CHINO BASIN WATERMASTER

NOTICE OF MEETINGS

Thursday, September 8, 2022

9:00 a.m. – Appropriative Pool Meeting
11:00 a.m. – Non-Agricultural Pool Meeting
1:30 p.m. – Agricultural Pool Meeting

Watermaster's function is to administer and enforce provisions of the Judgment and subsequent orders of the Court, and to develop and implement an Optimum Basin Management Program

CHINO BASIN WATERMASTER

Thursday, September 8, 2022

9:00 a.m. – Appropriative Pool Meeting
11:00 a.m. – Non-Agricultural Pool Meeting
1:30 p.m. – Agricultural Pool Meeting

POOL AGENDAS

CHINO BASIN WATERMASTER
APPROPRIATIVE POOL COMMITTEE MEETING
9:00 a.m. September 8, 2022
Mr. Eduardo Espinoza, Chair
Mr. Chris Diggs, Vice-Chair
At The Offices Of
Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

(Call can be taken remotely via Zoom at this link)

AGENDA

CALL TO ORDER

ROLL CALL

AGENDA - ADDITIONS/REORDER

I. CONSENT CALENDAR

Note: All matters listed under the Consent Calendar are considered to be routine and non-controversial and will be acted upon by one motion in the form listed below. There will be no separate discussion on these items prior to voting unless any members, staff, or the public requests specific items be discussed and/or removed from the Consent Calendar for separate action.

A. MINUTES

Approve as presented:

1. Minutes of the Appropriative Pool Committee Meeting held August 11, 2022 *(Page 1)*

B. FINANCIAL REPORTS

Receive and file as presented:

1. Cash Disbursements for the month of July 2022 *(Page 20)*
2. Watermaster VISA Check Detail for the month of July 2022 *(Page 32)*
3. Combining Schedule for the Period July 1, 2022 through July 31, 2022 *(Page 35)*
4. Treasurer's Report of Financial Affairs for the Period July 1, 2022 through July 31, 2022 *(Page 38)*
5. Budget vs. Actual Report for the Period July 1, 2022 through July 31, 2022 *(Page 42)*
6. Cash Disbursements for August 2022 (Information Only) *(Page 65)*

C. OBMP SEMI-ANNUAL STATUS REPORT 2022-1 *(Page 76)*

Recommend to the Advisory Committee to recommend to the Watermaster Board to adopt the Semi-Annual OBMP Status Report 2022-1, along with filing a copy with the Court, subject to any necessary non-substantive changes.

II. BUSINESS ITEMS

A. SAFE YIELD RESET METHODOLOGY UPDATE *(Page 97)*

Provide advice and assistance.

III. REPORTS/UPDATES

A. LEGAL COUNSEL

1. San Bernardino County Superior Court Emergency Order
2. September 30, 2022 Hearing
3. Motion Challenging Watermaster's Budget Action To Fund Unauthorized CEQA Review
4. Governor's Executive Order N-7-22

5. Kaiser Permanente Lawsuit
6. Rules and Regulations Update

B. ENGINEER

1. Ground-Level Monitoring Committee Update

C. CHIEF FINANCIAL OFFICER

None

D. GENERAL MANAGER

1. 2020 OBMP
2. SNMP Presentation Date – October 27, 2022 at 9:30am
3. Workshop IV
4. Supplemental Water Flowchart
5. 2023 RMPU
6. Water Activity Reports
7. Other

IV. POOL MEMBER COMMENTS

V. OTHER BUSINESS

VI. CONFIDENTIAL SESSION – POSSIBLE ACTION

A Confidential Session may be held during the Pool Committee meeting for the purpose of discussion and possible action.

1. Ag Legal Expenses
2. AP Administrative Matters

VII. FUTURE MEETINGS AT WATERMASTER

09/08/22	Thu	9:00 a.m.	Appropriative Pool Committee
09/08/22	Thu	11:00 a.m.	Non-Agricultural Pool Committee
09/08/22	Thu	1:30 p.m.	Agricultural Pool Committee
09/15/22	Thu	9:00 a.m.	Advisory Committee
09/22/22	Thu	11:00 a.m.	Watermaster Board
09/29/22	Thu	9:00 a.m.	Ground-Level Monitoring Committee (GLMC)

ADJOURNMENT

CHINO BASIN WATERMASTER
NON-AGRICULTURAL POOL COMMITTEE MEETING
11:00 a.m. September 8, 2022
Mr. Brian Geye, Chair
Mr. Bob Bowcock, Vice-Chair
At The Offices Of
Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

AGENDA

CALL TO ORDER

ROLL CALL

AGENDA – ADDITIONS/REORDER

I. BUSINESS ITEMS - ROUTINE

A. MINUTES

Receive and file as presented:

1. Minutes of the Non-Agricultural Pool Committee Meeting held August 11, 2022 *(Page 7)*

B. FINANCIAL REPORTS

Receive and file as presented:

1. Cash Disbursements for the month of July 2022 *(Page 20)*
2. Watermaster VISA Check Detail for the month of July 2022 *(Page 32)*
3. Combining Schedule for the Period July 1, 2022 through July 31, 2022 *(Page 35)*
4. Treasurer's Report of Financial Affairs for the Period July 1, 2022 through July 31, 2022 *(Page 38)*
5. Budget vs. Actual Report for the Period July 1, 2022 through July 31, 2022 *(Page 42)*
6. Cash Disbursements for August 2022 (Information Only) *(Page 65)*

C. OBMP SEMI-ANNUAL STATUS REPORT 2022-1 *(Page 76)*

Recommend to the Advisory Committee to recommend to the Watermaster Board to adopt the Semi-Annual OBMP Status Report 2022-1, along with filing a copy with the Court, subject to any necessary non-substantive changes.

II. BUSINESS ITEMS

A. SAFE YIELD RESET METHODOLOGY UPDATE *(Page 97)*

Provide advice and assistance.

B. MEMBER STATUS CHANGES

1. Any proposed transfer of Safe Yield by a Member.
2. Any transfer of Safe Yield that has actually closed or been completed.
3. Any change in name or corporate identity of a Member (such as results from a merger or filing of a change of name certificate).
4. Any change in the name of a representative or alternate representative of a Member, or a change in e-mail address for either such person.

III. REPORTS/UPDATES

A. LEGAL COUNSEL

1. San Bernardino County Superior Court Emergency Order
2. September 30, 2022 Hearing
3. Motion Challenging Watermaster's Budget Action To Fund Unauthorized CEQA Review
4. Governor's Executive Order N-7-22

5. Kaiser Permanente Lawsuit
6. Rules and Regulations Update

B. ENGINEER

1. Ground-Level Monitoring Committee Update

C. CHIEF FINANCIAL OFFICER

None

D. GENERAL MANAGER

1. 2020 OBMP
2. SNMP Presentation Date – October 27, 2022 at 9:30am
3. Workshop IV
4. Supplemental Water Flowchart
5. 2023 RMPU
6. Water Activity Reports
7. Other

IV. POOL MEMBER COMMENTS

V. OTHER BUSINESS

VI. CONFIDENTIAL SESSION - POSSIBLE ACTION

A Confidential Session may be held during the Pool Committee meeting for the purpose of discussion and possible action.

None

VII. FUTURE MEETINGS AT WATERMASTER

09/08/22	Thu	9:00 a.m.	Appropriative Pool Committee
09/08/22	Thu	11:00 a.m.	Non-Agricultural Pool Committee
09/08/22	Thu	1:30 p.m.	Agricultural Pool Committee
09/15/22	Thu	9:00 a.m.	Advisory Committee
09/22/22	Thu	11:00 a.m.	Watermaster Board
09/29/22	Thu	9:00 a.m.	Ground-Level Monitoring Committee (GLMC)

ADJOURNMENT

CHINO BASIN WATERMASTER
AGRICULTURAL POOL COMMITTEE MEETING
1:30 p.m. September 8, 2022
Mr. Bob Feenstra, Chair
Mr. Jeff Pierson, Vice-Chair
At The Offices Of
Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

AGENDA

CALL TO ORDER

ROLL CALL

AGENDA - ADDITIONS/REORDER

I. CONSENT CALENDAR

Note: All matters listed under the Consent Calendar are considered to be routine and non-controversial and will be acted upon by one motion in the form listed below. There will be no separate discussion on these items prior to voting unless any members, staff, or the public requests specific items be discussed and/or removed from the Consent Calendar for separate action.

A. MINUTES

Approve as presented:

1. Minutes of the Agricultural Pool Committee Meeting held August 11, 2022 *(Page 12)*

B. FINANCIAL REPORTS

Receive and file as presented:

1. Cash Disbursements for the month of July 2022 *(Page 20)*
2. Watermaster VISA Check Detail for the month of July 2022 *(Page 32)*
3. Combining Schedule for the Period July 1, 2022 through July 31, 2022 *(Page 35)*
4. Treasurer's Report of Financial Affairs for the Period July 1, 2022 through July 31, 2022 *(Page 38)*
5. Budget vs. Actual Report for the Period July 1, 2022 through July 31, 2022 *(Page 42)*
6. Cash Disbursements for August 2022 (Information Only) *(Page 65)*

C. OBMP SEMI-ANNUAL STATUS REPORT 2022-1 *(Page 76)*

Recommend to the Advisory Committee to recommend to the Watermaster Board to adopt the Semi-Annual OBMP Status Report 2022-1, along with filing a copy with the Court, subject to any necessary non-substantive changes.

II. BUSINESS ITEMS

A. SAFE YIELD RESET METHODOLOGY UPDATE *(Page 97)*

Provide advice and assistance.

B. OLD BUSINESS

III. REPORTS/UPDATES

A. LEGAL COUNSEL

1. San Bernardino County Superior Court Emergency Order
2. September 30, 2022 Hearing
3. Motion Challenging Watermaster's Budget Action To Fund Unauthorized CEQA Review
4. Governor's Executive Order N-7-22
5. Kaiser Permanente Lawsuit

6. Rules and Regulations Update

B. ENGINEER
1. Ground-Level Monitoring Committee Update

C. CHIEF FINANCIAL OFFICER
None

D. GENERAL MANAGER
1. 2020 OBMP
2. SNMP Presentation Date – October 27, 2022 at 9:30am
3. Workshop IV
4. Supplemental Water Flowchart
5. 2023 RMPU
6. Water Activity Reports
7. Other

IV. POOL DISCUSSION
1. Chairman's Update
2. Pool Member Comments

V. OTHER BUSINESS

VI. CONFIDENTIAL SESSION - POSSIBLE ACTION
A Confidential Session may be held during the Pool Committee meeting for the purpose of discussion and possible action.

1. Complete Review of Ag Pool Finances and AP Payments
2. Current Pool Budget
    a. Expenses to Date
    b. Remaining Funds
3. Strategic Planning

VII. FUTURE MEETINGS AT WATERMASTER

09/08/22	Thu	9:00 a.m.	Appropriative Pool Committee
09/08/22	Thu	11:00 a.m.	Non-Agricultural Pool Committee
09/08/22	Thu	1:30 p.m.	Agricultural Pool Committee
09/15/22	Thu	9:00 a.m.	Advisory Committee
09/22/22	Thu	11:00 a.m.	Watermaster Board
09/29/22	Thu	9:00 a.m.	Ground-Level Monitoring Committee (GLMC)

ADJOURNMENT

CHINO BASIN WATERMASTER

I. CONSENT CALENDAR (AP)

A. MINUTES

1. Appropriative Pool Meeting held August 11, 2022

DRAFT MINUTES
CHINO BASIN WATERMASTER
APPROPRIATIVE POOL COMMITTEE MEETING
August 11, 2022

The Appropriative Pool committee meeting was held at the Watermaster offices located at 9641 San Bernardino Road, Rancho Cucamonga, CA, and via Zoom (conference call and web meeting) on August 11, 2022.

APPROPRIATIVE POOL COMMITTEE MEMBERS PRESENT AT WATERMASTER

Eduardo Espinoza, Chair	Cucamonga Valley Water District
Chris Diggs, Vice-Chair	City of Pomona
Dave Crosley	City of Chino
Christopher Quach for Courtney Jones	City of Ontario
Josh Swift	Fontana Union Water Company
Cris Fealy	Fontana Water Company
Chris Berch	Jurupa Community Services District
Justin Scott-Coe	Monte Vista Irrigation Company
Justin Scott-Coe	Monte Vista Water District
Cris Fealy	Nicholson Family Trust

APPROPRIATIVE POOL COMMITTEE MEMBERS PRESENT ON ZOOM

Ron Craig	City of Chino Hills
Braden Yu	City of Upland
Ben Lewis	Golden State Water Company
Teri Layton for Brian Lee	San Antonio Water Company
John Lopez	Santa Ana River Water Company
Braden Yu	West End Consolidated Water Company

WATERMASTER BOARD MEMBERS PRESENT ON ZOOM

Jim Curatalo	Minor Representative
Pete Hall	State of California

WATERMASTER STAFF PRESENT

Peter Kavounas	General Manager
Edgar Tellez Foster	Water Resources Mgmt. & Planning Dir.
Anna Nelson	Director of Administration
Justin Nakano	Water Resources Technical Manager
Frank Yoo	Data Services and Judgment Reporting Mgr.
Janine Wilson	Senior Accountant
Denise Morales	Executive Assistant II/Board Clerk
Ruby Favela	Administrative Assistant
David Huynh	Senior Field Operations Specialist
Alonso Jurado	Senior Field Operations Specialist

WATERMASTER CONSULTANTS PRESENT AT WATERMASTER

Brad Herrema	Brownstein Hyatt Farber Schreck, LLP
Andy Malone	West Yost

WATERMASTER CONSULTANTS PRESENT ON ZOOM

Garrett Rapp	West Yost

OTHERS PRESENT AT WATERMASTER

Amanda Coker	Cucamonga Valley Water District
Joel Ignacio	Inland Empire Utilities Agency
Bryan Smith	Jurupa Community Services District
Jeff Davis	Provost & Pritchard Consulting

OTHERS PRESENT ON ZOOM

Toyasha Sebbag	Chino Basin Water Conservation District
Luis Cetina	Cucamonga Valley Water District
Mark Gibboney	Cucamonga Valley Water District
Eric Grubb	Cucamonga Valley Water District
Rob Hills	Cucamonga Valley Water District
Randall Reed	Cucamonga Valley Water District
Tarren Alicia Torres	Egoscue Law Group, Inc.
Shawnda Grady	Ellison Schneider Harris & Donlan LLP
Eric Fordham	GeoPentech
Adham Almasri	Inland Empire Utilities Agency
Jason Marseilles	Inland Empire Utilities Agency
Stephanie Reimer	Monte Vista Water District
Kevin O'Toole	Orange County Water District
Bill Wyatt	Sheppard, Mullin, Richter & Hampton
Jimmy Medrano	State of California (Ag Pool)
Marilyn Levin	State of California (Ag Pool
David De Jesus	Three Valleys Municipal Water District

CALL TO ORDER

Chair Espinoza called the Appropriative Pool committee meeting to order at 9:01 a.m.

ROLL CALL

(0:00:09) Ms. Morales conducted the roll call and announced that a quorum was present.

AGENDA - ADDITIONS/REORDER

None

I. CONSENT CALENDAR

Note: All matters listed under the Consent Calendar are considered to be routine and non-controversial and will be acted upon by one motion in the form listed below. There will be no separate discussion on these items prior to voting unless any members, staff, or the public requests specific items be discussed and/or removed from the Consent Calendar for separate action.

A. MINUTES

Approve as presented:

1. Minutes of the Appropriative Pool Committee Meeting held June 9, 2022
2. Minutes of the Appropriative Pool Committee Special Meeting held June 16, 2022
3. Minutes of the Appropriative Pool Committee Special Meeting held July 21, 2022

B. FINANCIAL REPORTS

Receive and file as presented:

1. Cash Disbursements for the month of May 2022
2. Watermaster VISA Check Detail for the month of May 2022
3. Combining Schedule for the Period July 1, 2021 through May 31, 2022
4. Treasurer's Report of Financial Affairs for the Period May 1, 2022 through May 31, 2022

5. Budget vs. Actual Report for the Period July 1, 2021 through May 31, 2022
6. Cash Disbursements for the month of June 2022
7. Watermaster VISA Check Detail for the month of June 2022
8. Combining Schedule for the Period July 1, 2021 through June 30, 2022
9. Treasurer's Report of Financial Affairs for the Period June 1, 2022 through June 30, 2022
10. Budget vs. Actual Report for the Period July 1, 2021 through June 30, 2022
11. Cash Disbursements for July 2022 (Information Only)

C. APPLICATION: WATER TRANSACTION

Provide advice and assistance to the Advisory Committee on the proposed transaction: The purchase of 708.3 acre-feet of water from West End Consolidated Water Company by City of Upland. This purchase is made from West End Consolidated Water Company's Excess Carryover Account. City of Upland is utilizing this transaction to produce its West End Consolidated Water Company shares. [Within WM Duties and Powers]

D. APPLICATION: WATER TRANSACTION

Provide advice and assistance to the Advisory Committee on the proposed transaction: The purchase of 66.4 acre-feet of water from West End Consolidated Water Company by Golden State Water Company. This purchase is made from West End Consolidated Water Company's Annual Production Right. Golden State Water Company is utilizing this transaction to produce its West End Consolidated Water Company shares. [Within WM Duties and Powers]

E. APPLICATION: WATER TRANSACTION

Provide advice and assistance to the Advisory Committee on the proposed transaction: The purchase of 440 acre-feet of water from City of Upland by Golden State Water Company. This purchase is made from City of Upland's Annual Production Right. [Within WM Duties and Powers]

F. CHINO CREEK WELL FIELD EXTENSOMETER LAND LEASE EXTENSION

Recommend to Advisory Committee to authorize Watermaster to give notice of intent and extend the Land Lease Agreement. [Advisory Committee Approval Required]

(0:03:26)
Motion by Mr. Cris Fealy, seconded by Mr. Josh Swift, and passed unanimously.
Moved to approve the Consent Calendar as presented.

II. BUSINESS ITEMS

A. SECOND AMENDMENT TO TASK ORDER NO. 9 UNDER THE MASTER AGREEMENT FOR COLLABORATIVE RECHARGE PROJECTS (PROJECT 23a)

Recommend Advisory Committee approval of the Second Amendment to Task Order No. 9 to increase the total budgeted cost.

(0:04:46) Mr. Kavounas prefaced the item and introduced Mr. Joel Ignacio of the Inland Empire Utilities Agency who gave a presentation. A discussion ensued.

(0:19:02)
Motion by Mr. Chris Diggs, seconded by Mr. Christopher Quach, and passed unanimously.
Moved to approve Business Item II.A. as presented.

III. REPORTS/UPDATES

A. LEGAL COUNSEL

1. San Bernardino County Superior Court Emergency Order
2. August 31, 2022 Hearing
3. Governor's Executive Order N-7-22
4. Kaiser Permanente Lawsuit

(0:21:25) Mr. Herrema gave a report. A discussion ensured.

B. ENGINEER

1. Safe Yield Reset Methodology Update
2. Chino Basin Maximum Benefit SNMP

(0:24:46) Mr. Malone introduced Mr. Rapp, who gave a report on Item 1. Mr. Malone then gave a report on Item 2 and announced that a fuller presentation on the Maximum Benefit SNMP will likely be presented to Watermaster stakeholders in October.

C. CHIEF FINANCIAL OFFICER

1. FY 2020/21 Audit of Groundwater Recharge Basin O&M Expenses

(0:38:26) Ms. Wilson gave a report on behalf of Mr. Joswiak.

D. GENERAL MANAGER

1. Supplemental Water Tracking
2. July 28, 2022 Board Workshop: OBMP
3. 2020 OBMP Environmental Review
4. Other

(0:41:41) Mr. Kavounas prefaced Item 1 and handed off to Mr. Nakano who gave a presentation on the flowchart for supplemental water tracking. A discussion ensued. Mr. Kavounas gave a report on the remainder of the GM report items and noted that a workshop will be held on September 1, 2022, at 1:00 p.m. to advance the 2020 OBMP Environmental Review process. Mr. Kavounas expressed his appreciation for Ms. Nelson for putting together the Robert's Rules of Order training held on July 27, 2022. He indicated that the training was a success and that he received complimentary remarks from a few parties who attended. A discussion ensued.

IV. INFORMATION

None

V. POOL MEMBER COMMENTS

None

VI. OTHER BUSINESS

None

VII. CONFIDENTIAL SESSION – POSSIBLE ACTION

A Confidential Session may be held during the Pool Committee meeting for the purpose of discussion and possible action.

Chair Espinoza called for a confidential session at 10:34 a.m. to discuss the following:

1. Safe Yield Reset
2. OBMP Update

Confidential session concluded at 11:45 a.m. with no reportable action.

ADJOURNMENT
Chair Espinoza adjourned the Appropriative Pool Committee meeting at 12:02 p.m.

Secretary: _____

Approved: _____

CHINO BASIN WATERMASTER

I. BUSINESS ITEMS – ROUTINE (ONAP)

A. MINUTES

1. Non-Agricultural Pool Meeting held August 11, 2022

DRAFT MINUTES
CHINO BASIN WATERMASTER
NON-AGRICULTURAL POOL COMMITTEE MEETING
August 11, 2022

The Non-Agricultural Pool committee meeting was held at the Watermaster offices located at 9641 San Bernardino Road, Rancho Cucamonga, CA, and via Zoom (conference call and web meeting) on August 11, 2022.

NON-AGRICULTURAL POOL COMMITTEE MEMBERS PRESENT ON ZOOM

Brian Geye, Chair	California Speedway Corporation
Kathleen Brundage	California Steel Industries
Alexis Mascarinas for Christopher Quach	City of Ontario

NON-AGRICULTURAL POOL COMMITTEE MEMBERS PRESENT AT WATERMASTER

Bob Bowcock, Vice-Chair	CalMat Co.

WATERMASTER BOARD MEMBERS PRESENT ON ZOOM

Pete Hall	State of California (Ag Pool)

WATERMASTER STAFF PRESENT AT WATERMASTER

Peter Kavounas	General Manager
Edgar Tellez Foster	Water Resources Mgmt. & Planning Dir.
Anna Nelson	Director of Administration
Justin Nakano	Water Resources Technical Manager
Frank Yoo	Data Services and Judgment Reporting Mgr.
Janine Wilson	Senior Accountant
Denise Morales	Executive Assistant II/Board Clerk
Ruby Favela	Administrative Assistant
David Huynh	Sr. Field Operations Specialist
Alonso Jurado	Sr. Field Operations Specialist

WATERMASTER CONSULTANTS PRESENT AT WATERMASTER

Brad Herrema	Brownstein Hyatt Farber Schreck, LLP
Andy Malone	West Yost

WATERMASTER CONSULTANTS PRESENT ON ZOOM

Garrett Rapp	West Yost

OTHERS PRESENT ON ZOOM

Tarren Alicia Torres	Egoscue Law Group, Inc.
Adham Almasri	Inland Empire Utilities Agency
Jason Marseilles	Inland Empire Utilities Agency

NON-AGRICULTURAL POOL LEGAL COUNSEL PRESENT ON ZOOM

Allen Hubsch	Law Office of Allen W. Hubsch

CALL TO ORDER
Chair Geye called the Non-Agricultural Pool committee meeting to order at 11:00 a.m.

ROLL CALL
(00:00:14) Ms. Morales conducted the roll call.

AGENDA – ADDITIONS/REORDER
None

I. BUSINESS ITEMS - ROUTINE

A. MINUTES

Receive and file as presented:

1. Minutes of the Non-Agricultural Pool Committee Meeting held June 9, 2022

(00:02:44)
Motion by Ms. Kathleen Brundage, seconded by Ms. Alexis Mascarinas. The Chair called for dissent, and, none being noted, the motion was deemed passed by unanimous vote of those present.

Moved to receive and file Business Item I.A. as presented.

B. FINANCIAL REPORTS

Receive and file as presented:

1. Cash Disbursements for the month of May 2022
2. Watermaster VISA Check Detail for the month of May 2022
3. Combining Schedule for the Period July 1, 2021 through May 31, 2022
4. Treasurer's Report of Financial Affairs for the Period May 1, 2022 through May 31, 2022
5. Budget vs. Actual Report for the Period July 1, 2021 through May 31, 2022
6. Cash Disbursements for the month of June 2022
7. Watermaster VISA Check Detail for the month of June 2022
8. Combining Schedule for the Period July 1, 2021 through June 30, 2022
9. Treasurer's Report of Financial Affairs for the Period June 1, 2022 through June 30, 2022
10. Budget vs. Actual Report for the Period July 1, 2021 through June 30, 2022
11. Cash Disbursements for July 2022 (Information Only)

(00:03:09)
Motion by Mr. Kathleen Brundage, seconded by Ms. Alexis Mascarinas. The Chair called for dissent, and, none being noted, the motion was deemed passed by unanimous vote of those present.

Moved to receive and file Business Item I.B. without approval as presented.

C. APPLICATION: WATER TRANSACTION

Provide advice and assistance to the Advisory Committee on the proposed transaction:
The purchase of 708.3 acre-feet of water from West End Consolidated Water Company by City of Upland. This purchase is made from West End Consolidated Water Company's Excess Carryover Account. City of Upland is utilizing this transaction to produce its West End Consolidated Water Company shares. [Within WM Duties and Powers]

D. APPLICATION: WATER TRANSACTION

Provide advice and assistance to the Advisory Committee on the proposed transaction:
The purchase of 66.4 acre-feet of water from West End Consolidated Water Company by Golden State Water Company. This purchase is made from West End Consolidated Water Company's Annual Production Right. Golden State Water Company is utilizing this transaction to produce its West End Consolidated Water Company shares. [Within WM Duties and Powers]

E. APPLICATION: WATER TRANSACTION

Provide advice and assistance to the Advisory Committee on the proposed transaction:
The purchase of 440 acre-feet of water from City of Upland by Golden State Water Company. This purchase is made from City of Upland's Annual Production Right. [Within WM Duties and Powers]

(00:03:45)
Motion by Ms. Kathleen Brundage, seconded by Ms. Alexis Mascarinas. The Chair called for dissent, and, none being noted, the motion was deemed passed by unanimous vote of those present.

Moved to approve staff recommendation of Business Items I.C. through I.E., and to direct the Pool representatives to support at the Advisory Committee and Watermaster Board meetings subject to changes which they deem appropriate.

F. CHINO CREEK WELL FIELD EXTENSOMETER LAND LEASE EXTENSION

Recommend to Advisory Committee to authorize Watermaster to give notice of intent and extend the Land Lease Agreement. [Advisory Committee Approval Required]

(00:04:20)
Motion by Ms. Kathleen Brundage, seconded by Ms. Alexis Mascarinas. The Chair called for dissent, and, none being noted, the motion was deemed passed by unanimous vote of those present.

Moved to approve staff recommendation of Business Item I.F., and to direct the Pool representatives to support at the Advisory Committee and Watermaster Board meetings subject to changes which they deem appropriate.

II. BUSINESS ITEMS

A. SECOND AMENDMENT TO TASK ORDER NO. 9 UNDER THE MASTER AGREEMENT FOR COLLABORATIVE RECHARGE PROJECTS (PROJECT 23a)

Recommend Advisory Committee approval of the Second Amendment to Task Order No. 9 to increase the total budgeted cost.

(00:07:52)
Motion by Ms. Kathleen Brundage, seconded by Ms. Alexis Mascarinas. The Chair called for dissent, and, none being noted, the motion was deemed passed by unanimous vote of those present.

Moved to approve staff recommendation of Business Item II.A., and to direct the Pool representatives to support at the Advisory Committee and Watermaster Board meetings subject to changes which they deem appropriate.

B. MEMBER STATUS CHANGES

1. Any proposed transfer of Safe Yield by a Member.
2. Any transfer of Safe Yield that has actually closed or been completed.
3. Any change in name or corporate identity of a Member (such as results from a merger or filing of a change of name certificate).
4. Any change in the name of a representative or alternate representative of a Member, or a change in e-mail address for either such person.

There were no changes to note.

III. REPORTS/UPDATES

A. LEGAL COUNSEL

1. San Bernardino County Superior Court Emergency Order
2. August 31, 2022 Hearing
3. Governor's Executive Order N-7-22
4. Kaiser Permanente Lawsuit

(00:08:35) Mr. Herrema gave a report.

B. ENGINEER

1. Safe Yield Reset Methodology Update
2. Chino Basin Maximum Benefit SNMP

(00:11:23) Mr. Rapp gave a report on Item 1. Mr. Malone gave a report on Item 2 and indicated that a fuller presentation on the Maximum Benefit SNMP will likely be brought back in October. A discussion ensued.

C. CHIEF FINANCIAL OFFICER

1. FY 2020/21 Audit of Groundwater Recharge Basin O&M Expenses

(00:19:41) Ms. Wilson gave a report on behalf of Mr. Joswiak.

D. GENERAL MANAGER

1. Supplemental Water Tracking
2. July 28, 2022 Board Workshop: OBMP
3. 2020 OBMP Environmental Review
4. Other

(00:22:50) Mr. Kavounas prefaced Item 1 and handed off to Mr. Nakano who gave a report. Mr. Kavounas gave a report on the remainder of the GM items and noted that a workshop will be held on September 1, 2022, at 1:00 p.m. to advance the 2020 OBMP Environmental Review process. He also shared with the Pool that the Robert's Rules of Order training held on July 27, 2022 was a success and that he received complimentary remarks from a few parties who attended. A discussion ensued.

IV. POOL MEMBER COMMENTS

None

V. OTHER BUSINESS

None

VI. CONFIDENTIAL SESSION - POSSIBLE ACTION

A Confidential Session may be held during the Pool Committee meeting for the purpose of discussion and possible action.

None

ADJOURNMENT

Chair Geye adjourned the Non-Agricultural Pool Committee meeting at 11:47 a.m.

Secretary: _____

Approved: _____

CHINO BASIN WATERMASTER

I. CONSENT CALENDAR (OAP)

A. MINUTES

1. Agricultural Pool Meeting held on August 11, 2022

DRAFT MINUTES
CHINO BASIN WATERMASTER
AGRICULTURAL POOL COMMITTEE MEETING
August 11, 2022

The Agricultural Pool committee meeting was held at the Watermaster offices located at 9641 San Bernardino Road, Rancho Cucamonga, CA, and via Zoom (conference call and web meeting) on August 11, 2022.

AGRICULTURAL POOL COMMITTEE MEMBERS PRESENT AT WATERMASTER

Bob Feenstra, Chair	Dairy
Jeff Pierson, Vice-Chair	Crops
Gino Filippi for Ron LaBrucherie, Jr.	Crops

AGRICULTURAL POOL COMMITTEE MEMBERS PRESENT ON ZOOM

Steven Raughley	County of San Bernardino
Ruben Llamas	Crops
Nathan deBoom	Dairy
Henry DeHaan	Dairy
John Huitsing	Dairy
Geoffrey Vanden Heuvel	Dairy
Pete Hall	State of California – CIM
Jimmy Medrano	State of California – CIM
Marilyn Levin for Tariq Awan	State of California – DOJ

WATERMASTER STAFF PRESENT

Peter Kavounas	General Manager
Edgar Tellez Foster	Water Resources Mgmt. and Planning Dir.
Anna Nelson	Director of Administration
Justin Nakano	Water Resources Technical Manager
Frank Yoo	Data Services and Judgment Reporting Mgr.
Denise Morales	Executive Assistant II/Board Clerk
Janine Wilson	Senior Accountant
Ruby Favela	Administrative Assistant
David Huynh	Senior Field Operations Specialist
Alonso Jurado	Senior Field Operations Specialist

WATERMASTER CONSULTANTS PRESENT AT WATERMASTER

Brad Herrema	Brownstein Hyatt Farber Schreck, LLP
Andy Malone	West Yost

WATERMASTER CONSULTANTS PRESENT ON ZOOM

Garrett Rapp	West Yost

OTHERS PRESENT AT WATERMASTER

Tracy Egoscue	Egoscue Law Group, Inc.
Joel Ignacio	Inland Empire Utilities Agency

OTHERS PRESENT ON ZOOM

Natalie Avila	City of Chino
Amanda Coker	Cucamonga Valley Water District
Jason Marseilles	Inland Empire Utilities Agency
Craig Stewart	Wood plc

CALL TO ORDER

Chair Feenstra called the Agricultural Pool committee meeting to order at 1:32 p.m.

ROLL CALL
(0:00:24) Ms. Morales conducted the roll call and announced that a quorum was present.

AGENDA - ADDITIONS/REORDER
None

I. CONSENT CALENDAR

Note: All matters listed under the Consent Calendar are considered to be routine and non-controversial and will be acted upon by one motion in the form listed below. There will be no separate discussion on these items prior to voting unless any members, staff, or the public requests specific items be discussed and/or removed from the Consent Calendar for separate action.

A. MINUTES

Approve as presented:

1. Minutes of the Agricultural Pool Committee Meeting held June 9, 2022

B. FINANCIAL REPORTS

Receive and file as presented:

1. Cash Disbursements for the month of May 2022
2. Watermaster VISA Check Detail for the month of May 2022
3. Combining Schedule for the Period July 1, 2021 through May 31, 2022
4. Treasurer's Report of Financial Affairs for the Period May 1, 2022 through May 31, 2022
5. Budget vs. Actual Report for the Period July 1, 2021 through May 31, 2022
6. Cash Disbursements for the month of June 2022
7. Watermaster VISA Check Detail for the month of June 2022
8. Combining Schedule for the Period July 1, 2021 through June 30, 2022
9. Treasurer's Report of Financial Affairs for the Period June 1, 2022 through June 30, 2022
10. Budget vs. Actual Report for the Period July 1, 2021 through June 30, 2022
11. Cash Disbursements for July 2022 (Information Only)

C. APPLICATION: WATER TRANSACTION

Provide advice and assistance to the Advisory Committee on the proposed transaction:
The purchase of 708.3 acre-feet of water from West End Consolidated Water Company by City of Upland. This purchase is made from West End Consolidated Water Company's Excess Carryover Account. City of Upland is utilizing this transaction to produce its West End Consolidated Water Company shares. [Within WM Duties and Powers]

D. APPLICATION: WATER TRANSACTION

Provide advice and assistance to the Advisory Committee on the proposed transaction:
The purchase of 66.4 acre-feet of water from West End Consolidated Water Company by Golden State Water Company. This purchase is made from West End Consolidated Water Company's Annual Production Right. Golden State Water Company is utilizing this transaction to produce its West End Consolidated Water Company shares. [Within WM Duties and Powers]

E. APPLICATION: WATER TRANSACTION

Provide advice and assistance to the Advisory Committee on the proposed transaction:
The purchase of 440 acre-feet of water from City of Upland by Golden State Water Company. This purchase is made from City of Upland's Annual Production Right. [Within WM Duties and Powers]

F. CHINO CREEK WELL FIELD EXTENSOMETER LAND LEASE EXTENSION
Recommend to Advisory Committee to authorize Watermaster to give notice of intent and extend the Land Lease Agreement. [Advisory Committee Approval Required]

(0:03:23) A roll call vote was taken.
Motion by Vice-Chair Pierson, seconded by Steven Raughley and passed by unanimous roll call vote as attached to these minutes.
Moved to approve the Consent Calendar as presented.

II. BUSINESS ITEMS

A. SECOND AMENDMENT TO TASK ORDER NO. 9 UNDER THE MASTER AGREEMENT FOR COLLABORATIVE RECHARGE PROJECTS (PROJECT 23a)
Recommend Advisory Committee approval of the Second Amendment to Task Order No. 9 to increase the total budgeted cost.

(0:06:21) Mr. Kavounas introduced Mr. Joel Ignacio of the Inland Empire Utilities Agency who gave a presentation. A discussion ensued.

(0:25:02) A roll call vote was taken.
Motion by Vice-Chair Pierson, seconded by Mr. Geoffrey Vanden Heuvel and passed by unanimous roll call vote as attached to these minutes.
Moved to approve Business Item II.A. as presented.

B. OLD BUSINESS
None

III. REPORTS/UPDATES

A. LEGAL COUNSEL
1. San Bernardino County Superior Court Emergency Order
2. August 31, 2022 Hearing
3. Governor's Executive Order N-7-22
4. Kaiser Permanente Lawsuit

(0:27:27) Mr. Herrema gave a report. A discussion ensued.

B. ENGINEER
1. Safe Yield Reset Methodology Update
2. Chino Basin Maximum Benefit SNMP

(0:31:35) Mr. Malone asked Mr. Rapp to give an update on Item 1. Mr. Malone gave a report on Item 2 and announced that a fuller presentation on the Maximum Benefit SNMP will likely be given in October. A discussion ensued.

C. CHIEF FINANCIAL OFFICER
1. FY 2020/21 Audit of Groundwater Recharge Basin O&M Expenses

(0:50:43) Ms. Wilson gave a report on behalf of Mr. Joswiak.

D. GENERAL MANAGER
1. Supplemental Water Tracking
2. July 28, 2022 Board Workshop: OBMP
3. 2020 OBMP Environmental Review
4. Other

(0:54:11) Mr. Kavounas invited Mr. Nakano to presentation of the flow charts related to supplemental water tracking under Item 1. Mr. Kavounas gave a report on Item 2 and informed the Pool that Watermaster plans to hold a 2020 OBMP Workshop on September 1, 2022, at 1:00 pm to advance the CEQA Environmental Review process. Chair Feenstra and Vice-Chair Pierson complimented Mr. Tellez Foster on his efforts related to the Board workshops. Mr. Kavounas gave a report on Item 3 and also thanked Ms. Nelson for putting together the Robert's Rules of Order Workshop on July 27, 2022, and indicated that it was a success. A discussion ensued.

IV. POOL DISCUSSION

1. Chairman's Update
2. Pool Member Comments

(1:25:54) Mr. Vanden Heuvel spoke about the Governor's recent press conference.

V. OTHER BUSINESS

None

VI. CONFIDENTIAL SESSION - POSSIBLE ACTION

A Confidential Session may be held during the Pool Committee meeting for the purpose of discussion and possible action.

The Pool convened into Confidential Session at 3:02 p.m. to discuss the following:

1. Progress of Settlement Agreement with AP
    a. Financial Arrangement with AP
2. Water Transfers
3. Safe Yield

Confidential Session concluded at 3:24 p.m. with no reportable action.

ADJOURNMENT

Chair Feenstra adjourned the Agricultural Pool committee meeting at 3:24 p.m. (See adjournment time as provided by email below)

Secretary: _____

Approved: _____

Attachments:

1. 20220811 Agricultural Pool Meeting (Roll Call Vote Outcome for Consent Calendar)
2. 20220811 Agricultural Pool Meeting (Roll Call Vote Outcome for Business Item II.A.)
3. 20220811 Agricultural Pool Meeting (Adjournment Email from Pool Counsel)

20220811 Roll Call Vote Outcome		

Member	Alternate	Consent Calendar
LaBrucherie, Jr., Ron		Absent
Pierson, Jeff, Vice-Chair		Yes
deBoom, Nathan*		Yes
DeHaan, Henry *		Yes
Huitsing, John**		See below
Pietersma, Ron		Absent
Vanden Heuvel, Geoffrey*		Yes
Raughley, Steven*		Yes
Levin, Marilyn for Awan, Tariq*	Yes	
Hall, Pete*		Yes
Medrano, Jimmy*		Yes
Feenstra, Bob - Chair		Yes
	OUTCOME:	**Passed Unanimously by those present**

*Participated via Zoom

**John Huitsing was having audio problems and did not vote.

ATTACHMENT 2

20220811 Roll Call Vote Outcome		

Member	Alternate	Business Item II.A.
LaBrucherie, Jr., Ron		Absent
Pierson, Jeff, Vice-Chair		Yes
deBoom, Nathan*		Yes
DeHaan, Henry *		Yes
Huitsing, John*		Yes
Pietersma, Ron		Absent
Vanden Heuvel, Geoffrey*		Yes
Raughley, Steven*		Yes
Levin, Marilyn for Awan, Tariq*	Yes	
Hall, Pete*		Yes
Medrano, Jimmy*		Yes
Feenstra, Bob - Chair		Yes
	OUTCOME:	**Passed Unanimously by those present**

*Participated via Zoom

From: Tracy Egoscue
To: Denise Morales; Anna Nelson
Subject: Ag Pool
Date: Thursday, August 11, 2022 3:25:16 PM
Attachments: image001.png

Closed Session ended at 3:24 pm with no reportable action.

No need to reopen the public meeting.

Thank you.

Tracy J. Egoscue
562.988.5978 office
562.981.4866 cell
tracy@egoscuelaw.com

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CHINO BASIN WATERMASTER

I. CONSENT CALENDAR (AP & OAP)

B. FINANCIAL REPORTS

1. Cash Disbursements for the month of July 2022
2. Watermaster VISA Check Detail for the month of July 2022
3. Combining Schedule for the Period July 1, 2022 through July 31, 2022
4. Treasurer's Report of Financial Affairs for the Period July 1, 2022 through July 31, 2022
5. Budget vs. Actual Report for the Period July 1, 2022 through July 31, 2022
6. Cash Disbursements for August 2022 (Information Only)

I. BUSINESS ITEMS – ROUTINE (ONAP)

B. FINANCIAL REPORTS

1. Cash Disbursements for the month of July 2022
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CHINO BASIN WATERMASTER

9641 San Bernardino Road, Rancho Cucamonga, CA 91730
Tel: 909.484.3888 Fax: 909.484.3890 www.cbwm.org

PETER KAVOUNAS, P.E.
General Manager

STAFF REPORT

DATE: September 8, 2022

TO: AP/ONAP/OAP Committee Members

SUBJECT: Cash Disbursement Report - Financial Report B1 (July 31, 2022)
(Consent Calendar Item I.B.1.)

