allocation year).

Table 3: Board Adopted Allocation Timeline					
Year	Month	Year 1 Board Decision	Year 1 Allocation Year	Year 2 Board Decision	Year 2 Allocation Year
Year 1	January				
	February				
	March				
	April	Declaration *			
	May		Effective Period Continuous Tracking of Member Agency Local Supply and Imported Water Use		
	June				
	July				
	August				
	September				
	October				
	November				
	December				
Year 2	January				
	February				
	March				
	April			Declaration *	
	May				
	June				
	July				Effective Period Continuous Tracking of Member Agency Local Supply and Imported Water Use
	August		Assess		
	September				
	October				
	November				
	December				
Year 3	January				
	February				
	March				
	April				
	May				
	June				

*Member agency projections of local supplies are due on April 1st to assist Metropolitan staff in determining the need for an allocation in the coming allocation year.

EXHIBIT "B"

IRVINE RANCH WATER DISTRICT POLICY POSITION
WATER BANKING, TRANSFERS AND WHEELING

Revised: September 25, 2017

Issue Summary:

The Irvine Ranch Water District is further diversifying its water supply portfolio by developing water banking facilities located in the southern San Joaquin Valley in Kern County. Water supplies continue to be stressed in California due to potential shortages from the Colorado River, supply limitations from the Sacramento-San Joaquin Delta (Delta), potential climate change and reoccurring droughts. Under such conditions, water banking recharge, storage and recovery programs will continue to provide a cost effective and reliable supplemental source of water that can be relied upon during majors droughts and periods of supply interruptions. The development of and participation in water banking programs by retail water agencies should be encouraged throughout the State. This policy position paper provides Policy Principles for the implementation of the IRWD water banking program.

IRWD Supply Diversity Requirements:

IRWD's primary mission is to provide a safe and reliable water supply to its customers. IRWD's water supply reliability is directly related to supply diversity. Along with the implementation of numerous water use efficiency programs, IRWD has developed and continues to develop a diverse mix of local and non-local supplies including high quality groundwater, impaired groundwater, and recycled water – all of which reducing IRWD's dependence on imported water.

IRWD has completed a Water Supply Reliability Evaluation that affirmed the importance of IRWD's water banking programs to meet District demands during future droughts and major supply interruptions. Current demand projections indicate that IRWD has a long-term need to store supplemental water that could be called upon during drought conditions or major supply interruptions. In the event of a major supply interruption, such as an earthquake that significantly damages the levees in the Delta, this stored water would be available to fulfill IRWD's estimated needs for imported water over extended periods of time. IRWD's water banking program is a cost effective and environmentally sound method to store and recover supplemental water to meet such long-term supply reliability requirements.

Key Elements of IRWD's Water Banking Program:

Since 2005, IRWD has made significant progress in the development of its water banking program and in securing associated supplemental supplies. IRWD has purchased land, constructed facilities, and is now operating the Strand and Stockdale Integrated Banking Projects through a long-term partnership with Rosedale-Rio Bravo Water Storage District. IRWD retains equity ownership of these water banking projects. IRWD is also partnering with Rosedale and Castaic Lake Water Agency in the construction of wells that will allow IRWD to ensure the ability to recover water for itself and its partners during peak demand periods.

Securing Water Supplies:

So far, IRWD has secured water supplies for its water banking projects through unbalanced exchange partnerships with other agencies. These partnerships allow agencies with surplus water to store water in IRWD's water banking projects in return for transferring 50 percent of the water to IRWD. Such exchanges are called unbalanced exchanges because only half of the water that is delivered into storage is returned to the originating agency.

Wheeling and Exchange Agreements:

In 2011, IRWD, Metropolitan Water District of Southern California (MWD) and Municipal Water District of Orange County (MWDOC) executed a long-term Coordinated Operating, Exchange and Delivery Agreement (Coordinated Agreement) that facilitates the delivery of State Water Project (SWP) supplies from IRWD's water banking projects to IRWD's service area. The agreement allows IRWD to secure SWP supplies with the concurrence of MWD, with MWD maintaining control of the introduction of these supplies into its service area. In 2014, IRWD, MWD and MWDOC developed and executed a template Wheeling Agreement that facilitated the delivery of non-SWP water into IRWD's service area. Water delivered to IRWD's service area, through the use of either of these agreements, is considered "Extraordinary Supply" by MWD during water supply allocation periods. It is IRWD's position, that the Coordinated Agreement and the template Wheeling Agreement will be used by IRWD in the future to facilitate the delivery of water that is recovered from IRWD's water banking projects to IRWD's service area.