SUMMARY

Issue: Record of Cash Disbursements for the month of July 2022. [Normal Course of Business]

Recommendation: Receive and file Cash Disbursements for July 2022 as presented.

Financial Impact: Funds disbursed were included in the FY 2022/23 "Amended" Watermaster Budget.

Future Consideration
Appropriative Pool – September 8, 2022: Receive and File
Non-Agricultural Pool – September 8, 2022: Receive and File
Agricultural Pool – September 8, 2022: Receive and File
Advisory Committee – September 15, 2022: Receive and File
Watermaster Board – September 22, 2022: Receive and File

ACTIONS:
Appropriative Pool – September 8, 2022:
Non-Agricultural Pool – September 8, 2022:
Agricultural Pool – September 8, 2022:
Advisory Committee – September 15, 2022:
Watermaster Board – September 22, 2022:

BACKGROUND

A monthly cash disbursement report is provided to keep all members apprised of Watermaster expenditures.

DISCUSSION

Total cash disbursements during the month of July 2022 were $524,527.36.

The most significant expenditures during the month were West Yost and Associates in the amount of $136,995.40 (check number 23595 dated July 5, 2022); and Brownstein Hyatt Farber Schreck in the amount of $79,768.01 (check number 23575 dated July 5, 2022). There were no other checks greater than $50,000 issued during the month of July 2022.

ATTACHMENTS

1. Financial Report – B1

CHINO BASIN WATERMASTER
Cash Disbursements For The Month of
July 2022

Type	Date	Num	Name	Memo	Account	Paid Amount
Bill Pmt -Check	**07/05/2022**	**23574**	**ACCENT COMPUTER SOLUTIONS, INC.**	**152118**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/01/2022	152118		Monthly services - July 2022	6052.4 · IT Managed Services	5,251.30
				Overwatch - July 2022	6052.5 · IT Data Backup/Storage	699.00
				Omni Cloud - July 2022	6052.5 · IT Data Backup/Storage	170.00
				Office 365 Subscriptions - Business-July 2022	6052.4 · IT Managed Services	276.25
				Image Office Storage (per GB, per month)-July 202	6052.5 · IT Data Backup/Storage	509.97
TOTAL						6,906.52
Bill Pmt -Check	**07/05/2022**	**23575**	**BROWNSTEIN HYATT FARBER SCHRECK**		**1012 · Bank of America Gen'l Ckg**	
Bill	05/31/2022	895290		895290	6078 · BHFS Legal - Miscellaneous	35,843.40
				Federal Express	6078 · BHFS Legal - Miscellaneous	15.83
				Research - Westlaw	6078 · BHFS Legal - Miscellaneous	258.20
Bill	05/31/2022	895291		GM Evaluation	6073 · BHFS Legal - Personnel Matters	5,628.60
Bill	05/31/2022	895292		895292	6907.34 · Santa Ana River Water Rights	346.50
Bill	05/31/2022	895293		895293	6275 · BHFS Legal - Advisory Committee	1,386.00
Bill	05/31/2022	895294		895294	6375 · BHFS Legal - Board Meeting	6,915.60
Bill	05/31/2022	895295		895295	8375 · BHFS Legal - Appropriative Pool	1,138.50
Bill	05/31/2022	895296		895296	8475 · BHFS Legal - Agricultural Pool	1,138.50
Bill	05/31/2022	895297		895297	8575 · BHFS Legal - Non-Ag Pool	1,138.50
Bill	05/31/2022	895298		895298	6071 · BHFS Legal - Court Coordination	15,992.55
				Federal Express	6071 · BHFS Legal - Court Coordination	44.40
				Research - Westlaw	6071 · BHFS Legal - Court Coordination	641.28
				Research - Lexis	6071 · BHFS Legal - Court Coordination	103.71
				Research	6071 · BHFS Legal - Court Coordination	11.07
				05/10/22 Lodging - Slater	6071 · BHFS Legal - Court Coordination	225.00
Bill	05/31/2022	895299		895299	6072 · BHFS Legal - Rules & Regs	198.00
Bill	05/31/2022	895300		895300	6077 · BHFS Legal - Party Status Maint	166.50
Bill	05/31/2022	895301		895301	6907.38 · Reg. Water Quality Cntrl Board	990.00
Bill	05/31/2022	895302		895302	6907.41 · Prado Basin Habitat Sustain	1,813.50
Bill	05/31/2022	895303		895303	6907.45 · OBMP Update	310.50
Bill	05/31/2022	895304		895304	6907.47 · 2020 Safe Yield Reset	4,447.35
Bill	05/31/2022	895305		895305	6078.25 · Ely 3 Basin Investigation	866.25
				Research - Lexis	6078.25 · Ely 3 Basin Investigation	148.27
TOTAL						79,768.01
Bill Pmt -Check	**07/05/2022**	**23576**	**CHEF DAVE'S CATERING & EVENT SERVICES**	**Board Meeting Expenses**	**1012 · Bank of America Gen'l Ckg**	
Bill	05/26/2022	1316B		Lunch for 5/26/22 Watermaster Board meeting	6312 · Meeting Expenses	492.94
Bill	05/31/2022	1290B		Lunch for 4/28/22 Watermaster Board meeting	6312 · Meeting Expenses	568.36
Bill	06/23/2022	1363B		Lunch for 6/23/22 Watermaster Board meeting	6312 · Meeting Expenses	390.58

CHINO BASIN WATERMASTER
Cash Disbursements For The Month of
July 2022

	Type	Date	Num	Name	Memo	Account	Paid Amount
TOTAL							1,451.88
	Bill Pmt -Check	**07/05/2022**	**23577**	**D.I.A. PRODUCTIONS, INC.**	**1169**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/01/2022	1169		50% down payment - Roberts Rules of Order	6375.2 · Board Workshop Expenses-Misc.	4,150.00
TOTAL							4,150.00
	Bill Pmt -Check	**07/05/2022**	**23578**	**ELIE, STEVEN**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/23/2022	6/23 Board Mtg		6/23/22 Board Meeting	6311 · Board Member Compensation	125.00
TOTAL							125.00
	Bill Pmt -Check	**07/05/2022**	**23579**	**ESRI**	**94275353**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/01/2022	94275353		ESRI maintenance 8/19/2022-8/18/2023	6054 · Computer Software	1,000.00
TOTAL							1,000.00
	Bill Pmt -Check	**07/05/2022**	**23580**	**FILIPPI, GINO**	**Ag Pool Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/09/2022	6/09 Ag Pool Mtg		6/09/22 Ag Pool Meeting	8470 · Ag Meeting Attend -Special	125.00
	Bill	06/23/2022	6/23 Board Mtg		6/23/22 Board Meeting	8470 · Ag Meeting Attend -Special	125.00
TOTAL							250.00
	Bill Pmt -Check	**07/05/2022**	**23581**	**FOLSOM, BETTY**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/22/2022	6/22 Call w/ChaIr		6/22/22 Call w/Board Chair	6311 · Board Member Compensation	125.00
	Bill	06/23/2022	6/23 Board Mth		6/23/22 Board Meeting	6311 · Board Member Compensation	125.00
TOTAL							250.00
	Bill Pmt -Check	**07/05/2022**	**23582**	**GEYE, BRIAN**	**Non-Ag Pool Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/09/2022	6/09 Non Ag Mtg		6/09/22 Non-Ag Pool Meeting	8511 · Non-Ag Pool Member Compensation	125.00
	Bill	06/16/2022	6/16 Advisory Comm		6/16/22 Advisory Committee Meeting	8511 · Non-Ag Pool Member Compensation	125.00
	Bill	06/23/2022	6/23 Board Mtg		6/23/22 Board Meeting	8511 · Non-Ag Pool Member Compensation	125.00
TOTAL							375.00
	Bill Pmt -Check	**07/05/2022**	**23583**	**KESSLER ALAIR INSURANCE SERVICES, INC.**	**880778**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/01/2022	880778		07/01/22-06/26/23 D&O Coverage	6085 · Business Insurance Package	14,398.93
					06/26/22-06/30/22 D&O Coverage	6085 · Business Insurance Package	199.99
TOTAL							14,598.92
	Bill Pmt -Check	**07/05/2022**	**23584**	**PHILADELPHIA INSURANCE COMPANY**	**Insurance Coverages**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/01/2022	2004689171		06/26/22-06/30/22 Municipalities Umbrella	6085 · Business Insurance Package	73.89
					07/01/22-06/26/23 Municipalities Unmbrella	6085 · Business Insurance Package	5,320.11
	Bill	07/01/2022	2004691843		06/26/22-06/30/22 Municipalities Coverage	6085 · Business Insurance Package	174.96
					07/01/22-06/26/23 Municipalities Coverage	6085 · Business Insurance Package	12,597.32

CHINO BASIN WATERMASTER
Cash Disbursements For The Month of
July 2022

Type	Date	Num	Name	Memo	Account	Paid Amount
TOTAL						18,166.28
Bill Pmt -Check	**07/05/2022**	**23585**	**PITNEY BOWES GLOBAL FINANCIAL SERVICE**	**3105574954**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/01/2022	3105574954		Lease - Account #0011526621	6044 · Postage Meter Lease	454.87
TOTAL						454.87
Bill Pmt -Check	**07/05/2022**	**23586**	**PREMIERE GLOBAL SERVICES**	**30943648**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	30943648		Fee - General	6022 · Telephone	39.00
				Fee - Confidential	6022 · Telephone	39.00
				Service fee	6022 · Telephone	8.50
				Call shortfall	6022 · Telephone	78.00
TOTAL						164.50
Bill Pmt -Check	**07/05/2022**	**23587**	**READY REFRESH**	**0023230253**	**1012 · Bank of America Gen'l Ckg**	
Bill	05/31/2022	0023230253		Office Water Bottle - May 2022	6031.7 · Other Office Supplies	256.54
TOTAL						256.54
Bill Pmt -Check	**07/05/2022**	**23588**	**RR FRANCHISING, INC.**	**112540**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/01/2022	112540		Monthly service - July 2022	6024 · Building Repair & Maintenance	915.00
TOTAL						915.00
Bill Pmt -Check	**07/05/2022**	**23589**	**SANTA ANA WATERSHED PROJECT AUTHORI**	**MSAR 2023-01**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/01/2022	MSAR 2023-01		FY 2022-23 Middle SAR Pathogen TMDL Task For	8471 · Ag Pool Expense	9,116.00
TOTAL						9,116.00
Bill Pmt -Check	**07/05/2022**	**23590**	**SPECTRUM BUSINESS**	**2031978062322**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/28/2022	2031978062322		6/23/22-7/22/22	6053 · Internet Expense	1,105.31
TOTAL						1,105.31
Bill Pmt -Check	**07/05/2022**	**23591**	**STATE COMPENSATION INSURANCE FUND**	**1000907864**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/01/2022	1000907864		Premium charge 6/26/22-7/26/22	60183 · Worker's Comp Insurance	1,732.22
TOTAL						1,732.22
Bill Pmt -Check	**07/05/2022**	**23592**	**UNION 76**	**Fuel Charges**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	7076224530355049		June 2022	6175 · Vehicle Fuel	127.99
TOTAL						127.99
Bill Pmt -Check	**07/05/2022**	**23593**	**VISION SERVICE PLAN**	**815427749**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/23/2022	815427749		Vision Insurance Premium - July 2022	60182.2 · Dental & Vision Ins	158.89
TOTAL						158.89

CHINO BASIN WATERMASTER
Cash Disbursements For The Month of
July 2022

Type	Date	Num	Name	Memo	Account	Paid Amount
Bill Pmt -Check	**07/05/2022**	**23594**	**WEST POINT MEDICAL CENTER**	**MOR234940**	**1012 · Bank of America Gen'l Ckg**	
Bill	05/18/2022	MOR234940		Pre-employment tests - Morales	6016 · New Employee Search Costs	105.00
TOTAL						105.00
Bill Pmt -Check	**07/05/2022**	**23595**	**WEST YOST**		**1012 · Bank of America Gen'l Ckg**	
Bill	05/31/2022	2049697		2049697	6906.31 · OBMP-Pool, Adv. Board Mtgs	9,747.62
Bill	05/31/2022	2049698		2049698	6906.32 · OBMP-Other General Meetings	2,449.50
Bill	05/31/2022	2049776		2049776	6906.71 · OBMP-Data Req.-CBWM Staff	568.00
Bill	05/31/2022	2049700		2049700	6906.72 · OBMP-Data Req.-Non CBWM Staff	1,276.50
Bill	05/31/2022	2049701		2049701	6906 · OBMP Engineering Services	1,117.50
Bill	05/31/2022	2049702		2049702	6906.15 · Integrated Model Mtgs-IEUA Cost	67.25
Bill	05/31/2022	2049703		2049703	7103.3 · Grdwtr Qual-Engineering	11,565.44
Bill	05/31/2022	2049704		2049704	7104.3 · Grdwtr Level-Engineering	14,072.01
Bill	05/31/2022	2049705		2049705	7107.2 · Grd Level-Engineering	6,414.93
Bill	05/31/2022	2049706		2049706	7107.2 · Grd Level-Engineering	3,215.50
Bill	05/31/2022	2049707		2049707	7108.31 · Hydraulic Control - PBHSP	13,729.50
Bill	05/31/2022	2049708		2049708	7109.3 · Recharge & Well - Engineering	1,222.50
Bill	05/31/2022	2049709		2049709	7110.3 · Ag Prod. & Estimation-Eng. Serv	8,031.25
Bill	05/31/2022	2049710		2049710	7202.2 · Engineering Svc	4,910.75
Bill	05/31/2022	2049711		2049711	7402 · PE4-Engineering	10,479.75
Bill	05/31/2022	2049712		2049712	7402.10 · PE4 - Northwest MZ1 Area Proj.	6,041.50
Bill	05/31/2022	2049713		2049713	7402 · PE4-Engineering	6,611.00
Bill	05/31/2022	2049714		2049714	7510 · PE6&7-IEUA Salinity Mgmt. Plan	1,259.50
Bill	05/31/2022	2049715		2049715	7614 · PE8&9-Develop S&R Master Plan	29,540.65
Bill	05/31/2022	2049716		2049716	7508 · HC Mitigation Plan-50% IEUA	4,674.75
TOTAL						136,995.40
Bill Pmt -Check	**07/06/2022**	**ACH 070622**	**CALPERS**	**1394905143**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/01/2022	1394905143		Medical Insurance Premiums - July 2022	60182.1 · Medical Insurance	15,340.33
TOTAL						15,340.33
General Journal	**07/06/2022**	**07/06/2022**	**HEALTH EQUITY**	**Health Equity Invoice 3949591**	**1012 · Bank of America Gen'l Ckg**	
			HEALTH EQUITY	Health Equity Invoice 3949591	1012 · Bank of America Gen'l Ckg	2,555.00
TOTAL						2,555.00
General Journal	**07/12/2022**	**07/12/2022**	**HEALTH EQUITY**	**Health Equity Invoice 3973130**	**1012 · Bank of America Gen'l Ckg**	
			HEALTH EQUITY	Health Equity Invoice 3973130	1012 · Bank of America Gen'l Ckg	516.05
TOTAL						516.05

CHINO BASIN WATERMASTER
Cash Disbursements For The Month of
July 2022

Type	Date	Num	Name	Memo	Account	Paid Amount
Bill Pmt -Check	**07/13/2022**	**ACH 071322**	**BANK OF AMERICA**	**XXXX-XXXX-XXXX-4026**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/31/2022	XXXX-XXXX-XXXX-4026		Miscellaneous office supplies	6031.7 · Other Office Supplies	10.19
				Miscellaneous office supplies	6031.7 · Other Office Supplies	10.46
				Miscellaneous office supplies	6031.7 · Other Office Supplies	16.74
				Shirts/jackets for staff	6154 · Uniforms	558.71
				Shirts/jackets for staff	6154 · Uniforms	188.26
				Miscellaneous office supplies	6031.7 · Other Office Supplies	27.22
				Safety mats for office	6031.7 · Other Office Supplies	280.44
				Miscellaneous office supplies	6031.7 · Other Office Supplies	409.30
				Miscellaneous office supplies	6031.7 · Other Office Supplies	14.14
				Adming mtg - J. Joswiak, J. Wilson	6141.3 · Admin Meetings	51.10
				Miscellaneous office supplies	6031.7 · Other Office Supplies	73.80
				Amazon Business Prime membership renewal	6111 · Membership Dues	187.48
				Miscellaneous office supplies	6031.7 · Other Office Supplies	19.37
				TV and mount for board room	6031.7 · Other Office Supplies	529.28
				Shirts/jackets for staff	6154 · Uniforms	92.07
				Supplies for staff mtg	6141.3 · Admin Meetings	40.23
				Miscellaneous office supplies	6031.7 · Other Office Supplies	10.45
				Miscellaneous office supplies	6031.7 · Other Office Supplies	116.45
				Miscellaneous office supplies	6031.7 · Other Office Supplies	7.32
				Miscellaneous office supplies	6031.7 · Other Office Supplies	6.29
				Miscellaneous office supplies	6031.7 · Other Office Supplies	5.18
				Service charge	6039.1 · Banking Service Charges	0.06
TOTAL						2,654.54
General Journal	**07/14/2022**	**07/14/2022**	**Payroll and Taxes for 06/26/22-07/09/22**	**Payroll and Taxes for 06/26/22-07/09/22**	**1012 · Bank of America Gen'l Ckg**	
			ADP, LLC	Direct Deposits for 06/26/22-07/09/22	1012 · Bank of America Gen'l Ckg	37,198.50
			ADP, LLC	Payroll Taxes for 06/26/22-07/09/22	1012 · Bank of America Gen'l Ckg	13,666.39
			MISSIONSQUARE RETIREMENT	457(b) EE Deductions for 06/26/22-07/09/22	1012 · Bank of America Gen'l Ckg	6,501.95
			MISSIONSQUARE RETIREMENT	401(a) EE Deductions for 06/26/22-07/09/22	1012 · Bank of America Gen'l Ckg	1,990.00
TOTAL						59,356.84
Bill Pmt -Check	**07/14/2022**	**ACH 071422**	**PUBLIC EMPLOYEES' RETIREMENT SYSTEM**	**Payor #3493**	**1012 · Bank of America Gen'l Ckg**	
General Journal	07/09/2022	07/14/2022	PUBLIC EMPLOYEES' RETIREMENT SYSTEM	CalPERS Retirement for 06/26/22-07/09/22	2000 · Accounts Payable	10,523.90
TOTAL						10,523.90
Bill Pmt -Check	**07/15/2022**	**23596**	**ACWA JOINT POWERS INSURANCE AUTHORI**	**0689218**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/06/2022	0689218		Prepayment - August 2022	1409 · Prepaid Life, BAD&D & LTD	294.66
				July 2022	60191 · Life & Disab.Ins Benefits	382.30
TOTAL						676.96

CHINO BASIN WATERMASTER
Cash Disbursements For The Month of
July 2022

Type	Date	Num	Name	Memo	Account	Paid Amount
Bill Pmt -Check	**07/15/2022**	**23597**	**APPLIED COMPUTER TECHNOLOGIES**	**35479**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	35479		Database Consulting Services - June 2022	6052.2 · Applied Computer Technol	3,850.00
TOTAL						3,850.00
Bill Pmt -Check	**07/15/2022**	**23598**	**BURRTEC WASTE INDUSTRIES, INC.**	**N2112835548**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/06/2022	N2112835548		Trash Services - July 2022	6024 · Building Repair & Maintenance	142.50
TOTAL						142.50
Bill Pmt -Check	**07/15/2022**	**23599**	**CORELOGIC INFORMATION SOLUTIONS**	**82138903**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	82138903		June 2022	7103.7 · Grdwtr Qual-Computer Svc	62.50
				82138903	7101.4 · Prod Monitor-Computer	62.50
TOTAL						125.00
Bill Pmt -Check	**07/15/2022**	**23600**	**CURATALO, JAMES**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/06/2022	6/06 Board Issues		6/06/22 Mtg. w/Bowcock re WM Board Issues Lette	6311 · Board Member Compensation	125.00
Bill	06/07/2022	6/07 Mtg w/B. Kuhn		6/07/22 Mtg./Kuhn re WM Officers Issues	6311 · Board Member Compensation	125.00
Bill	06/08/2022	6/08 Mtg w/Gardner		6/08/22 Meeting w/Gardner re WM Board Issues	6311 · Board Member Compensation	125.00
Bill	06/09/2022	6/096 Appro Pool		6/09/22 Appropriative Pool Meeting	6311 · Board Member Compensation	125.00
Bill	06/16/2022	6/16 Advisory Comm		6/16/22 Advisory Committee Meeting	6311 · Board Member Compensation	125.00
Bill	06/20/2022	6/20 Mtg w/Bosler		6/20/22 Meeting w/Bosler re WM Matters	6311 · Board Member Compensation	125.00
Bill	06/21/2022	6/21 Board Agenda		6/21/22 Board Agenda Preview	6311 · Board Member Compensation	125.00
Bill	06/22/2022	6/22 Mtg w/JCSD		6/22/22 Coordination meeting w/JCSD	6311 · Board Member Compensation	125.00
Bill	06/23/2022	6/23 Board Mtg		6/23/22 Board Meeting	6311 · Board Member Compensation	125.00
Bill	06/29/2022	6/29 CBWM Matters		6/29/22 Meeting to discuss CBWM Matters	6311 · Board Member Compensation	125.00
Bill	06/30/2022	6/30 CBWM Matters		6/30/22 Meeting to discuss CBWM Matters	6311 · Board Member Compensation	125.00
TOTAL						1,375.00
Bill Pmt -Check	**07/15/2022**	**23601**	**D.I.A. PRODUCTIONS, INC.**	**1169**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/06/2022	1169		Final payment - Roberts Rules of Order	6375.2 · Board Workshop Expenses-Misc.	4,150.00
TOTAL						4,150.00
Bill Pmt -Check	**07/15/2022**	**23602**	**EGOSCUE LAW GROUP, INC.**	**Ag Pool Legal Services**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	13502		May 2022 - General Counsel	8467 · Ag Legal & Technical Services	11,237.50
Bill	06/30/2022	13560		June 2022 - General Counsel	8467 · Ag Legal & Technical Services	14,375.00
TOTAL						25,612.50
Bill Pmt -Check	**07/15/2022**	**23603**	**FEDAK & BROWN LLP**	**Ongoing Audit Services**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022			June 2022	6062 · Audit Services	5,037.00
TOTAL						5,037.00

CHINO BASIN WATERMASTER
Cash Disbursements For The Month of
July 2022

Type	Date	Num	Name	Memo	Account	Paid Amount
Bill Pmt -Check	**07/15/2022**	**23604**	**GENERAL PUMP COMPANY**	**29495**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	29495		29495	7103.3 · Grdwtr Qual-Engineering	8,500.00
TOTAL						8,500.00
Bill Pmt -Check	**07/15/2022**	**23605**	**LAW OFFICE OF ALLEN W. HUBSCH**	**29**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	29		Non-Ag Pool Legal Services - June 2022	8567 · Non-Ag Legal Service	1,100.00
TOTAL						1,100.00
Bill Pmt -Check	**07/15/2022**	**23606**	**PARKER, KATHERINE**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/01/2022	4/26 Board Workshop		4/26/22 Board Workshop	6311 · Board Member Compensation	125.00
TOTAL						125.00
Bill Pmt -Check	**07/15/2022**	**23607**	**EASTVALE DEVELOPMENT COMPANY - PIERS**	**Ag Pool and Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/01/2022	6/01 Call w/Chair		6/01/22 Conference call w/Ag Pool Chair	8470 · Ag Meeting Attend -Special	125.00
Bill	06/07/2022	6/07 Call w/Chair		6/07/22 Conference call w/Ag Pool Chair	8470 · Ag Meeting Attend -Special	125.00
Bill	06/08/2022	6/08 Call w/Chair		6/08/22 Conference call w/Ag Pool Chair	8470 · Ag Meeting Attend -Special	125.00
Bill	06/09/2022	6/09 Ag Pool Mtg		6/09/22 Ag Pool Meeting	8470 · Ag Meeting Attend -Special	125.00
Bill	06/10/2022	6/10 Call w/State CA		6/10/22 Conference call w/State Attorney General	8470 · Ag Meeting Attend -Special	125.00
Bill	06/10/2022	6/10 Call w/Bd Chair		6/10/22 Conference call w/Board Chair	6311 · Board Member Compensation	125.00
Bill	06/16/2022	6/16 Call w/Chair		6/16/22 Conference call w/Ag Pool Chair	8470 · Ag Meeting Attend -Special	125.00
Bill	06/16/2022	6/16 Advisory Comm		6/16/22 Advisory Committee Meeting	8470 · Ag Meeting Attend -Special	125.00
Bill	06/16/2022	6/16 Call w/ State		6/16/22 Conference call w/State Board Member	6311 · Board Member Compensation	125.00
Bill	06/21/2022	6/21 Board Agenda		6/21/22 Board Agenda Preview Meeting	6311 · Board Member Compensation	125.00
Bill	06/22/2022	6/22 Call w/Chair		6/22/22 Conference call w/Ag Pool Chair	8470 · Ag Meeting Attend -Special	125.00
Bill	06/23/2022	6/23 Call w/Chair		6/23/22 Conference call w/Ag Pool Chair	8470 · Ag Meeting Attend -Special	125.00
Bill	06/23/2022	6/23 Board Mtg		6/23/22 Board Meeting	6311 · Board Member Compensation	125.00
TOTAL						1,625.00
Bill Pmt -Check	**07/15/2022**	**23608**	**R&D PEST SERVICES**	**327264**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/14/2022	327264		July 2022 - Treat office and annex for pest control	6024 · Building Repair & Maintenance	100.00
TOTAL						100.00
Bill Pmt -Check	**07/15/2022**	**23609**	**RR FRANCHISING, INC.**	**113131**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	113131		Electrostatic spraying on 6/11, 6/16, 6/23 and 6/30	6024 · Building Repair & Maintenance	700.00
TOTAL						700.00
Bill Pmt -Check	**07/15/2022**	**23610**	**STATE COMPENSATION INSURANCE FUND**	**1000941563**	**1012 · Bank of America Gen'l Ckg**	
Bill	06/26/2022	1000941563		Premium Charge for Payroll 6/26/2021-6/26/2022	60183 · Worker's Comp Insurance	462.00
TOTAL						462.00

CHINO BASIN WATERMASTER
Cash Disbursements For The Month of
July 2022

	Type	Date	Num	Name	Memo	Account	Paid Amount
	Bill Pmt -Check	**07/15/2022**	**23611**	**TELLEZ-FOSTER, EDGAR**	**Empoloyee Reimbursement**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/06/2022	7/06 Ops Staff Mtg		7/06/22 Ops Staff mtg	6141.3 · Admin Meetings	77.01
	Bill	07/12/2022	7/12 Mtg w/CBWCD		7/12/22 Meeting w/Skrzat from CBWCD	8312 · Meeting Expenses	71.26
TOTAL							148.27
	Bill Pmt -Check	**07/15/2022**	**23612**	**VERIZON WIRELESS**	**9910359055**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/30/2022	9910359055		Acct #470810953-00002	6022 · Telephone	557.16
TOTAL							557.16
	Bill Pmt -Check	**07/15/2022**	**23613**	**WESTERN MUNICIPAL WATER DISTRICT**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/09/2022	6/09 Appro Pool Mtg		6/09/22 Appropriative Pool Meeting - Gardner	6311 · Board Member Compensation	125.00
	Bill	06/16/2022	6/16 Advisory Comm		6/16/22 Advisory Committee Meeting - Gardner	6311 · Board Member Compensation	125.00
	Bill	06/23/2022	6/23 Board Mtg		6/23/22 Board Meeting - Gardner	6311 · Board Member Compensation	125.00
TOTAL							375.00
	General Journal	**07/15/2022**	**07/15/2022**	**ADP, LLC**	**ADP Tax Service for 06/11/22-609953391**	**1012 · Bank of America Gen'l Ckg**	
				ADP, LLC	ADP Tax Service for 06/11/22-609953391	1012 · Bank of America Gen'l Ckg	161.55
				ADP, LLC	ADP Tax Service for 06/25/22-609953391	1012 · Bank of America Gen'l Ckg	161.55
TOTAL							323.10
	General Journal	**07/19/2022**	**07/19/2022**	**HEALTH EQUITY**	**Health Equity Invoice 3977833**	**1012 · Bank of America Gen'l Ckg**	
				HEALTH EQUITY	Health Equity Invoice 3977833	1012 · Bank of America Gen'l Ckg	536.80
TOTAL							536.80
	General Journal	**07/19/2022**	**07/19/2022**	**HEALTH EQUITY**	**Health Equity Invoice 3996553**	**1012 · Bank of America Gen'l Ckg**	
				HEALTH EQUITY	Health Equity Invoice 3996553	1012 · Bank of America Gen'l Ckg	76.00
TOTAL							76.00
	Bill Pmt -Check	**07/21/2022**	**23614**	**CHEF DAVE'S CATERING & EVENT SERVICES**	**1289B**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/30/2022	1289B		Dinner-4/26/22 Watermaster Board Workshop	6312 · Meeting Expenses	1,316.38
TOTAL							1,316.38
	Bill Pmt -Check	**07/21/2022**	**23615**	**CUCAMONGA VALLEY WATER DISTRICT**	**Office Lease**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/18/2022			Lease payment due August 1, 2022	1422 · Prepaid Rent	7,588.83
TOTAL							7,588.83
	Bill Pmt -Check	**07/21/2022**	**23616**	**FIRST LEGAL NETWORK LLC**	**40063309**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/30/2022	40063309		Court filings for June 2022	6061.5 · Court Filing Services	673.46

	Type	Date	Num	Name	Memo	Account	Paid Amount
TOTAL							673.46
	Bill Pmt -Check	**07/21/2022**	**23617**	**FRONTIER COMMUNICATIONS**	**909-484-3890-050914-5**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/20/2022	90948438900509145		Office fax	6022 · Telephone	173.14
TOTAL							173.14
	Bill Pmt -Check	**07/21/2022**	**23618**	**GREAT AMERICA LEASING CORP.**	**32046325**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/19/2022	32046325		Invoice for July 2022	6043.1 · Ricoh Lease Fee	1,528.34
					Supply freight fee	6043.2 · Ricoh Usage & Maintenance Fee	8.57
TOTAL							1,536.91
	Bill Pmt -Check	**07/21/2022**	**23619**	**NELSON, ANNA**	**Employee Tuition Reimbursement**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/30/2022			Tuition reimbursement	6193 · Employee Training	2,000.00
TOTAL							2,000.00
	Bill Pmt -Check	**07/21/2022**	**23620**	**READY REFRESH**	**0023230253**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/20/2022	0023230253		Office Water Bottle - July 2022	6031.7 · Other Office Supplies	59.45
TOTAL							59.45
	Bill Pmt -Check	**07/21/2022**	**23621**	**TOM DODSON & ASSOCIATES**	**CBW271 22-1**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/30/2022	CBW217 22-1		June 2022	6908.1 · 2020 OBMP Update-Dodson & Assoc	720.00
TOTAL							720.00
	Bill Pmt -Check	**07/21/2022**	**23622**	**UNITED HEALTHCARE**	**052584930984**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/19/2022	052584930984		Dental Insurance Poremium - August 2022	60182.2 · Dental & Vision Ins	694.37
TOTAL							694.37
	General Journal	**07/25/2022**	**07/25/2022**	**HEALTH EQUITY**	**Health Equity Invoice 3908555**	**1012 · Bank of America Gen'l Ckg**	
				HEALTH EQUITY	Health Equity Invoice 3908555	1012 · Bank of America Gen'l Ckg	81.50
TOTAL							81.50
	Bill Pmt -Check	**07/26/2022**	**ACH 072622**	**PUBLIC EMPLOYEES' RETIREMENT SYSTEM**	**Payor #3493**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/01/2022	16849982		Annual Unfunded Accrued Liability-Plan 3299	60180 · Employers PERS Expense	10,361.75
TOTAL							10,361.75
	Bill Pmt -Check	**07/26/2022**	**ACH 072622**	**PUBLIC EMPLOYEES' RETIREMENT SYSTEM**	**Payor #3493**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/01/2022	16849991		Annual Lump Sum Prepayment-Plan 27239	60180 · Employers PERS Expense	3,633.00
TOTAL							3,633.00
	General Journal	**07/26/2022**	**07/26/2022**	**HEALTH EQUITY**	**Health Equity Invoice 4016580**	**1012 · Bank of America Gen'l Ckg**	

CHINO BASIN WATERMASTER
Cash Disbursements For The Month of
July 2022

Type	Date	Num	Name	Memo	Account	Paid Amount
			HEALTH EQUITY	Health Equity Invoice 4016580	1012 · Bank of America Gen'l Ckg	349.46
TOTAL						349.46
Bill Pmt -Check	**07/27/2022**	**ACH 072722**	**PUBLIC EMPLOYEES' RETIREMENT SYSTEM**	**Payor #3493**	**1012 · Bank of America Gen'l Ckg**	
General Journal	07/23/2022	07/27/2022	PUBLIC EMPLOYEES' RETIREMENT SYSTEM	Payroll and Taxes for 07/10/22-07/23/22	2000 · Accounts Payable	10,714.30
TOTAL						10,714.30
General Journal	**07/28/2022**	**07/28/2022**	**Payroll and Taxes for 07/10/22-07/23/22**	**Payroll and Taxes for 07/10/22-07/23/22**	**1012 · Bank of America Gen'l Ckg**	
			ADP, LLC	Direct Deposits for 07/10/22-07/23/22	1012 · Bank of America Gen'l Ckg	37,427.59
			ADP, LLC	Payroll Taxes for 07/10/22-07/23/22	1012 · Bank of America Gen'l Ckg	13,939.27
			MISSIONSQUARE RETIREMENT	457(b) EE Deductions for 07/10/22-07/23/22	1012 · Bank of America Gen'l Ckg	6,513.92
			MISSIONSQUARE RETIREMENT	401(a) EE Deductions for 07/10/22-07/23/22	1012 · Bank of America Gen'l Ckg	2,026.75
TOTAL						59,907.53
					Total Disbursements:	**524,527.36**

CHINO BASIN WATERMASTER

9641 San Bernardino Road, Rancho Cucamonga, CA 91730
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PETER KAVOUNAS, P.E.
General Manager

STAFF REPORT

DATE: September 8, 2022

TO: AP/ONAP/OAP Committee Members

SUBJECT: VISA Check Detail Report - Financial Report B2 (July 31, 2022)
(Consent Calendar Item I.B.2.)

SUMMARY

Issue: Record of VISA credit card payment disbursed for the month of July 2022. [Normal Course of Business]

Recommendation: Receive and file VISA Check Detail Report for July 2022 as presented.

Financial Impact: Funds disbursed were included in the FY 2022/23 "Amended" Watermaster Budget.

Future Consideration
Appropriative Pool – September 8, 2022: Receive and File
Non-Agricultural Pool – September 8, 2022: Receive and File
Agricultural Pool – September 8, 2022: Receive and File
Advisory Committee – September 15, 2022: Receive and File
Watermaster Board – September 22, 2022: Receive and File

ACTIONS:
Appropriative Pool – September 8, 2022:
Non-Agricultural Pool – September 8, 2022:
Agricultural Pool – September 8, 2022:
Advisory Committee – September 15, 2022:
Watermaster Board – September 22, 2022:

BACKGROUND

A monthly VISA Check Detail report is provided to keep all members apprised of Watermaster expenditures charged against the General Manager and Chief Financial Officer's Bank of America VISA card.

DISCUSSION

The total cash disbursements during the month of July 2022 was $2,654.54. The payment of $2,654.54 was processed in the amount of $2,654.54 (by ACH payment dated July 13, 2022). The monthly charges for July 2022 of $2,654.54 were for routine and customary expenditures and properly documented with receipts.

ATTACHMENTS

1. Financial Report – B2

CHINO BASIN WATERMASTER
VISA Check Detail Report
July 2022

Type	Num	Date	Name	Memo	Account	Paid Amount
Bill Pmt -Check	**07/13/2022**	**ACH 071322**	**BANK OF AMERICA**	**XXXX-XXXX-XXXX-4026**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/31/2022	XXXX-XXXX-XXXX-4026		Miscellaneous office supplies	6031.7 · Other Office Supplies	10.19
				Miscellaneous office supplies	6031.7 · Other Office Supplies	10.46
				Miscellaneous office supplies	6031.7 · Other Office Supplies	16.74
				Shirts/jackets for staff	6154 · Uniforms	558.71
				Shirts/jackets for staff	6154 · Uniforms	188.26
				Miscellaneous office supplies	6031.7 · Other Office Supplies	27.22
				Safety mats for office	6031.7 · Other Office Supplies	280.44
				Miscellaneous office supplies	6031.7 · Other Office Supplies	409.30
				Miscellaneous office supplies	6031.7 · Other Office Supplies	14.14
				Adming mtg - J. Joswiak, J. Wilson	6141.3 · Admin Meetings	51.10
				Miscellaneous office supplies	6031.7 · Other Office Supplies	73.80
				Amazon Business Prime membership renewal	6111 · Membership Dues	187.48
				Miscellaneous office supplies	6031.7 · Other Office Supplies	19.37
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				Shirts/jackets for staff	6154 · Uniforms	92.07
				Supplies for staff mtg	6141.3 · Admin Meetings	40.23
				Miscellaneous office supplies	6031.7 · Other Office Supplies	10.45
				Miscellaneous office supplies	6031.7 · Other Office Supplies	116.45
				Miscellaneous office supplies	6031.7 · Other Office Supplies	7.32
				Miscellaneous office supplies	6031.7 · Other Office Supplies	6.29
				Miscellaneous office supplies	6031.7 · Other Office Supplies	5.18
				Service charge	6039.1 · Banking Service Charges	0.06
TOTAL					**Subtotal Disbursements:**	**2,654.54**

CHINO BASIN WATERMASTER

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PETER KAVOUNAS, P.E.
General Manager

STAFF REPORT

DATE: September 8, 2022

TO: AP/ONAP/OAP Committee Members

SUBJECT: Combining Schedule of Revenue, Expenses and Changes in Net Assets for the Period July 1, 2022 through July 31, 2022 - Financial Report B3 (July 31, 2022)
(Consent Calendar Item I.B.3.)

SUMMARY

Issue: Record of Revenue, Expenses and Changes in Net Assets for the Period July 1, 2022 through July 31, 2022. [Normal Course of Business]

Recommendation: Receive and file Combining Schedule of Revenue, Expenses and Changes in Net Assets for the Period July 1, 2022 through July 31, 2022 as presented.

Financial Impact: Funds disbursed were included in the FY 2022/23 "Amended" Watermaster Budget.

Future Consideration
Appropriative Pool – September 8, 2022: Receive and File
Non-Agricultural Pool – September 8, 2022: Receive and File
Agricultural Pool – September 8, 2022: Receive and File
Advisory Committee – September 15, 2022: Receive and File
Watermaster Board – September 22, 2022: Receive and File

ACTIONS:
Appropriative Pool – September 8, 2022:
Non-Agricultural Pool – September 8, 2022:
Agricultural Pool – September 8, 2022:
Advisory Committee – September 15, 2022:
Watermaster Board – September 22, 2022:

BACKGROUND

A Combining Schedule of Revenue, Expenses and Changes in Net Assets for the period July 1, 2022 through July 31, 2022 is provided to keep all members apprised of the FY 2022/23 cumulative Watermaster revenues, expenditures and changes in net assets for the period listed.

DISCUSSION

The Combining Schedule of Revenue, Expenses and Changes in Net Assets has been created from various financial reports and statements created from Intuit QuickBooks Enterprise Solutions 22.0, the Watermaster accounting system. The Combining Schedule provided balances to the supporting documentation in the Watermaster accounting system as presented.

ATTACHMENTS:

1. Financial Report – B3

CHINO BASIN WATERMASTER
COMBINING SCHEDULE OF REVENUE, EXPENSES AND CHANGES IN NET ASSETS
FOR THE PERIOD JULY 1, 2022 THROUGH JULY 31, 2022

	WATERMASTER JUDGMENT ADMINISTRATION	OBMP AND PE 1-9	POOL ADMINISTRATION & SPECIAL PROJECTS APPROPRIATIVE POOL	AG POOL	NON-AG POOL	AP ESCROW ACCOUNT	GROUNDWATER REPLENISHMENT	LAIF VALUE ADJ.	GASB 75 BEG. NET POSITION	GRAND TOTALS	AMENDED BUDGET 2022-2023
Administrative Revenues:											
Administrative Assessments			-	-	-					-	9,314,560
Interest Revenue			-	-	-					-	35,550
Mutual Agency Project Revenue	181,866									181,866	181,866
Miscellaneous Income	1									1	0
Total Revenues	181,867	-	-	-	-	-	-	-	-	181,867	9,531,976
Administrative & Project Expenditures:											
Watermaster Judgment Administration	254,756									254,756	2,593,044
Watermaster Board-Advisory Committee	23,983									23,983	422,505
Ag Pool Legal Services - Ag Fund [1]				-						-	-
Pool Administration			104	10,116	1,310					11,530	613,095
Optimum Basin Mgmt Administration		75,166								75,166	1,526,058
OBMP Program Elements 1-9		145,887								145,887	4,619,904
Debt Service		-								-	482,302
Basin Recharge Improvements		-								-	816,710
Total Administrative/OBMP Expenses	278,738	221,053	104	10,116	1,310	-	-	-	-	511,321	11,073,617
Net Administrative/OBMP Expenses	(96,872)	(221,053)									
Allocate Net Admin Expenses To Pools	96,872		71,986	21,064	3,821					-	
Allocate Net OBMP Expenses To Pools		221,053	164,267	48,067	8,719					-	
Allocate Debt Service to App Pool		-	-							-	
Allocate Basin Recharge to App Pool		-	-							-	
Agricultural Expense Transfer*			79,247	(79,247)						-	
Total Expenses			315,604	-	13,850	-	-	-	-	511,321	11,073,617
Net Administrative Income			(315,604)	-	(13,850)		-	-	-	(329,454)	(1,541,641)
Other Income/(Expense)											
Replenishment Water Assessments							-			-	0
Desalter Replenishment Obligation										-	0
Exhibit "G" Non-Ag Pool Water			-							-	0
RTS Charges from IEUA							-			-	0
Interest Revenue			-	-	-		-			-	0
MWD Water Purchases										-	0
Non-Ag Stored Water Purchases										-	0
Exhibit "G" Non-Ag Pool Water			-							-	0
Groundwater Replenishment										-	0
LAIF - Fair Market Value Adjustment								-		-	0
Gain on Sale of Assets			-		-			-		-	0
AP Escrow Account - Refunds to AP			-		-	-			-	-	0
AP Escrow Account - Interest Earned						1				1	0
Refund-Basin O&M Expenses			-		-					-	0
Refund-Recharge Debt Service			-							-	0
Funding To/(From) Reserves										-	0
Net Other Income/(Expense)			-	-	-	1	0.00	-	-	1	0
Net Transfers To/(From) Reserves		(329,453)	(315,604)	-	(13,850)	1	0.00	-	-	(329,453)	(1,541,641)
		0									
Net Assets, July 1, 2022			8,686,293	871,691	101,058	374	1,644,153	(143,111)	(443,445)	10,717,014	
Net Assets, End of Period			8,370,690	871,691	87,208	375	1,644,153	(143,111)	(443,445)	10,387,561	10,387,561
Ag Pool Assessments Outstanding [2]				(586,852)							
Ag Pool Fund Balance				284,839							
20/21 Assessable Production			73,423.920	21,484.815	3,897.385					98,806.120	
20/21 Production Percentages			74.311%	21.744%	3.944%					100.000%	

*Fund balance transfer as agreed to in the Peace Agreement.

Note [1] - Agricultural Pool Legal Services for July 2022 through July 2022

Note [2] - Outstanding balance of Agricultural Pool Special Assessments for $200,000 is $121,504.22 and $635,000 invoicing is $465,347.97

CHINO BASIN WATERMASTER

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PETER KAVOUNAS, P.E.
General Manager

STAFF REPORT

DATE: September 8, 2022

TO: AP/ONAP/OAP Committee Members

SUBJECT: Treasurer's Report of Financial Affairs for the Period July 1, 2022 through July 31, 2022 - Financial Report B4 (July 31, 2022) (Consent Calendar Item I.B.4.)

SUMMARY

Issue: Record of increases or decreases in the cash position, assets and liabilities of Watermaster for the Period of July 1, 2022 through July 31, 2022. [Normal Course of Business]

Recommendation: Receive and file Treasurer's Report of Financial Affairs for the Period July 1, 2022 through July 31, 2022 as presented.

Financial Impact: Funds disbursed were included in the FY 2022/23 "Amended" Watermaster Budget.

Future Consideration
Appropriative Pool – September 8, 2022: Receive and File
Non-Agricultural Pool – September 8, 2022: Receive and File
Agricultural Pool – September 8, 2022: Receive and File
Advisory Committee – September 15, 2022: Receive and File
Watermaster Board – September 22, 2022: Receive and File

ACTIONS:
Appropriative Pool – September 8, 2022:
Non-Agricultural Pool – September 8, 2022:
Agricultural Pool – September 8, 2022:
Advisory Committee – September 15, 2022:
Watermaster Board – September 22, 2022:

BACKGROUND

A Treasurer's Report of Financial Affairs for the Period July 1, 2022 through July 31, 2022 is provided to keep all members apprised of the total cash in banks (Bank of America, LAIF, and CalTRUST); and cash on hand at the Watermaster office (petty cash) at the end of the period stated. The Treasurer's Report details the change (increase or decrease) in the overall cash position of Watermaster, as well as the changes (increase or decrease) to the assets and liabilities section of the balance sheet. The report also provides a detailed listing of all deposits and/or withdrawals in the California State Treasurer's Local Agency Investment Fund (LAIF) and/or CalTRUST, the most current effective yield as of the last quarter, and the ending balance in LAIF as of the reporting date.

DISCUSSION

The Treasurer's Report of Financial Affairs has been created from various financial reports and statements created from Intuit QuickBooks Enterprise Solutions 22.0, the Watermaster accounting system. The Treasurer's Report provided, balances to the supporting documentation in the Watermaster accounting system, as well as the supporting bank statements.

ATTACHMENTS

1. Financial Report – B4

CHINO BASIN WATERMASTER
TREASURER'S REPORT OF FINANCIAL AFFAIRS FOR THE PERIOD
JULY 1, 2022 THROUGH JULY 31, 2022

DEPOSITORIES:				
Cash on Hand - Petty Cash				$ 500
Bank of America				
Governmental Checking-Demand Deposits		$ 354,030		
Zero Balance Account - Payroll		-		354,030
Restricted Funds - AP Escrow				5,392
Local Agency Investment Fund - Sacramento				10,995,132
TOTAL CASH IN BANKS AND ON HAND	7/31/2022			**$ 11,355,055**
TOTAL CASH IN BANKS AND ON HAND	6/30/2022			11,742,546
PERIOD INCREASE (DECREASE)				**$ (387,491)**

CHANGE IN CASH POSITION DUE TO:

Decrease/(Increase) in Assets:	Accounts Receivable	$ (135,411)
	Assessments Receivable	73,749
	Prepaid Expenses, Deposits & Other Current Assets	16,086
(Decrease)/Increase in Liabilities	Accounts Payable	11,122
	Accrued Payroll, Payroll Taxes & Other Current Liabilities	(27,196)
	Long Term Liabilities	3,613
	Transfer to/(from) Reserves	(329,453)
	PERIOD INCREASE (DECREASE)	**$ (387,491)**

SUMMARY OF FINANCIAL TRANSACTIONS:	**Petty Cash**	**Govt'l Checking Demand**	**Zero Balance Account Payroll**	**Restricted Funds AP Escrow**	**Local Agency Investment Funds**	**Totals**
Balances as of 6/30/2022	$ 500	$ 764,015	$ -	$ 5,391	$ 10,972,640	$ 11,742,546
Deposits	-	114,543	-	1	22,493	137,036
Transfers	-	(178,298)	(102,555)	-	-	(280,853)
Withdrawals/Checks	-	(346,230)	102,555	-	-	(243,675)
Balances as of 7/31/2022	$ 500	$ 354,030	$ -	$ 5,392	$ 10,995,132	$ 11,355,055
PERIOD INCREASE OR (DECREASE)	**$ -**	**$ (409,985)**	**$ -**	**$ 1**	**$ 22,493**	**$ (387,491)**

CHINO BASIN WATERMASTER
TREASURER'S REPORT OF FINANCIAL AFFAIRS FOR THE PERIOD
JULY 1, 2022 THROUGH JULY 31, 2022

INVESTMENT TRANSACTIONS

Effective Date	Transaction	Depository	Activity	Redeemed	Days to Maturity	Interest Rate(*)	Maturity Yield
7/15/2022	Interest Earned		22,493				
TOTAL INVESTMENT TRANSACTIONS			**$ 22,493**	**$0**			

* The earnings rate for L.A.I.F. is a daily variable rate; 0.75% was the effective yield rate at the Quarter ended June 30, 2022.

INVESTMENT STATUS
July 31, 2022

Financial Institution	**Principal Amount**	**Number of Days**	**Interest Rate**	**Maturity Date**
Local Agency Investment Fund	$ 10,995,132			
TOTAL INVESTMENTS	**$ 10,995,132**			

Funds on hand are sufficient to meet all foreseen and planned Administrative and project expenditures during the next six months.

All investment transactions have been executed in accordance with the criteria stated in Chino Basin Watermaster's Investment Policy.

Respectfully submitted,

Joseph S. Joswiak
Chief Financial Officer

CHINO BASIN WATERMASTER

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PETER KAVOUNAS, P.E.
General Manager

STAFF REPORT

DATE: September 8, 2022

TO: AP/ONAP/OAP Committee Members

SUBJECT: Budget vs. Actual Report for the Period July 1, 2022 through July 31, 2022 - Financial Report B5 (July 31, 2022) (Consent Calendar Item I.B.5.)

SUMMARY

Issue: Record of revenues and expenses of Watermaster for the Period of July 1, 2022 through July 31, 2022. [Normal Course of Business]

Recommendation: Receive and file Budget vs. Actual Report for the Period July 1, 2022 through July 31, 2022 as presented.

Financial Impact: Funds disbursed were included in the FY 2022/23 "Amended" Watermaster Budget.

Future Consideration
Appropriative Pool – September 8, 2022: Receive and File
Non-Agricultural Pool – September 8, 2022: Receive and File
Agricultural Pool – September 8, 2022: Receive and File
Advisory Committee – September 15, 2022: Receive and File
Watermaster Board – September 22, 2022: Receive and File

ACTIONS:
Appropriative Pool – September 8, 2022:
Non-Agricultural Pool – September 8, 2022:
Agricultural Pool – September 8, 2022:
Advisory Committee – September 15, 2022:
Watermaster Board – September 22, 2022:

BACKGROUND

A Budget vs. Actual Report for the period July 1, 2022 through July 31, 2022 is provided to keep all members apprised of the total revenues and expenses for the current fiscal year. The expense section is categorized into four distinct sections. Those sections are: Judgment Administration and Administrative Expenses; Optimum Basin Management Program Expenses; Program Element 1-9 Expenses; and Other Income/Expenses. The Budget vs. Actual report has been created from Intuit QuickBooks Enterprise Solutions 22.0, the Watermaster accounting system. The Budget vs. Actual report provided, balances to the supporting documentation in the Watermaster accounting system, as well as the supporting bank statements.

DISCUSSION

CURRENT MONTH – JULY 2022

Year-To-Date (YTD) for the one month ending July 31, 2022, all but two categories were at or below the projected budget.

The categories over budget were: (1) the Administration Salary/Benefits expenses (6010s) were over budget by $32,370 or 49.2% as a result of increased staff time and activities in the administrative functions. Please note that the overage is only in the administrative section, not with the entire consolidated staffing budget. (2) The Watermaster Legal Services (6070s) were over budget by $4,964 or 12.5% as a result of increased activities in the areas of Personnel Matters; unbudgeted expenses for the Ely 3 Basin Investigation; and miscellaneous legal expenses during the last month. Please note that the overage is only in the administrative section, not the entire consolidated BHFS budget.

During the month of July 2022, the “Carry Over” funding was calculated. The Total “Carry Over” funding amount of $1,541,640.96 has been posted to the general ledger accounts. The total amount of $1,596,853.31 consisted of $478,326.10 from Engineering Services, $458,709.78 from Capital Improvement Projects, $373,394.56 from OBMP Activities, $145,428.66 from Pool Funding Accounts, and $85,781.86 from Administration Services. More detailed information is provided regarding this issue under the “Carry Over” Funding section.

The “Amended” Budget for FY 2022/23 is $11,073,616.96 which includes $1,541,640.96 for the prior years “Carry Over” funding.

There are no Budget Transfers or Budget Amendments being proposed for FY 2022/23 as of July 31, 2022.

Overall, the Watermaster (YTD) Actual Expenses were $2,613,229 or 83.6% below the (YTD) Budgeted Expenses of $3,124,549.

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

SALARIES EXPENSE

CURRENT MONTH – JULY 2022

As of July 31, 2022, the total (YTD) Watermaster salary expenses were $58,173 or 26.7% below the (YTD) budgeted amount of $218,263. The overall staffing budget was developed with a staffing level of eleven Full-Time Equivalents (FTEs), and staffing is currently at eleven Full-Time Equivalents (FTEs).

Watermaster utilizes an in-house database time and attendance system to track and record staff's actual hours worked and records those hours to a specific project or activity. This time and attendance database of captured staff hours and activities is the basis for the bi-weekly payrolls which are processed using an external payroll processing service (ADP). During the FY 2022/23 budget development, Watermaster staff modified the internal timekeeping database system to better track the actual activities performed by the staff. Watermaster reduced the number of cost accounting activities from 160+ labor codes down to 53 labor codes. Watermaster staff can now record time to the following six activity categories: (1) Judgment Administration activities; (2) General Administrative activities; (3) Paid Leaves of vacation, sick or holiday; (4) Pools, Advisory or Board Meeting attendance; (5) OBMP activities; and (6) Program Elements 1 through 9 activities.

When the FY 2022/23 budget was developed, basic assumptions were used in allocating how staff's time would be spent and on which of the projects or activities. The staffing dollars were then allocated into those specific areas and budgeted on a 1/12 monthly budget. When actual staffing activities vary from the budgeted assumptions, a positive or negative variance can be created.

Currently the following actual allocations are tracking above the projected allocations due to Watermaster staff spending more time in these activities as follows: Judgment Administration-Document Review-WM Staff expenses (account 5901.1) above budget by $1,262 or 13.85%; Administrative-Accounting-WM Staff expenses (account 6011.10) above budget by $8,293 or 50.8%; Administrative-Building Admin-WM Staff expenses (account 6011.15) above budget by $377 or 18.3%; Administrative-Document Review-WM Staff expenses (account 6011.25) above budget by $2,370 or 128.8%; Administrative-Field Work-WM Staff expenses (account 6011.30) above budget by $269 or 32.8%; Administrative-General-WM Staff expenses (account 6011.50) above budget by $23,982 or 343.2%; Administrative-IT-WM Staff expenses (account 6011.70) above budget by $9,173 or 492.9%; PE1-Monitoring Program-WM Staff expenses (account 7104.1) above budget by $9,337 or 582.1%; and PE2-Comprehensive Recharge-WM Staff expenses (account 7201) above budget by $2,405 or 107.4%.

Watermaster does not plan to present any Budget Transfers or Budget Amendments as of July 31, 2022.

The table summarizes the Year-To-Date (YTD) Actual Watermaster salary costs compared to the Year-To-Date (YTD) Budget as of July 31, 2022. Please be advised that the "$ Over Budget" and the "% of Budget" columns are a comparison of the (YTD) Actual to the (YTD) Budget, not the 12-month Annual Budget. The 12-month Annual Budget column is presented only to provide the data in a full and complete format. The following details are provided:

	Jul '22 - Jul '22 Actual	Jul '22 - Jul '22 Budget	$ Over Budget	% of Budget	FY 2022/23 Annual Budget
WM Salary Expense					
5901.1 · Judgment Admin - Doc. Review-WM Staff	10,426.44	9,164.00	1,262.44	113.78%	108,299.00
5901.3 · Judgment Admin - Field Work-WM Staff	0.00	5,288.00	-5,288.00	0.0%	62,491.00
5901.5 · Judgment Admin - General-WM Staff	4,833.13	12,397.00	-7,563.87	38.99%	146,513.00
5901.7 · Judgment Admin - Meeting-WM Staff	5,865.72	7,838.00	-1,972.28	74.84%	92,638.00
5901.9 · Judgment Admin - Reporting-WM Staff	0.00	6,310.00	-6,310.00	0.0%	74,568.00
5910 · JAdmin - Court Coord./Attendance-WM Staff	0.00	1,940.00	-1,940.00	0.0%	22,945.00
5911 · JAdmin - Exhibit G-WM Staff	0.00	1,616.00	-1,616.00	0.0%	19,090.00
5921 · JAdmin - Production Monitoring-WM Staff	1,070.75	3,456.00	-2,385.25	30.98%	40,822.00
5931 · JAdmin - Recharge Applications-WM Staff	0.00	778.00	-778.00	0.0%	9,191.00
5941 · JAdmin - Reporting-WM Staff	0.00	3,089.00	-3,089.00	0.0%	36,520.00
5951 · JAdmin - Rules & Regs-WM Staff	0.00	1,460.00	-1,460.00	0.0%	17,251.00
5961 · JAdmin - Safe Yield-WM Staff	1,699.37	4,564.00	-2,864.63	37.23%	53,915.00
5971 · JAdmin - Storage Agreements-WM Staff	0.00	4,518.00	-4,518.00	0.0%	53,393.00
5981 · JAdmin - Water Accounting/Database-WM Staff	1,180.11	2,129.00	-948.89	55.43%	25,171.00
5991 · JAdmin - Water Transactions-WM Staff	727.18	3,000.00	-2,272.82	24.24%	35,490.00
6011.1 · WM Staff Salaries - Overtime	120.64	1,000.00	-879.36	12.06%	12,000.00
6011.4 · 457(f) NQDC Plan	3,612.78	3,284.00	328.78	110.01%	39,402.00
6011.10 · Admin - Accounting-WM Staff	24,608.91	16,316.00	8,292.91	150.83%	192,807.00
6011.15 · Admin - Building Admin-WM Staff	2,442.02	2,065.00	377.02	118.26%	24,389.00
6011.20 · Admin - Conference/Seminars-WM Staff	2,791.96	5,428.00	-2,636.04	51.44%	64,170.00
6011.25 · Admin - Document Review-WM Staff	4,209.52	1,840.00	2,369.52	228.78%	21,729.00
6011.30 · Admin - Field Work-WM Staff	1,086.64	818.00	268.64	132.84%	9,685.00
6011.50 · Admin - General-WM Staff	30,969.07	6,987.00	23,982.07	443.24%	82,566.00
6011.60 · Admin - HR-WM Staff	510.25	2,887.00	-2,376.75	17.67%	34,113.00
6011.70 · Admin - IT-WM Staff	11,034.09	1,861.00	9,173.09	592.91%	21,997.00
6011.80 · Admin - Meeting-WM Staff	2,476.84	4,626.00	-2,149.16	53.54%	54,669.00
6011.90 · Admin - Team Building-WM Staff	302.38	2,312.00	-2,009.62	13.08%	27,330.00
6011.95 · Admin - Training (Give/Receive)-WM Staff	1,830.51	1,899.00	-68.49	96.39%	22,439.00
6017· Temporary Services	0.00	2,084.00	-2,084.00	0.0%	25,000.00
6201 · Advisory Committee - WM Staff	0.00	6,655.00	-6,655.00	0.0%	78,642.00
6301 · Watermaster Board - WM Staff	3,392.84	7,643.00	-4,250.16	44.39%	90,345.00
8301 · Appropriative Pool - WM Staff	0.00	7,643.00	-7,643.00	0.0%	90,345.00
8401 · Agricultural Pool - WM Staff	0.00	7,643.00	-7,643.00	0.0%	90,345.00
8501 · Non-Agricultural Pool - WM Staff	0.00	6,737.00	-6,737.00	0.0%	79,637.00
6901.1 · OBMP - Document Review-WM Staff	2,306.87	4,463.00	-2,156.13	51.69%	52,751.00
6901.3 · OBMP - Field Work-WM Staff	1,327.63	4,097.00	-2,769.37	32.41%	48,426.00
6901.5 · OBMP - General-WM Staff	3,708.32	5,772.00	-2,063.68	64.25%	68,213.00
6901.7 · OBMP - Meeting-WM Staff	2,239.85	4,845.00	-2,605.15	46.23%	57,257.00
6901.9 · OBMP - Reporting-WM Staff	0.00	4,754.00	-4,754.00	0.0%	56,190.00
7104.1 · PE1 - Monitoring Program-WM Staff	10,940.98	1,604.00	9,336.98	682.11%	18,945.00
7201 · PE2 - Comprehensive Recharge - WM Staff	4,646.01	2,241.00	2,405.01	207.32%	26,495.00
7301 · PE3&5 - Water Supply/Desalter-WM Staff	0.00	1,613.00	-1,613.00	0.0%	19,048.00
7301.1 · PE5 - Reg. Supply Water Prgm.-WM Staff	0.00	1,694.00	-1,694.00	0.0%	20,042.00
7401 · PE4 - MZ1 Subsidence Mgmt. Plan-WM Staff	0.00	1,613.00	-1,613.00	0.0%	19,048.00
7501 · PE6 - Coop. Programs/Salt Mgmt.-WM Staff	1,475.14	1,694.00	-218.86	87.08%	20,042.00
7501.1 · PE 7 - Salt Nutrient Mgmt. Plan-WM Staff	0.00	2,155.00	-2,155.00	0.0%	25,501.00
7601 · PE8&9 - Storage Mgmt./Recovery-WM Staff	544.03	2,339.00	-1,794.97	23.26%	27,659.00
Subtotal WM Staff Costs	**142,379.98**	**196,159.00**	**-53,779.02**	**72.58%**	**2,319,524.00**
60184.1 · Administrative Leave	0.00	537.00	-537.00	0.0%	6,354.00
60185 · Vacation	12,290.67	9,117.00	3,173.67	134.81%	107,736.00
60186 · Sick Leave	761.43	6,273.00	-5,511.57	12.14%	74,127.00
60187 · Holidays	4,657.72	6,177.00	-1,519.28	75.4%	92,660.00
Subtotal WM Paid Leaves	**17,709.82**	**22,104.00**	**-4,394.18**	**80.12%**	**280,877.00**
Total WM Salary Costs	**160,089.80**	**218,263.00**	**-58,173.20**	**73.35%**	**2,600,401.00**

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

LEGAL SERVICES
BROWNSTEIN HYATT FARBER SCHRECK EXPENSES

CURRENT MONTH – JULY 2022

As of July 31, 2022, the total (YTD) Watermaster Legal Services expenses (consolidating the three categories of Watermaster Administrative Legal Services, Pool/Advisory/Board Meeting legal expenses, and OBMP legal expenses) were $46,100 or 42.8% below the (YTD) budgeted amount of $107,597.

The Watermaster Legal Services budget was developed jointly by the Watermaster staff and Brownstein Hyatt Farber Schreck staff with specific assumptions regarding the tasks and legal activities that would occur during FY 2022/23. The total legal services budget was developed by multiplying the number of hours that would be required to complete the specific tasks by the hourly rate. The "Approved" budget was adopted for the original amount of $1,166,098.

Watermaster does not plan to present any Budget Transfers or Budget Amendments as of July 31, 2022.

WATERMASTER ADMINISTRATIVE LEGAL SERVICES:
Overall, the Watermaster Administrative Legal Services expense (6070s) as of July 31, 2022 was $4,964 or 12.5% above the budgeted amount of $39,714. The specific items within the Administrative Legal Services expenses (6070s) which were over budget were Personnel Matters expenses (6073) which were over budget by $4,065 or 162.6%; Miscellaneous (6078) which were over budget by $13,867 or 74.8%; and the Ely 3 Basin Investigation (6078.25) which were over budget by $2,606 or 100%. Please see Note 1 on the following page for a more detailed explanation of the miscellaneous types of expenses (6078).

The specific items within the Administrative Legal Services expenses (6070s) which were under budget were the expenses for Court Coordination (6071) under budget by $3,646 or 54.0%; Rules & Regulations (6072) under budget by $7,371 or 100%; Interagency Issues (6074) under budget by $3,468 or 100%; and Party Status Maintenance expenses (6077) under budget by $1,090 or 100%.

WATERMASTER POOLS, ADVISORY AND BOARD LEGAL SERVICES:
The Pools, Advisory Committee and the Board meeting legal expenses from BHFS are captured by month within the accounts (6275, 6375, 6375.1, 8375, 8475 and 8575). The legal service costs associated with the Board Workshop(s) are also included as part of this group. Overall, this category of legal expenses as of July 31, 2022 was $17,703 or 64.9% below the budgeted amount of $27,279. Normal Brownstein Hyatt Farber Schreck meeting attendance during any given month includes attendance at all three pool meetings, one Advisory Committee meeting and one Board meeting.

There were no scheduled Pool or Advisory Committee meetings during the month of July. However, during July there was a Robert's Rules of Order Workshop held, as well as a Special Board meeting. The legal services budget was developed with the assumption of having eleven months of meetings, intentionally excluding the month of December 2022.

OBMP LEGAL SERVICES:
The OBMP legal expenses (accounts 6907.31 through 6907.90) were below the budget for the month, with the exception of the Recharge Master Plan expenses (6907.39) which were over budget by $878 or 80.6%. As of July 31, 2022, the category of OBMP legal expenses were $33,362 or 82.8% below the budgeted amount of $40,604.

The table listed below summarizes the Brownstein Hyatt Farber Schreck (BHFS) expenses as of July 31, 2022 compared to the Year-To-Date (YTD) budget. Please be advised that the "$ Over Budget" and the "% of Budget" columns are a comparison of the (YTD) Actual to the (YTD) Budget, not the 12-month Annual Budget. The 12-month Annual Budget column is presented only to provide the data in a full and complete format. The following details are provided:

	Jul '22 - Jul '22 Actual	Jul '22 - Jul '22 Budget	$ Over Budget	% of Budget	FY 2022/23 Annual Budget
6070 · Watermaster Legal Services					
6071 · BHFS Legal - Court Coordination	3,104.10	6,750.00	-3,645.90	45.99%	74,250.00
6072 · BHFS Legal - Rules & Regulations	0.00	7,371.00	-7,371.00	0.0%	88,480.00
6073 · BHFS Legal - Personnel Matters	6,565.05	2,500.00	4,065.05	262.6%	10,300.00
6074 · BHFS Legal - Interagency Issues	0.00	3,468.00	-3,468.00	0.0%	41,616.00
6077 · BHFS Legal - Party Status Maintenance	0.00	1,090.00	-1,090.00	0.0%	13,080.00
6078 · BHFS Legal - Miscellaneous (Note 1)	32,402.25	18,535.00	13,867.25	174.82%	222,420.00
6078.25 · BHFS - Ely 3 Basin Investigation	2,606.46	0.00	2,606.46	100.0%	0.00
Total 6070 · Watermaster Legal Services	44,677.86	39,714.00	4,963.86	112.5%	450,146.00
6275 · BHFS Legal - Advisory Committee	0.00	2,312.00	-2,312.00	0.0%	25,432.00
6375 · BHFS Legal - Board Meeting	9,576.45	7,380.00	2,196.45	129.76%	81,180.00
6375.1 · BHFS Legal - Board Workshop(s)	0.00	8,917.00	-8,917.00	0.0%	26,750.00
8375 · BHFS Legal - Appropriative Pool	0.00	2,890.00	-2,890.00	0.0%	31,790.00
8475 · BHFS Legal - Agricultural Pool	0.00	2,890.00	-2,890.00	0.0%	31,790.00
8575 · BHFS Legal - Non-Ag Pool	0.00	2,890.00	-2,890.00	0.0%	31,790.00
Total BHFS Legal Services	9,576.45	27,279.00	-17,702.55	35.11%	228,732.00
6907.3 · WM Legal Counsel					
6907.31 · Archibald South Plume	0.00	958.00	-958.00	0.0%	11,505.00
6907.32 · Chino Airport Plume	0.00	958.00	-958.00	0.0%	11,505.00
6907.33 · Desalter/Hydraulic Control	0.00	2,953.00	-2,953.00	0.0%	35,420.00
6907.34 · Santa Ana River Water Rights	0.00	1,635.00	-1,635.00	0.0%	19,620.00
6907.36 · Santa Ana River Habitat	0.00	2,389.00	-2,389.00	0.0%	28,660.00
6907.38 · Reg. Water Quality Cntrl Board	0.00	4,265.00	-4,265.00	0.0%	51,170.00
6907.39 · Recharge Master Plan	1,967.85	1,090.00	877.85	180.54%	13,080.00
6907.40 · Storage Agreements	0.00	1,347.00	-1,347.00	0.0%	16,155.00
6907.41 · Prado Basin Habitat Sustainability	0.00	1,090.00	-1,090.00	0.0%	13,080.00
6907.44 · SGMA Compliance	0.00	785.00	-785.00	0.0% #	9,430.00
6907.45 · OBMP Update	633.60	10,516.00	-9,882.40	6.03% #	126,200.00
6907.47 · 2020 Safe Yield Reset	4,640.85	5,385.00	-744.15	86.18% #	64,620.00
6907.48 · Ely Basin Investigation	0.00	4,265.00	-4,265.00	0.0% #	51,170.00
6907.90 · WM Legal Counsel - Unanticipated	0.00	2,968.00	-2,968.00	0.0%	35,605.00
Total 6907 · WM Legal Counsel	7,242.30	40,604.00	-33,361.70	17.84%	487,220.00
Total Brownstein, Hyatt, Farber, Schreck Costs	**61,496.61**	**107,597.00**	**-46,100.39**	**57.16%**	**1,166,098.00**

Note 1: The types of legal activities that have been charged against the "Miscellaneous" legal category account 6078 are as follows: (1) Correspondence and discussions with Watermaster staff regarding current issues/topics; (2) Correspondence with Watermaster staff regarding special projects (assessment package, replenishment obligations, annual report, audit report, business plan, etc.); (3) Brownstein's status review of ongoing Watermaster projects and issues; (4) Brownstein's update of the outstanding issues list; (5) Coordination of ongoing Watermaster projects; (6) Review of draft documents and contracts; (7) Review transfer documents; (8) Ground-Level Monitoring Committee reports/meetings; (9) CEQA review and compliance; (10) Desalter Replenishment obligations, assessment methodologies, and ongoing issues; (11) Master Cost Sharing Agreement with IEUA; (12) Estimation and adoption of an evaporative loss policy for Recharge; (13) Right of Entry Agreements for various locations; (14) Payment of Ag Legal Fees; (15) Ag Invoices; and (16) Miscellaneous legal research on current and pending issues.

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

OBMP - WATERMASTER AND WEST YOST STAFF, ENGINEERING SERVICES, LEGAL SERVICES, AND OTHER COSTS

CURRENT MONTH – JULY 2022

Reviewing in total the OBMP Watermaster and West Yost Staff, Engineering Services, Legal Services, and Other Costs (consolidating the six categories of OBMP Watermaster and West Yost Staff, SAWPA, OBMP Engineering Services, OBMP Legal Costs, OBMP Update Costs, and OBMP Other Expenses) for the one month ending July 31, 2022, the actual expenses of $75,166 were below the budgeted amount of $200,439 by $125,273 or 62.5%. For a detailed discussion, the following is provided.

For July 31, 2022, the accounts 6901 (Optimum Basin Mgmt. Program) section was above the Year-To-Date (YTD) budget by $4,649 or 14.7%. Watermaster utilizes an in-house database time and attendance system to record and document staff's actual hours worked and also allocates those hours to a specific project or activity. Watermaster staff time could be charged to Judgment Administration, General Administrative, OBMP, or Program Elements 1-9 categories. Recently, Watermaster staff spent less time on specific OBMP related areas as budgeted. As a result, Watermaster staff allocated less actual time to the OBMP project as budgeted, which resulted in an under-budget variance of $16,348 or 57.7%. West Yost staff, however, spent more time on general meetings, and as a result, was over budget.by $20,997 or 621.2%. When consolidated, the accounts 6901 (as stated earlier) were above the budget by $4,649 or 14.7%.

For July 31, 2022, account (6903) for the Santa Ana Watershed Project Authority (SAWPA) FY 2022/23 Basin Monitoring Program Task Force Contribution was budgeted at $21,458 and actual expenses were $21,458.

For July 31, 2022, the accounts 6906 (Optimum Basin Mgmt. Program Engineering Services) section was below the Year-To-Date (YTD) budget by $79,447 or 88.7%. The majority of expenses within this OBMP category were under budget (YTD), however, the accounts over budget were the OBMP-Data Requests-Non CBWM Staff (6906.72) which were over budget by $2,103 or 98.4%; and the OBMP-Engineering Services-Other expenses (6906) which were over budget by $999 or 27.1%.

Within the 6906 categories, one account had funding "Carried-Over" from the previous fiscal year. The Integrated Model Meetings-IEUA Costs expenses (6906.15) had $25,774 brought forward from the previous year. The amount of $25,774 has been included in the FY 2022/23 "Amended" budget.

Within the category 6907 (Optimum Basin Mgmt. Program Legal Fees) are the remaining Brownstein Hyatt Farber Schreck (BHFS) Watermaster's legal expenses. Within the legal expense category, there was only one line item which was above the budget. This line item was the Recharge Master Plan expenses (6907.39) which were over budget by $878 or 80.6%. The individual legal projects/activities that were below budget for the Year-To-Date (YTD) period were the Archibald South Plume of $958; the Chino Airport Plume of $958; the Desalter/Hydraulic Control of $2,953; Santa Ana River Water Rights of $1,635; the Santa Ana River Habitat of $2,389; the Regional Water Quality Control Board of $4,265; Storage Agreements of $1,347; the Prado Basin Habitat Sustainability of $1,090; SGMA Compliance of $785; the OBMP Update of $9,882; the 2020 Safe Yield Reset of $744: the Ely Basin Investigation expenses of $4,265; and the WM Unanticipated legal expenses of $2,968. The below budget items totaled $34,240. For the one month ended July 31, 2022, the overall cumulative (YTD) budget was $40,604 and the actual (BHFS) legal expenses totaled $7,242 which resulted in an under-budget variance of $33,362 or 82.8%.

The OBMP Update Costs (6908.1) were below the budget for the month. These expenses relate to the OBMP Update costs for the contract between Tom Dodson and Associates and CBWM to procure environmental review services for the 2020 OBMP Update. The contract had a remaining amount available of $16,344.56 as of the year-ended June 30, 2022 and that amount was "Carried-Over" into the FY 2022/23 budget. The budget has a remaining balance as of July 31, 2022 of $16,345.

The OBMP Other Expenses (6909's) were below the budget for the month. These expenses are typically conference calls, meeting expenses, supplies, annual inspection fees, and other miscellaneous type expenses. As of July 31, 2022, this category of expenses was $768 or 100% below the budgeted amount of $768.

Overall, the Optimum Basin Management Program (OBMP) category was $75,166 actual (YTD) compared to a budget (YTD) of $200,439 for an under budget of $125,273 or 62.5% as of July 31, 2022.

Watermaster does not plan to present any Budget Transfers or Budget Amendments as of July 31, 2022.

The table listed below summarizes the Optimum Basin Management Program (OBMP) expenses as of July 31, 2022 compared to the Year-To-Date (YTD) budget. Please be advised that the "$ Over Budget" and the "% of Budget" columns are a comparison of the (YTD) Actual to the (YTD) Budget, not the 12-month Annual Budget. The 12-month Annual Budget column is presented only to provide the data in a full and complete format. The following details are provided:

	Jul '22 - Jul '22 Actual	Jul '22 - Jul '22 Budget	$ Over Budget	% of Budget	FY 2022/23 Annual Budget
6900 · Optimum Basin Mgmt Plan					
6901.1 · OBMP - Document Review-WM Staff	2,306.87	4,463.00	-2,156.13	51.69%	52,751.00
6901.3 · OBMP - Field Work-WM Staff	1,327.63	4,097.00	-2,769.37	32.41%	48,426.00
6901.5 · OBMP - General-WM Staff	3,708.32	5,772.00	-2,063.68	64.25%	68,213.00
6901.7 · OBMP - Meeting-WM Staff	2,239.85	4,845.00	-2,605.15	46.23%	57,257.00
6901.8 · OBMP - Meeting-West Yost	24,376.81	3,380.00	20,996.81	721.21%	40,553.00
6901.9 · OBMP - Reporting-WM Staff	0.00	4,754.00	-4,754.00	0.0%	56,190.00
6901.95 · OBMP - Reporting-West Yost	2,395.50	4,395.00	-1,999.50	54.51%	52,762.00
Total 6901 · OBMP WM and West Yost Staff	36,354.98	31,706.00	4,648.98	114.66%	376,152.00
6903 · OBMP - SAWPA Group	21,458.00	21,458.00	0.00	100.0%	21,458.00
Total 6903 · OBMP - SAWPA	21,458.00	21,458.00	0.00	100.0%	21,458.00
6906 · OBMP Engineering Services					
6906.1 · OBMP - Watermaster Model Update	0.00	0.00	0.00	0.0%	0.00
6906.15 · Integrated Model Mtgs. - IEUA Costs	0.00	25,774.00	-25,774.00	0.0%	25,774.00
6906.21 · State of the Basin Report	0.00	29,255.00	-29,255.00	0.0%	175,540.00
6906.26 · 2020 OBMP Update	0.00	23,067.00	-23,067.00	0.0%	276,799.00
6906.71 · OBMP - Data Requests - CBWM Staff	1,188.75	5,642.00	-4,453.25	21.07%	67,710.00
6906.72 · OBMP - Data Requests - Non CBWM	4,241.25	2,138.00	2,103.25	198.38%	25,656.00
6906 · OBMP Engineering Services - Other	4,680.75	3,682.00	998.75	127.13%	44,180.00
Total 6906 · OBMP Engineering Services	10,110.75	89,558.00	-79,447.25	11.29%	615,659.00
6907 · OBMP Legal Fees					
6907.3 · WM Legal Counsel					
6907.31 · Archibald South Plume	0.00	958.00	-958.00	0.0%	11,505.00
6907.32 · Chino Airport Plume	0.00	958.00	-958.00	0.0%	11,505.00
6907.33 · Desalter/Hydraulic Control	0.00	2,953.00	-2,953.00	0.0%	35,420.00
6907.34 · Santa Ana River Water Rights	0.00	1,635.00	-1,635.00	0.0%	19,620.00
6907.36 · Santa Ana River Habitat	0.00	2,389.00	-2,389.00	0.0%	28,660.00
6907.38 · Reg. Water Quality Cntrl Board	0.00	4,265.00	-4,265.00	0.0%	51,170.00
6907.39 · Recharge Master Plan	1,967.85	1,090.00	877.85	180.54%	13,080.00
6907.40 · Storage Agreements	0.00	1,347.00	-1,347.00	0.0%	16,155.00
6907.41 · Prado Basin Habitat Sustainability	0.00	1,090.00	-1,090.00	0.0%	13,080.00
6907.44 · SGMA Compliance	0.00	785.00	-785.00	0.0%	9,430.00
6907.45 · OBMP Update	633.60	10,516.00	-9,882.40	6.03%	126,200.00
6907.47 · 2020 Safe Yield Reset	4,640.85	5,385.00	-744.15	86.18%	64,620.00
6907.48 · Ely Basin Investigation	0.00	4,265.00	-4,265.00	0.0%	51,170.00
6907.90 · WM Legal Counsel - Unanticipated	0.00	2,968.00	-2,968.00	0.0%	35,605.00
Total 6907 · WM Legal Counsel	7,242.30	40,604.00	-33,361.70	17.84%	487,220.00
6908 · OBMP Updates					
6908.1 · 2020 OBMP Update-Dodson & Assoc.	0.00	16,344.56	-16,344.56	0.0%	16,344.56
Total 6908 · OBMP Updates	0.00	16,344.56	-16,344.56	0.0%	16,344.56
6909 · OBMP Other Expenses					
6909.1 · OBMP Meetings	0.00	125.00	-125.00	0.0%	1,500.00
6909.3 · Other OBMP Expenses	0.00	227.00	-227.00	0.0%	2,724.00
6909.6 · OBMP Expenses - Miscellaneous	0.00	416.00	-416.00	0.0%	5,000.00
6909 · OBMP Other Expenses - Other	0.00	0.00	0.00	0.0%	0.00
Total 6909 · OBMP Other Expenses	0.00	768.00	-768.00	0.0%	9,224.00
Total 6900 · Optimum Basin Mgmt Plan	**75,166.03**	**200,438.56**	**-125,272.53**	**37.5%**	**1,526,057.56**

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

ENGINEERING SERVICES
WEST YOST ASSOCIATES

CURRENT MONTH – JULY 2022

The "Original" Approved budget for FY 2022/23 for Engineering Services was $3,281,528. The Engineering Services budget was Amended with the addition of "Carry-Over" funding totaling $478,326.10 which brought the FY 2022/23 "Amended" Budget amount to $3,759,854.10.

As of July 31, 2022, the total (YTD) Engineering Services expenses were $635,825 or 80.6% below the (YTD) budget amount of $789,202. The Engineering Services were all under budget of as of July 31, 2022, except for the OBMP-Meetings-WY Staff expenses (6901.8) which were over budget by $20,997 or 621.2%; the OBMP Engineering Services-Other expenses (6906) which were over budget by $999 or 27.1%; the OBMP-Data Request-Non CBWM expenses (6906.72) which were over budget by $2,103 or 98.6%; the Groundwater Level-Capital Equipment expenses (7104.9) which were over budget by $1,322 or 14.6%; and the PE6&7-Engineering expenses (7502) which were over budget by $7,588 or 25.7%.

The explanations regarding the Carry-Over amount of $478,326.10 from FY 2021/22 to the FY 2022/23 budget is provided as follows:

1. IEUA - Integrated Model Meetings and Technical Review - 50% IEUA Cost Share (Account 6906.15): $51,548 (Watermaster's portion is $25,774)
   The requested carryover is necessary because this effort was planned for completion in FY 2021/22 but is now scheduled to be completed in FY 2022/23.