<u>Sharing Reliability Benefits:</u>

The acquisition of supplemental supplies for IRWD's water banking projects is likely to require the use of unbalanced exchange concepts whereby IRWD stores water on behalf of another party in return for 50 percent of the water being transferred to IRWD. The storage and recovery of water for IRWD's exchange partners will take up capacity in IRWD's water banking projects that might otherwise be available for IRWD's use.

Recently, other agencies have expressed an interest in securing shared reliability from IRWD's water banking programs. It is IRWD's intent, after taking into consideration IRWD's reliability needs as well as hydrologic and regional water supply conditions, that IRWD will be able to enter into shared reliability program agreements that will allow other retail water agencies to receive reliability benefits from IRWD's water banking program. In exchange for receiving these benefits, the agencies would reimburse IRWD for its costs along with a proportional share of IRWD's capital investment in its water banking facilities.

The implementation of future unbalanced exchanges and sharing of reliability benefits from IRWD's water banking projects will result in the need to expand IRWD's water banking capacities. In addition, potential climate change impacts could further increase the need to expand IRWD's water banking projects. Such expansions will ensure that IRWD can meet its water supply reliability requirements while meeting the requirements of its partners. IRWD and Rosedale are currently planning to expand their respective water banking projects and are

working together to secure grant funds from the California Water Commission through the Water Storage Investment Program, that would be used to develop the proposed Kern Fan Groundwater Storage Project. IRWD and Rosedale would each retain equity ownership in half of the project.

Objectives for Acquiring Supplemental Water Supplies:

IRWD's objectives for acquiring both short and long-term supplemental water supplies through water transfers, exchanges and other market transactions, that would be available to IRWD's water banking projects and other water supply reliability programs, excluding supplies needed to fulfill local operations (including irrigation), are as follows:

1. IRWD seeks to acquire low-cost and diverse supplemental sources of water such as high flow Kern River water, State Water Project supplies, water associated with pre-1914 rights, CVP supplies and water from other available sources depending on annual availability and conveyance capacity availability.

2. Generally, IRWD seeks to acquire up to 67% of its supplemental supplies during wet hydrologic periods subject to the conditions established by the water supplier and availability. IRWD does not intend to compete for supplemental supplies during dry years.

3. IRWD plans to acquire up to 33% of its supplemental supplies through smaller sustained, controllable and schedulable supply sources. Such supplies are expected to be acquired through the purchases of farm land that have water supply entitled to it. IRWD intends to preserve existing agricultural uses when possible, and will schedule excess water for direct or exchange delivery to its water banking and other water supply reliability programs through rotational fallowing or onsite conservation using methods that are implemented in coordination with the local community with the intent to minimize significant third-party impacts to local economies.

Policy Principles:

Based on the information provided above, the following IRWD policy principles have been developed:

1. The State's water supplies are being impacted by reoccurring droughts, problems in the Delta, a growing population, increasing regulatory pressure, potential climate change impacts, and an imbalance between available water supplies and available storage. As a result, IRWD needs supplemental supplies and storage facilities to bank the supplemental water supplies for use during dry periods.

2. Based on economic and environmental criteria, water banking programs involving storage in groundwater aquifers are preferred, having demonstrated that they are less expensive and preferable to surface storage.

3. A primary mission of IRWD is to provide a highly reliable supply of water. Reliability is enhanced by having multiple redundant sources of supply. To address this need, IRWD will develop diverse supplemental water supply sources and water banking capacities that will be sufficient to meet changes in IRWD's reliability needs in the future.

4. IRWD seeks to secure low-cost and diverse supplemental sources of water including high flow Kern River, State Water Project supplies, water with pre-1914 rights, CVP supplies and water from other available sources depending on annual availability and conveyance and/or exchange capacity that will allow IRWD to achieve its water supply reliability goals through the implementation its water banking program.

5. Because of the District's obligation to its customers, long-term equity ownership of water banking capacity as well as lands that have water supplies entitled to them is strongly preferred over contract or lease arrangements. Equity partnerships that provide benefits to both the District and to local entities are preferred.