2. Groundwater Quality Monitoring Program (Account 7505 - formerly account 7103.5): $1,694
   The carryover is necessary for the laboratory cost for the HCMP GW and SW monitoring program. The work was completed in FY 2021/22, but the invoice has not yet been received from the laboratory.

3. Groundwater Level Monitoring Program (Account 7104.9): $1,085
   The requested carryover is necessary for the purchase of replacement transducer for the MZ1 transducer monitoring program. The work was completed in FY 2021/22, but the invoice has not yet been received from the subcontractor.

4. Ground Level - Capital Equipment (Account 7408 - formerly account 7107.8): $5,000
   The requested carryover is necessary for the of purchase of a replacement door at the Ayala Park Extensometer facility and for materials and equipment for the Pomona Extensometer Facility. These orders were made in FY 2021/22 but the invoices have not yet been received.

5. Prado Basin Habitat Monitoring, Data Analysis and Reporting - 50% IEUA Cost Share (Account 7302 - formerly account 7108.31) $42,000 (Watermaster's portion is $21,000)
   The requested carryover is necessary to implement a recommendation in Prado Basin Habitat Sustainability Committee Annual Report for Water Year 2021 (approved in June 2021) to update the digital elevation model for the Prado Basin. This data will improve the estimates of current depth- to-groundwater in the study area, and in critical areas where there are observed declines in groundwater levels that could potentially threaten the quality of the riparian habitat.

6. Agriculture Production and Estimation (Account 5925 – formerly account 7110.3): $22,325
   The requested carryover is necessary to complete the Agriculture Production and Estimation work that was planned for completion in FY 2021/22 but is now scheduled to be completed in FY 2022/23.

7. PE2: Engineering Services for Other Recharge Improvement Projects (Account 7202.2): $95,256
   The requested carryover is necessary to finalize this work in FY 2022/23. The work includes conducting a life-cycle analysis at the San Sevaine 1 and Etiwanda Debris conservation berms and preparing a

technical memorandum describing the analysis and conclusions. The scope and schedule for this work was refined with input from IEUA and Watermaster Staff in FY 2020/21. The work is to be completed in FY 2022/23.

8. SB88 Specification to Ensure Compliance with Regulations (Account 7206.1) - $108,024 (GRCC's portion is $54,012 and IEUA's portion is $54,012)
   The requested carryover is necessary to provide as-needed support to IEUA and Watermaster in implementing the recommendations described in the technical memorandum evaluating the existing methodology to estimate stormwater diversions in the Chino Basin.

9. 2023 RMPU Recharge Master Plan Scoping (Account 7210): $34,668. The requested Carry-Over is necessary to complete the scope, budget and report outline the 2023 RMPU.

10. Management Zone Strategies - Data Analyses and Reports (Account 7402): $26,758
    The requested carryover is necessary because the GLMC annual report is prepared over two fiscal years and is completed in November. Not as much progress was made in FY 2021/22 as was anticipated. The unspent budget in FY 2021/22 is needed to complete the annual report.

11. Management Zone Strategies - Northwest MZ-1 (Account 7402.10): $64,515
    The requested carryover is necessary because this is a multi-year project to develop a subsidence management plan for the Northwest MZ-1, and not all tasks planned/budgeted in FY 2021/22 were completed and must be completed in FY 2022/23. This included the request by the GLCM to perform a sensitivity study on the 1D compaction models and the use of the 1D compaction models to evaluate the effectiveness of potential subsidence management strategies. Carryover needed to complete the GLMC annual report. Tim Moore was on vacation and so we didn't make as much progress on this task as was anticipated in 2021/22.

12. Updated Plan - Mitigation Temp Loss of Hydraulic Control of Basin - 50% IEUA Cost Share (Account 7508): $20,000 (Watermaster's portion is $10,000)
    The requested carryover is necessary to complete regulatory compliance support or add additional model simulations that may potentially be requested by the Regional Board based on its review of the submitted Plan.

13. IEUA - Update Recycled Water Permit - Salinity (Account 7510): $81,214 (Watermaster's portion is $73,019)
    The requested carryover is necessary to complete the technical and regulatory compliance support work to update the Chino Basin Maximum Benefit Salt and Nutrient Management Plan. This multiyear project began FY 2017/18 and will continue through FY 2022/23.

14. PE 8/9: Support Implementation of the 2020 Storage Management Plan (Account 7610): $43,220
    This budget is for as-requested technical support to Watermaster staff, updating the information required for a complete Storage and Recovery Program application, updating the Storage and Recovery Program application forms, and updating the process to evaluate an application. No implementation activities occurred in FY 2021/22. The entire budget is requested to be carried over to FY 2022/23.

West Yost Associates provides Watermaster a Progress and Estimated Cost at Completion (ECAC) report each quarter. The purpose of this (ECAC) report is to update Watermaster on whether or not the Engineering Services budget will be above or below budget at the end of the fiscal year. If the Engineering Services budget is expected to be above budget at fiscal year-end, a Budget Amendment or Budget Transfer Form would need to be approved to ensure funding.

The first quarter (ECAC) report is scheduled for issuance and distribution in early May 2022 for the period July 1, 2022 through March 31, 2022.

Watermaster does not plan to present any Budget Transfers or Budget Amendments at this time.

The table listed below summarized the Year-To-Date (YTD) Actual West Yost Associates and other Engineering costs compared to the Year-To-Date (YTD) Budget as of July 31, 2022. Please be advised that the "$ Over Budge" and the "% of Budget" columns are a comparison of the (YTD) Actual to the (YTD) Budget, not the 12-month Annual Budget. The 12-month Annual Budget column is presented only to provide the data in a full and complete format. The following details are provided:

	Jul '22 - Jul '22 Actual	Jul '22 - Jul '22 Budget	$ Over Budget	% of Budget	FY 2022/23 Annual Budget
5901.8 · JAdmin - Meetings-Engineering Services	556.00	3,380.00	-2,824.00	16.45%	40,552.00
5906.1 · JAdmin - Watermaster Model Update	0.00	5,972.00	-5,972.00	0.0%	71,674.00
5906.71 · JAdmin - Data Requests-CBWM Staff	902.50	5,643.00	-4,740.50	15.99%	67,710.00
5906.72 · JAdmin - Data Requests-Non-CBWM Staff	0.00	2,138.00	-2,138.00	0.0%	25,656.00
5925 · JAdmin - Ag Production & Estimation	5,978.00	27,121.00	-21,143.00	22.04%	79,877.00
5935 · JAdmin - Mat'l Physical Injury Requests	0.00	6,790.00	-6,790.00	0.0%	81,472.00
5945 · JAdmin - WM Annual Report Preparation	0.00	2,554.00	-2,554.00	0.0%	15,320.00
5965 · JAdmin - Support Data Collection & Mgmt Process	0.00	1,214.00	-1,214.00	0.0%	14,568.00
6206 · Advisory Committee Meetings-WY Staff	0.00	1,884.00	-1,884.00	0.0%	22,603.00
6306 · Watermaster Board Meetings-WY Staff	191.00	1,884.00	-1,693.00	10.14%	22,603.00
8306 · Appropriative Pool Meetings-WY Staff	0.00	1,884.00	-1,884.00	0.0%	22,603.00
8406 · Agricultural Pool Meetings-WY Staff	0.00	1,884.00	-1,884.00	0.0%	22,603.00
8506 · Non-Agricultural Pool Meetings-WY Staff	0.00	1,884.00	-1,884.00	0.0%	22,603.00
6901.8 · OBMP - Meetings-WY Staff	24,376.81	3,380.00	20,996.81	721.21%	40,553.00
6901.95 · OBMP - Reporting-WY Staff	2,395.50	4,395.00	-1,999.50	54.51%	52,762.00
6906 · OBMP Engineering Services - Other	4,680.75	3,682.00	998.75	127.13%	44,180.00
6906.15 · Integrated Model Mtgs-IEUA Cost	0.00	25,774.00	-25,774.00	0.0%	25,774.00
6906.21 · State of the Basin Report	0.00	29,255.00	-29,255.00	0.0%	175,540.00
6906.26 · 2020 OBMP Update	0.00	23,067.00	-23,067.00	0.0%	276,799.00
6906.71 · OBMP - Data Requests - CBWM Staff	1,188.75	5,642.00	-4,453.25	21.07%	67,710.00
6906.72 · OBMP - Data Requests - Non CBWM	4,241.25	2,138.00	2,103.25	198.38%	25,656.00
7104.3 · Grdwtr Level-Engineering	9,631.75	18,534.00	-8,902.25	51.97%	222,417.00
7104.8 · Grdwtr Level-Contracted Services	0.00	834.00	-834.00	0.0%	10,000.00
7104.9 · Grdwtr Level-Capital Equipment	10,406.88	9,085.00	1,321.88	114.55%	9,085.00
7202 · PE2-Comp Recharge-Engineering Services	0.00	2,550.00	-2,550.00	0.0%	30,600.00
7202.2 · PE2-Comp Recharge-Engineering Services	7,633.75	100,115.00	-92,481.25	7.63%	153,572.00
7206.1 · SB88 Specs-Compliance-50% IEUA	0.00	54,012.38	-54,012.38	0.0%	54,012.38
7210 · OBMP - 2023 RMPU	4,725.25	52,412.25	-47,687.00	9.02%	247,588.25
7220 · Integrated Model Mtg./Tech. Review-50% IEUA	0.00	2,167.00	-2,167.00	0.0%	26,014.00
7302 · PE3&5-PBHSP Monitoring Program	2,326.62	26,829.00	-24,502.38	8.67%	90,937.00
7303 · PE3&5-Engineering - Other	0.00	1,648.00	-1,648.00	0.0%	19,776.00
7306 · PE3&5-Engineering - Outside Professionals	0.00	1,812.00	-1,812.00	0.0%	21,750.00
7402 · PE4-Engineering	13,292.88	44,421.00	-31,128.12	29.93%	238,723.00
7402.10 · PE4-Northwest MZ1 Area Project	5,493.75	78,859.00	-73,365.25	6.97%	236,653.00
7403 · PE4-Eng. Services-Contracted Services-InSar	0.00	21,250.00	-21,250.00	0.0%	85,000.00
7406 · PE4-Engineering Services-Outside Professionals	0.00	2,598.00	-2,598.00	0.0%	31,167.00
7408 · PE4-Engineering Services-Network Equipment	80.00	6,100.00	-6,020.00	1.31%	18,210.00
7502 · PE6&7-Engineering	37,141.79	29,554.00	7,587.79	125.67%	354,520.00
7505 · PE6&7-Laboratory Services	1,194.00	6,071.00	-4,877.00	19.67%	54,207.00
7508 · HC Mitigation Plan-50% IEUA (TO #6)	0.00	10,918.00	-10,918.00	0.0%	21,016.00
7510 · PE6&7-IEUA Salinity Mgmt. Plan	647.40	73,018.47	-72,371.07	0.89%	73,018.47
7511 · PE6&7-SAWBMP Task Force-50% IEUA	0.00	1,993.00	-1,993.00	0.0%	23,909.00
7610 · PE8&9-Support 2020 Mgmt. Plan	0.00	43,220.00	-43,220.00	0.0%	43,220.00
7614 · PE8&9-Support Imp. Safe Yield Court Order	16,292.55	39,636.00	-23,343.45	41.11%	475,641.00
Total Engineering Services Costs	**153,377.18**	**789,202.10**	**-635,824.92**	**19.43%**	**3,759,854.10** *

*** West Yost and Subcontractor Engineering Budget of $3,281,528 plus Carryover Funds from FY 2021/22 of $478,326.10**
Carryover Funds from FY 2021/22 of $478,326.10 = $22,325 (5925); $25,774 (6906.15); $1,085 (7104.9); $21,000 (7302); $5,000 (7408); $95,256 (7202.2); $54,012.38 (7206.1); $34,668.25 (7210); $26,758 (7402); $64,515 (7402.1); $1,694 (7505); $10,000 (7508); $73,018.47 (7510); and $43,220 (7610).

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

PRADO BASIN HABITAT SUSTAINABILITY PROGRAM

Ongoing Costs
Program costs that are ongoing (Ongoing Costs) will be cost-shared between Watermaster and IEUA, split on a 50/50 basis, subject to the following limitation: in each fiscal year, neither Watermaster nor IEUA shall be obligated to reimburse the other for Ongoing Costs that exceed the amount that the reimbursing party has budgeted for Ongoing Costs in that fiscal year, except as agreed upon by both parties in writing or as amended during the fiscal year. The first year expenses (FY 2016/17) to be cost shared were approximately $300,000, with projected future years (FY 2017/18 and forward) estimated at approximately $150,000. For the purposes of the agreement, Ongoing Costs are defined as the costs associated with the following Program activities:

1. A Riparian Habitat Monitoring Program, including, but not limited to, the following sub-tasks:
    a. Design and implement a site–specific vegetation monitoring program with the United States Bureau of Reclamation (USBR) and Orange County Water District, pursuant to which USBR will perform site-specific vegetation surveys.
    b. Manage and perform custom flight to collect a high resolution air photo of the Prado Basin Region.
    c. Collect, check, and upload historical air photos and vegetation survey data in the Prado Basin region.
    d. Collect, check, and upload historical Landsat data in the Prado Basin region.

2. A Climate Monitoring Program, including, but not limited to, the following sub-task:
    a. Collect, check, and upload climatic data on an annual basis

3. Preparation of the AMP Annual Report (Annual Report), including, but not limited to, the following sub-tasks:
    a. Water level monitoring, vegetation survey, photo monitoring, landsat data, climate data and analysis of the components.
    b. Analyze data and prepare an administrative draft of the Annual Report for Watermaster/IEUA.
    c. Incorporate the Watermaster and IEUA comments and prepare a draft Annual Report for review by the PBHSC.
    d. Meet with PBHSC to review draft Annual Report.
    e. Incorporate PBHSC comments and finalize the Annual Report.

4. Annual license fees for monitoring wells.

5. Project management and administration activities associated with the Program undertaken by a Party's consultant, including, but not limited to, the following sub-tasks:
    a. Ad-Hoc Meetings
    b. Preparation of scope and budget for the Program
    c. Project administration and financial reporting

6. Other costs required to fulfill the requirements of Peace II Subsequent EIR mitigation measure 4.4-3. Watermaster shall be responsible for the costs associated with the Groundwater Level Monitoring Program, Groundwater Quality Monitoring Program, and Surface Water Monitoring Program.

Watermaster and IEUA shall each have responsibility for its own administrative costs, excluding the tasks and expenses included under Set-Up Costs and Ongoing Costs. Watermaster and IEUA will meet to review the cost-sharing structure under this agreement and negotiate necessary adjustments in good faith on at least an annual basis.

The Peace II SEIR does not explicitly state a duration for the monitoring and mitigation program. It is logical to assume that the program will last until the drawdown impacts, if any, on the riparian habitat from Peace II activities are fully manifested and not predicated to worsen, and that mitigation measures, if any are

required, are fully implemented. This is not a perpetual agreement. Upon termination of the monitoring and any necessary mitigation obligations, the parties may elect to terminate the cost share agreement.

	West Yost Associates	50% Billing **"TO"** IEUA	50% Billing **"FROM"** IEUA	Costs For Watermaster
Jul. 2022 - Jul. 2022	$ 4,653.25	$ (2,326.63)	$ -	$ 2,326.63
Totals	**$ 4,653.25**	**$ (2,326.63)**	**$ -**	**$ 2,326.63**
		7302	7302	
Maximum Costs	**$ 183,374.00**	**$ 91,687.00**	**$ 91,687.00**	**$ 91,687.00**

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

OTHER INCOME AND EXPENSE

Per section VI.D.3 of the Groundwater Storage Program Funding Agreement No. 49960 in the Chino Basin with The Metropolitan Water District of Southern California, the FY 2022/23 annual administrative fee invoice was issued on July 1, 2022 in the amount of $181,865.78 under invoice number 2022-07-CUP. Payment in the amount of $181,865.78 was received and deposited on August 2, 2022.

There were no other significant items to report within the category of Other Income and Expenses for the month ending July 31, 2022.

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

POOL LEGAL SERVICES FUND ACCOUNTING

Each Pool has a Fund Account created to pay their own legal service invoices. The legal services invoices are funded and paid using the Fund accounts (8467 for the OAP, 8567 for the ONAP, and 8367 for the AP). These Fund Accounts are replenished at the direction of each Pool, and the legal service invoices are approved by the Pool leadership and when paid by Watermaster, are deducted from the existing Fund Account balances. If the Fund Account for any Pool reaches zero, no further payments can be paid from the Fund and a replenishment action must be initiated by the Pool. Along with the legal services Fund account for the OAP (8467), the OAP also has two other Fund accounts for Ag Pool Meeting Attendance expenses (8470), and Special Projects expenses (8471).

On August 15, 2022, the Appropriative Pool leadership instructed Watermaster to transfer the remaining amount due of $75,868.59 to the Agricultural Pool Special Fund. This transfer will be reported as part of the accounting reports during the month of August 2022. The total mount received to date by the Agricultural Pool from the Appropriative Pool is $267,442.88.

The following charts detail the Fund Accounts activity as of July 31, 2022:

Fund Balance for Agricultural Pool Account 8467 - Legal Services		
Beginning Balance July 1, 2020:	$	-
Additions:		
Ag Pool Legal invoices issued Nov. 19, 2020 for $500,000 with outstanding balance of $384,736.12	$	115,263.88
Admin Reserve used to cover shortfall *	$	102,557.12
Ag Pool Legal invoices issued Nov. 18, 2021 for $500,000 with outstanding balance of $410,135.61	$	89,864.39
Subtotal Additions:	$	307,685.39
From Agricultural Pool Reserve Funds	$	415,397.25
Total Additions:	$	723,082.64
Reductions:		
Invoices paid July 2020 - November 2020	$	(217,821.00)
Invoices paid December 2020 - June 2021	$	(220,365.00)
Invoices paid July 2021 - June 2022	$	(284,896.64)
Invoices paid July 2022 - July 2022	$	-
Subtotal Reductions:	$	(723,082.64)
Ending Fund Balance as of July 31, 2022	**$**	**-**

***** The Admin Reserve amount of $102,557.12 will need to be refunded back to Watermaster.

Agricultural Pool Reserve Funds As shown on the B-3 Financial Report		
Agricultural Pool Reserve Funds Balance as of June 30, 2020:	$	515,498.06
Additions:		
AP payments w/o Escrow instructions ($165,694.75 - $161,070.09)	$	4,624.66
Y-T-D Interest earned on Ag Pool Funds FY 2020/21, FY 2021/22	$	4,400.30
Payments rec'd on Wellhead Production invoices issued Sep. 2021	$	78,495.78
Payments rec'd on FY 2021/22 Ag Pool invoices issued Nov. 18, 2021 *	$	169,652.03
Transfer of AP Settlement Funds	$	191,574.29
Transfer of AP Settlement Funds (Balance due of $75,868.59)	$	-
Subtotal Additions:	$	448,747.06
Reductions:		
Actual vs. Budget Shortfall from FY 2019/20	$	(165,694.75)
Mediation invoice paid	$	(8,450.00)
Subtotal Reductions:	$	(174,144.75)
Invoices paid December 2020 - June 2021	$	(220,365.00)
Invoices paid July 2021 - June 2022	$	(284,896.64)
Invoices paid July 2022 - July 2022	$	-
Total Reductions	$	(679,406.39)
Agricultural Pool Reserve Funds Balance as of July 31, 2022:	**$**	**284,838.73**

Note: Balance of $284,838.73 as shown on the B-3 Financial Report

* FY 2021/22 Invoices for $635,000 issued Nov. 18, 2021 with outstanding balance due of $465,347.97 for Ag Pool Administration, Legal Services, and Special Projects.

Fund Balance For Agricultural Pool Account 8470 - Meeting Compensation		
Beginning Balance July 1, 2022:	$	18,950.98
Additions:		
Receipts from invoicing	$	-
Budget Transfers	$	-
Subtotal Additions:	$	-
Reductions:		
Compensation paid July 2022 - July 2022	$	(1,000.00)
Subtotal Reductions:	$	(1,000.00)
Ending Fund Balance as of July 31, 2022	**$**	**17,950.98**

Fund Balance For Agricultural Pool Account 8471 - Special Projects		
Beginning Balance July 1, 2022:	$	71,109.67
Additions:		
Receipts from invoicing	$	-
Subtotal Additions:	$	-
Reductions:		
Invoices paid July 2022 - July 2022	$	(9,116.00)
Budget Transfers	$	-
Subtotal Reductions:	$	(9,116.00)
Ending Fund Balance as of July 31, 2022	**$**	**61,993.67**

Fund Balance For Non-Agricultural Pool Account 8567 - Legal Services		
Beginning Balance July 1, 2022:	$	51,564.90
Additions:		
Pool Invoices issued	$	-
Subtotal Additions:	$	-
Reductions:		
Invoices paid July 2022 - July 2022	$	(935.00)
Subtotal Reductions:	$	(935.00)
Ending Fund Balance as of July 31, 2022	**$**	**50,629.90**

Fund Balance For Appropriative Pool Account 8367 - Legal Services		
Beginning Balance July 1, 2022:	$	3,803.11
Additions:		
Outstanding invoice payment received	$	422.29
Subtotal Additions:	$	422.29
Reductions:		
Invoices paid July 2022 - July 2022	$	-
Accrued (not paid)	$	-
Subtotal Reductions:	$	-
Ending Fund Balance as of July 31, 2022	**$**	**4,225.40**

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

"CARRY OVER" FUNDING
BACKGROUND OF "CARRY OVER" FUNDING

CURRENT MONTH – JULY 2022

As of July 31, 2022, the total (YTD) amount remaining of the "Carried Over" funding is $1,478,952.77 ($1,541,640.96 – $62,688.19 = $1,478,952.77).

The following details are provided:

"Carried Over" Expenses At June 30, 2022

Human Resources Services	$	6,000.00	A	6013	FY 2020/21	ADMIN
Human Resources Services	$	6,000.00	A	6013	FY 2021/22	ADMIN
Other Office Equipment - Boardroom Upgrades	$	18,486.41	B	6038	FY 2019/20	ADMIN
Other Office Equipment - Boardroom Upgrades	$	41,295.45	B	6038	FY 2020/21	ADMIN
Board Workshop Expenses - Misc.	$	14,000.00	C	6375.2	FY 2021/22	ADMIN
2020 OBMP Update - Tom Dodson & Associates	$	16,344.56	D	6908.1	FY 2020/21	OBMP
Meter Installation - New Meter Installation	$	175,400.00	E	7540	FY 2018/19	OBMP
Meter Installation - Calibration and Testing	$	181,650.00	E	7545	FY 2018/19	OBMP
Agriculture Production and Estimation	$	8,096.75	F	5925	FY 2020/21	ENG
Agriculture Production and Estimation	$	14,228.25	F	5925	FY 2021/22	ENG
Integrated Model - Meetings - 50% IEUA Costs	$	1,791.12	G	6906.15	FY 2020/21	ENG
Integrated Model - Meetings - 50% IEUA Costs	$	23,982.88	G	6906.15	FY 2021/22	ENG
Ground Water Level - Capital Equipment	$	1,085.00	H	7104.9	FY 2021/22	ENG
PBHSP - Monitoring, Data Analysis, Reporting	$	21,000.00	I	7302	FY 2021/22	ENG
Ground Level Monitoring - Capital Equipment	$	3,772.00	J	7408	FY 2020/21	ENG
Ground Level Monitoring - Capital Equipment	$	1,228.00	J	7408	FY 2021/22	ENG
PE2 - Comprehensive Recharge - Eng. Services	$	76,814.15	K	7202.2	FY 2020/21	ENG
PE2 - Comprehensive Recharge - Eng. Services	$	18,441.85	K	7202.2	FY 2021/22	ENG
SB88-Specs-Ensure Compliance-50% IEUA	$	54,012.38	L	7206.1	FY 2020/21	ENG
OBMP - 2023 RMPU	$	34,668.25	M	7210	FY 2020/21	ENG
OBMP - Engineering Services	$	26,758.00	N	7402	FY 2021/22	ENG
PE4 - Northwest MZ-1 Area Project	$	64,515.00	O	7402.1	FY 2021/22	ENG
Groundwater Quality Monitoring Program	$	1,694.00	P	7505	FY 2021/22	ENG
Hydraulic Control Mitigation Plan Update-50% IEUA	$	10,000.00	Q	7508	FY 2021/22	ENG
IEUA - Update Recycle Water Permit - Salinity	$	36,797.47	R	7510	FY 2020/21	ENG
IEUA - Update Recycle Water Permit - Salinity	$	36,221.00	R	7510	FY 2021/22	ENG
PE8&9 - Support Imp. 2020 Storage Mgmt. Plan	$	43,220.00	S	7610	FY 2020/21	ENG
Upper Santa Ana River HCP (TO #7)	$	15,062.88	T	7690.7	FY 2014/15	PROJ
Upper Santa Ana River HCP (TO #7)	$	5,000.00	T	7690.7	FY 2015/16	PROJ
Lower Day Basin RMPU (TO #2)	$	238,646.90	U	7690.8	FY 2016/17	PROJ
Funds on Hold for Projects/Refund	$	200,000.00	V	7690.9	FY 2017/18	PROJ
Appropriative Pool - Legal Services	$	3,803.11	W	8367	FY 2021/22	AP
Agricultural Pool - Mtg. Attendance Compensation	$	18,950.98	X	8470	FY 2021/22	OAP
Agricultural Pool - Special Project Funding	$	20,873.00	Y	8471	FY 2020/21	OAP
Agricultural Pool - Special Project Funding	$	50,236.67	Y	8471	FY 2021/22	OAP
Non-Agricultural Pool - Legal Services	$	1,564.90	Z	8567	FY 2020/21	ONAP
Non-Agricultural Pool - Legal Services	$	50,000.00	Z	8567	FY 2021/22	ONAP
Total Balance, July 1, 2022	**$**	**1,541,640.96**				

"Carried Over" Balance, July 1, 2021	$	1,541,640.96				
Less: (Invoices Received To Date FY 2022/23)						
Human Resources Services	$	-	A	6013	FY 2020/21	ADMIN
Human Resources Services	$	-	A	6013	FY 2021/22	ADMIN
Other Office Equipment - Boardroom Upgrades	$	(960.53)	B	6038	FY 2019/20	ADMIN
Other Office Equipment - Boardroom Upgrades	$	-	B	6038	FY 2020/21	ADMIN
Board Workshop Expenses - Misc.	$	(8,300.00)	C	6375.2	FY 2021/22	ADMIN
2020 OBMP Update - Tom Dodson & Associates	$	-	D	6908.1	FY 2020/21	OBMP
Meter Installation - New Meter Installation	$	-	E	7540	FY 2018/19	OBMP
Meter Installation - Calibration and Testing	$	-	E	7545	FY 2018/19	OBMP
Agriculture Production and Estimation	$	(5,978.00)	F	5925	FY 2020/21	ENG
Agriculture Production and Estimation	$	-	F	5925	FY 2021/22	ENG
Integrated Model - Meetings - 50% IEUA Costs	$	-	G	6906.15	FY 2020/21	ENG
Integrated Model - Meetings - 50% IEUA Costs	$	-	G	6906.15	FY 2021/22	ENG
Ground Water Level - Capital Equipment	$	(1,085.00)	H	7104.9	FY 2021/22	ENG
PBHSP - Monitoring, Data Analysis, Reporting	$	(2,326.63)	I	7302	FY 2021/22	ENG
Ground Level Monitoring - Capital Equipment	$	-	J	7408	FY 2020/21	ENG
Ground Level Monitoring - Capital Equipment	$	-	J	7408	FY 2021/22	ENG
PE2 - Comprehensive Recharge - Eng. Services	$	(7,633.75)	K	7202.2	FY 2020/21	ENG
PE2 - Comprehensive Recharge - Eng. Services	$	-	K	7202.2	FY 2021/22	ENG
SB88-Specs-Ensure Compliance-50% IEUA	$	-	L	7206.1	FY 2020/21	ENG
OBMP - 2023 RMPU	$	(4,725.25)	M	7210	FY 2020/21	ENG
OBMP - Engineering Services	$	(13,292.88)	N	7402	FY 2021/22	ENG
PE4 - Northwest MZ-1 Area Project	$	(5,493.75)	O	7402.1	FY 2021/22	ENG
Groundwater Quality Monitoring Program	$	(1,194.00)	P	7505	FY 2021/22	ENG
Hydraulic Control Mitigation Plan Update-50% IEUA	$	-	Q	7508	FY 2021/22	ENG
IEUA - Update Recycle Water Permit - Salinity	$	(647.40)	R	7510	FY 2020/21	ENG
IEUA - Update Recycle Water Permit - Salinity	$	-	R	7510	FY 2021/22	ENG
PE8&9 - Support Imp. 2020 Storage Mgmt. Plan	$	-	S	7610	FY 2020/21	ENG
Upper Santa Ana River HCP (TO #7)	$	-	T	7690.7	FY 2014/15	PROJ
Upper Santa Ana River HCP (TO #7)	$	-	T	7690.7	FY 2015/16	PROJ
Lower Day Basin RMPU (TO #2)	$	-	U	7690.8	FY 2016/17	PROJ
Funds on Hold for Projects/Refund	$	-	V	7690.9	FY 2017/18	PROJ
Appropriative Pool - Legal Services	$	-	W	8367	FY 2021/22	AP
Agricultural Pool - Mtg. Attendance Compensation	$	(1,000.00)	X	8470	FY 2021/22	OAP
Agricultural Pool - Special Project Funding	$	(9,116.00)	Y	8471	FY 2020/21	OAP
Agricultural Pool - Special Project Funding	$	-	Y	8471	FY 2021/22	OAP
Non-Agricultural Pool - Legal Services	$	(935.00)	Z	8567	FY 2020/21	ONAP
Non-Agricultural Pool - Legal Services	$	-	Z	8567	FY 2021/22	ONAP
Updated Balance as of July 31, 2022	**$**	**1,478,952.77**				

Updated Balance as of July 1, 2021						
Less: (Invoices Received To Date FY 2022/23)						
Human Resources Services	$	6,000.00	A	6013	FY 2020/21	ADMIN
Human Resources Services	$	6,000.00	A	6013	FY 2021/22	ADMIN
Other Office Equipment - Boardroom Upgrades	$	17,525.88	B	6038	FY 2019/20	ADMIN
Other Office Equipment - Boardroom Upgrades	$	41,295.45	B	6038	FY 2020/21	ADMIN
Board Workshop Expenses - Misc.	$	5,700.00	C	6375.2	FY 2021/22	ADMIN
2020 OBMP Update - Tom Dodson & Associates	$	16,344.56	D	6908.1	FY 2020/21	OBMP
Meter Installation - New Meter Installation	$	175,400.00	E	7540	FY 2018/19	OBMP
Meter Installation - Calibration and Testing	$	181,650.00	E	7545	FY 2018/19	OBMP
Agriculture Production and Estimation	$	2,118.75	F	5925	FY 2020/21	ENG
Agriculture Production and Estimation	$	14,228.25	F	5925	FY 2021/22	ENG
Integrated Model - Meetings - 50% IEUA Costs	$	1,791.12	G	6906.15	FY 2020/21	ENG
Integrated Model - Meetings - 50% IEUA Costs	$	23,982.88	G	6906.15	FY 2021/22	ENG
Ground Water Level - Capital Equipment	$	-	H	7104.9	FY 2021/22	ENG
PBHSP - Monitoring, Data Analysis, Reporting	$	18,673.37	I	7302	FY 2021/22	ENG
Ground Level Monitoring - Capital Equipment	$	3,772.00	J	7408	FY 2020/21	ENG
Ground Level Monitoring - Capital Equipment	$	1,228.00	J	7408	FY 2021/22	ENG
PE2 - Comprehensive Recharge - Eng. Services	$	69,180.40	K	7202.2	FY 2020/21	ENG
PE2 - Comprehensive Recharge - Eng. Services	$	18,441.85	K	7202.2	FY 2021/22	ENG
SB88-Specs-Ensure Compliance-50% IEUA	$	54,012.38	L	7206.1	FY 2020/21	ENG
OBMP - 2023 RMPU	$	29,943.00	M	7210	FY 2020/21	ENG
OBMP - Engineering Services	$	13,465.12	N	7402	FY 2021/22	ENG
PE4 - Northwest MZ-1 Area Project	$	59,021.25	O	7402.1	FY 2021/22	ENG
Groundwater Quality Monitoring Program	$	500.00	P	7505	FY 2021/22	ENG
Hydraulic Control Mitigation Plan Update-50% IEUA	$	10,000.00	Q	7508	FY 2021/22	ENG
IEUA - Update Recycle Water Permit - Salinity	$	36,150.07	R	7510	FY 2020/21	ENG
IEUA - Update Recycle Water Permit - Salinity	$	36,221.00	R	7510	FY 2021/22	ENG
PE8&9 - Support Imp. 2020 Storage Mgmt. Plan	$	43,220.00	S	7610	FY 2020/21	ENG
Upper Santa Ana River HCP (TO #7)	$	15,062.88	T	7690.7	FY 2014/15	PROJ
Upper Santa Ana River HCP (TO #7)	$	5,000.00	T	7690.7	FY 2015/16	PROJ
Lower Day Basin RMPU (TO #2)	$	238,646.90	U	7690.8	FY 2016/17	PROJ
Funds on Hold for Projects/Refund	$	200,000.00	V	7690.9	FY 2017/18	PROJ
Appropriative Pool - Legal Services	$	3,803.11	W	8367	FY 2021/22	AP
Agricultural Pool - Mtg. Attendance Compensation	$	17,950.98	X	8470	FY 2021/22	OAP
Agricultural Pool - Special Project Funding	$	11,757.00	Y	8471	FY 2020/21	OAP
Agricultural Pool - Special Project Funding	$	50,236.67	Y	8471	FY 2021/22	OAP
Non-Agricultural Pool - Legal Services	$	629.90	Z	8567	FY 2020/21	ONAP
Non-Agricultural Pool - Legal Services	$	50,000.00	Z	8567	FY 2021/22	ONAP
Updated Balance as of July 31, 2022	**$**	**1,478,952.77**				

ADMINISTRATION SERVICES:
Unspent funds related to ongoing projects and associated activities from the Administration Services budget from FY 2021/22 totaling $85,781.86 were “Carried Over” into the current FY 2022/23 budget. These funds were from the Human Resources Services [A] in the amount of $12,000 in account (6013); Other Office Equipment-Boardroom Upgrades [B] in the amount of $59,781.86 in account (6038); and Board Workshop

Expenses-Miscellaneous [C] in the amount of $14,000 in account (6375.2). The total funds available are $85,781.86.

OBMP ACTIVITIES:
The OBMP Update costs relate to the contract between Tom Dodson and Associates and CBWM to procure environmental review services for the 2020 OBMP Update. The original budget was $225,500 and was approved during FY 2019/20. At the end of June 30, 2022 a remaining balance in the fund of $16,344.56 was "Carried Over" into the current FY 2022/23 budget. The 2020 OBMP Update - Tom Dodson & Associates [D] in the amount of $16,344.56 in account (6908.1).

Unspent funds related to ongoing projects and associated activities from the Agricultural area metering installation efforts budget from FY 2018/19 in several accounts totaling $357,050 were "Carried Over" into the current FY 2022/23 budget. These funds were from the Meter Installation - New Meter Installation [E] in the amount of $175,400 in account (7540); and Meter Installation - Calibration and Testing [E] in the amount of $181,650 in account (7545). The total funds available are $373,394.56.

ENGINEERING SERVICES:
Unspent funds related to ongoing projects and associated activities from the Engineering Services budget from FY 2021/22 in several accounts totaling $478,326.10 were "Carried Over" into the current FY 2022/23 budget. These funds were from the Agriculture Production and Estimation [F] in the amount of $22,325 in account (5925); Integration Model-Meetings-50% IEUU Costs [G] in the amount of $25,774 in account (6906.15); Ground Water Level-Capital Equipment [H] in the amount of $1,085 in account (7104.9); PBHSP-Monitoring, Data Analysis, and Reporting [I] in the amount of $21,000 in account (7302); Ground Level Monitoring-Capital Equipment [J] in the amount of $5,000 in account (7408); PE2-Comprehensive Recharge-Engineering Services [K] in the amount of $95,256 in account (7202.2); SB88 Specs-Ensure Compliance [L] in the amount of $54,012.38 in account (7206.1); OBMP-2023 RMPU [M] in the amount of $34,668.25 in account (7210); OBMP-Engineering Services [N] in the amount of $26,758 in account (7402); PE4-Northwest MZ1 Area Project [O] in the amount of $64,515 in account (7402.1); Groundwater Quality Monitoring Program [P] in the amount of $1,694 in account (7505); Hydraulic Control Mitigation Plan Update-50% IEUA Costs [Q] in the amount of $10,000 in account (7508); IEUA-Update Recycle Water Permit-Salinity [R] in the amount of $73,018.47 in account (7510); and PE8&9-Support Implementation of the 2020 Storage Management Plan [S] in the amount of $43,220 in account (7610). The total funds available are $478,326.10.

ONGOING RECHARGE IMPROVEMENT PROJECTS:
The Upper Santa Ana River HCP-Task Order #7 [T] has a remaining funded balance of $20,062.88 in account (7690.7); and the Lower Day Basin RMPU-Task Order #2 [U] has a remaining funded budget balance of $238,646.90 in account (7690.8). The total funds available are $258,709.78.

FUNDS ON HOLD FOR PROJECTS/REFUND:
The "Funds on Hold for Projects/Refund" [V] has a remaining budget from FY 2017/18 of $200,000 in account (7690.9). By unanimous action of the Watermaster Board on June 24, 2021 the amount of $1,234,582.42 was refunded to the Appropriative Pool with the November 2021 Assessment Package. The remaining amount of $200,000 will be kept on hold until the warranty period for the San Sevaine Project has expired, and no warranty issues are noted.

POOL RELATED FUNDING;
The remaining funding items are strictly Pool related and are added to the FY 2022/23 budget to ensure proper funding is recorded and tracked. The Appropriative Pool Legal Services [W] in the amount of $3,803.11 in account (8367); the Agricultural Pool Meeting Attendance Compensation [X] in the amount of $18,950.98 in account (8470); the Agricultural Pool Special Project Funding [Y] in the amount of $71,109.67 in account (8471); and the Non-Agricultural Pool Legal Services [Z] in the amount of $51,564.90 in account (8567). The total funds available are $145,428.66.

As invoices are received from the vendors and booked against these items listed above, the "Carried Over" balance will be reduced throughout the current fiscal year. At June 30, 2023, any remaining balances of the FY 2021/22 and prior years funding (if any), along with any new FY 2022/23 expenses, will then be "Carried Over" into the FY 2023/24 budget.

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

AUDIT FIELD WORK

CURRENT MONTH – JULY 2022

The auditors from the audit firm of Fedak & Brown LLP started the interim field work for FY 2021/22 on June 13, 2022 through June 17, 2022. The plan was for the auditors not to be onsite at the Watermaster office for the interim field audit. Instead, all of the audit schedules, accounts payable selections, accounts receivable selections, bank reconciliations, payroll and timesheet selections, and any other reports and information were provided to the auditors electronically via Dropbox software. This has been the same processed used for the past several years and has worked well for both Watermaster and the auditors. This was the start of the interim field work for the period of July 1, 2021 through April 30, 2022. The final field work for the period of May 1, 2022 through July 31, 2022 has been tentatively scheduled for the week of September 19, 2022 through September 23, 2022.

The Annual Financial and Audit Reports are tentatively scheduled for presentation to the Watermaster Board by Fedak & Brown LLP at the October 27, 2022 Board meeting. The Annual Financial and Audit Reports for FY 2021/22 are tentatively scheduled for posting to the Watermaster website no later than October 31, 2022.

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

FY 2022/23 EXHIBIT "G" NON-AGRICULTURAL POOL SALE OF WATER

CURRENT MONTH – JULY 2022

No Exhibit "G" activity to report for the month.

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

ASSESSMENTS AND OTHER INVOICING

CURRENT MONTH – JULY 2022

FY 2022/23 Assessment Package

There was no Assessment activity to report for the month.

PREVIOUSLY REPORTED ACTIONS (Descending Order)
None

ATTACHMENTS

1. Financial Report – B5

CHINO BASIN WATERMASTER
Budget vs. Actual
Current Month, Year-To-Date and Fiscal Year-End

	1/12th (8.33%) of the Total Budget				1/12th (8.33%) of the Total Budget				100% of the Total Budget			
	For The Month of July 2022				Year-To-Date as of July 31, 2022				Fiscal Year End as of June 30, 2023			
	Actual	Budget	$ Over(Under)	% of Budget	Actual	Budget	$ Over(Under)	% of Budget	Projected	Budget	$ Over(Under)	% of Budget
Income												
4010 · Local Agency Subsidies	181,865.78	181,866.00	-0.22	100.0%	181,865.78	181,866.00	-0.22	100.0%	181,865.78	181,866.00	-0.22	100.0%
4110 · Admin Asmnts-Approp Pool	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	9,029,425.00	9,029,425.00	0.00	100.0%
4120 · Admin Asmnts-Non-Agri Pool	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	285,135.00	285,135.00	0.00	100.0%
4130 · Admin Asmnts-Agricultural Pool	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
4700 · Non Operating Revenues	0.93	0.00	0.93	100.0%	0.93	0.00	0.93	100.0%	35,550.00	35,550.00	0.00	100.0%
4900 · Miscellaneous Income	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
Total Income	181,866.71	181,866.00	0.71	100.0%	181,866.71	181,866.00	0.71	100.0%	9,531,975.78	9,531,976.00	-0.22	100.0%
Gross Profit	181,866.71	181,866.00	0.71	100.0%	181,866.71	181,866.00	0.71	100.0%	9,531,975.78	9,531,976.00	-0.22	100.0%
Expense												
5900 · Judgment Administration	33,239.20	122,359.00	-89,119.80	27.17%	33,239.20	122,359.00	-89,119.80	27.17%	398,870.40	1,195,126.00	-796,255.60	33.38%
6010 · Admin. Salary/Benefit Costs	98,176.90	65,807.00	32,369.90	149.19%	98,176.90	65,807.00	32,369.90	149.19%	1,178,122.80	656,096.00	522,026.80	179.57%
6020 · Office Building Expense	10,069.15	11,600.00	-1,530.85	86.8%	10,069.15	11,600.00	-1,530.85	86.8%	138,329.80	141,031.00	-2,701.20	98.09%
6030 · Office Supplies & Equip.	4,929.08	63,106.86	-58,177.78	7.81%	4,929.08	63,106.86	-58,177.78	7.81%	89,148.96	96,181.86	-7,032.90	92.69%
6040 · Postage & Printing Costs	1,991.78	3,540.00	-1,548.22	56.27%	1,991.78	3,540.00	-1,548.22	56.27%	33,901.36	38,255.00	-4,353.64	88.62%
6050 · Information Services	20,081.22	20,392.00	-310.78	98.48%	20,081.22	20,392.00	-310.78	98.48%	172,974.64	177,624.00	-4,649.36	97.38%
6060 · Contract Services	1,532.01	2,600.00	-1,067.99	58.92%	1,532.01	2,600.00	-1,067.99	58.92%	53,384.12	57,960.00	-4,575.88	92.11%
6070 · Watermaster Legal Services	44,677.86	39,714.00	4,963.86	112.5%	44,677.86	39,714.00	4,963.86	112.5%	536,134.32	450,146.00	85,988.32	119.1%
6080 · Insurance	34,092.84	34,818.00	-725.16	97.92%	34,092.84	34,818.00	-725.16	97.92%	46,592.84	48,743.00	-2,150.16	95.59%
6110 · Dues and Subscriptions	16,562.87	16,800.00	-237.13	98.59%	16,562.87	16,800.00	-237.13	98.59%	40,625.74	41,475.00	-849.26	97.95%
6140 · WM Admin Expenses	170.97	488.00	-317.03	35.04%	170.97	488.00	-317.03	35.04%	5,901.64	6,550.00	-648.36	90.1%
6150 · Field Supplies	923.36	1,000.00	-76.64	92.34%	923.36	1,000.00	-76.64	92.34%	2,770.08	3,200.00	-429.92	86.57%
6170 · Travel & Transportation	2,164.58	2,235.00	-70.42	96.85%	2,164.58	2,235.00	-70.42	96.85%	25,974.96	28,970.00	-2,995.04	89.66%
6190 · Training, Conferences, Seminars	5,375.00	5,642.00	-267.00	95.27%	5,375.00	5,642.00	-267.00	95.27%	41,500.00	42,678.00	-1,178.00	97.24%
6200 · Advisory Committee Expenses	0.00	10,893.00	-10,893.00	0.0%	0.00	10,893.00	-10,893.00	0.0%	114,480.83	127,177.00	-12,696.17	90.02%
6300 · Watermaster Board Expenses	23,982.85	48,362.00	-24,379.15	49.59%	23,982.85	48,362.00	-24,379.15	49.59%	280,311.35	295,328.00	-15,016.65	94.92%
8300 · Approp Pool-WM & Pool Admin	103.51	16,350.11	-16,246.60	0.63%	103.51	16,350.11	-16,246.60	0.63%	146,242.12	150,101.11	-3,858.99	97.43%
8400 · Ag Pool-WM & Pool Admin	0.00	12,442.00	-12,442.00	0.0%	0.00	12,442.00	-12,442.00	0.0%	144,304.00	145,038.00	-734.00	99.49%
8467 · Ag Legal & Technical Services	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	300,000.00	0.00	300,000.00	100.0%
8470 · Ag Meeting Attend -Special	1,000.00	18,950.98	-17,950.98	5.28%	1,000.00	18,950.98	-17,950.98	5.28%	18,500.00	18,950.98	-450.98	97.62%
8471 · Ag Pool Expense	9,116.00	71,109.67	-61,993.67	12.82%	9,116.00	71,109.67	-61,993.67	12.82%	9,116.00	71,109.67	-61,993.67	12.82%
8485 · Ag Pool - Misc. Exp. - Ag Fund	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	400.00	400.00	0.00	100.0%
8500 · Non-Ag Pool-WM & Pool Admin	1,310.00	104,150.90	-102,840.90	1.26%	1,310.00	104,150.90	-102,840.90	1.26%	215,720.00	227,494.90	-11,774.90	94.82%
9400 · Depreciation Expense	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9500 · Allocated G&A Expenditures	-19,231.28	-32,582.00	13,350.72	59.02%	-19,231.28	-32,582.00	13,350.72	59.02%	-325,775.36	-390,992.00	65,216.64	83.32%
6900 · Optimum Basin Mgmt Plan	75,166.03	200,438.56	-125,272.53	37.5%	75,166.03	200,438.56	-125,272.53	37.5%	1,501,992.36	1,526,057.56	-24,065.20	98.42%
7104 · Gdwtr Level Monitoring	30,979.61	31,035.00	-55.39	99.82%	30,979.61	31,035.00	-55.39	99.82%	269,255.32	272,197.00	-2,941.68	98.92%
7200 · PE2- Comp Recharge Pgm	17,005.01	490,109.63	-473,104.62	3.47%	17,005.01	490,109.63	-473,104.62	3.47%	1,629,060.12	1,653,951.63	-24,891.51	98.5%
7300 · PE3&5-Water Supply/Desalte	2,326.62	34,180.00	-31,853.38	6.81%	2,326.62	34,180.00	-31,853.38	6.81%	172,919.44	178,553.00	-5,633.56	96.85%
7400 · PE4- Mgmt Plan	18,866.63	156,646.00	-137,779.37	12.04%	18,866.63	156,646.00	-137,779.37	12.04%	626,399.56	632,897.00	-6,497.44	98.97%
7500 · PE6&7-CoopEfforts/SaltMgmt	40,641.36	483,708.47	-443,067.11	8.4%	40,641.36	483,708.47	-443,067.11	8.4%	937,696.32	944,443.47	-6,747.15	99.29%
7600 · PE8&9-StorageMgmt/Conj Use	16,836.58	85,225.00	-68,388.42	19.76%	16,836.58	85,225.00	-68,388.42	19.76%	537,038.96	546,870.00	-9,831.04	98.2%
7690 · Recharge Improvements	0.00	970,845.78	-970,845.78	0.0%	0.00	970,845.78	-970,845.78	0.0%	1,295,000.00	1,299,011.78	-4,011.78	99.69%
9501 · Admin Expenses Allocated-OBMP	9,421.66	20,050.00	-10,628.34	46.99%	9,421.66	20,050.00	-10,628.34	46.99%	198,059.92	240,607.00	-42,547.08	82.32%

CHINO BASIN WATERMASTER
Budget vs. Actual
Current Month, Year-To-Date and Fiscal Year-End

	1/12th (8.33%) of the Total Budget				1/12th (8.33%) of the Total Budget				100% of the Total Budget			
	For The Month of July 2022				Year-To-Date as of July 31, 2022				Fiscal Year End as of June 30, 2023			
	Actual	Budget	$ Over(Under)	% of Budget	Actual	Budget	$ Over(Under)	% of Budget	Projected	Budget	$ Over(Under)	% of Budget
9502 · Admin Expenses Allocated-PE 1-9	9,809.62	12,532.00	-2,722.38	78.28%	9,809.62	12,532.00	-2,722.38	78.28%	127,715.44	150,385.00	-22,669.56	84.93%
Total Expense	511,321.02	3,124,548.96	-2,613,227.94	16.37%	511,321.02	3,124,548.96	-2,613,227.94	16.37%	10,962,668.04	11,073,616.96	-110,948.92	99.0%
Net Ordinary Income	-329,454.31	-2,942,682.96	2,613,228.65	11.2%	-329,454.31	-2,942,682.96	2,613,228.65	11.2%	-1,430,692.26	-1,541,640.96	110,948.70	92.8%
Other Income												
4210 · Approp Pool-Replenishment	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
4220 · Non-Ag Pool-Replenishment	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
4225 · Interest Income	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
4226 · LAIF Fair Market Value	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
4227 · AP Escrow Interest	0.82	0.00	0.82	100.0%	0.82	0.00	0.82	100.0%	15.00	0.00	15.00	100.0%
4600 · Groundwater Sales	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
4715 · Gain on Sale of Assets	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
Total Other Income	0.82	0.00	0.82	100.0%	0.82	0.00	0.82	100.0%	15.00	0.00	15.00	100.0%
Other Expense												
5010 · Groundwater Replenishment	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
5100 · Other Water Purchases	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9000 · Other Expenses	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9200 · Interest Expense	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9251 · Other Post Employment Benefits	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9996 · Refund-Excess Reserves-Approp.	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9996.5 · Refund-Basin O&M-Approp.	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9997 · Refund-Excess Reserves-NonAg	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9997.5 · Refund-Basin O&M-NonAg	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9998 · Refund-Recharge Debt-Approp.	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
9999 · To/(From) Reserves	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
Total Other Expense	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%	0.00	0.00	0.00	0.0%
Net Other Income	0.82	0.00	0.82	100.0%	0.82	0.00	0.82	100.0%	15.00	0.00	15.00	100.0%
Net Income	**-329,453.49**	**-2,942,682.96**	**2,613,229.47**	**11.2%**	**-329,453.49**	**-2,942,682.96**	**2,613,229.47**	**11.2%**	**-1,430,677.26**	**-1,541,640.96**	**110,963.70**	**92.8%**

Note: Please see the staff report (Financial Report-B5) for additional detailed information on the account categories.

Type	Date	Num	Name	Memo	Account	Paid Amount
Bill Pmt -Check	**08/01/2022**	**23623**	**BROWNSTEIN HYATT FARBER SCHRECK**		**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	897715		897715	6078 · BHFS Legal - Miscellaneous	17,958.15
				Misc. download from SB County court	6078 · BHFS Legal - Miscellaneous	13.50
				Research - Lexis Nexis	6078 · BHFS Legal - Miscellaneous	0.41
Bill	06/30/2022	897716		GM Evaluation & Contract	6073 · BHFS Legal - Personnel Matters	5,681.25
				Employee Handbook Review	6073 · BHFS Legal - Personnel Matters	2,830.50
Bill	06/30/2022	897717		897717	6275 · BHFS Legal - Advisory Committee	346.50
Bill	06/30/2022	897718		897718	6375 · BHFS Legal - Board Meeting	8,849.25
				Mileage/Parking Expense-Herrema	6375 · BHFS Legal - Board Meeting	71.75
Bill	06/30/2022	897719		897719	8375 · BHFS Legal - Appropriative Pool	544.50
Bill	06/30/2022	897720		897720	8475 · BHFS Legal - Agricultural Pool	544.50
Bill	06/30/2022	897721		897721	8575 · BHFS Legal - Non-Ag Pool	544.50
Bill	06/30/2022	897722		897722	6071 · BHFS Legal - Court Coordination	25,499.25
				04/22/22 - Mileage/Parking Expense-Slater	6071 · BHFS Legal - Court Coordination	14.81
				06/02/22 - Research-Westlaw	6071 · BHFS Legal - Court Coordination	262.96
				06/02/22 - Research-Lexis	6071 · BHFS Legal - Court Coordination	129.76
				06/02/20 - Research-Lexis	6071 · BHFS Legal - Court Coordination	131.07
				04/22/22 - Lodging-Slater	6071 · BHFS Legal - Court Coordination	185.19
Bill	06/30/2022	897723		897723	6907.41 · Prado Basin Habitat Sustain	198.00
Bill	06/30/2022	897724		897724	6907.45 · OBMP Update	1,569.60
Bill	06/30/2022	897725		897725	6907.47 · 2020 Safe Yield Reset	2,479.50
Bill	06/30/2022	897726		897726	6078.25 · Ely 3 Basin Investigation	15,314.40
				CourtCall - Sandler	6078.25 · Ely 3 Basin Investigation	94.00
TOTAL						83,263.35
Bill Pmt -Check	**08/01/2022**	**23624**	**WEST YOST**		**1012 · Bank of America Gen'l Ckg**	
Bill	06/30/2022	2049986		2049986	6906.31 · OBMP-Pool, Adv. Board Mtgs	4,620.40
Bill	06/30/2022	2049987		2049987	6906.32 · OBMP-Other General Meetings	12,666.75
Bill	06/30/2022	2049988		2049988	6906.71 · OBMP-Data Req.-CBWM Staff	1,464.00
Bill	06/30/2022	2049989		2049989	6906.72 · OBMP-Data Req.-Non CBWM Staff	1,870.50
Bill	06/30/2022	2049990		2049990	6906 · OBMP Engineering Services	3,870.50
Bill	06/30/2022	2049991		2049991	6906.15 · Integrated Model Mtgs-IEUA Cost	134.50
Bill	06/30/2022	2049992		2049992	7103.3 · Grdwtr Qual-Engineering	26,944.25
Bill	06/30/2022	2049993		2049993	7104.3 · Grdwtr Level-Engineering	33,924.55
Bill	06/30/2022	2049994		2049994	7107.2 · Grd Level-Engineering	1,092.64
Bill	06/30/2022	2049995		2049995	7107.2 · Grd Level-Engineering	1,934.75
Bill	06/30/2022	2049996		2049996	7107.2 · Grd Level-Engineering	1,479.50
				General Atomics	7107.3 · Grd Level-SAR Imagery	79,438.00
Bill	06/30/2022	2049997		2049997	7107.2 · Grd Level-Engineering	269.00
				Guida Surveying Inc.	7107.6 · Grd Level-Contract Svcs	62,560.31

Type	Date	Num	Name	Memo	Account	Paid Amount
Bill	06/30/2022	2049998		2049998	7108.31 · Hydraulic Control - PBHSP	2,251.50
Bill	06/30/2022	2049999		2049999	7110.3 · Ag Prod. & Estimation-Eng. Serv	4,338.75
Bill	06/30/2022	2050000		2050000	7202.2 · Engineering Svc	2,942.50
Bill	06/30/2022	2050001		2050001	7402 · PE4-Engineering	1,785.00
Bill	06/30/2022	2050002		2050002	7402.10 · PE4 - Northwest MZ1 Area Proj.	6,203.00
Bill	06/30/2022	2050003		2050003	7402 · PE4-Engineering	5,411.00
Bill	06/30/2022	2050004		2050004	7510 · PE6&7-IEUA Salinity Mgmt. Plan	348.00
Bill	06/30/2022	2050005		2050005	7511 · PE6&7-SAWBMPTask Force-50% IEU	1,241.25
Bill	06/30/2022	2050006		2050006	7614 · PE8&9-Develop S&R Master Plan	7,640.08
Bill	06/30/2022	2050007		2050007	6906.14 · Modeling for WSIP-100% IEUA	8,425.25
Bill	06/30/2022	2050008		2050008	7508 · HC Mitigation Plan-50% IEUA	7,053.25
TOTAL						279,909.23
Bill Pmt -Check	**08/02/2022**	**23625**	**ACCENT COMPUTER SOLUTIONS, INC.**	**152758**	**1012 · Bank of America Gen'l Ckg**	
Bill	08/01/2022	152758		Monthly services - August 2022	6052.4 · IT Managed Services	5,005.95
				Overwatch - August 2022	6052.5 · IT Data Backup/Storage	699.00
				Omni Cloud - August 2022	6052.5 · IT Data Backup/Storage	188.00
				Office 365 Subscriptions - Business Premier-Aug 2	6052.4 · IT Managed Services	258.25
				Image Office Storage (per GB, per month)-Aug 202	6052.5 · IT Data Backup/Storage	618.66
TOTAL						6,769.86
Bill Pmt -Check	**08/02/2022**	**23626**	**ACWA JOINT POWERS INSURANCE AUTHORI**	**0690753**	**1012 · Bank of America Gen'l Ckg**	
Bill	08/01/2022	0690753		Prepayment - September 2022	1409 · Prepaid Life, BAD&D & LTD	338.48
				August 2022	60191 · Life & Disab.Ins Benefits	338.48
TOTAL						676.96
Bill Pmt -Check	**08/02/2022**	**23627**	**APPLIED COMPUTER TECHNOLOGIES**	**35488**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/31/2022	35488		Database Consulting - July 2022	6052.2 · Applied Computer Technol	4,050.00
TOTAL						4,050.00
Bill Pmt -Check	**08/02/2022**	**23628**	**BOWCOCK, ROBERT**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/20/2022	7/20 SY Workshop		7/20/22 Safe Yield Workshop	6311 · Board Member Compensation	125.00
Bill	07/27/2022	7/27 Board Workshop		7/22/22 Board Workshop - Roberts Rules	6311 · Board Member Compensation	125.00
Bill	07/28/2022	7/28 Special Board		7/28/22 Special Board Workshop	6311 · Board Member Compensation	125.00
TOTAL						375.00
Bill Pmt -Check	**08/02/2022**	**23629**	**CURATALO, JAMES**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
Bill	07/01/2022	7/01 Legal Mtg		7/01/22 meeting w/legal counsel re: WM issues	6311 · Board Member Compensation	125.00
Bill	07/06/2022	7/06 Admin Mtg		7/06/22 Administrative Meeting	6311 · Board Member Compensation	125.00
Bill	07/26/2022	7/26 Call w/PK		7/26/22 call w/P. Kavounas	6311 · Board Member Compensation	125.00

	Type	Date	Num	Name	Memo	Account	Paid Amount
	Bill	07/27/2022	7/27 Board Workshop		7/27/22 Board Workshop - Roberts Rules	6311 · Board Member Compensation	125.00
	Bill	07/28/2022	7/28 Board Workshop		7/28/22 Board Workshop	6311 · Board Member Compensation	125.00
TOTAL							625.00
	Bill Pmt -Check	**08/02/2022**	**23630**	**ELIE, STEVEN**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/28/2022	7/28 Board Workshop		7/28/22 Board Workshop	6311 · Board Member Compensation	125.00
TOTAL							125.00
	Bill Pmt -Check	**08/02/2022**	**23631**	**FILIPPI, GINO**	**Ag Pool Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/27/2022	7/27 Workshop		7/27/22 Workshop re Roberts Rules	8470 · Ag Meeting Attend -Special	125.00
TOTAL							125.00
	Bill Pmt -Check	**08/02/2022**	**23632**	**FOLSOM, BETTY**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/27/2022	7/27 Board Workshop		7/27/22 Workshop re Roberts Rules	6311 · Board Member Compensation	125.00
	Bill	07/28/2022	7/28 Board Workshop		7/28/22 Board Workshop	6311 · Board Member Compensation	125.00
TOTAL							250.00
	Bill Pmt -Check	**08/02/2022**	**23633**	**GEYE, BRIAN**	**Non-Ag Pool Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/20/2022	7/20 SY Workshop		7/20/22 Safe Yield Workshop	8511 · Non-Ag Pool Member Compensation	125.00
	Bill	07/27/2022	7/27 Board Workshop		7/27/22 Board Workshop - Roberts Rules	8511 · Non-Ag Pool Member Compensation	125.00
	Bill	07/28/2022	7/28 Board Workshop		7/28/22 Board Workshop	8511 · Non-Ag Pool Member Compensation	125.00
TOTAL							375.00
	Bill Pmt -Check	**08/02/2022**	**23634**	**JOHN J. SCHATZ**	**Appropriative Pool Legal Services**	**1012 · Bank of America Gen'l Ckg**	
	Bill	06/30/2022			February 2022	8367 · Legal Service	15,729.06
	Bill	06/30/2022			March 2022	8367 · Legal Service	23,642.50
	Bill	06/30/2022			April 2022	8367 · Legal Service	29,622.50
	Bill	06/30/2022			May 2022	8367 · Legal Service	14,128.50
	Bill	06/30/2022			June 2022	8367 · Legal Service	15,576.50
TOTAL							98,699.06
	Bill Pmt -Check	**08/02/2022**	**23635**	**PR MILLWORKS**	**Estimate #20**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/29/2022	20		50% down on extension of board room desk	1840 · Capital Assets	2,100.00
TOTAL							2,100.00
	Bill Pmt -Check	**08/02/2022**	**23636**	**PREMIERE GLOBAL SERVICES**	**30969223**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	30969223		Fee - General	6022 · Telephone	39.00
					Fee - Confidential	6022 · Telephone	39.00
					Service fee	6022 · Telephone	8.50
					Call shortfall	6022 · Telephone	78.00

	Type	Date	Num	Name	Memo	Account	Paid Amount
TOTAL							164.50
	Bill Pmt -Check	**08/02/2022**	**23637**	**VANGUARD CLEANING SYSTEMS**	**113462**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/01/2022	113462		Monthly service - August 2022	6024 · Building Repair & Maintenance	915.00
TOTAL							915.00
	Bill Pmt -Check	**08/02/2022**	**23638**	**SPECTRUM BUSINESS**	**2031978072322**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/28/2022	2031978072322		7/23/22-8/22/22	6053 · Internet Expense	1,105.31
TOTAL							1,105.31
	Bill Pmt -Check	**08/02/2022**	**23639**	**STANDARD INSURANCE CO.**	**Policy # 00-649299-0009**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	006492990009		Policy # 00-649299-0009	60191 · Life & Disab.Ins Benefits	1,057.98
TOTAL							1,057.98
	Bill Pmt -Check	**08/02/2022**	**23640**	**STATE COMPENSATION INSURANCE FUND**	**1000907865**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/26/2022	1000907865		Premium charge 7/26/22-8/26/22	60183 · Worker's Comp Insurance	1,011.91
TOTAL							1,011.91
	Bill Pmt -Check	**08/02/2022**	**23641**	**UNION 76**	**7076-2245-3035-5049**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	7076224530355049		July 2022	6175 · Vehicle Fuel	375.56
TOTAL							375.56
	Bill Pmt -Check	**08/02/2022**	**23642**	**VISION SERVICE PLAN**	**815659500**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/26/2022	815659500		Vision Insurance Premium - August 2022	60182.2 · Dental & Vision Ins	126.36
TOTAL							126.36
	Bill Pmt -Check	**08/02/2022**	**23643**	**WESTERN MUNICIPAL WATER DISTRICT**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/27/2022	7/27 Board Workshop		7/27/22 Board Workshop re Roberts Rules-Gardne	6311 · Board Member Compensation	125.00
	Bill	07/28/2022	7/28 Board Workshop		7/28/22 Board Workshop-Gardner	6311 · Board Member Compensation	125.00
TOTAL							250.00
	Bill Pmt -Check	**08/02/2022**	**23644**	**ACCENT COMPUTER SOLUTIONS, INC.**	**152869**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	152869		Xirrius renewal for 2022/2023	6054 · Computer Software	1,040.00
TOTAL							1,040.00
	Bill Pmt -Check	**08/02/2022**	**23645**	**BUSINESS TELECOMMUNICATION SYSTEMS I**	**19056**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/22/2022	19056		Replacement phones for office	6055 · Computer Hardware	2,684.88
TOTAL							2,684.88
	Bill Pmt -Check	**08/02/2022**	**23646**	**EMPOWER LAB**	**Culture Workshop**	**1012 · Bank of America Gen'l Ckg**	

	Type	Date	Num	Name	Memo	Account	Paid Amount
	Bill	06/08/2022	2371		6/08/22 Culture Workshop w/Don Pierro	6193 · Employee Training	1,500.00
	Bill	07/29/2022	2387		July 2022	6193 · Employee Training	1,125.00
TOTAL							2,625.00
	Bill Pmt -Check	**08/02/2022**	**23647**	**VERIZON WIRELESS**	**9911024192**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/28/2022	9911024192		Acct #642073270-00002	7525 · PE6&7 - Computer Services	58.03
TOTAL							58.03
	Bill Pmt -Check	**08/03/2022**	**ACH 080322**	**CALPERS**	**1394905143**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/01/2022	1394905143		Medical Insurance Premiums - August 2022	60182.1 · Medical Insurance	13,588.04
TOTAL							13,588.04
	General Journal	**08/02/2022**	**08/02/2022**	**HEALTH EQUITY**	**Health Equity Invoice 4052634**	**1012 · Bank of America Gen'l Ckg**	
				HEALTH EQUITY	Health Equity Invoice 4052634	1012 · Bank of America Gen'l Ckg	52.71
TOTAL							52.71
	Bill Pmt -Check	**08/05/2022**	**23648**	**CALIFORNIA BANK & TRUST**	**Account 6198**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	Account 6198		Miscellaneous office supplies	6031.7 · Other Office Supplies	48.29
					Custom signs for office	6031.7 · Other Office Supplies	44.40
					Speaker for meeting room	6055 · Computer Hardware	58.32
					Reciever for meeting room	6055 · Computer Hardware	255.67
					Miscellaneous office supplies	6031.7 · Other Office Supplies	73.84
					Miscellaneous office supplies	6031.7 · Other Office Supplies	214.54
					Miscellaneous office supplies	6031.7 · Other Office Supplies	13.86
					Miscellaneous office supplies	6031.7 · Other Office Supplies	12.34
					Miscellaneous office supplies	6031.7 · Other Office Supplies	5.13
					Netgear ethernet	6055 · Computer Hardware	57.96
					Miscellaneous office supplies	6031.7 · Other Office Supplies	33.28
					Website security software	6054 · Computer Software	538.01
					Miscellaneous office supplies	6031.7 · Other Office Supplies	85.42
					Miscellaneous office supplies	6031.7 · Other Office Supplies	276.43
					Miscellaneous office supplies	6031.7 · Other Office Supplies	91.30
					Ice maker for office	6038 · Other Office Equipment	414.76
					Miscellaneous office supplies	6031.7 · Other Office Supplies	449.87
					Keyboard for ipad for Executive Assistant	6055 · Computer Hardware	321.20
					Cables for office	6055 · Computer Hardware	18.24
					Cables for office	6055 · Computer Hardware	18.25
					Miscellaneous office supplies	6031.7 · Other Office Supplies	15.86
					Miscellaneous office supplies	6031.7 · Other Office Supplies	127.71
					Miscellaneous office supplies	6031.7 · Other Office Supplies	32.12

	Type	Date	Num	Name	Memo	Account	Paid Amount
					Miscellaneous office supplies	6031.7 · Other Office Supplies	80.00
					Miscellaneous office supplies	6031.7 · Other Office Supplies	42.97
					Supplies for workshop - Roberts Rules of Order	6312 · Meeting Expenses	95.05
					PK mtg w/R. Craig	8312 · Meeting Expenses	32.15
					PK mtg w/K. Parker	6312 · Meeting Expenses	52.06
TOTAL							3,509.03
	Bill Pmt -Check	**08/05/2022**	**23649**	**FEDEX**	**962656480**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/18/2022	962656480		shipping-wall mounts for San Sevaine equipment	1840 · Capital Assets	162.07
TOTAL							162.07
	Bill Pmt -Check	**08/05/2022**	**23650**	**LAW OFFICE OF ALLEN W. HUBSCH**	**38**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	38		Non-Ag Pool Legal Services - July 2022	8567 · Non-Ag Legal Service	935.00
TOTAL							935.00
	Bill Pmt -Check	**08/05/2022**	**23651**	**TOTAL COMPENSATION SYSTEMS, INC.**	**10796**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	10796		GASB 75 Full Valuation - 2nd installment	6062.5 · Audit Support Services	1,350.00
TOTAL							1,350.00
	General Journal	**08/09/2022**	**08/09/2022**	**HEALTH EQUITY**	**Health Equity Invoice 4074162**	**1012 · Bank of America Gen'l Ckg**	
				HEALTH EQUITY	Health Equity Invoice 4074162	1012 · Bank of America Gen'l Ckg	69.20
TOTAL							69.20
	General Journal	**08/11/2022**	**08/11/2022**	**Payroll and Taxes for 07/24/22-08/06/22**	**Payroll and Taxes for 07/24/22-08/06/22**	**1012 · Bank of America Gen'l Ckg**	
				ADP, LLC	Direct Deposits for 07/24/22-08/06/22	1012 · Bank of America Gen'l Ckg	37,530.26
				ADP, LLC	Payroll Taxes for 07/24/22-08/06/22	1012 · Bank of America Gen'l Ckg	14,031.26
				MISSIONSQUARE RETIREMENT	457(b) EE Deductions for 07/24/22-08/06/22	1012 · Bank of America Gen'l Ckg	6,513.92
				MISSIONSQUARE RETIREMENT	401(a) EE Deductions for 07/24/22-08/06/22	1012 · Bank of America Gen'l Ckg	2,026.75
TOTAL							60,102.19
	General Journal	**08/12/2022**	**08/12/2022**	**ADP, LLC**	**ADP Tax Service**	**1012 · Bank of America Gen'l Ckg**	
				ADP, LLC	ADP Tax Service for 07/09/22-612006625	1012 · Bank of America Gen'l Ckg	177.34
				ADP, LLC	ADP Tax Service for 07/23/22-612006625	1012 · Bank of America Gen'l Ckg	170.93
TOTAL							348.27
	Bill Pmt -Check	**08/11/2022**	**ACH 081122**	**PUBLIC EMPLOYEES' RETIREMENT SYSTEM**	**Payor #3493**	**1012 · Bank of America Gen'l Ckg**	
	General Journal	08/06/2022	08/11/2022	PUBLIC EMPLOYEES' RETIREMENT SYSTEM	CalPERS Retirement for 07/24/22-08/06/22	2000 · Accounts Payable	10,714.30
TOTAL							10,714.30
	Bill Pmt -Check	**08/18/2022**	**23652**	**ACCENT COMPUTER SOLUTIONS, INC.**	**IT Miscellaneous Services**	**1012 · Bank of America Gen'l Ckg**	

	Type	Date	Num	Name	Memo	Account	Paid Amount
	Bill	07/31/2022	153093		Internet switch upgrade	6054 · Computer Software	700.00
	Bill	07/31/2022	153094		2nd down payment for project	6054 · Computer Software	1,323.00
TOTAL							2,023.00
	Bill Pmt -Check	**08/18/2022**	**23653**	**BURRTEC WASTE INDUSTRIES, INC.**	**N2112902506**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/09/2022	N2112902506		August 2022	6024 · Building Repair & Maintenance	142.50
TOTAL							142.50
	Bill Pmt -Check	**08/18/2022**	**23654**	**CORELOGIC INFORMATION SOLUTIONS**	**82142529**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	82142529		July 2022	7525 · PE6&7 - Computer Services	125.00
TOTAL							125.00
	Bill Pmt -Check	**08/18/2022**	**23655**	**DE HAAN, HENRY**	**Ag Pool Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/01/2022	5/12 Ag Pool Mtg		5/12/22 Ag Pool Meeting	8470 · Ag Meeting Attend -Special	125.00
TOTAL							125.00
	Bill Pmt -Check	**08/18/2022**	**23656**	**EMPOWER LAB**	**Employee Training**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/01/2022	2268		April 2022	6193 · Employee Training	1,125.00
	Bill	07/01/2022	2347		June 2022	6193 · Employee Training	1,125.00
TOTAL							2,250.00
	Bill Pmt -Check	**08/18/2022**	**23657**	**FAVELA, RUBY**	**Employee Expense Reimbursement**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/10/2022			Miscellaneous office supplies	6031.7 · Other Office Supplies	113.09
					Supplies for PK anniversary frame	6141.3 · Admin Meetings	13.22
					Mileage reimbursement	6173 · Airfare/Mileage	38.24
TOTAL							164.55
	Bill Pmt -Check	**08/18/2022**	**23658**	**FIRST LEGAL NETWORK LLC**	**40064456**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	40064456		Court filings for July 2022	6061.5 · Court Filing Services	182.01
TOTAL							182.01
	Bill Pmt -Check	**08/18/2022**	**23659**	**KUHN, BOB**	**Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/05/2022	7/05 Admin Mtg		7/05/22 Administrative meeting w/Legal	6311 · Board Member Compensation	125.00
	Bill	07/25/2022	7/25 Roberts Rules		7/25/22 Roberts Rules Workshop	6311 · Board Member Compensation	125.00
	Bill	07/26/2022	7/26 Board Workshop		7/26/22 Board Workshop	6311 · Board Member Compensation	125.00
TOTAL							375.00
	Bill Pmt -Check	**08/18/2022**	**23660**	**LEGAL SHIELD**	**Employee Deductions**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/15/2022	111802		Employee deductions - July 2022	60194 · Other Employee Insurance	135.50
	Bill	08/15/2022	111802		Employee deductions - August 2022	60194 · Other Employee Insurance	109.60

	Type	Date	Num	Name	Memo	Account	Paid Amount
TOTAL							245.10
	Bill Pmt -Check	**08/18/2022**	**23661**	**SANTA ANA WATERSHED PROJECT AUTHORI**	**BMPTF 2023-02**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/27/2022	BMPTF 2023-02		FY 2022-23 Basin Monitoring Program Task Force	6903 · OBMP SAWPA Group	21,458.00
TOTAL							21,458.00
	Bill Pmt -Check	**08/18/2022**	**23662**	**TELLEZ-FOSTER, EDGAR**	**Employee Expense Reimbursement**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/10/2022			8/02/22 Ops Staff Meeting	6141.3 · Admin Meetings	120.75
					8/9/2022 mtg. w/E. Skrzat CBWCD	8312 · Meeting Expenses	37.82
TOTAL							158.57
	Bill Pmt -Check	**08/18/2022**	**23663**	**UNITED HEALTHCARE**	**052587364607**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/16/2022	052587364607		Dental Insurance Premium - September 2022	60182.2 · Dental & Vision Ins	938.49
TOTAL							938.49
	Bill Pmt -Check	**08/19/2022**	**23664**	**CUCAMONGA VALLEY WATER DISTRICT**	**Office Lease**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/18/2022			Lease payment due September 1, 2022	1422 · Prepaid Rent	7,588.83
TOTAL							7,588.83
	Bill Pmt -Check	**08/19/2022**	**23665**	**DELL MARKETING LP**	**10607619860**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/18/2022	10607619860		San Sevaine room AV Equipment	1840 · Capital Assets	13,027.58
TOTAL							13,027.58
	Bill Pmt -Check	**08/19/2022**	**23666**	**FRONTIER COMMUNICATIONS**	**909-484-3890-050914-5**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/18/2022	90948438900509145		Office fax	6022 · Telephone	172.92
TOTAL							172.92
	Bill Pmt -Check	**08/19/2022**	**23667**	**GREAT AMERICA LEASING CORP.**	**32242127**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/18/2022	32242127		Invoice for August 2022	6043.1 · Ricoh Lease Fee	1,528.34
					Supply freight fee	6043.2 · Ricoh Usage & Maintenance Fee	8.57
					Usage for color images	6043.2 · Ricoh Usage & Maintenance Fee	346.12
TOTAL							1,883.03
	Bill Pmt -Check	**08/19/2022**	**23668**	**EASTVALE DEVELOPMENT COMPANY - PIERS**	**Ag Pool and Board Member Compensation**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/12/2022	7/12 Call w/Chair		7/12/22 Call with Ag Pool Chair	8470 · Ag Meeting Attend -Special	125.00
	Bill	07/18/2022	7/18 Call w/Chair		7/18/22 Call with Agricultural Pool Chair	8470 · Ag Meeting Attend -Special	125.00
	Bill	07/19/2022	7/19 Call w/Chair		7/19/22 Call with Agricultural Pool Legal and Chair	8470 · Ag Meeting Attend -Special	125.00
	Bill	07/20/2022	7/20 Call w/Chair		7/20/22 Call with Agricultural Pool Chair	8470 · Ag Meeting Attend -Special	125.00
	Bill	07/20/2022	7/20 SY Workshop		7/20/22 Safe Yield Reset Workshop	6311 · Board Member Compensation	125.00
	Bill	07/21/2022	7/21 Call w/Chair		7/21/22 Call with Agricultural Pool Chair	8470 · Ag Meeting Attend -Special	125.00

	Type	Date	Num	Name	Memo	Account	Paid Amount
	Bill	07/26/2022	7/26 Call w/Chair		7/26/22 Call with Agricultural Pool Chair	8470 · Ag Meeting Attend -Special	125.00
	Bill	07/27/2022	7/27 RRO		7/27/22 Board Meeting - Robert's Rules of Order	6311 · Board Member Compensation	125.00
	Bill	07/29/2022	7/29 RIPCOMM		7/29/22 RIPCOMM	6311 · Board Member Compensation	125.00
TOTAL							1,125.00
	Bill Pmt -Check	**08/19/2022**	**23669**	**VERIZON WIRELESS**	**9912686844**	**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	9912686844		Acct #470810953-00002	6022 · Telephone	520.18
TOTAL							520.18
	Bill Pmt -Check	**08/24/2022**	**ACH 082422**	**PUBLIC EMPLOYEES' RETIREMENT SYSTEM**	**Payor #3493**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/01/2022	16881901		Annual Unfunded Accrued Liability-Plan 3299	60180 · Employers PERS Expense	10,361.75
TOTAL							10,361.75
	General Journal	**08/23/2022**	**08/23/2022**	**HEALTH EQUITY**	**Health Equity Invoice 4117564**	**1012 · Bank of America Gen'l Ckg**	
				HEALTH EQUITY	Health Equity Invoice 4117564	1012 · Bank of America Gen'l Ckg	837.17
TOTAL							837.17
	General Journal	**08/24/2022**	**08/24/2022**	**HEALTH EQUITY**	**Health Equity Invoice 4022988**	**1012 · Bank of America Gen'l Ckg**	
				HEALTH EQUITY	Health Equity Invoice 4022988	1012 · Bank of America Gen'l Ckg	92.00
TOTAL							92.00
	Bill Pmt -Check	**08/24/2022**	**23670**	**BROWNSTEIN HYATT FARBER SCHRECK**		**1012 · Bank of America Gen'l Ckg**	
	Bill	07/31/2022	902962		902962	6907.39 · Recharge Master Plan	1,967.85
	Bill	07/31/2022	902963		902963	6907.45 · OBMP Update	633.60
	Bill	07/31/2022	902964		902964	6907.47 · 2020 Safe Yield Reset	4,640.85
	Bill	07/31/2022	902965		902965	6078.25 · Ely 3 Basin Investigation	2,511.90
					Filing Fee - First Legal Network, LLC	6078.25 · Ely 3 Basin Investigation	94.56
	Bill	07/31/2022	902958		902958	6078 · BHFS Legal - Miscellaneous	32,402.25
	Bill	07/31/2022	902959		902959	6073 · BHFS Legal - Personnel Matters	6,565.05
	Bill	07/31/2022	902960		902960	6375 · BHFS Legal - Board Meeting	9,576.45
	Bill	07/31/2022	902961		902961	6071 · BHFS Legal - Court Coordination	3,104.10
TOTAL							61,496.61
	Bill Pmt -Check	**08/24/2022**	**23671**	**CHEF DAVE'S CATERING & EVENT SERVICES**	**1417B**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/17/2022	1417B		8/17/2022 Executive Committee Meeting	6193 · Employee Training	248.35
TOTAL							248.35
	Bill Pmt -Check	**08/24/2022**	**23672**	**INLAND EMPIRE UTILITIES AGENCY**	**90032361**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/17/2022	90032361		GW Recharge O&M Cost Reimbursement - 1st Qtr	7206 · Comp Recharge-O&M	275,458.25
TOTAL							275,458.25

	Type	Date	Num	Name	Memo	Account	Paid Amount
	Bill Pmt -Check	**08/24/2022**	**23673**	**PRINTING RESOURCES**	**67753**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/18/2022	67753		Nameplates for D. Morales, title plate for ETF	6031.7 · Other Office Supplies	110.92
TOTAL							110.92
	Bill Pmt -Check	**08/24/2022**	**23674**	**READY REFRESH**	**0023230253**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/18/2022	0023230253		Office Water Bottle - August 2022	6031.7 · Other Office Supplies	65.80
TOTAL							65.80
	Bill Pmt -Check	**08/24/2022**	**23675**	**STANDARD INSURANCE CO.**	**Policy # 00-649299-0009**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/23/2022	006492990009		Policy # 00-649299-0009	60191 · Life & Disab.Ins Benefits	1,057.98
TOTAL							1,057.98
	Bill Pmt -Check	**08/24/2022**	**23676**	**VERIZON WIRELESS**	**9913354273**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/23/2022	9913354273		Acct #642073270-00002	7525 · PE6&7 - Computer Services	58.03
TOTAL							58.03
	General Journal	**08/25/2022**	**08/25/2022**	**Payroll and Taxes for 08/07/22-08/20/22**	**Payroll and Taxes for 08/07/22-08/20/22**	**1012 · Bank of America Gen'l Ckg**	
				ADP, LLC	Direct Deposits for 08/07/22-08/20/22	1012 · Bank of America Gen'l Ckg	38,292.66
				ADP, LLC	Payroll Taxes for 08/07/22-08/20/22	1012 · Bank of America Gen'l Ckg	14,418.53
				MISSIONSQUARE RETIREMENT	457(b) EE Deductions for 08/07/22-08/20/22	1012 · Bank of America Gen'l Ckg	6,219.42
				MISSIONSQUARE RETIREMENT	401(a) EE Deductions for 08/07/22-08/20/22	1012 · Bank of America Gen'l Ckg	2,026.75
TOTAL							60,957.36
	Bill Pmt -Check	**08/25/2022**	**ACH 082522**	**PUBLIC EMPLOYEES' RETIREMENT SYSTEM**	**Payor #3493**	**1012 · Bank of America Gen'l Ckg**	
	General Journal	08/20/2022	08/20/2022	PUBLIC EMPLOYEES' RETIREMENT SYSTEM	CalPERS Retirement for 08/07/22-08/20/22	2000 · Accounts Payable	10,714.30
TOTAL							10,714.30
	Bill Pmt -Check	**08/30/2022**	**ACH 083022**	**PUBLIC EMPLOYEES' RETIREMENT SYSTEM**	**Payor #3493**	**1012 · Bank of America Gen'l Ckg**	
	Bill	08/03/2022	16886592		Fees for GASB-68 Reports & Schedules	60180 · Employers PERS Expense	700.00
TOTAL							700.00
	General Journal	**08/30/2022**	**08/30/2022**	**HEALTH EQUITY**	**Health Equity Invoice 4153909**	**1012 · Bank of America Gen'l Ckg**	
				HEALTH EQUITY	Health Equity Invoice 4153909	1012 · Bank of America Gen'l Ckg	91.34
TOTAL							91.34
						Total Disbursements:	**1,054,343.42**

CHINO BASIN WATERMASTER

I. CONSENT CALENDAR (AP & OAP)
C. OBMP SEMI-ANNUAL STATUS REPORT 2022-1

I. BUSINESS ITEMS – ROUTINE (ONAP)
C. OBMP SEMI-ANNUAL STATUS REPORT 2022-1

CHINO BASIN WATERMASTER

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PETER KAVOUNAS, P.E.
General Manager

STAFF REPORT

DATE: September 8, 2022

TO: AP/ONAP/OAP Committee Members

SUBJECT: OBMP Semi-Annual Status Report 2022-1 (Consent Calendar Item I.C.)