6. The District's water banking partners will benefit from the sharing of recharge, storage and recovery capacity through unbalanced exchanges and shared reliability benefit programs. In addition, due to potential climate change, the future intervals between wet years could become longer with increases in the rate of runoff. These issues may make it necessary for IRWD in the future to consider increasing recharge, storage and recovery capacities in its water banking program.

7. Expansion of water banking capacities may be considered through equity purchases of capacities available in existing water banking programs or development of partnerships for capacity expansion.

8. IRWD will support wheeling policies and rates adopted by MWD and other agencies to the extent they reflect cost of service approach. Any wheeling or exchange of water through MWD's conveyance facilities should be consistent with MWD's Administrative Code, must not financially impact MWD or its Member Agencies and should protect MWD's rights including its SWP contract.

9. IRWD will put all available supplemental water supplies to beneficial use using methods that are implemented in coordination with the communities that are local to the source waters and where necessary attempt to minimize significant third-party impacts while preserving the agricultural benefits of the contributing lands through temporary fallowing arrangements and / or water conservation efforts.

10. IRWD will seek partnerships that result in mutually beneficial exchange opportunities including the ability to enhance direct and in-lieu recharge or recovery operations associated with IRWD's water banking program.

11. IRWD will support and actively work with the State and the Federal governments and available legislative processes to streamline procedures for the implementation of short

and long-term water transfers and exchanges as well as the formation of local, regional and statewide water marketing systems.

12. IRWD will support the development of water marketing systems in the State of California that are consistent with and do not expand existing lawful authorities, provide local and regional oversight of markets, encourage regional and statewide cooperation, protect existing land, water and capacity rights, attempt to protect communities from unreasonable third party and / or environmental impacts, do not interfere with contract rights and that result in streamlined abilities to effectuate water transfers, exchanges and wheeling of supplies among voluntary market participants.

13. IRWD will support sharing water supply reliability benefits from its water banking program after considering its own water supply reliability needs as well as hydrologic and regional water supply conditions. In providing such benefits, IRWD will ensure that it is kept financially whole and that IRWD recovers a proportional share of its capital investments in a way that avoids impacts to its customers.

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EXHIBIT "C"

Forecasted Need for Extraordinary Supply Considering IRWD Water Banking Contingency Storage and Recovery Capacities in Response to a Major Multi-Year Drought with Delta Levee Failures
[Assuming 2035 Buildout Demand Projections, a 10% MWD Water Supply Allocation, and Stressed OC Groundwater Basin (BPP = 60%)]