SUMMARY:

Issue: Watermaster produces the Semi-Annual Optimum Basin Management Program (OBMP) Status Reports. The report for the period January to June 2022 has been drafted. [Discretionary Function]

Recommendation: Recommend to the Advisory Committee to recommend to the Watermaster Board to adopt the Semi-Annual OBMP Status Report 2022-1, along with filing a copy with the Court, subject to any necessary non-substantive changes.

Financial Impact: None

Future Consideration
Appropriative Pool – September 8, 2022: Advice and assistance
Non-Agricultural Pool – September 8, 2022: Advice and assistance
Agricultural Pool – September 8, 2022: Advice and assistance
Advisory Committee – September 15, 2022: Advice and assistance
Watermaster Board – September 22, 2022: Adoption

ACTIONS:
Appropriative Pool – September 8, 2022:
Non-Agricultural Pool – September 8, 2022:
Agricultural Pool – September 8, 2022:
Advisory Committee – September 15, 2022:
Watermaster Board – September 22, 2022:

BACKGROUND

OBMP Semi-Annual Status Report 2022-1 covers the period from January to June 2022. The report describes work conducted, and the status of the nine Program Elements of the Optimum Basin Management Program during the six-month period.

DISCUSSION

OBMP Semi-Annual Status Report 2022-1 has been drafted (Attachment 1). Once adopted by the Watermaster Board, a copy of the OBMP Semi-Annual Status Report 2022-1 will be filed with the Court.

ATTACHMENTS

1. OBMP Semi-Annual Status Report 2022-1 (Draft)

Optimum Basin Management Program

Staff Status Report 2022-1: January to June 2022

CHINO BASIN WATERMASTER

Optimum Basin Management Program

Highlighted Activities

- During this reporting period, Watermaster manually measured 300 water levels at about 40 private wells, three monitoring wells, and nine municipal supply wells throughout the Chino Basin, conducted two quarterly download events at about 130 wells containing pressure transducers, collected six groundwater quality samples from three wells, and collected four surface water quality samples from 2 sites.

- Pursuant to a monitoring and mitigation requirement of the Peace II Subsequent Environmental Impact Report (SEIR), Watermaster, the Inland Empire Utilities Agency (IEUA), and the Orange County Water District (OCWD) continued to implement the Prado Basin Habitat Sustainability Program (PBHSP). During this reporting period, Watermaster conducted two quarterly downloads of pressure transducers that measure water levels at the 18 PBHSP monitoring wells and two surface water sites, prepare the annual report on the monitoring and analysis for water year 2021, and developed the PBHSP scope and budget for the fiscal year 2022/23.

- Pursuant to the Chino Basin Subsidence Management Plan, Watermaster continued to implement the Ground-Level Monitoring Program for the MZ-1 and Northwest MZ-1 areas, During this reporting period, Watermaster collected, processed, and checked groundwater level data and aquifer-system deformation data from the Ayala Park, Chino Creek, ad Pomona extensometer facilities, continued high-resolution water-level monitoring at about 30 wells within the MZ-1 Managed Area and the Areas of Subsidence Concern, and performed a sensitivity analysis on the calibration of one-dimensional (1D) compaction models, which will be used to explore subsidence management strategies and develop a subsidence management plan for Northwest MZ-1, and performed preliminary work on figures for the 2021/22 Annual Report that characterize the subsidence feature south of the Ontario International Airport.

Important Court Hearings and Orders

- **February 4, 2022:**
  Hearing and Order Granting Watermaster's Motion for Court to Receive and File the 2020/2021 Annual Report of the Ground-Level Monitoring Committee

- **April 8, 2022:**
  Hearing and Order Granting on the: 1) Motion for Court Approval of Update to Watermaster's Rules and Regulations; and 2) Motion for Court to Receive and File Watermaster's 44th Annual Report

- **April 22, 2022:**
  Hearing and Order Denying City of Chino's Motion and Corrected Motion for Reimbursement of Attorney's Fees and Expenses Paid to the Agricultural Pool

- Watermaster and the IEUA are continuing to implement the 2013 Amendment to the 2010 Recharge Master Plan Update (2013 RMPU) pursuant to the October 2013 Court Order authorizing its implementation. During this reporting period, construction of the Wineville/Jurupa/RP3 and Lower Day projects continued.. The required permits for the Montclair Basins project are being obtained in preparation for the start of construction in fall 2022.

- During this reporting period, Watermaster and the IEUA recharged a total of 10,067 acre-feet of water: 1,975 acre-feet of stormwater, 6,622 acre-feet of recycled water, and 1,470 acre-feet of imported water.

- Watermaster and IEUA are continuing to implement the Maximum Benefit Salinity Management Plan which includes conducting groundwater and surface water monitoring, maintaining Hydraulic Control of the basin, operating the Chino Desalters at 40,000 acre-feet per year of pumping, and managing recycled water quality and recharge. During this reporting period, Watermaster and IEUA submitted *2021 Maximum Benefit Annual Report* to the Regional Board, continue to work with the Regional Board to finalize a regulatory compliance strategy to support the adoption of a longer-term averaging period for recycled water compliance for incorporation into the Basin Plan, and prepared and submitted to the Regional Board an Updated Plan for *Mitigation of Temporary Loss of Hydraulic Control in the Chino Basin*. Watermaster continued work to implement elements of the 2017 Court Order regarding ongoing improvement of the process to recalculate the Safe Yield. This work includes supplementing the current Safe Yield Reset methodology to address comments received during the 2020 Safe Yield recalculation process and annual data collection to evaluate changes in cultural conditions compared to the data used in the 2020 Safe Yield recalculation. Watermaster completed the first data collection and evaluation process pursuant to the 2017 Court Order. This process resulted in the completion of the *Data Collection and Evaluation Report for Fiscal Year 2020/2021* in May 2022.

Program Element 1: Develop and Implement a Comprehensive Monitoring Program

Fundamental to the implementation of the OBMP Program Elements are the monitoring and data collection efforts performed in accordance with Program Element 1, including monitoring basin hydrology, production, recharge, groundwater levels, groundwater quality, and ground-level movement. Various monitoring programs have and will continue to be refined over time to satisfy the evolving needs of Watermaster and the IEUA, such as new regulatory requirements and improved data coverage. Monitoring is performed by basin pumpers, Watermaster staff, and other cooperating entities as follows.

Groundwater Level Monitoring

Watermaster's basin-wide groundwater-level monitoring program supports the periodic reassessment of Safe Yield, the monitoring and management of ground-level movement, the impact analysis of desalter pumping on private wells, the impact analysis of the implementation of the Peace II Agreement on groundwater levels and riparian vegetation in the Prado Basin, the triennial re-computation of ambient water quality mandated by the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan), and the assessment of Hydraulic Control—a maximum-benefit commitment in the Basin Plan. The data are also used to update and recalibrate Watermaster's computer-simulated groundwater flow model in order to assess groundwater flow directions, to compute storage changes, to support interpretations of water quality data, and to identify areas of the basin where recharge and discharge are not in balance.

Watermaster Field Staff Measuring Groundwater Level at a CDA Well

The current groundwater-level monitoring program is comprised of approximately 1,150 wells. At about 960 of these wells, groundwater levels are measured by well owners, which include municipal water agencies, the California Department of Toxic Substances Control (DTSC), the Counties, and various private consulting firms. Watermaster collects these groundwater level data semi-annually from the well owners. At the remaining 190 wells, groundwater levels are measured monthly by Watermaster staff using manual methods or by pressure transducers that record data on a 15-minute interval. These wells are mainly Agricultural Pool wells or dedicated monitoring wells located south of the 60 freeway.

All groundwater-level data are checked and uploaded to a centralized database management system that can be accessed online through HydroDaVEsm. During this reporting period, Watermaster measured approximately 300 groundwater levels at about 40 private wells, three monitoring wells, and nine municipal supply wells throughout the Chino Basin and conducted two quarterly downloads of 130 pressure transducers installed in private, municipal, and monitoring wells. Additionally, Watermaster compiled all available groundwater-level data from well owners in the basin for the October 2021 to March 2022 period.

Groundwater Quality Monitoring

Watermaster initiated a comprehensive groundwater-quality monitoring program in which the obtained data may be used for: the biennial *Chino Basin OBMP State of the Basin* report, the triennial re-computation of ambient water quality, the demonstration of Hydraulic Control, monitoring of nonpoint-source groundwater contaminations and plumes associated with point-source contamination, and assessing the overall health of the groundwater basin. Groundwater-quality data are also used in conjunction with numerical models to assist Watermaster and other parties in evaluating proposed salinity management and groundwater remediation strategies. The details of the groundwater-quality monitoring programs as of fiscal year 2021/22 are described below.

Chino Basin Data Collection (CBDC). Watermaster routinely and proactively collects groundwater-quality data from well owners including municipal and governmental agencies. Groundwater quality data are also obtained from special studies and monitoring required by orders of the Santa Ana Regional Water Quality Control Board (Regional Board)—such as for landfills and other groundwater quality investigations, the DTSC, the US Geological Survey (USGS), and others. These data are collected semi-annually from well owners and monitoring entities. Data are collected for approximately 860 wells as part of the CBDC program. During this reporting period, Watermaster compiled data collected for the CBDC program for the July to December 2021 period.

Program Element 1: Develop and Implement a Comprehensive Monitoring Program (Continued)

Watermaster Field Groundwater Quality Monitoring Programs. Watermaster monitors groundwater quality at privately owned wells and dedicated monitoring wells on a routine basis as follows:

1. *Private Wells*. About 80 private wells, located predominantly in the southern portion of the basin, are sampled at various frequencies based on their proximity to known point-source contamination plumes. Seven wells near contaminant plumes are sampled annually, and the remaining 73 wells are sampled triennially.
2. *Watermaster Monitoring Wells*. Watermaster collects groundwater-quality samples from a total of 49 multi-nested monitoring wells at 22 well sites located throughout the Chino Basin. These monitoring well sites include: nine HCMP sites constructed to support the demonstration of Hydraulic Control in the southern Chino Basin, nine sites constructed to support the PBHSP in the Prado Basin region, and three sites that fill spatial data gaps near contamination plumes in MZ-3. Each nested well site contains up to four wells in the borehole. Additionally, Watermaster samples one single-casing well in MZ-3. Currently, the HCMP and MZ-3 wells are sampled annually, and the PBHSP wells are sampled triennially.
3. *Other Wells*. Watermaster collects quarterly samples from four near-river wells to characterize the interaction of the Santa Ana River and groundwater. These shallow wells along the Santa Ana River consist of two former USGS National Water Quality Assessment Program wells (Archibald 1 and Archibald 2) and two Santa Ana River Water Company (SARWC) wells (active Well 9 and inactive Well 10).

During this reporting period, Watermaster collected groundwater quality samples from three near river wells that are sampled quarterly. The samples were sent to Eurofins Eaton Analytical Laboratory for analysis. All groundwater quality data are checked by Watermaster staff and uploaded to a centralized database management system that can be accessed online through HydroDaVE^{sm}. Also during this reporting period, Watermaster worked with the SARWC to convert the near-river SARWC well 10 into a monitoring well to replace SARWC well 11 that was destroyed during the last reporting period in late 2021.

Groundwater Production Monitoring

As of the end of this reporting period, there were a total of 454 producing wells, 249 of which were for agricultural uses. The number of agricultural wells has been decreasing in recent years due to urbanization and development. Many of the remaining active agricultural production wells are metered, and Watermaster reads the meters on a quarterly basis. Meter reads and production data are then entered into Watermaster's relational database, which can be accessed online through HydroDaVE^{sm}.

Watermaster Staff Taking a Meter Read from an Ag Meter

Surface Water Monitoring in the Santa Ana River

Watermaster collects grab water quality samples at two sites along the Santa Ana River (Santa Ana River at River Road and Santa Ana River at Etiwanda) on a quarterly basis. Sample data from these surface water sites and from the near-river wells are used to characterize the interaction between the Santa Ana River and nearby groundwater. During this reporting period, Watermaster collected four surface water-quality samples from the two surface water sites.

Prado Basin Habitat Sustainability Program (PBHSP)

Mitigation Measure 4.4-3 from the Peace II SEIR requires that Watermaster and the IEUA, in collaboration with the OCWD, form a committee, the Prado Basin Habitat Sustainability Committee (PBHSC), to develop and implement an Adaptive Management Plan for the PBHSP. The PBHSC is open to all interested participants, including the Watermaster Parties, IEUA member agencies, the OCWD, and other interested stakeholders. The objective of the PBHSP is to ensure that riparian habitat in the Prado Basin is not adversely impacted by the implementation of Peace II activities. Currently, the PBHSP consists of a monitoring program and the annual reporting on its results. The monitoring program includes an assessment of the riparian habitat and all factors that could potentially impact the riparian habitat, including those factors affected by Peace II activities such as changes in groundwater levels. Sixteen monitoring wells at nine sites were constructed in 2015 to support the PBHSP. Two existing wells are also monitored as part of the PBHSP. The PBHSC developed the Adaptive Management Plan of the PBHSP to describe an initial monitoring program and a process to modify the monitoring program and/or implement mitigation strategies, as necessary.

Program Element 1: Develop and Implement a Comprehensive Monitoring Program (Continued)

During this reporting period, Watermaster performed the following tasks:

- Conducted the groundwater monitoring program, which included quarterly downloads in March and June 2022 of transducers that measure groundwater levels at 14 PBHSP monitoring wells, and transducers that measure electrical conductivity (EC), temperature, and level at four PHBSP monitoring wells in two locations.
- Conducted the surface-water monitoring program at two surface water sites, which included quarterly downloads in March and June 2022 of transducers that measure EC, temperature, and level.
- Prepared a memorandum titled: *Recommended Scope and Budget of the Prado Basin Habitat Sustainability Program for Fiscal Year 2022/23*. This memorandum was used by Watermaster and the IEUA to develop and approve their respective fiscal year 2022/23 budgets.
- Prepared the sixth annual report: *Annual Report of the Prado Basin Habitat Sustainability Committee for Water Year 2021*. The main conclusions of the annual report was that the quality of the riparian habitat remained stable or experienced a minor change in greenness across most of the Prado Basin from 2020-2021 and at the same time the area experienced below average precipitation and discharge in the creeks, and slightly lower temperatures. Groundwater levels have remained relatively stable and within their historical range of short-term and long-term variability in the Prado Basin, except where there are some notable decreases since monitoring began in 2016 by about five feet near the top of Mill Creek, and two feet near the northern portion of the Santa Ana River. No mitigation measures are proposed at this time.
- Conducted two meetings of the PBHSC:
    - On March 9, 2022 to present the Recommended Scope and Budget of the PBHSP for fiscal year 2022/23.
    - On May 11, 2022 to present the draft Annual Report of the PBHSC for water year 2021.

Chino Basin Groundwater Recharge Monitoring Program

Watermaster, the IEUA, the Chino Basin Water Conservation District, and the San Bernardino County Flood Control District jointly sponsor the Chino Basin Groundwater Recharge Program. This is a comprehensive water supply program to enhance water supply reliability and improve groundwater quality in local drinking water wells by increasing the recharge of storm, imported, and recycled waters. The recharge program is regulated under IEUA and Watermaster's recycled water recharge permit— Regional Board Order No. R8-2007-0039 and Monitoring and Reporting Program No. R8-2007-0039.

Watermaster and the IEUA measure the quantity of storm, imported, and recycled water that enters recharge basins using pressure transducers or staff gauges. The IEUA also conducts water-quality monitoring for all required parameters in Order No. R8-2007-0039 for recycled water, diluent water (storm water, dry-weather flow, and imported water), and groundwater. The IEUA staff samples for recycled water quality data: daily and weekly for the RP-1 and RP-4 effluent; quarterly and annually at two recycled water locations representative of recharge quality; and weekly or monthly from lysimeters at recharge basins. Most of the recycled water recharge basins have alternative compliance plans for total organic carbon (TOC) and Total Nitrogen (TN) using the results from the recycled water samples and the application of a correction factor for soil aquifer treatment. The IEUA also collects samples at about 15 surface water locations for stormwater and dry-weather flows. Imported water quality data for State Water Project water are obtained from the Metropolitan Water District of Southern California (MWDSC). The flow and quality data is used to calculate: 120-month blended water quality for total dissolved solids (TDS) and nitrate of all recharge sources in each recharge basin to assess adequate dilution of recycled water as required by the recycled water recharge permits held with the Division of Drinking Water (DDW); and 5-year blended water quality for TDS and nitrate for all recharge sources in all recharge basins in the Chino Basin as required by the Maximum Benefit Salinity Management Plan (see the Program Element 7 update in this status report).

The IEUA also collects quarterly and annual groundwater quality samples at a network of about 35 dedicated monitoring wells and production wells that are downgradient of the recharge basins.

Monitoring Activities. During this reporting period, the IEUA performed its ongoing monitoring program to measure and record recharge volumes and to collect water quality samples for recycled water, diluent water, and groundwater pursuant to IEUA and Watermaster's permit requirements. This included collecting approximately 110 recycled water quality samples, 35 lysimeter samples, 7 diluent water quality samples, and 74 groundwater quality samples for analytical analyses. Daily composite water quality data was also collected at the RP-1 and RP-4 effluent.

Program Element 1: Develop and Implement a Comprehensive Monitoring Program (Continued)

Reporting. Watermaster and the IEUA completed the following compliance reports concerning the recharge program during this reporting period:

- 4Q-2021 Quarterly Report, which was submitted to the Regional Board on February 15, 2022
- 1Q-2022 Quarterly Report, which was submitted to the Regional Board on May 15, 2022
- 2021 Annual Report, which was submitted to the Regional Board on May 1, 2022

Ground Level Monitoring

To address the historical occurrence of land subsidence and ground fissuring in the Chino Basin, Watermaster prepared and submitted a subsidence management plan (known as the MZ-1 Plan) to the Court for approval, and in November 2007, the Court ordered its implementation (see Program Element 4 in this report for more on MZ-1 Plan implementation). The MZ-1 Plan required several monitoring and mitigation measures to minimize or abate the future occurrence of land subsidence and ground fissuring. These measures and activities included:

- Continuing the scope and frequency of monitoring within the so-called Managed Area that was conducted during the period when the MZ-1 Plan was being developed.
- Expanding the monitoring of the aquifer system and ground-level movement into other areas of MZ-1 and the Chino Basin where data indicate concern for future subsidence and ground fissuring (Areas of Subsidence Concern).
- Monitoring of horizontal strain across the historical zone of ground fissuring.
- Conducting additional testing and monitoring to refine the MZ-1 Guidance Criteria for subsidence management (e.g., the Long-Term Pumping Test).
- Developing alternative pumping plans for the MZ-1 producers impacted by the MZ-1 Plan.
- Constructing and testing a lower-cost cable extensometer facility at Ayala Park.
- Evaluating and comparing ground-level surveying and Interferometric Synthetic Aperture Radar (InSAR) and recommending future monitoring protocols for both techniques.
- Conducting an aquifer storage recovery (ASR) feasibility study at a City of Chino Hills production well (Well 16) within the MZ-1 Managed Area.

Since the initial MZ-1 Plan was adopted in 2007, Watermaster has conducted the Ground-Level Monitoring Program (GLMP). The main results from the GLMP show that very little permanent land subsidence has occurred in the MZ-1 Managed Area, indicating that subsidence is being successfully managed in this area, but land subsidence has been occurring in Northwest MZ-1. One concern is that land subsidence in Northwest MZ-1 has occurred differentially across the San Jose Fault, following the same pattern of differential subsidence that occurred in the MZ-1 Managed Area during the time of ground fissuring.

Based on these observations, Watermaster determined that the subsidence management plan needed to be updated to include a Subsidence Management Plan for Northwest MZ-1, with the long-term objective of minimizing or abating the occurrence of the differential land subsidence. Thus, Watermaster expanded the GLMP into Northwest MZ-1 and prepared an updated Chino Basin Subsidence Management Plan, which included the Work Plan to Develop a Subsidence Management Plan for Northwest MZ-1 (Work Plan) as an appendix.

During this reporting period, Watermaster undertook the following Chino Basin Subsidence Management Plan activities:

- Continued high-resolution water-level monitoring at approximately 30 wells within the MZ-1 Managed Area and within the Areas of Subsidence Concern. All monitoring equipment was inspected at least quarterly and was repaired and/or replaced as necessary. The data collected were checked and analyzed to assess the functionality of the monitoring equipment and for compliance with the Chino Basin Subsidence Management Plan.
- Performed monthly routine maintenance, data collection, and verification at the Ayala Park and Chino Creek extensometer facilities.

Program Element 1: Develop and Implement a Comprehensive Monitoring Program (Continued)

- Continued implementation of the Work Plan:
    - Collected, processed, and checked groundwater level data and production data from wells in Northwest MZ-1 on a monthly basis.
    - Collected, processed, and checked groundwater level data and aquifer-system deformation data from the Pomona extensometer facility (PX).
    - At the request of the Ground Level Monitoring Committee (GLMC), performed a sensitivity analysis on the calibration of one-dimensional (1D) compaction models that simulate aquifer-system deformation at the MVWD-28 and PX locations. The calibration results were used to estimate the hydraulic and mechanical properties of the aquifer-system and the pre-consolidation stress(es). The 1D compaction models will be used in FY 2022/23 to explore subsidence management strategies in Northwest MZ-1 and develop a subsidence management plan for Northwest MZ-1.

Program Element 2: Develop and Implement a Comprehensive Recharge Program

The objectives of the comprehensive recharge program include: enhancing the yield of the Chino Basin through the development and implementation of a Recharge Master Plan to improve, expand, and construct recharge facilities that enable the recharge of storm, recycled, and imported waters; ensuring a balance of recharge and discharge in the Chino Basin management zones; and ensuring that sufficient storm and imported waters are recharged to comply with the recycled water dilution requirements in Watermaster and the IEUA's recycled water recharge permits.

Pursuant to Program Element 2 of the OBMP, Watermaster and the IEUA partnered with the San Bernardino County Flood Control District and the Chino Basin Water Conservation District to construct and/or improve 18 recharge sites. This project is known as the Chino Basin Facilities Improvement Project (CBFIP). The average annual stormwater recharge of the CBFIP facilities is approximately 10,000 acre-feet per year, the supplemental "wet"[1] water recharge capacity is about 56,600 acre-feet per year, and the in-lieu supplemental water recharge capacity ranges from 17,700 to 49,900 acre-feet per year. In addition to the CBFIP facilities, the Monte Vista Water District has five ASR wells with a demonstrated well injection capacity of 5,500 acre-feet per year. The current total supplemental water recharge capacity ranges from 90,310 to 118,310 acre-feet per year, which is greater than the projected supplemental water recharge capacity required by Watermaster.

In 2008, Watermaster began preparing the *2010 Recharge Master Plan Update* (2010 RMPU) pursuant to the December 21, 2007 Court Order (the Peace II Agreement) to complete a Recharge Master Plan Update by July 1, 2010. In October 2010, the Court accepted the 2010 RMPU as satisfying the condition and ordered that certain recommendations of the 2010 RMPU be implemented. In November 2011, Watermaster reported its progress to the Court pursuant to the October 2010 Court Order, and in December 2011, the Court issued an order directing Watermaster to continue with its implementation of the 2010 RMPU per its October 2010 order but with a revised schedule. On December 15, 2011, the Watermaster Board moved to:

> "approve that within the next year there will be the completion of [a] Recharge Master Plan Update, there will be the development of an Implementation Plan to address balance issues within the Chino Basin subzones, and the development of a Funding Plan, as presented."

This motion led to the development of an update to the 2010 RMPU, and in 2012, Watermaster staff sent out a "call for projects" to the Watermaster Parties, seeking their recommendations for recharge improvement projects that should be considered in the update. The *2013 Amendment to the 2010 Recharge Master Plan Update* (2013 RMPU) outlines the recommended projects to be implemented by Watermaster and the IEUA and lays out the implementation and financing plans. The 2013 RMPU report was approved by the Watermaster Board in September 2013 and filed with the Court in October 2013. In December 2013, the Court approved the 2013 RMPU except for Section 5, which dealt with the accounting for new recharge from Municipal Separate Stormwater Sewer Systems; Section 5 was later approved by the Court in April 2014.

In September 2018, Watermaster completed the 2018 Recharge Master Plan Update (2018 RMPU) and submitted it to the Court in October 2018. On December 28, 2018, the Court approved the 2018 RMPU. The next Recharge Master Plan Update will be completed no later than October 2023.

[1]The modifier "wet" means actual physical water is being recharged in spreading basins as opposed to the dedication of water from storage or in-lieu recharge.

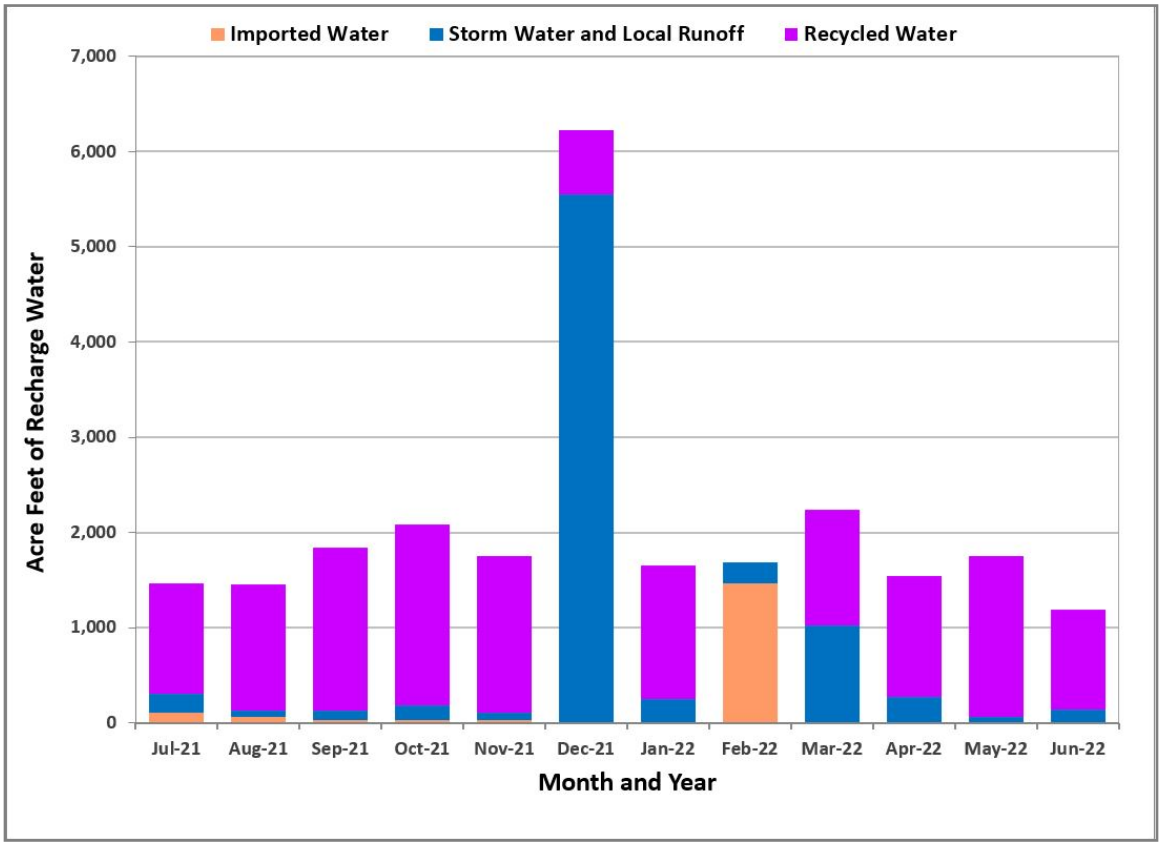
Program Element 2: Develop and Implement a Comprehensive Recharge Program (Continued)

2013 RMPU Implementation. Watermaster and the IEUA are continuing to carry out the October 2013 Court Order, which authorizes them to implement the 2013 RMPU. Construction of the San Sevaine Basin improvements was completed in September 2018 and the construction of the Victoria Basin improvements was completed in December 2018. During this reporting period, =the construction work for the Wineville/Jurupa/RP3 and Lower Day projects continued. The Lower Day project is near completion. The required permits are being obtained for the Montclair Basins project and construction is expected to start in fall 2022.

Additionally, Watermaster and the IEUA continue to collaborate in the development of projects outside of the 2013 RMPU effort that will increase and/or facilitate stormwater and supplemental water recharge and have jointly funded these projects, including monitoring upgrades and habitat conservation. During this reporting period, no projects were completed.

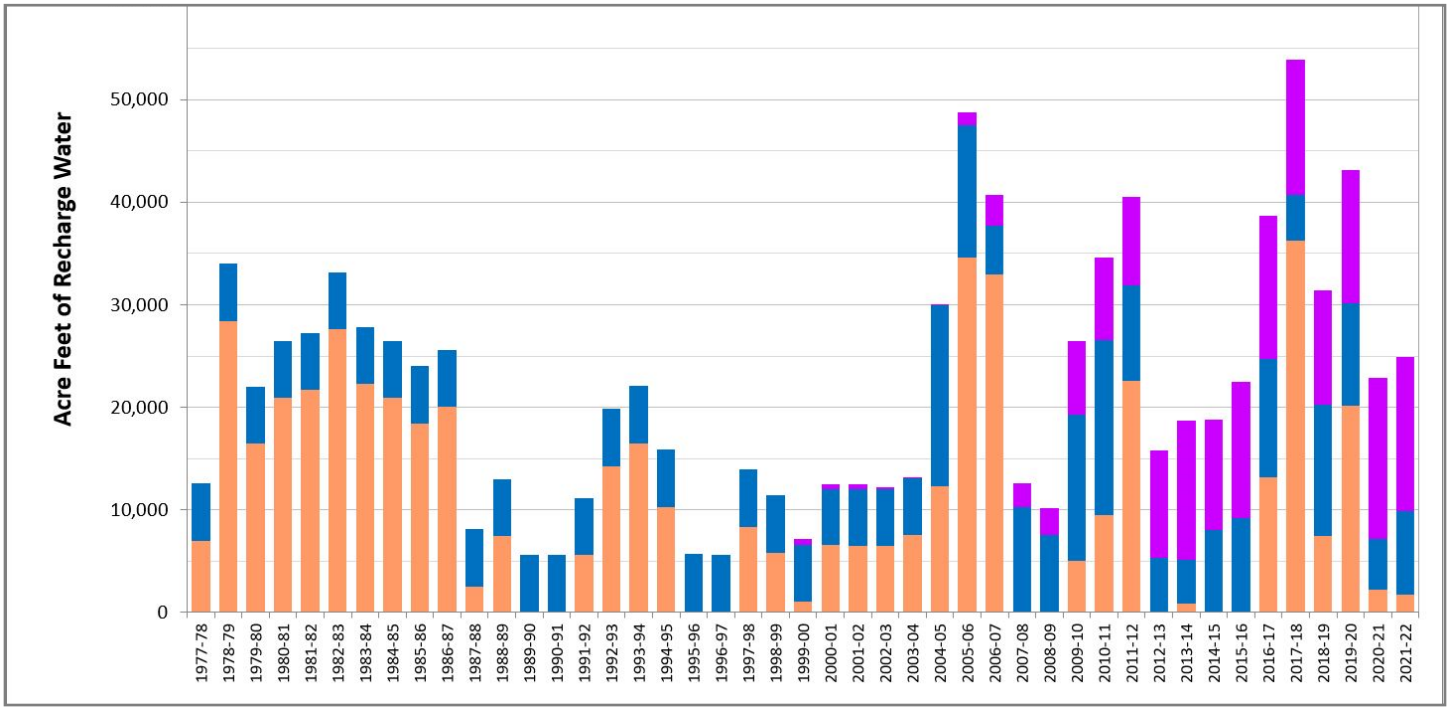
The Recharge Investigation and Projects Committee met twice during this reporting period on the progress of implementing the 2013 RMPU Projects and other recharge-related projects.

Recharge for Dilution of Recycled Water. In fiscal year 2009/10, Watermaster and the IEUA's recycled water recharge permit was amended to allow for existing underflow dilution and extended the period for calculating dilution from a running 60-month to a running 120-month period. Additionally, the IEUA has worked with the DDW to obtain approval to increase the allowable recycled water contribution (RWC) at wells to 50 percent. These permit amendments allow for increased recycled water recharge without having to increase the amount of imported and storm waters required for dilution. The IEUA projects its dilution requirements as part of its annual reporting to the Regional Board. Based on the latest Annual Report (May 2022), the IEUA projects that dilution requirements will be met through 2031 even if no imported water is available for dilution.

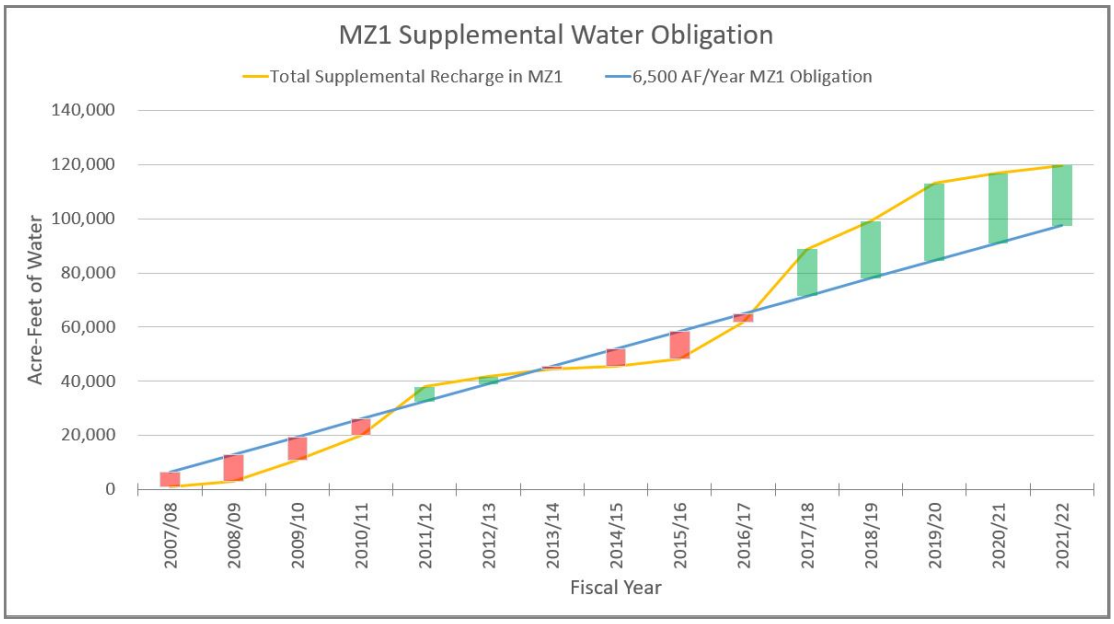


Recharge Activities. During this reporting period, ongoing recycled water recharge occurred in the Brooks, 7th Street, 8th Street, Ely, Turner, Victoria, San Sevaine, Hickory, Banana, RP-3, and Declez Basins; stormwater was recharged at 18 recharge basins across all Chino Basin management zones; and imported water was recharged at Brooks, 7th Street, 8th Street, Turner, Victoria, San Sevaine, Hickory, Banana, and RP-3 Basins. From January1 through June 30, 2022, Watermaster and the IEUA recharged a total of 10,067 acre-feet of water: 1,975 acre-feet of stormwater, 6,622 acre-feet of recycled water, and 1,470 acre-feet of imported water.

Program Element 2: Develop and Implement a Comprehensive Recharge Program (Continued)



Balance of Recharge and Discharge in MZ-1. The total amount of supplemental water recharged in MZ-1 since the Peace II Agreement through June 30, 2022 was approximately 119,692 acre-feet, which is about 22,192 acre-feet more than the 97,500 acre-feet required by June 30, 2022 (annual requirement of 6,500 acre-feet). The amount of supplemental water recharged into MZ-1 during the reporting period was approximately 1,354 acre-feet.



Program Element 3: Develop and Implement Water Supply Plan for the Impaired Areas of the Basin; and Program Element 5: Develop and Implement Regional Supplemental Water Program

As stated in the OBMP, "the goal of Program Elements 3 and 5 is to develop a regional, long range, cost effective, equitable, water supply plan for producers in the Chino Basin that incorporates sound basin management." One element of the water supply plan is the development of a way to replace the decline in agricultural groundwater production to prevent significant amounts of degraded groundwater from discharging to the Santa Ana River and violating the Basin Plan. Replacing the decline in agricultural groundwater production will mitigate the reduction of the Safe Yield of the basin and allow for more flexibility in the basin's supplemental water supplies if the produced groundwater is treated. This is achieved through the operation of the Chino Basin Desalter facilities, which comprise a series of wells and treatment facilities in the southern Chino Basin that are designed to replace the decline of the agricultural groundwater producers and to treat and serve this groundwater to various Appropriative Pool members.

The Chino I Desalter expansion and the Chino II Desalter facilities were completed in February 2006, bringing the total Chino Basin Desalter capacity to 29 million gallons per day (MGD) (32,480 acre-feet per year). Development and planning continued between the Chino Desalter Authority (CDA) and Watermaster to expand the production and treatment capacity of the Chino Basin Desalter by about 10 MGD. More than $77 million in grant funds were secured toward this expansion. As currently configured, the Chino I Desalter produces about 15,500 acre-feet of groundwater per year (13.8 MGD) at 14 wells (I-1 through I-11, and I-13 through I-15). This water is treated through air stripping (volatile organic compound [VOC] removal), ion exchange (nitrate removal), and/or reverse osmosis (for nitrate and TDS removal). The Chino II Desalter produces about 24,500 acre-feet of groundwater per year (21.8 MGD) at eleven wells (II-1 through II-4 and II-6 through II-12). This water is treated through ion exchange and/or reverse osmosis.

The most recently completed expansion project included adding three wells (Wells II-10, II-11, and II-12) to Chino II Desalter. These wells provide additional raw water to the Chino II Desalter to meet the maximum-benefit commitment to produce a total of 40,000 acre-feet per year from the combined desalter well fields. These wells will also be utilized as part of the remediation action plan to clean up the South Archibald Plume (see the Program Element 6 update in this status report). Construction of wells II-10 and II-11 was completed in late 2015, equipping of the wells was completed in August 2018, and production at the wells commenced soon after.

Construction of well II-12 was completed in November 2020. And in August 2021 construction of the dedicated pipeline to convey groundwater from wells II-12, II-10, II-11, and I-11 to the Chino II Desalter was completed and well II-12 began pumping. The Chino Bain Desalters reached the 40,000 acre-feet per year of pumping capacity in June 2020, prior to the commencement of pumping at well II-12.

Program Element 4: Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1

Because of the historical occurrence of pumping induced land subsidence and ground fissuring in southwestern Chino Basin (Managed Area), the OBMP required the development and implementation of an Interim Management Plan (IMP) for MZ-1 that would:

- Minimize subsidence and fissuring in the short-term.
- Collect the information necessary to understand the extent, rate, and mechanisms of subsidence and fissuring.
- Formulate a management plan to reduce to tolerable levels or abate future subsidence and fissuring.