	2035 Imported Demands			Allocation of Imported Supplies		Contingency Storage Requirements		Strand and Stockdale Extraordinary Supply Use by IRWD				Kern Fan Project Extraordinary Supply Use by IRWD					Strand, Stockdale, and Kern Fan Project Capacity Available for New Partners				
Description	Imported Treated Adjusted Demands (AF)[3]	Imported Untreated Demands (AF)[4]	Total Imported Demands (AF)	MWD Allocation (AF)	Annual IRWD Extraordinary Supply Requirement (AFY)	3 Years of Banked Supplies Needed to Meet Imported Water Demands During Shortage (AF)	Water Bank Contingency Storage Requirement for use During Shortage (Rounded up to Nearest 5,000 AF)	IRWD Share of Strand and Stockdale Banking Storage Capacity (AF)	IRWD Share of Strand and Stockdale Banking Recovery Capacity (AFY)	Annual Extraordinary Supply from Strand and Stockdale (AFY)	Remaining Amount of Annual Extraordinary Supply Required (AF)	Total Kern Fan Storage Dedicated to IRWD (AF)[5]	IRWD Share of Kern Fan Recovery Capacity (AFY)	Annual Extraordinary Supply from Kern Fan Project (AFY)	Total Kern Fan Storage Needed to Meet Extraordinary Supply Requirements (AF)	Unfulfilled Annual Extraordinary Supply Requirement (AFY)	Recovery Capacity Available in Strand and Stockdale (AFY)	Storage Capacity Available in Strand and Stockdale (AF)	Recovery Capacity Available in Kern Fan (AF)	Storage Capacity Available in Kern Fan (AF)	Comments
IRWD Board Declares Level 1 Shortage (10% Demand Reduction)																					
No RW penalty and With Syphon[1]	21,983	7,000	28,983	3,193	25,790	77,369	80,000	88,000	17,900	17,900	7,890	37,500	21,700	7,890	23,669	0	None	N/A	13,810	13,831	KFP Necessary to Satisfy Extraordinary Supply Req.
No RW penalty and Without Syphon[2]	21,983	8,510	30,493	3,380	27,113	81,338	85,000	88,000	17,900	17,900	9,213	37,500	21,700	9,213	27,638	0	None	N/A	12,487	9,862	KFP Necessary to Satisfy Extraordinary Supply Req.
With RW penalty and With Syphon	32,315	7,000	39,315	4,525	34,790	104,369	105,000	88,000	17,900	17,900	16,890	37,500	21,700	12,500	37,500	4,390	None	N/A	0	0	KFP Unable to Satisfy All Extraordinary Supply Req.
With RW penalty and Without Syphon	32,315	8,510	40,825	4,731	36,094	108,281	110,000	88,000	17,900	17,900	18,194	37,500	21,700	12,500	37,500	5,694	None	N/A	0	0	KFP Unable to Satisfy All Extraordinary Supply Req.
IRWD Board Declares Level 3 Shortage (30% Demand Reduction)																					
No RW penalty and With Syphon	17,098	7,000	24,098	2,718	21,380	64,140	65,000	88,000	17,900	17,900	3,480	37,500	21,700	3,480	10,440	0	None	N/A	18,220	27,060	KFP Necessary to Satisfy Extraordinary Supply Req.
No RW penalty and Without Syphon	17,098	8,510	25,608	2,914	22,694	68,081	70,000	88,000	17,900	17,900	4,794	37,500	21,700	4,794	14,381	0	None	N/A	16,906	23,119	KFP Necessary to Satisfy Extraordinary Supply Req.
With RW penalty and With Syphon	25,134	7,000	32,134	3,809	28,325	84,976	85,000	88,000	17,900	17,900	10,425	37,500	21,700	10,425	31,276	0	None	N/A	11,275	6,224	KFP Necessary to Satisfy Extraordinary Supply Req.
With RW penalty and Without Syphon	25,134	8,510	33,644	4,027	29,617	88,850	90,000	88,000	17,900	17,900	11,717	37,500	21,700	11,717	35,150	0	None	N/A	9,983	2,350	KFP Necessary to Satisfy Extraordinary Supply Req.
IRWD Board Declares Level 5 Shortage (50% Demand Reduction)																					
No RW penalty and With Syphon	12,213	7,000	19,213	2,245	16,968	50,905	55,000	88,000	17,900	16,968	0	37,500	21,700	0	0	0	932	2795	21,700	37,500	Extraord. Supply Req. Satisfied by Strand and Stockdale
No RW penalty and Without Syphon	12,213	8,510	20,723	2,456	18,267	54,801	55,000	88,000	17,900	17,900	367	37,500	21,700	367	1,101	0	None	N/A	21,333	36,399	KFP Necessary to Satisfy Extraordinary Supply Req.
With RW penalty and With Syphon	17,953	7,000	24,953	3,085	21,868	65,605	70,000	88,000	17,900	17,900	3,968	37,500	21,700	3,968	11,905	0	None	N/A	17,732	25,595	KFP Necessary to Satisfy Extraordinary Supply Req.
With RW penalty and Without Syphon	17,953	8,510	26,463	3,323	23,140	69,419	70,000	88,000	17,900	17,900	5,240	37,500	21,700	5,240	15,719	0	None	N/A	16,460	21,781	KFP Necessary to Satisfy Extraordinary Supply Req.

[1]Assumes IRWD prevails in ongoing litigation related to OCWD's exclusion of recycled water as a supplemental source.
[2]Assumes Syphon Reservoir Improvement Project is not constructed.
[3]Demands consistent with stages of IRWD's Water Supply Contingency Plan.
[4]Imported untreated demands includes purchasing 7,000 AFY of untreated water from Metropolitan for Baker WTP and 1,510 AFY of supplemental untreated water for the reycled water system without Syphon.
[5]Assumes State Water Project Contract amendment will allow IRWD's 100% use of supplies by IRWD.