From 2001-2005, Watermaster developed, coordinated, and conducted an IMP under the guidance of the MZ-1 Technical Committee (referred to now as the Ground-Level Monitoring Committee or GLMC). The investigation provided enough information for Watermaster to develop Guidance Criteria for the MZ-1 producers in the investigation area that, if followed, would minimize the potential for subsidence and fissuring during the completion of the MZ-1 Plan. The Guidance Criteria included a list of Managed Wells and their owners subject to the criteria, a map of the so-called Managed Area, and an initial threshold water level (Guidance Level) of 245 feet below the top of the PA-7 well casing. The MZ-1 Summary Report and the Guidance Criteria were adopted by the Watermaster Board in May 2006. The Guidance Criteria formed the basis for the MZ-1 Plan, which was approved by Watermaster in October 2007. The Court approved the MZ-1 Plan in November 2007 and ordered its implementation. Watermaster has implemented the MZ-1 Plan since that time, including the ongoing Ground-Level Monitoring Program (GLMP) called for by the MZ-1 Plan (refer to in Program Element 1).

The MZ-1 Plan states that if data from existing monitoring efforts in the so-called Areas of Subsidence Concern indicate the potential for adverse impacts due to subsidence, Watermaster will revise the MZ-1 Plan pursuant to the process outlined in Section 3 of the MZ-1 Plan. In early 2015, Watermaster prepared an update to the MZ-1 Plan, which included a name change to the *2015 Chino*

Program Element 4: Develop and Implement a Comprehensive Groundwater Management Plan for Management Zone 1 (Continued)

Basin Subsidence Management Plan, and a *Work Plan to Develop the Subsidence Management Plan for Northwest MZ-1* (Work Plan) as an appendix. The Chino Basin Subsidence Management Plan and the Work Plan were adopted through the Watermaster Pool process in July 2015.

The data, analysis, and reports generated through the implementation of the MZ-1 Plan, Chino Basin Subsidence Management Plan, and Work Plan are reviewed and discussed by the GLMC, which meets on a periodic basis throughout the year. The GLMC is open to all interested participants, including the Watermaster Parties and their consultants. During this reporting period, Watermaster undertook the following data analysis and reporting tasks:

- Performed preliminary work on figures for: 2021/22 Annual Report of the Ground-Level Monitoring Committee. This included work to characterize the subsidence feature south of the Ontario International Airport.

One GLMC meeting was conducted during the reporting period on March 3, 2022. The meeting agenda included:

- Recommended Scope and Budget of the Ground-Level Monitoring Committee for FY 2022/23.

The GLMC approved the recommended scope and budget which supported the Watermaster's budgeting process for FY 2022/23.

Program Element 6: Develop and Implement Cooperative Programs with the Regional Water Quality Control Board, Santa Ana Region and Other Agencies to Improve Basin Management

Program Elements 6 and 7 are necessary to address the water quality management problems in the Chino Basin. During the development of the OBMP, it was identified that Watermaster did not have sufficient information to determine whether point and non-point sources of groundwater contamination are being adequately addressed, including the various Chino Basin contaminant plumes. With the Regional Board and other agencies, Watermaster has worked to address the following major point source contaminant plumes in the Chino Basin:

South Archibald Plume

In July 2005, the Regional Board prepared draft Cleanup and Abatement Orders (CAOs) for six parties who were tenants on the Ontario Airport regarding the South Archibald Trichloroethene (TCE) Plume in the southern portion of the Chino Basin. The draft CAOs required the parties to "submit a work plan and time schedule to further define the lateral and vertical extent of the TCE and related VOCs that are discharging, have been discharged, or threaten to be discharged from the site" and to "submit a detailed remedial action plan, including an implementation schedule, to cleanup or abate the effects of the TCE and related VOCs." Four of the six parties (Aerojet-General Corporation, The Boeing Company, General Electric, and Lockheed Martin) voluntarily formed a group known as ABGL to work jointly on a remedial investigation. Northrop Grumman declined to participate in the group. The US Air Force, in cooperation with the US Army Corps of Engineers, funded the installation of one of the four clusters of monitoring wells installed by the ABGL Parties.

In 2008, Regional Board staff conducted research pertaining to the likely source of the TCE contamination and identified discharges of wastewater that may have contained TCE to the RP-1 treatment plant and associated disposal areas as a potential source. The Regional Board identified several industries, including some previously identified tenants of the Ontario Airport property, that likely used TCE solvents before and during the early-1970s, and discharged wastes to the Cities of Ontario and Upland's sewage systems and subsequently to the RP-1 treatment plant and disposal areas. In 2012, an additional Draft CAO was issued by the Regional Board jointly to the City of Ontario, City of Upland, and IEUA as the previous and current operators of the RP-1 treatment plant and disposal area (collectively, the RP-1 Parties). In part, the draft CAOs require that RP-1 Parties "supply uninterrupted replacement water service […] to all residences south of Riverside Drive that are served by private domestic wells at which TCE has been detected at concentrations at or exceeding 5 µg/L […]" and to report this information to the Regional Board. In addition, the RP-1 Parties are to "prepare and submit [a] […] feasibility study" and "prepare, submit and implement the Remedial Action Plan" to mitigate the "effects of the TCE groundwater plume."

Under the Regional Board's oversight, the ABGL Parties and/or the RP-1 Parties conducted sampling four sample events at private residential wells and taps between 2007 and 2014 in the region where groundwater is potentially contaminated with TCE. By 2014, all private wells and/or taps in the region of the plume had been sampled at least once. Alternative water systems (tanks) have been

Program Element 6: Develop and Implement Cooperative Programs with the Regional Water Quality Control Board, Santa Ana Region and Other Agencies to Improve Basin Management (Continued)

installed at residences in the area where well or tap water contains TCE at or above 80 percent of the MCL for TCE. Residents who declined tank systems are being provided bottled water. Watermaster also samples for water quality at private wells in the area and uses this and other data obtained from its data collection programs to independently delineate the spatial extent of the plume. Watermaster completed its most recent characterization of the plume in June 2021 for the *2020 Chino Basin OBMP State of the Basin Report*. In April of this reporting period, Watermaster prepared a semi-annual status report on the South Archibald Plume for Watermaster Parties.

In July 2015, the RP-1 Parties completed the Draft Feasibility Study Report for the South Archibald Plume (Feasibility Study). The Feasibility Study established cleanup objectives for both domestic water supply and plume remediation and evaluated alternatives to accomplish these objectives. In November 2015, a revised Draft Feasibility Study, Remedial Action Plan, and Responses to Comments were completed to address input from the public, the ABGL, and others. In September 2016, the Regional Board issued the Final CAO R8-2016-0016 collectively to the RP-1 Parties and the ABGL Parties. The Final CAO was adopted by all parties in November 2016, thus approving the preferred plume remediation and domestic water supply alternatives identified in the Remedial Action Plan. The parties also reached a settlement agreement that aligns with the Final CAO and authorizes funding to initiate implementation of the plume remediation alternative.

The plume remediation alternative involves the use of CDA production wells and facilities. The RP-1 Parties reached a Joint Facility Development Agreement with the CDA for the implementation of a project designed in part to remediate the South Archibald Plume. The project, termed the Chino Basin Improvement and Groundwater Clean-up Project, includes the operation of three newly constructed CDA wells (II-10, II-11, and II-12) and a dedicated pipeline connecting the three wells and the existing CDA well I-11 to the Desalter II treatment facility. Construction of two of the three wells (II-10 and II-11) were completed and became operational in 2018. The construction of well II-12 was completed in November 2020. In the first half of 2021, the RP-1 Parties and the CDA submitted the final *Monitoring and Reporting Plan for the Chino Basin Improvement and Groundwater Clean-up Project* to the Regional Board and completed the construction of five multi-depth monitoring wells at two locations in the South Archibald Plume (II-MW-4 and II-MW-5). In the second half of 2021, the CDA completed the equipping of well II-12, the modification to the decarbonator, and the construction of the raw water pipeline, and the project became operational in August of 2021.

The domestic water supply alternative for the private residences affected by TCE groundwater contamination is a hybrid between the installation of tank systems for some residences, where water is delivered from the City of Ontario potable supply via truck deliveries, and the installation of a temporary pipeline to connect some residences to the City of Ontario potable water system. The Cities of Ontario and Upland have assumed responsibility for implementing the domestic water supply alternative. In February 2017, the Cities of Ontario and Upland submitted the Domestic Water Supply Work Plan to the Regional Board to outline the approach to monitoring and supplying alternative water supplies for affected residences. The City of Ontario has conducted six annual water supply sampling events at private residences pursuant to the Domestic Water Supply Plan and prepared annual monitoring reports of the results. The most recent annual monitoring occurred in October and November 2021 and the annual report was submitted to the Regional Board in December 2021.

Chino Airport Plume

In 1990, the Regional Board issued CAO No. 90-134 to the County of San Bernardino, Department of Airports (County) to address groundwater contamination originating from Chino Airport. During 1991 to 1992, ten underground storage tanks and 310 containers of hazardous waste were removed, and 81 soil borings were drilled and sampled on the airport property. From 2003 to 2005, nine onsite monitoring wells were installed and used to collect groundwater quality samples. In 2007, the County conducted its first offsite monitoring effort, and in 2008, the Regional Board issued CAO No. R8-2008-0064, requiring the County to define the lateral and vertical extent of the plume and prepare a remedial action plan. From 2009 to 2012, Tetra Tech, consultant to the County, conducted several off-site plume characterization studies to delineate the areal and vertical extent of the plume and constructed 33 offsite monitoring wells. From 2013 to early-2015, Tetra Tech conducted an extensive investigation of several areas identified for additional characterization of soil and groundwater contamination. At the conclusion of this work, they constructed an additional 33 groundwater monitoring wells on and adjacent to the airport property. In August 2016, the County completed a Draft Feasibility Study to identify remedial action objectives and evaluate remediation alternatives for mitigation. In January 2017, the Regional Board issued CAO R8-2017-0011, which requires the County to prepare a Final Feasibility Study that incorporates comments from the Regional Board and to prepare, submit, and implement a Remedial Action Plan. The County submitted a Final Feasibility Study for Chino Airport on June 6, 2017, and it was approved by the Regional Board on June 7, 2017. On December 18, 2017, the County submitted the *Draft Interim Remedial Action Plan* for public review and comment through April 2018. The preferred remediation alternative is a groundwater pump-and-treat system to provide hydraulic containment and treatment of both the West and the East Plumes,

Program Element 6: Develop and Implement Cooperative Programs with the Regional Water Quality Control Board, Santa Ana Region and Other Agencies to Improve Basin Management (Continued)

originating from Chino Airport. The system consists of ten extraction wells that combined will produce approximately 900 gallons per minute of groundwater for treatment using granular activated carbon (GAC). The system will also treat groundwater from CDA wells I-1 through I-4 and I-16 through I-18. Once treated, the preferred option is to discharge the treated groundwater to the CDA's Chino I Desalter influent pipeline via a newly constructed pipeline. Currently the County is in discussions with the CDA to discharge the treated water from the extraction system to the CDA's influent pipeline.

In late 2018, Watermaster used the Chino Basin groundwater flow model to analyze how increased groundwater production for the remedial solution from the ten new County well clusters and CDA wells will affect groundwater levels within the vicinity. Watermaster has commitments to this area to maintain Hydraulic Control and to avoid impacts to the groundwater dependent habitat in the Prado Basin. Watermaster completed the modeling and prepared a technical memorandum to describe the results, which concluded operation of the remedial solution would improve Hydraulic Control in this area.

In 2018, the County constructed five extraction wells and 12 nearby piezometers and conducted aquifer pumping tests at these wells. In 2019 and 2020, the County constructed 14 new monitoring wells at six locations to assist with the delineation of the plume. In May 2021, the County submitted the *Work Plan for Installation of Piezometers for Riparian Area Monitoring* for six piezometers at four locations to monitoring the groundwater levels near riparian habitat along Chino Creek to monitor the impact of Chino Airport groundwater remedial solution on groundwater elevations near riparian habitat in the area. During this reporting period, the County completed construction of six wells for monitoring potential impacts to the riparian habitat and initiated monitoring. The County began preparing the draft *Remedial Action Work Plan* which will be submitted to the Regional Board in the second half of 2022.

The County conducts quarterly and/or annual monitoring events at all 89 of their monitoring wells constructed to date. The conclusions from this monitoring program can be found in reports posted on the Regional Board's GeoTracker website. Watermaster also samples for water quality at private and monitoring wells in the area and uses this and other data obtained from its data collection programs to independently delineate the spatial extent of the plume. Watermaster completed its most recent characterization of the plume in June 2021 for the *2020 Chino Basin OBMP State of the Basin Report*. In April of this reporting period, Watermaster prepared a semi-annual status report on the Chino Airport Plume for Watermaster Parties. And, the County submitted, to the Regional Board, a *Semiannual Groundwater Monitoring Report Summer and Fall 2021 Chino Airport Groundwater Assessment, San Bernardino County, California.*

Other Water Quality Issues

Watermaster continues to track the monitoring programs and mitigation measures associated with other point sources in the Chino Basin, including: Alumax Aluminum Recycling, Alger Manufacturing Facility, the Former Crown Coach Facility, General Electric Test Cell and Flatiron, Former Kaiser Steel Mill, Milliken Landfill, Upland Landfill, and the Stringfellow National Priorities List sites. Watermaster prepared the most recent annual status reports in October 2021 for the GE Test Cell, GE Flatiron, Milliken Landfill, California Institution for Men, Stringfellow Plumes, and the former Kaiser Steel Mill site.

Watermaster completed the most current delineations of the extent of the VOC plumes in June 2021 for the GE Test Cell, GE Flatiron, Milliken Landfill, and so-called Pomona VOC Plumes as part of the *2020 Chino Basin OBMP State of the Basin Report.*

Program Element 7: Develop and Implement a Salt Management Program

Maximum Benefit Salinity Management Plan

In January 2004, the Regional Board amended the Basin Plan to incorporate an updated TDS and nitrogen (N) management plan. The Basin Plan amendment includes both "antidegradation" and "maximum-benefit" objectives for TDS and nitrate-N (nitrate) for the Chino-North and Cucamonga groundwater management zones (GMZs). The maximum-benefit objectives allow for recycled water reuse and recharge of recycled water and imported water without mitigation; these activities are an integral part of the OBMP. The application of the maximum-benefit objectives is contingent on the implementation of specific projects and requirements termed the maximum-benefit commitments by Watermaster and IEUA. The status of compliance with each commitment is reported to the Regional Board annually in April. The nine maximum-benefit commitments include:

1. The implementation of a surface water monitoring program.
2. The implementation of a groundwater monitoring program.

Program Element 7: Develop and Implement a Salt Management Program (Continued)

1. The expansion of the Chino I Desalter to a capacity of 10 MGD and the construction of the Chino II Desalter with a design capacity of 10 MGD.
2. The additional expansion of desalter capacity (to 40 MGD) pursuant to the OBMP and the Peace Agreement (tied to the IEUA's agency-wide effluent concentration).
3. The completion of the recharge facilities included in the Chino Basin Facilities Improvement Program.
4. The management of recycled water quality to ensure that the IEUA agency-wide, 12-month volume-weighted running average TDS and TIN concentrations do not exceed 550 mgl and 8 mgl, respectively.
5. The management of basin-wide, volume-weighted TDS and nitrogen concentrations in artificial recharge to less than or equal to the maximum-benefit objectives of 420 mgl and 5 mgl, respectively, on a five-year volume-weighted basis.
6. The achievement and maintenance of the "Hydraulic Control" of groundwater outflow from the Chino Basin, specifically from Chino-North GMZ, to protect Santa Ana River water quality and downstream beneficial uses.
7. The determination of ambient TDS and nitrate concentrations of Chino Basin groundwater every three years.

Monitoring Programs. Pursuant to maximum-benefit commitment numbers 1 and 2, Watermaster and the IEUA submitted a surface water and groundwater monitoring program work plan to the Regional Board in May 2004. On April 15, 2005, the Regional Board adopted resolution R8-2005-0064, approving Watermaster and the IEUA's surface and groundwater monitoring programs (2005 Work Plan). These monitoring programs were implemented pursuant to the 2005 Work Plan from 2004 to 2012. On February 12, 2012, the Regional Board adopted an amendment to the Basin Plan to remove all references to the specific monitoring locations and sampling frequencies required for groundwater and surface water monitoring. The Basin Plan amendment allows the monitoring programs to be modified over time, subject to the approval of the Executive Officer of the Regional Board. On December 6, 2012, the State Office of Administrative Law finalized the approval of the Basin Plan amendment. In place of specific monitoring requirements, the Basin Plan amendment required that Watermaster and the IEUA submit (i) a new surface water monitoring program work plan by February 25, 2012 and (ii) a new groundwater monitoring program work plan by December 31, 2013 to the Regional Board for approval. Pursuant to (i), Watermaster and the IEUA submitted the *2012 Hydraulic Control Monitoring Program Work Plan*, which was approved by the Regional Board in March 2012. Pursuant to (ii), Watermaster and the IEUA submitted the *2014 Maximum-Benefit Monitoring Program Work Plan* (2014 Work Plan) which was approved by the Regional Board in April 2014. The 2014 Workplan describes: the questions to be answered by the monitoring program, the methods that will be employed to address each question, the monitoring and data collection that will be performed to implement the methods, and a reporting schedule. The monitoring pursuant to the 2014 Work Plan is incorporated as part of the groundwater level, groundwater quality, and surface water monitoring programs described in Program Element 1. During this reporting period, Watermaster continued implementing the monitoring programs (see Program Element 1 for details).

Hydraulic Control and Chino Basin Desalters. Pursuant to maximum-benefit commitment number 8, to achieve and maintain Hydraulic Control, Watermaster and the IEUA constructed desalter wells and expanded the desalter capacity (maximum-benefit commitments numbers 3 and 4) to increase desalter production in the southern portion of the Chino Basin. The Chino Basin Desalters are designed to replace the diminishing agricultural production that previously prevented the outflow of high TDS and nitrate groundwater to the Santa Ana River and the Prado Basin surface water management zone (PBMZ). Hydraulic Control is defined by the Basin Plan as the elimination of groundwater discharge from the Chino-North GMZ to the Santa Ana River to a *de minimis* level. Pursuant to commitment number 8, Watermaster and the IEUA submitted a mitigation plan (2005 Mitigation Plan) to the Regional Board in March 2005. This plan demonstrated how Watermaster and the IEUA would address the mitigation for any temporary loss of hydraulic control. In October 2011, the Regional Board defined the de minimis discharge of groundwater from the Chino-North GMZ to the PBMZ as 1,000 acre-feet per year or less. Watermaster and the IEUA have demonstrated that complete Hydraulic Control has been achieved at and east of Chino I Desalter Well 20. The construction and operation of the CCWF (see Program Element 5), which began in 2010, is intended to achieve Hydraulic Control, per the definition above, at the area west of Chino I Desalter Well 5. Watermaster and the IEUA recalibrate the Chino Basin groundwater-flow model every five years to estimate groundwater discharge from the Chino-North GMZ to the PBMZ (i.e., annual underflow past the CCWF) to determine whether Hydraulic Control has been achieved.

In February 2016, the CCWF commenced full-scale operation with production at wells I-16, I-17, I-20, and I-21 to achieve and maintain Hydraulic Control at the area west of Chino I Desalter Well 5. Production at the CCWF has decreased since 2017 as a result of the new maximum contaminant level (MCL) for 1,2,3-TCP, which required the temporary cessation of operation at Well I-17. In 2020, the Chino Basin groundwater-flow model was used to estimate the historical (fiscal year 2004-2018) and projected (fiscal year

Program Element 7: Develop and Implement a Salt Management Program (Continued)

2019-2050) volume of groundwater discharge past the CCWF under revised pumping conditions at the CCWF. The model results indicate that both the estimated historical and projected discharge past the CCWF area is always below the de minimis threshold level of 1,000 acre-feet per year. The model assumes an annual average pumping volume at the CCWF of 992 acre-feet per year from fiscal year 2019 through 2050.

Future agricultural groundwater production in the southern part of the basin is expected to continue to decline, necessitating future expansion of the desalters to sustain Hydraulic Control. In a letter dated January 23, 2014, the Regional Board required that Watermaster and the IEUA submit a plan detailing how Hydraulic Control will be sustained in the future as agricultural production in the southern region of Chino-North continues to decrease—specifically, how the Chino Basin Desalters will achieve the required total groundwater production level of 40,000 acre-feet per year. On June 30, 2015, Watermaster and the IEUA submitted a final plan and schedule for the construction and operation of three new desalter wells (II-10, II-11, and II-12). Well II-10 and II-11 were constructed and began operation in mid-2018, and Well II-12 was constructed in 2020 and began operation in mid-2021. The CDA officially reached the pumping capacity necessary to meet the 40,000 acre-feet per year required for Hydraulic Control in June 2020. This pumping capacity was achieved without the inclusion of Well II-12, which was part of the final expansion plan designed to meet the 40,000 acre-feet per year. A full status report on the desalter expansion facilities is described in Program Element 3.

During this reporting period, Watermaster prepared an update to the 2005 Mitigation Plan to formally update (i) plan and schedule for the mitigation of any temporary loss of Hydraulic Control, (ii) definition of the required minimum pumping at the CCWF to maintain outflows from the Chino-North GMZ to the PBMZ to de minimis level, and (iii) definition of operational flexibility around the 40,000 acre-feet per year requirement for the aggregate pumping at the CDA facilities. The updated mitigation plan was submitted to the Regional Board on June 21, 2022.

Recycled Water Recharge. Pursuant to the maximum-benefit commitment number 5, Watermaster and the IEUA completed the construction of the recharge facilities and began artificial recharge of stormwater and recycled water in the Chino Basin in 2005. Additionally, pursuant to maximum-benefit commitment number 7, Watermaster and the IEUA limit recycled water for artificial recharge to the amount that can be blended on a volume-weighted basis with other sources of recharge to achieve five-year running average concentrations of no more than the maximum-benefit objectives (420 mgl for TDS and 5 mgl for nitrate). This data is compiled and analyzed in April of each year for reporting to the Regional Board. During this reporting period, Watermaster and the IEUA continued their monitoring programs to collect the data required for analysis and reporting to the Regional Board. Since recycled water recharge began in July 2005, the five-year volume-weighted running average TDS and nitrate concentrations have never exceeded the maximum-benefit objectives. As of December 2021, the five-year volume-weighted running average TDS and nitrate concentrations of these three recharge sources were 264 and 1.5 mgl, respectively.

Recycled Water Quality. Pursuant to the maximum-benefit commitment number 6, Watermaster and the IEUA manage the recycled water quality to ensure that the 12-month volume-weighted running average IEUA agency-wide, wastewater effluent quality does not exceed the permit limits of 550 mgl and 8 mgl for TDS and TIN, respectively. Additionally, Watermaster and the IEUA must submit a plan and schedule to the Regional Board for the implementation of measures to ensure long-term compliance with these permit limits when either the 12 -month volume-weighted running average IEUA agency-wide effluent TDS concentration exceeds 545 mgl for three consecutive months or the TIN concentration exceeds 8 mgl in any one month (action limits). The IEUA calculates and reports the 12-month volume-weighted running average agency-wide effluent TDS and TIN concentrations in the *Groundwater Recharge Program Quarterly Monitoring Reports*.

Recycled Water Being Discharged Into 8th Street Basin for Recharge

Since the initiation of recycled water recharge in July 2005, the 12-month running average TDS and TIN concentrations have ranged between 456 and 534 mgl and 3.8 and 7.6 mgl, respectively, and have never exceeded the permit limits. During the statewide drought in mid-2015, a historical high 12-month running average IEUA agency-wide effluent TDS concentration of 534 mgl was calculated for three consecutive months: June, July, and August. This 12-month running average IEUA agency-wide effluent TDS concentration of 534 mgl was only 11 mgl below the action limit. The 12-month running average agency-wide TDS concentration has decreased since mid-2015. As of December 2021, the 12-month running average IEUA agency-wide effluent TDS concentration was 494 mgl.

Program Element 7: Develop and Implement a Salt Management Program (Continued)

Through analysis of water supply and wastewater data, Watermaster and the IEUA concluded that drought conditions have a meaningful impact on the short-term TDS concentration of the water supplies available to IEUA agencies and that future droughts similar to the 2012-2016 period could lead to short-term exceedances of the 12-month running average IEUA agency-wide effluent TDS concentration. For this reason, in October 2016, Watermaster and the IEUA petitioned the Regional Board to consider modifying the TDS compliance metric for recycled water to a longer-term averaging period. The Regional Board agreed that an evaluation of the compliance metric was warranted and directed Watermaster and the IEUA to develop a technical scope of work to support the adoption of a longer-term averaging period for incorporation into the Basin Plan. The proposed technical scope of work to support a Basin Plan amendment to revise the recycled water compliance metric was submitted to the Regional Board in May 2017. The proposed scope of work which was approved by the Regional Board includes the following tasks:

- Develop numerical modeling tools (R4, Hydrus 2D, MODFLOW, MT3D) to evaluate the projected TDS and nitrate concentrations of the Chino Basin.
- Define a baseline (status-quo) scenario and evaluate it with the new modeling tools.
- Define salinity management planning scenarios and evaluate them with the new modeling tools to compare the projected TDS and nitrate concentrations against the baseline scenario.
- Use the results to develop a draft regulatory compliance strategy that includes a longer-term average period for recycled water TDS concentrations.
- Collaborate with the Regional Board to review and finalize the regulatory strategy.
- Support the Regional Board in the preparation of a Basin Plan amendment upon approval of the regulatory strategy.

Watermaster and the IEUA began implementing the scope of work in July 2017 and have been working collaboratively with Regional Board staff to review interim work products and address new technical questions that have arisen. In December 2021, Watermaster and the IEUA completed and submitted the documentation of the technical work, *Total Dissolved Solids and Nitrate Concentrations Projections for the Chino Basin*, to the Regional Board.

During this reporting period, Watermaster and the IEUA continue to work with the Regional Board to finalize a regulatory compliance strategy based on the projection results.

Ambient Groundwater Quality. Pursuant to the maximum-benefit commitment number 9, Watermaster and the IEUA recompute ambient TDS and nitrate concentrations for the Chino Basin and Cucamonga GMZs every three years (due by June 30). The re-computation of ambient water quality is performed for the entire Santa Ana River Watershed, and the technical work is contracted, managed, and directed by the Santa Ana Watershed Project Authority's (SAWPA) Basin Monitoring Program Task Force (Task Force). Watermaster and the IEUA have participated in each triennial, watershed-wide ambient water quality determination as members of the Task Force. The most recent recomputation covering the 20-year period from 1999 to 2018 was completed in July 2020.

Program Element 8: Develop and Implement a Groundwater Storage Management Program; and Program Element 9: Develop and Implement a Storage and Recovery Program

Groundwater storage is critical to the Chino Basin stakeholders. The OBMP outlines Watermaster's commitments to investigate the technical and management implications of Local Storage Agreements, improve related policies and procedures, and then revisit all pending Local Storage Agreement applications.

The existing Watermaster/IEUA/MWDSC/Three Valleys Municipal Water District Dry-Year Yield (DYY) program is the only Storage and Recovery Program that is being implemented in the Chino Basin. By April 30, 2011, all DYY program construction projects and a full "put" and "take" cycle had been completed, leaving the DYY storage account with a zero balance. Another DYY cycle began in June 2017. During this past year, there have been several "takes" that have yet to be certified. If and when they are certified, the DYY storage account balance will be zero acre-feet as of June 30, 2022, completing this DYY cycle.

Program Element 8: Develop and Implement a Groundwater Storage Management Program; and Program Element 9: Develop and Implement a Storage and Recovery Program (Continued)

Safe Yield Recalculation

The Basin's Safe Yield was initially set by the Judgment at 140,000 acre-feet per year. The Safe Yield was based on the hydrology for the period of 1965 through 1974. Pursuant to the Judgment, the Chino Basin Safe Yield is to be recalculated periodically but not for at least ten years following 1978.

Pursuant to the OBMP Implementation Plan and Watermaster's Rules and Regulations, in year 2010/11 and every ten years thereafter, Watermaster is to recalculate the Safe Yield. The 2011 Safe Yield recalculation began in 2011 and after significant technical and legal process, on April 28, 2017, the Court issued a final order (2017 Court Order), resetting the Safe Yield to 135,000 acre-feet per year effective July 1, 2010.

In July 2018, Watermaster's Engineer began the technical work necessary for the Safe Yield recalculation for 2020 pursuant to the OBMP Implementation Plan using the approved methodology in the 2017 Court Order. After substantial technical process and stakeholder engagement, the Watermaster Board adopted recommendations to the Court to update the Safe Yield for the period 2021 through 2030 to 131,000 acre-feet per year. In July 2020, the Court approved Watermaster's recommendation and reset the Safe Yield to 131,000 acre-feet per year for the period commencing on July 1, 2020 and ending on June 30, 2030.

The 2017 Court Order requires that the Safe Yield be reevaluated again no later than June 30, 2025 and provides support for the ongoing improvement of the process to recalculate the Safe Yield. More specifically, the 2017 Court Order: 1) allows for supplementation of the current Safe Yield Reset methodology and 2) requires annual collection and evaluation of data regarding cultural conditions of the Chino Basin. The annual data collection and evaluation process includes determining whether "there has been or will be a material change from existing and projected conditions or threatened undesirable results" as compared to the conditions evaluated in the current Safe Yield recalculation study. If evaluation of the data suggests that any of these criteria are met, then Watermaster's Engineer is required to undertake "a more significant evaluation" to model the impacts of the existing and projected cultural conditions on the Chino Basin. During the reporting period, Watermaster's Engineer continued work to supplement the current Safe Yield Reset methodology to address comments received during the peer review process of the 2020 Safe Yield recalculation regarding uncertainty in the groundwater model and the data used in future projections. Watermaster's Engineer also completed the first data collection and evaluation process pursuant to the 2017 Court Order. This process resulted in the completion of the *Data Collection and Evaluation Report for Fiscal Year 2020/2021* in May 2022.

Groundwater Storage Management

Addendum to PEIR. The original OBMP storage management program consists of managing groundwater production, replenishment, recharge, and storage such that the total storage within the basin would range from a low of 5,300,000 acre-feet to a high of 5,800,000 acre-feet. The following storage-related definitions are included in the OBMP Implementation Plan:

- Operational Storage Requirement – The Operational Storage Requirement is the storage or volume in the Chino Basin that is necessary to maintain the Safe Yield. (Note: this is an average value with the storage oscillating around this value due to dry and wet periods in precipitation. The Operational Storage Requirement was estimated in the development of the OBMP to be about 5.3 million acre-feet. This storage value was set at the estimated storage in the basin in 1997.)
- Safe Storage – Safe Storage is an estimate of the maximum storage in the basin that will not cause significant water quality and high groundwater related problems. (Note: safe storage was estimated in the development of the OBMP to be about 5.8 million acre-feet.)
- Safe Storage Capacity – Safe Storage Capacity is the difference between Safe Storage and the Operational Storage Requirement. The allocation and use of storage space in excess of the Safe Storage Capacity will preemptively require mitigation: mitigation must be defined, and resources must be committed to mitigation prior to allocation and use.

Water occupying the Safe Storage Capacity includes Local Storage Account Water, Carryover Water, and water anticipated to be stored in future groundwater storage programs. This storage management program was evaluated in the OBMP programmatic environmental impact report (PEIR) in 2000.

Subsequent to the OBMP PEIR, Watermaster and the Watermaster Parties developed revisions to the OBMP based on: new monitoring and borehole data collected since 1998, an improved hydrogeologic conceptualization of the basin, new numerical models that have improved the understanding of basin hydrology since 2000, and the need to expand the Chino Basin Desalters (desalters)

Program Element 8: Develop and Implement a Groundwater Storage Management Program; and Program Element 9: Develop and Implement a Storage and Recovery Program (Continued)

to the 40,000 acre-feet per year of groundwater production required in the OBMP Implementation Plan. These investigations included a recalculation of the total water in storage in the basin, based on the improved hydrogeologic understanding. The total storage in the Chino Basin for 2000 was estimated to be about 5.9 million acre-feet[1].

The Peace II Agreement was negotiated by the Watermaster Parties to implement, among other things, the expansion of the desalters, the dedication of 400,000 acre-feet of groundwater in storage to desalter replenishment, and changes in the Judgment to implement the Peace II Agreement. However, there was no change to the storage management plan in the OBMP Implementation Plan even though the revised storage estimated for 2000 was greater than the Safe Storage, and the implementation of the Peace II Agreement would result in 400,000 acre-feet of new controlled overdraft. The IEUA completed and subsequently adopted a supplemental environmental impact report for the Peace II Agreement in 2010.

As basin storage continued to grow following the implementation of the desalters and the Peace II Agreement, Watermaster and the IEUA proposed a temporary increase in the Safe Storage Capacity, which was analyzed through an addendum to the 2000 PEIR. On March 15, 2017, the IEUA adopted an addendum to the 2000 PEIR, increasing the Safe Storage Capacity from 500,000 acre-feet to 600,000 acre-feet for the period July 1, 2017 through June 30, 2021. This temporary increase in Safe Storage Capacity was found to not cause material physical injury (MPI) and/or loss of Hydraulic Control, and it provided Watermaster, with assistance from the Parties, time to develop a new storage management plan and agreements to implement it.

2020 Storage Management Plan. During the period June through December 2019, Watermaster staff and consultants conducted a process with the Watermaster Parties and Board to develop the 2020 Storage Management Plan (2020 SMP) that would update the SMP currently included in the OBMP implementation plan. In that effort, Watermaster prepared a white paper that outlined the need and requirements of the 2020 SMP and presented it to the Watermaster Parties and other interested stakeholders in June 2019. This work built upon the findings of the 2018 Storage Framework Investigation, where Watermaster's Engineer evaluated the use of storage space in the range of 700,000 acre-feet to 1,000,000 acre-feet for potential Storage and Recovery programs. Watermaster and its Engineer published a final SMP report on December 19, 2019. This report was included in the 2020 OBMP Update Report, which the Watermaster Board adopted in full in October 2020. The SMP will be incorporated into the implementation plan for the 2020 OBMP Update.

Local Storage Limitation Solution. The temporary increase in Safe Storage Capacity to 600,000 acre-feet was set to expire on June 30, 2021, after which it would have declined to 500,000 acre-feet absent a new Court-approved storage agreement. At the end of Production Year 2020, the total volume of Managed Storage was about 588,000 acre-feet. Anticipating the expiration of the temporary increase in Safe Storage, Watermaster Parties recommended that environmental documentation and analysis be developed to cover the use of Managed Storage above 500,000 acre-feet beyond June 30, 2021. The Parties' projected behavior and the operations of the DYY program were called the Local Storage Limitation Solution (LSLS). During fiscal year 2020/21, Watermaster's Engineer completed an investigation to assess the potential MPI for the LSLS using the updated groundwater-flow model that was used to recalculate the Safe Yield. The conclusions of the investigation were that there would be no unmitigable significant adverse impacts attributable to the LSLS. This work supported CEQA documentation to increase the Safe Storage Capacity after June 30, 2021. The LSLS allows the Safe Storage Capacity to increase to 700,000 acre-feet through June 30, 2030, and 620,000 acre-feet from July 1, 2030 through June 30, 2035. The CEQA documentation formed Addendum No. 2 to the OBMP PEIR, which was adopted by the IEUA Board on March 17, 2021. The Court granted Watermaster's motion to implement the LSLS, which became effective on July 1, 2021.

2020 OBMP Update

OBMP implementation began in 2000. By 2019, many of the projects and management programs envisioned in the 2000 OBMP have been implemented. The understanding of the hydrology and hydrogeology of the Chino Basin has improved since 2000, and new water-management issues have been identified that necessitate that the OBMP be adapted to protect the collective interests of the Watermaster Parties and their water supply reliability. For these reasons, the Watermaster Parties prepared a 2020 OBMP Update to set the framework for the next 20 years of basin-management activities.

During 2019, Watermaster convened a collaborative stakeholder process to prepare the 2020 OBMP Update, similar to that the process employed for the development of the 2000 OBMP. A series of eight stakeholder "Listening Sessions" were held by the Watermaster to obtain information, ideas, and feedback from the Chino Basin stakeholders to define their issues needs and wants, their collective goals for the 2020 OBMP Update, the impediments to achieving the goals, and the management actions required to remove the impediments.

[1]The most recent modeling of the Chino Basin estimates the total water in storage to be about 12 million acre-feet.

Program Element 8: Develop and Implement a Groundwater Storage Management Program; and Program Element 9: Develop and Implement a Storage and Recovery Program (Continued)

The final 2020 OBMP Scoping Report (Scoping Report) was published in November 2019 to document the results of the first four Listening Sessions. The Scoping Report summarized (1) the need to update the OBMP, (2) the issues, needs, and wants of the stakeholders, (3) the goals for the 2020 OBMP Update, and (4) the recommended scope of work to implement seven stakeholder-defined basin-management activities that could be included in the 2020 OBMP Update.

Through the listening session process, it became apparent that the 2000 OBMP goals remain unchanged, and the nine Program Elements (PEs) defined in the 2000 OBMP are still relevant today as the overarching program elements of a basin management program. Each of the seven activities in the Scoping Report had objectives and tasks that were directly related to one or more of the 2000 OBMP PEs. Based on this finding, the nine PEs defined in the 2000 OBMP were retained for the 2020 OBMP Update. Each of the seven activities were mapped to one of the existing PEs.

In January 2020, the Watermaster published the 2020 OBMP Update Report, which described: (1) the 2020 OBMP Update process; (2) the OBMP goals and new activities for the 2020 OBMP Update; (3) the status of the OBMP PEs and ongoing activities within them; and (4) the recommended 2020 OBMP management plan – inclusive of ongoing and new activities. The management plan will form the foundation for the Watermaster Parties to develop a 2020 OBMP Implementation Plan and the agreements necessary to implement it. After several workshops and comprehensive review and comments by Watermaster Parties, the final 2020 OBMP Update Report was adopted by the Watermaster Board on October 22, 2020.

Additionally, in January 2020, the Watermaster and IEUA (as the lead agency) began preparing a new environmental documentation (PEIR) to support the OBMP Update. The updated PEIR will support decision-making, investment, and grant applications for ongoing and new management actions under the OBMP. Based on input from the Parties, the certification of the PEIR was postponed to a later time.

In March 2020, Watermaster convened a series of "Drafting Sessions" with the Watermaster Parties to develop a 2020 OBMP Implementation Plan Update and an agreement to implement it. Due to the COVID-19 Pandemic, the Chino Basin Parties requested that the Drafting Sessions be put on hold. The Parties decided that the immediate focus for 2020 OBMP implementation would be related to storage management and the LSLS (see above). All other 2020 OBMP Update implementation activities are being deferred for the time being.

CHINO BASIN WATERMASTER

II. BUSINESS ITEMS

A. SAFE YIELD RESET METHODOLOGY UPDATE

CHINO BASIN WATERMASTER

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PETER KAVOUNAS, P.E.
General Manager

STAFF REPORT

DATE: September 8, 2022

TO: AP/ONAP/OAP Committee Members

SUBJECT: Safe Yield Reset Methodology Update (Business Item II.A.)

SUMMARY:

Issue: Pursuant to the April 28, 2017 Court Order, Watermaster is updating the Safe Yield Reset Methodology. [Whitin WM Duties and Powers]

Recommendation: Provide advice and assistance.

Financial Impact: None

Future Consideration
Appropriative Pool – September 8, 2022: Advice and Assistance
Non-Agricultural Pool – September 8, 2022: Advice and Assistance
Agricultural Pool – September 8, 2022: Advice and Assistance
Advisory Committee – September 15, 2022: Advice and Assistance
Watermaster Board – September 22, 2022: Approve and file with the Court

ACTIONS:
Appropriative Pool – September 8, 2022:
Non-Agricultural Pool – September 8, 2022:
Agricultural Pool – September 8, 2022:
Advisory Committee – September 15, 2022:
Watermaster Board – September 22, 2022:

BACKGROUND

The Chino Basin Judgment defines the Safe Yield as the "long-term average annual quantity of ground water (excluding replenishment or stored water but including return flow to the Basin from use of replenishment or stored water) which can be produced from the Basin under cultural conditions of a particular year without causing an undesirable result."[1]

The "long-term average annual quantity of ground water which can be produced from the Basin" is directly related to the long-term average hydrologic conditions, such as precipitation. The "cultural conditions" refer to the overlying land uses and water-management practices that affect the net recharge to the Basin, including but not limited to, impervious land cover, channel lining, land use conversions from agricultural to urban uses, irrigation practices, installation, and operation of the Chino Desalter well fields, construction of recharge basins, and the location and magnitude of groundwater pumping, etc.

The Judgment also provides for a Physical Solution to provide maximum flexibility and adaptability in order that Watermaster and the Court may be free to use existing and future technological, social, institutional, and economic options in order to maximize the beneficial use of the Chino Basin.[2]

DISCUSSION

Watermaster developed a methodology to recalculate the Safe Yield for the period of July 1, 2010, through June 30, 2020, pursuant to the requirements of the OBMP (Optimum Basin Management Program) and Watermaster's Rules and Regulations. This methodology is documented in a technical memorandum dated August 10, 2015 (2015 SY Reset TM (Technical Memorandum)) that was approved by the Court in April 2017[3] (2017 Court Order) and is included as Exhibit A of the current Rules and Regulations.[4] The methodology outlined in the 2015 SY Reset TM was used to recalculate and reset the Safe Yield for the periods of July 1, 2010 through June 30, 2020 and July 1, 2020 through June 30, 2030.[5]

The Court's Orders for Watermaster's Motion Regarding the 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6, includes provisions regarding potential updates to the Safe Yield Reset methodology:

> *"4.4 Safe Yield Reset Methodology. […] In furtherance of the goal of maximizing the beneficial use of the waters of the Chino Basin, Watermaster, with the recommendation and advice of the Pools and Advisory Committee, may supplement the Reset Technical Memorandum's methodology to incorporate future advances in best management practices and hydrologic science as they evolve over the term of this order."*

During the process to reset the Safe Yield for the period July 1, 2020, through June 30, 2030, several Parties provided written comments and one party argued in Court recommending changes to the current Safe Yield

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[1] Section I.4.x of the *2012 Chino Basin Restated Judgment*, http://www.cbwm.org/docs/WatermasterCourtFilings/2012/2012%20Watermaster%20Restated%20Judgment.pdf

[2] See paragraph 40 of the *2012 Chino Basin Restated Judgment*

[3] *Orders for Watermaster's Motion Regarding the 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6,* Superior Court for the County of San Bernardino (2017), http://www.cbwm.org/docs/WatermasterCourtFilings/2017/20170418%20Further%20Revised%20Proposed%20Order%20re%20SYRA%20and%20Final%20Rulings%20and%20Order%20for%20Oral%20Argument.pdf

[4] See the 2022 *Chino Basin Watermaster Rules and Regulations,* http://www.cbwm.org/docs/rulesregs/CBWM%20Rules%20and%20Regulations%20[2022].pdf

[5] *Orders for Watermaster's Motion Regarding the 2020 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6*, Superior Court for the County of San Bernardino (2020), http://www.cbwm.org/docs/WatermasterCourtFilings/2020/20200806%20Notice%20of%20Orders.pdf

Reset methodology[6] including the recommendation to update the methodology to address uncertainty in the Safe Yield Reset modeling process.

In response to the Parties' recommendations and pursuant to the 2017 Court Order, Watermaster commenced an effort to update the current Safe Yield Reset methodology. Watermaster held three peer review workshops in October 2021, May 2022, and July 2022 to facilitate the update of the Safe Yield Reset methodology and gather feedback from the Parties. Watermaster also conducted a non-technical workshop for the Parties in May 2022 to describe the proposed updated methodology for the lay person. These workshops assisted the development of a separate TM that describes the proposed update to the Safe Yield Reset methodology, which is summarized in attachment 2.

The 2022 Safe Yield Reset Methodology Update (2022 SYRMU) has been updated from the 2015 Safe Yield Reset Methodology to be consistent with the Court Order and Parties' comments and to incorporate best management practices. The 2022 SYRMU adds requirements for the Safe Yield Reset process to consider the inherent uncertainty in the parameters of the groundwater-flow model and the predictive uncertainty of future water demands, water supplies, and hydrology. To consider the uncertainty in the groundwater-flow model parameters, the 2022 SYRMU includes an uncertainty analysis during the model calibration process to identify a plausible range of calibrated models. To consider predictive uncertainty, the 2022 SYRMU requires that the Safe Yield be reset based on the simulation results of an ensemble of multiple projection scenarios, with each scenario comprising unique combinations of water demand, water supply plans, and climate/hydrology.

Watermaster is grateful for the parties' participation in offering feedback, recommendations and advice that have helped improve the recommended methodology. Watermaster is seeking recommendation and advice from the Pool Committees and the Advisory Committee on this matter. Following the Committees' consideration, the Watermaster Board will consider the update to the Methodology to Reset the Safe Yield for filing with the Court for its approval.

ATTACHMENTS

1. Proposed Updated Methodology to Calculate the Safe Yield of the Chino Basin Technical Memorandum. Please access through the following link.
2. Methodology to Reset the Safe Yield of the Chino Basin Technical Memorandum

[6] See Appendix F of the *2020 Safe Yield Recalculation Report*, http://www.cbwm.org/docs/engdocs/Ground%20Water%20Modeling/20200515_Final_2020SYR_Report.pdf

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TECHNICAL MEMORANDUM

DATE: September 1, 2022

Project No.: 941-80-22-32
SENT VIA: EMAIL

TO: Peter Kavounas, Chino Basin Watermaster

FROM: Garrett Rapp, PE, RCE #86007
Eric Chiang, PhD
Lauren Sather, PhD

REVIEWED BY: Mark Wildermuth, PE, RCE #32331
Andy Malone, PG #8700

SUBJECT: Proposed Updated Methodology to Calculate the Safe Yield of the Chino Basin

This Technical Memorandum (TM) documents West Yost's findings related to the development of an updated Safe Yield Reset methodology. This TM is prepared pursuant to the scope of work[1] to comply with the April 28, 2017, Court Order regarding the Safe Yield of the Chino Basin (2017 Court Order).[2]

1.0 BACKGROUND AND OBJECTIVES

The Chino Basin Judgment defines the Safe Yield as the "long-term average annual quantity of ground water (excluding replenishment or stored water but including return flow to the Basin from use of replenishment or stored water) which can be produced from the Basin under cultural conditions of a particular year without causing an undesirable result."[3] The Judgment set the initial Safe Yield at 140,000 acre-feet per year (afy).

The Judgment also provides for a Physical Solution to provide maximum flexibility and adaptability in order that Watermaster and the Court may be free to use existing and future technological, social, institutional, and economic options in order to maximize the beneficial use of the Chino Basin.[4]

Watermaster's Optimum Basin Management Program (OBMP) Implementation Plan called for an initial redetermination of the Safe Yield in 2011 using monitoring data collected during the period of 2001 through

[1] The scope of work is described in Exhibit B of West Yost's October 29, 2021 letter http://www.cbwm.org/docs/othermeetings/2021%2010%2026%20-%20Safe%20Yield%20Reset%20Methodology%20Peer%20Review/downloads/20211029_SYCourtOrder_Supp_Scope_Budget.pdf

[2] *Orders for Watermaster's Motion Regarding the 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment,* Paragraph 6, Superior Court for the County of San Bernardino (2017), http://www.cbwm.org/docs/WatermasterCourtFilings/2017/20170418%20Further%20Revised%20Proposed%20Order%20re%20SYRA%20and%20Final%20Rulings%20and%20Order%20for%20Oral%20Argument.pdf

[3] Section I.4.x of the *2012 Chino Basin Restated Judgment*, http://www.cbwm.org/docs/WatermasterCourtFilings/2012/2012%20Watermaster%20Restated%20Judgment.pdf

[4] See paragraph 40 of the *2012 Chino Basin Restated Judgment*

2010.[5] This was incorporated as a requirement in Watermaster's Rules and Regulations.[6] In 2012, Watermaster began an investigation to recalculate the Safe Yield of the Chino Basin, which was completed in 2015. The investigation developed and implemented a methodology to calculate Safe Yield and concluded that the Safe Yield for the period of fiscal year (FY) 2010/11 through 2019/20 was 135,000 afy (WEI, 2015).[7] The methodology used to calculate the Safe Yield was approved in the 2017 Court Order and is described below:

> *"The methodology to redetermine the Safe Yield for 2010/11 and the recommended methodology for future Safe Yield evaluations is listed below. This methodology is consistent with professional custom, standard and practice, and the definition of Safe Yield in the Judgment and the Physical Solution.*
>
> 1. *Use the data collected during 2000/01 to 2009/10 (and in the case of subsequent resets newly collected data) in the re-calibration process for the Watermaster's groundwater-flow model.*
> 2. *Use a long-term historical record of precipitation falling on current and projected future land uses to estimate the long-term average net recharge to the Basin.*
> 3. *Describe the current and projected future cultural conditions, including, but not limited to the plans for pumping, stormwater recharge and supplemental-water recharge.*
> 4. *With the information generated in [1] through [3] above, use the groundwater-flow model to redetermine the net recharge to the Chino Basin taking into account the then existing current and projected future cultural conditions.*
> 5. *Qualitatively evaluate whether the groundwater production at the net recharge rate estimated in [4] above will cause or threaten to cause "undesirable results" or "Material Physical Injury". If groundwater production at net recharge rate estimated in [4] above will cause or threaten to cause "undesirable results" or "Material Physical Injury" then Watermaster will identify and implement prudent measures necessary to mitigate "undesirable results" or "Material Physical Injury", set the value of Safe Yield to ensure there is no "undesirable results" or "Material Physical Injury", or implement a combination of mitigation measures and a changed Safe Yield."*

In addition to approving the current Safe Yield Reset methodology, the 2017 Court Order included provisions regarding potential future updates to the Safe Yield Reset methodology:

> *"4.4 Safe Yield Reset Methodology. […] In furtherance of the goal of maximizing the beneficial use of the waters of the Chino Basin, Watermaster, with the recommendation and advice of the Pools and Advisory Committee, may supplement the Reset Technical Memorandum's methodology to*

[5] OBMP Implementation Plan, p. 44-45, Program Element 8 – Develop and Implement Groundwater Storage Management Program, Program Element 9 – Develop and Implement Storage and Recovery Program, http://www.cbwm.org/docs/legaldocs/Implementation_Plan.pdf

[6] See Section 6.5 of the June 2001 Chino Basin Watermaster Rules and Regulations, http://www.cbwm.org/docs/rulesregs/CBWM%20Rules%20and%20Regulations.pdf

[7] The report 2013 Groundwater Model Update and Recalculation of the Safe Yield Pursuant to the Peace Agreement, http://www.cbwm.org/docs/engdocs/WEI%202013%20CBWM%20Recalculation%20Model%20Update/20151005_WEI_2013_CBWM_Recal_Model_Final_low.pdf

incorporate future advances in best management practices and hydrologic science as they evolve over the term of this order."

Page 17 of the 2017 Court Order requires that "[t]he Pools be provided with reasonable opportunity, no less frequently than annually, for peer review of the collection of data and the application of the data collected in regard to" the update of the Safe Yield Reset methodology and the other requirements set forth in the 2017 Court Order.

The Safe Yield of the Chino Basin was recalculated in May 2020 using the 2020 Chino Valley Model (2020 CVM) and documented in the *2020 Safe Yield Recalculation Report* (2020 SYR Report) (WEI, 2020).[8] The Court adopted a Safe Yield of 131,000 acre-feet per year for the period of FY 2020/21 through 2029/30.[9] To aid the development of the 2020 CVM and its application to recalculate the Safe Yield, Watermaster conducted several peer review/stakeholder workshops for the Parties and their invited technical consultants. The questions and comments that arose during the review process were recorded and responded to in writing in Appendix F of the 2020 SYR Report. Several of these comments and questions are related to the Safe Yield Reset methodology and can be grouped into the following two categories:

- Recommendations to characterize and address uncertainty in the 2020 CVM and SYR methodology.
  - Uncertainty in groundwater model parameters (Appendix F-6, page 2-3; Appendix F-6, page 25)
  - Uncertainty in historical data (Appendix F-6, page 14)
  - Uncertainty in supply and demand projections (Appendix F-2, page 4; Appendix F-2, page 8; Appendix F-4, page 4; Appendix F-6, page 2-3; Appendix F-6, page 20)
  - Uncertainty in projected hydrology and human behavior (Numerous)
- Recommendations to reconsider the 10-year prospective calculation of the Safe Yield (Appendix F-5, page 1; Appendix F-5, page 3; Appendix F-6, page 22; Appendix F-7, page 1-2).

1.1 Scope of Work to Update the Safe Yield Reset Methodology

In FY 2020/21 and early FY 2021/22, Watermaster and the Parties collaborated to develop and refine a scope of work to update the Safe Yield Reset methodology pursuant to the 2017 Court Order and the above recommendations of the Parties. The initial scope of work comprised the following steps:

1. Watermaster's Engineer will develop a TM defining the various sources of modeling uncertainty that should be considered and addressed in an updated Safe Yield Reset methodology, including related questions necessary to answer when updating the Safe Yield Reset methodology. This TM will be submitted to the Parties for review and comment.
2. Watermaster's Engineer will conduct a peer review meeting to discuss the content of the TM described in Step 1. Feedback gathered from the peer review committee will inform the development of a process to define the proposed approaches to address the sources of model uncertainty in the proposed Safe Yield Reset methodology update.

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[8] The 2020 Safe Yield Recalculation Report, http://www.cbwm.org/docs/engdocs/Ground%20Water%20Modeling/20200515_Final_2020SYR_Report.pdf

9 Orders for Watermaster's Motion Regarding the 2020 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6, Superior Court for the County of San Bernardino (2020), http://www.cbwm.org/docs/WatermasterCourtFilings/2020/20200806%20Notice%20of%20Orders.pdf

3. Watermaster's Engineer will prepare responses to the comments received from the peer review committee and prepare a supplemental scope and budget for the process to define and document the proposed approaches to address model uncertainty. Watermaster will introduce this supplemental scope and budget as a budget amendment to be approved through the Watermaster process.

The TM described in Step 1 was distributed to the Parties on October 21, 2021. The peer review meeting described in Step 2 was held on October 26, 2021. The supplemental scope and budget described in Step 3 was introduced to the Watermaster Pool Committees, Advisory Committee, and Board in November 2021 and was approved by the Watermaster Board on November 18, 2021. The remaining steps in the scope of work include:

4. Watermaster's Engineer will complete a survey of the state-of-the-art approaches to address the sources of uncertainty identified in the TM described in Step 1 (i.e., model parameters, water supply/demand projections, and climate projections). This will include the alternative approaches and datasets suggested in the October 26, 2021, peer review meeting. Watermaster's Engineer will choose up to three approaches for each source of uncertainty to define in the next step.
5. Watermaster's Engineer will define a method to implement each of the approaches selected in Step 4. Each method will consist of detailed steps for implementation in the calculation of the Safe Yield.
6. Watermaster's Engineer will quantify the feasibility of the methods defined in Step 5. This will involve (i) testing the chosen methods and amending them as needed; (ii) determining the necessary computational capabilities necessary to implement the methods (e.g., parallel computing); and (iii) developing a general analysis of costs (e.g., staff time, computational resources) and benefits for each of the proposed methods. Sub-steps (i) and (ii) pertain to parameter uncertainty only. These estimates will aid in a comparison and selection of a preferred updated Safe Yield Reset methodology.
7. Watermaster's Engineer will prepare a TM documenting the findings from Steps 4 through 6 and a recommended Safe Yield Reset methodology update. This TM will be reviewed with Watermaster staff before distributing to the Parties for review.
8. Watermaster will conduct multiple peer review workshops to solicit feedback on the TM and the recommended Safe Yield Reset methodology update. This step may include multiple iterations of the draft TM.
9. Following the completion of the peer review process, Watermaster's Engineer will finalize the TM prepared in Steps 7 and 8 and prepare a summary TM with the proposed Safe Yield Reset methodology for submittal to the Court.
10. Watermaster's Engineer will work with Watermaster staff and legal counsel to assist with the Court-approval process.

Two drafts of this TM (prepared as Step 7) were distributed to the Parties and the peer review committee in May and July 2022 for review and comment. Watermaster held workshops on May 19, 2022 and July 20, 2022, to review the contents of the draft TMs and solicit feedback from the Parties and the peer review committee (Step 8). Following these workshops, several peer reviewers provided written comment on the draft TMs. These comments and West Yost's responses to the comments are included as Attachment B. A summary TM has also been prepared and is included as Attachment C (Step 9).

1.1 Outline of This Technical Memorandum

This TM includes the following sections.

- **Section 1: Background and Objectives**
- **Section 2: Overview of Uncertainty in Surface-Water and Groundwater Modeling**
  Provides an overview of the sources of uncertainty in surface-water and groundwater modeling as well as a description of best management practices published by the California Department of Water Resources (DWR) on how to address uncertainty in sustainable groundwater management.
- **Section 3: Uncertainty in the CVM and its Use in the Safe Yield Reset**
  Discusses the sources of uncertainty specific to the CVM and the Safe Yield Reset methodology.
- **Section 4: Potential Approaches for Characterizing and Addressing Uncertainty**
  Describes potential approaches and recommended methods to characterize and address uncertainty for updating the Safe Yield Reset methodology.
- **Section 5: Recommended Process to Calculate the Safe Yield**
  Describes the recommended Safe Yield Reset methodology update.
- **Section 6: Cost Estimate and Schedule**
  Summarizes the cost estimate and schedule developed for the implementation of the updated Safe Yield Reset methodology into the 2025 Safe Yield Reevaluation.
- **Section 7: References**

2.0 OVERVIEW OF UNCERTAINTY IN SURFACE-WATER AND GROUNDWATER MODELING

This section provides an overview of uncertainties in surface-water and groundwater modeling as well as a description of best management practices published by the DWR on how to address uncertainty in sustainable groundwater management.

Uncertainty analysis in calibration and projection is an important part of surface-water and groundwater modeling. Prior practice in environmental impact assessments typically involves developing a single numerical groundwater model with limited uncertainty analysis. Considered in a risk management context, this approach is often insufficient to predict the range of potential impacts and their likelihood. A quantitative uncertainty analysis, however, delivers a range of model predictions (simulating historical or future conditions) with associated likelihoods, each plausible in that they are consistent with all available information and data. Uncertainty analysis also identifies the main sources of uncertainty and the extent to which the uncertainty in outcomes can be reduced by incorporating additional data into the model (Middlemis and Peeters, 2018). An uncertainty analysis of model parameters has the benefit of identifying gaps in data or understanding that may inform future monitoring (DWR, 2016). An uncertainty analysis of model projections improves the understanding of the sensitivity of modeled responses to future assumptions.

2.1 Sources of Uncertainty in Surface-Water and Groundwater Modeling

Groundwater management faces uncertainty on many fronts: in understanding the behavior of the groundwater system; in anticipating possible future climatic, economic, or geopolitical conditions; and in prioritizing management objectives, all of which combine to add ambiguity in the evaluation of

management options (Guillaume et al., 2016). For example, the subsurface environment is complex, heterogeneous, and difficult to directly observe, measure and characterize; and, groundwater systems are influenced by multiple factors, including geology, topography, vegetation, climate, hydrology, and human activities. Uncertainty in these factors affects our ability to accurately describe the existing groundwater system or predict its future state (Middlemis and Peeters, 2018).

Uncertainty in a model can be defined as the difference between the model and the complex physical system that the model represents. Since a mathematical model is a simplification of the complex system and processes, there will always be some difference between the model and reality (Johnson, 2010) and there will always be alternative models or model parameters that are plausible representations of the physical system. Uncertainty can be expressed in terms of the parameters used to describe the system or the accuracy in model predictions.

The remainder of this section summarizes the main sources of uncertainty in surface-water and groundwater modeling.

2.1.1 Historical Data

Historical data can be divided into two groups: (1) data that may be observed directly, such as precipitation, temperature, stream discharge, metered pumping, managed artificial recharge, wastewater discharge, and groundwater levels, and (2) data that cannot be or is not observed/measured directly, such as evapotranspiration, unmanaged recharge, septic tank discharge, unmetered pumping, and unmeasured applied water. Some data of the second group can be estimated based on other measurable data; for example, evapotranspiration can be estimated based on temperature, relative humidity, wind speed, net radiation, and crop type.

Historical data are used in groundwater models for various purposes, primarily for direct model inputs and model calibration. Some historical data are indirectly used to estimate parameters or boundary conditions in the model (e.g., using historical groundwater levels and borehole lithology to infer the hydraulic properties of a fault barrier). The quality of data used to build a model directly affects the quality of the model projection. Some of the types of historical data and their uses are listed in Table 1 below.

Model uncertainties related to historical data may exist due to: measurement error (e.g., inaccurate measurements of groundwater levels which hampers model calibration); lack of records (e.g., inadequate borehole data to describe the aquifer geometry and composition); inconsistent spatial resolution (e.g., paucity of groundwater-level data in areas or depths of the basin which hampers model calibration); and inconsistent temporal resolution (e.g., paucity of historical groundwater-level data which hampers model calibration).

Table 1. Typical Historical Data used in Groundwater Models

Data Type	Purpose of Data	Use of Data in Model		
		Direct Input	Indirect Input	Model Calibration
Groundwater levels	Groundwater simulation		X	X
Groundwater pumping	Groundwater simulation	X		
Lithology and geologic data	Groundwater simulation	X	X	
Climatic data (precipitation, ET_0, temperature, evaporation, etc.)	Recharge estimation	X		
Ground elevation data	Recharge estimation		X	
Land use	Recharge estimation	X		
Stream discharge	Recharge estimation	X		X
Wastewater treatment plant influent	Recharge estimation			X
Water and wastewater infrastructure (sewersheds, water supply maps)	Recharge estimation		X	
Managed aquifer recharge	Recharge estimation/ groundwater simulation	X		X
Stream geometry	Recharge estimation/ groundwater simulation	X		
Wastewater treatment plant effluent	Recharge estimation/ groundwater simulation	X		

2.1.2 Surface Water and Groundwater Model Parameters

Uncertainty exists in the ways that the physical environment is represented in a model. This includes: (1) hydraulic parameters (e.g., hydraulic conductivity, specific storage, specific yield) that govern the simulated behavior of the groundwater-flow system; (2) hydrogeologic features (e.g., aquifer geometry, hydrostratigraphy, barriers to groundwater flow) that are underground and are often not well understood; and (3) hydrologic processes (e.g., evapotranspiration, streambed recharge, and deep infiltration of precipitation and applied water) that are typically not measured directly. Initial estimated values of hydraulic parameters and parameters representing hydrogeologic features are usually assigned to a groundwater model during model construction. Parameters governing hydrologic processes are assigned to the surface-water and groundwater models. Hydraulic parameters, parameters representing hydrogeologic features, and parameters governing hydrologic processes are then adjusted during the calibration process that attempts to minimize the differences between observed historical data and the model-simulated data.

Another related problem regarding uncertainty in model parameters is the existence of non-unique solutions as demonstrated by Freyberg (1988) and Hunt et al. (2020). Non-unique solutions of parameter combinations occur when there is more than one option for an unknown parameter that is being solved during the calibration process. The problem of non-uniqueness can result a model that meets calibration criteria but fails to adequately represent the real system.

2.1.3 Demand and Supply Plan Projections

The ability of a model to forecast the response of a groundwater system is not only dependent on the quality of the model calibration but is also dependent on future surface water and groundwater management projections. Long-term forecasts of water demand and available water supplies are critical inputs to water utility planning efforts and decision making (Kiefer, 2016). Forecasting water demands and supply plans is uncertain and influenced by macro-socioeconomic and climatic factors, as well as local behavior of consumers (Bruce, Brown, and Dufour, 2019).

In groundwater modeling, the projected water demand is coupled with a water-supply plan that assumes the use of various quantities of the available water sources, including groundwater pumping, local surface water, imported water, and recycled water. Wastewater disposal plans that describe the fate of the water supplied are also required to simulate the feedback between wastewater disposal and groundwater recharge. Translating the water supply and wastewater plans into groundwater model inputs also translates the uncertainty in these plans.

2.1.4 Projected Climate Impacts on Land Surface Processes

The climate directly and indirectly impacts the groundwater system through recharge and changes in water use in response to climate.

Currently, many studies on climate impacts rely on the projections of Global Circulation Models or Global Climate Models (GCMs) involved in the fifth phase of the Coupled Model Intercomparison Project (CMIP5) (Taylor and others, 2012). CMIP5 assumes four Representative Concentration Pathways (RCPs) that describe different climate futures, all of which are considered possible. The projections of updated GCMs of the sixth phase of the Coupled Model Intercomparison Project (CMIP6) (PCMDI, 2021) will soon replace those of CMIP5.

For use in SGMA-related water budget development and groundwater modeling, DWR provides climate change datasets in the form of change factors of precipitation, reference evapotranspiration (ET_0), and surface runoff based on 20 projections composed of 10 GCMs, each with two RCPs. According to the Guidance for Climate Data Change Use During Groundwater Sustainability Plan Development (DWR, 2018), change factor ratios were calculated as the future scenario (2030 or 2070) divided by the 1995 historical temperature detrended (1995 HTD) scenario. The 1995 HTD scenario represents historical climate conditions where the observed increasing temperature trend is removed. Review of the change factors for the Chino Valley indicated that average precipitation is projected to decrease and average ET_0 is projected to increase (WEI, 2020). As with all model projections, the GCM projections are inherently uncertain.

Groundwater demands can change in response to climate, and the feedbacks between groundwater demands and climate must be considered in groundwater management. For example, California has taken multiple actions to address the recent drought. On April 1, 2015, Governor Jerry Brown released Executive Order B-29-15, which mandated a statewide reduction in urban potable water usage of 25 percent through February 2016. This resulted in several Chino Basin Parties reducing their groundwater pumping, even though groundwater rights and storage accounts were unaffected by the order.

In 2018, the California legislature passed, and the Governor signed, two pieces of legislation (AB 1668 & SB 606) collectively known as “Making Conservation a California Way of Life” to establish new water efficiency standards for purveyors in response to the California drought. The legislation requires water suppliers to meet their supplier-specific urban water use objective starting in 2027, which is defined as a combination of objectives set for indoor residential water use, outdoor residential water use (ORWU),

as well as other uses. The ORWU objective, which takes direction from previous legislation establishing California's Model Water Efficient Landscape Ordinance (MWELO), has not yet been approved by the State Water Board. However, DWR has proposed the following provisional method to calculate a supplier's ORWU (gallons) objective[10]:

$$ORWU = (ET_0\text{-}P_{eff}) * ETF * LAs * 0.62$$

where, ET_0 is reference evapotranspiration (inches), P_{eff} is effective precipitation (inches), ETF is the supplier level evapotranspiration (ET) factor, LAs is landscape area (square ft) for a water supplier, and 0.62 is the unit conversion factor. If a supplier does not meet their ORWU objective by 2027, they may be required to reduce outdoor water use or be subject to penalties. A reduction in outdoor water use will reduce return flows from irrigation and precipitation (i.e., deep infiltration of precipitation and applied water [DIPAW]). In 2021, the DWR proposed a value of 0.7 for ETF. Additionally, the DWR is considering recommending that the value of ETF be reduced to 0.55 for any new development.

2.2 Modeling Best Management Practices for the Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) was passed by the California legislature in 2014 "to support the long-term sustainability of California's groundwater basins". Pursuant to SGMA, the DWR published a series of Best Management Practices (BMPs) to aid Groundwater Sustainability Agencies (GSAs) and other stakeholders in efforts to meet the Groundwater Sustainability Plan (GSP) Regulations (DWR, 2016). The DWR's Modeling BMP (Modeling BMP) is meant to "assist with the use and development of groundwater and surface water models."

The Modeling BMP includes the following two recommendations for characterizing and addressing uncertainty:

1. ***Develop and run predictive scenarios that establish expected future conditions under varying climatic conditions, and implementing various projects and management actions.*** *Predictive scenarios should be designed to assess whether the GSP's projects and management actions will achieve the sustainability goal, and the anticipated conditions at five-year interim milestones. Predictive scenarios for the GSP should demonstrate that the sustainability goal will be maintained over the 50-year planning and implementation horizon.*
2. ***Conduct an uncertainty analysis of the scenarios.*** *This is to identify the impact of parameter uncertainty on the use of the model's ability to effectively support management decisions and use the results of these analyses to identify high priority locations for expansion of monitoring networks. Predictive uncertainty analysis provides a measure of the likelihood that a reasonably constructed and calibrated model can still yield uncertain results that drive critical decisions. It is important that decision makers understand the implications of these uncertainties when developing long-term basin management strategies. As discussed in other sections of this BMP, this type of analysis can also identify high-value data gaps that should be prioritized to improve confidence in model outputs and yield a tool that has an increased probability of providing useful information to support effective basin management decisions. A formal optimization simulation of management options may be employed, taking advantage of the predictive uncertainty*

[10] DWR's proposed method is provisional because DWR is still finalizing the landscape area measurement data and considering stakeholder input.

> *analysis to minimize economic costs of future actions, while meeting regulatory requirements at an acceptable risk level.*

The Chino Basin is adjudicated and therefore exempt from many of the requirements of SGMA including the need to develop a GSP. The groundwater and surface-water models used in the Chino Basin have been approved for use by the Court. Furthermore, the groundwater models developed for GSPs are designed and interpreted to meet specific requirements of SGMA that are not entirely applicable to the Chino Basin. However, it is instructive to consider the above two recommendations when updating the Safe Yield Reset methodology, as they represent "best management practices" which are referenced in the 2017 Court Order.

3.0 UNCERTAINTY IN THE CVM AND ITS USE IN THE SAFE YIELD RESET

The previous section summarized the general sources of uncertainty in surface-water and groundwater modeling. This section identifies the sources of uncertainty specific to the CVM. Each source of uncertainty includes a brief description of how the model values were estimated for use in the 2020 SYR. Refer to the 2020 SYR Report for a more detailed description of each model input.

3.1 Historical Data

The following subsections describe the historical data sets that were collected or developed for use in the CVM, not including any historical data used to develop model parameters.

3.1.1 Precipitation

Precipitation is the primary source of water for the Chino Basin watershed. Estimates of precipitation over the 2020 CVM model domain were developed from precipitation stations operated and/or reported by the Los Angeles, San Bernardino, and Riverside County Flood Control Districts, NOAA, and others, and gridded precipitation data products produced by the PRISM Climate Group and NOAA. The monthly gridded precipitation estimates from the PRISM Climate Group were used to inform the spatial distribution of daily precipitation developed from precipitation stations for the period prior to the availability of gridded daily precipitation estimates from NEXRAD. NEXRAD estimates of daily precipitation were used starting in 2002.

3.1.2 Stream Discharge

Daily discharge estimates were obtained from the USGS through the USGS National Water Information System for the streams and channels tributary to and including the Santa Ana River. These discharge data were used in calibration of multiple parts of the 2020 CVM, including mountain-front runoff from the San Gabriel Mountains (the HSPF model) and the rest of the Chino Basin watershed tributary to Prado Dam (the R4 model).

3.1.3 Pumping

With one exception, groundwater pumping estimates were obtained from all pumpers through the Chino Basin and Six Basins Watermasters, the City of Corona, and the Cucamonga Valley Water District. The exception is overlying agricultural pumping in the Chino Basin which was estimated with the R4 model for the period 1978 through 2004.

3.1.4 Managed Aquifer Recharge

With one exception, estimates of Managed Aquifer Recharge (MAR) in the 2020 CVM domain were obtained from the entities that conduct recharge operations. The exception is estimates of stormwater captured at the major stormwater detention and recharge facilities in the Chino Basin which was estimated with the R4 model for the period 1978 through 2004. Starting in 2005, IEUA prepared estimates of stormwater captured at these facilities.

3.1.5 Wastewater Discharges

Wastewater discharges to stream channels in the 2020 CVM watershed. Data was obtained from the California Integrated Water Quality System, annual reports of the Santa Ana River Watermaster, the Cities of Corona, Riverside, and San Bernardino, and IEUA.

3.1.6 Groundwater Levels

Groundwater level measurements were obtained from the Chino Basin and Six Basins Watermasters, the Cities of Corona and Riverside, Cucamonga Valley Water District, the USGS, and the West Valley Water District.

3.1.7 Land Use

Historical land use datasets were acquired from the Southern California Association of Governments (SCAG), the DWR, and San Bernardino County. These land use datasets were available for specific years, and historical data before 1990 have gaps of six years or more between datasets. The R4 surface water model was run to simulate Deep Infiltration of Precipitation and Applied Water (DIPAW) and stormwater recharge (when data were unavailable) for each of these land use years, and the R4 model outputs were linearly interpolated between land use years.

3.1.8 Potential ET

ET_0 estimates for the 2020 CVM watershed were obtained from the California Irrigation Management Information System (CIMIS) stations located in Pomona and Riverside. The spatial distribution of daily ET_0 across the 2020 CVM watershed was estimated from the Pomona and Riverside CIMIS station ET_0 estimates using a spatial-temperature interpolation algorithm. For the period prior to these CIMIS stations becoming active, ET_0 was estimated by regression relationships developed at these stations with evaporation at Puddingstone reservoir.

3.1.9 Evaporation

Pan evaporation data from an evaporation pan at Puddingstone reservoir, operated by Los Angeles County Department of Public Works, was used to estimate evaporation losses from free water surfaces from surface water impounded in flood control and conservation basins and streamflow in channels.

3.1.10 Subsurface Inflow from Adjacent Groundwater Basins

Subsurface inflow from the Riverside Basin to the Chino Basin through the so-called Bloomington Divide area was set as a time-variant specified head boundary for the calibration period. The hydraulic conductivity of Layers 1, 3, and 5 adjacent to this boundary and the subsurface inflow from the Riverside Basin were estimated in calibration using the observed groundwater levels located in the Riverside Basin near the boundary.

Subsurface inflow from the Rialto Basin that occurs across the Rialto-Colton Fault was assumed to be the same value estimated in the calibration of the 2013 Chino Basin Model (WEI, 2015). The flux across the Rialto Fault is assumed to be either a constant inflow rate to the Chino Basin or a no-flow boundary depending on the geology along the fault. The range of subsurface inflow from the Arlington Basin to the Temescal Basin was estimated based on the Arlington Basin Model (WEI, 2009).

3.1.11 Unmanaged and Unintentional Recharge

Maliva (2019) defines unmanaged and unintentional recharge as "recharge incidental to other human activities. Unmanaged and unintentional urban recharge includes leakage from water and wastewater mains, discharges from on-site sewage systems, recharge from stormwater management infrastructure, and return flows from the irrigation of parks, lawns, and other vegetated areas." The recharge estimates from on-site sewage systems and irrigation return flows are described below. The leakage from water and wastewater mains are not explicitly accounted for in the groundwater model for multiple reasons: 1) the inability to quantify the magnitude and geographic distribution of these losses and the proportion of losses that result in recharge, and 2) the likely small magnitude of these losses compared to the other recharge components in the Chino Basin. Recharge from stormwater management infrastructure (i.e., Municipal Separate Storm Sewer Systems) beyond the MAR facilities is minor (WEI, 2018a) and not explicitly accounted for in the 2020 CVM.

3.1.12 Septic Tank Discharge

Data for parcels with septic tanks were collected for the entire 2020 CVM model domain. The septic tank parcel data were overlaid on the groundwater model, and the numbers of septic tank parcels within each model cell were determined. Various leakage rates from septic tanks were applied to account for the groundwater recharge flux of each model cell with septic tanks. These rates were based on observed in wastewater inflows to nearby wastewater treatment plants.

3.1.13 Applied Water

The initial estimate of applied water for urban areas was estimated from reports prepared by the IEUA. Final estimates of applied water for urban irrigation were developed by calibrating the R4 model and extending the calibration results to non-IEUA areas in the Chino Basin. Estimates of DIPAW for agricultural, native, and undeveloped areas (land in transition from vacant and agricultural uses to urban uses) were made with the R4 model using historical information on vegetation type and associated root zone depth, soil type, permeable area, irrigable area, evapotranspiration, and precipitation.

3.2 Model Parameters

The following subsections describe the data sets and processes used to develop the model parameters for the CVM.

3.2.1 Hydraulic Conductivity, Specific Storage, and Specific Yield

The following procedure was used to estimate horizontal hydraulic conductivity, vertical hydraulic conductivity, specific storage, and specific yield in the groundwater model. First, data collected from multiple well boreholes was used to estimate the aquifer-system properties at the well locations. The Kriging method was used to spatially interpolate the estimates across the model domain. The model domain was then subdivided into several parameter zones based on an estimate of logical depositional environments. Each parameter zone was assigned a scaling factor which was adjusted during the model

calibration process. The final calculated parameter value for any model cell (by model layer) was the product of the adjusted scaling factor and the initial hydraulic parameter value.

3.2.2 Hydraulic Characteristics of Faults

The faults that separate the Chino Basin, Cucamonga and Six Basins as well as internal faults and barriers within these basins, were simulated as horizontal flow barriers with the MODFLOW Horizontal-Flow Barrier (HFB) package. The estimated hydraulic conductivity values for these barriers were adjusted through model calibration. The sensitivity analysis conducted during calibration of the 2020 CVM indicated that the hydraulic characteristics of several faults are sensitive parameters in the model.

3.2.3 Stream Properties

For use in the surface water simulations, as-built drawings and field surveys from prior investigations were used to develop sub-watershed boundaries, channel and flood control and conservation basin geometry and facility operating schemes. For the groundwater model, the streambed elevations and geometry along creeks and channels were extracted from the 2015 LiDAR data along Santa Ana River with 1-meter resolution (US Army Corps of Engineers, 2015). Other streambed properties (e.g., conductance) were defined based on the streambed characteristics of the Santa Ana River and its tributaries. The stream properties were determined to be insensitive and were not adjusted through model calibration.

3.2.4 Groundwater Evapotranspiration

Groundwater ET was simulated with the MODFLOW Evapotranspiration Segments Package (ETS). This package requires the user to define the spatial extent of the riparian vegetation, the maximum ET rate for each model cell within the spatial extent, and a relationship between ET rate and depth to groundwater. The spatial extent of the riparian vegetation and the maximum ET rates were estimated based on aerial photos and the evaporation analysis of the Prado Basin prepared by Merkel (2006). The relationship between the ET rate and depth to groundwater was based on other modeling studies with similar climate and riparian vegetation. The groundwater ET parameters were determined to be insensitive and were not adjusted through model calibration.

3.2.5 Vadose Zone Travel (lag) Time

The HYDRUS-2D model was used to estimate lag time at several boreholes with detailed lithologic descriptions. For the boreholes that were investigated, the primary factor contributing to lag time was vadose zone thickness. These lag times were then generalized throughout the Chino Basin model domain based on vadose thickness and individual lag times were estimated for each model cell. Vadose zone travel (lag) time from the root zone to the water table ranges from about one to four years near the Santa Ana River to over 30 years in the City of Upland area, and typically ranges from 5 to 30 years in other areas. Vadose zone travel (lag) time was not adjusted through model calibration.

3.2.6 Land Use Parameters

Land use parameters (hydrologic soil type, crop coefficient, irrigation efficiency, curve number for impervious area, etc.) were obtained from the Department of Water Resources, Natural Resources Conservation Service (NRCS), San Bernardino County, and the Southern California Association of Governments. Land use type parameters were not adjusted through model calibration.

3.3 Demand and Supply Plan Projections

The following subsections describe the assumptions and data used to develop future projections for water demands and supply plans for the projection scenario of the CVM.

3.3.1 Projected Groundwater Pumping

Watermaster submitted a comprehensive data request to each Appropriative Pool Party and some of the larger Overlying Non-Agricultural Pool pumpers. Watermaster staff reviewed the Parties' responses and followed up for clarification, if necessary. The data provided by the Parties represents the best estimates of their demands and associated water supply plans. Individually and in aggregate, these water demands, and associated supply plans were the most reliable planning information available at that time. Watermaster translated the Parties' groundwater pumping projections included in the supply plans based on information regarding well priorities and the timing of groundwater pumping provided by each Appropriative Pool Party.

3.3.2 Projected Managed Artificial Recharge

Projected stormwater recharge in flood control and conservation basins was estimated with the R4 model based on existing and planned 2013 RMPU facilities that are assumed to be fully operational in 2023. Projected recycled water recharge is based on IEUA projections modified in the near term based on recent recharge history. Imported water was assumed to be recharged to meet Watermaster's replenishment obligations only.

3.3.3 Projected Wastewater Discharge

With one exception, the projected wastewater discharges were based on the "Most Likely Discharge" scenario documented in the Santa Ana River Waste Load Allocation Model Update Report (Geoscience, 2020). These projected discharges were based on estimates provided by the owners of each of the Publicly Owned Treatment Works (POTWs) that discharges wastewater to the Santa Ana River or its tributaries.

3.3.4 Land Use

Land use was assumed to transition from 2018 conditions to "built-out" conditions by 2040. Built-out conditions assumes 2018 land use with vacant and non-urban land uses to converted to land uses shown in the General Plans of the counties and municipalities that overlie the Chino Basin.

3.3.5 Subsurface Inflow from Adjacent Groundwater Basins

Subsurface inflow from the Rialto Basin that occurs across the Rialto-Colton Fault and subsurface inflow from the Arlington Basin to the Temescal Basin are modeled as they were in the calibration period. Groundwater discharges from the Riverside Basin to the Chino Basin through the so-called Bloomington Divide area was set as a constant specified flow boundary was assumed equal to the average subsurface inflow from the last five years of the calibration period.

3.3.6 Unmanaged and Unintentional Recharge

Future assumptions for unmanaged and unintentional recharge (with the exceptions identified below) are identical to the assumptions used in the historical data.

3.3.7 Septic Tank Discharge

Future locations of septic tank parcels are based on the land use planning data. The leakage rates from septic systems are assumed identical to the leakage rates assumed at the end of the calibration period.

3.3.8 Applied Water

Future assumptions for outdoor applied water are derived from the future water demand and water supply estimates discussed above and the irrigation assumptions for outdoor water use developed in model calibration. Given the uncertainties of the implementation and effects of the "Making Conservation a California Way of Life" legislation, any prescribed changes due to this legislation were not considered in the 2020 SYR projection scenario.

3.3.9 Projected Replenishment Obligation

Projected future replenishment obligations are based on current and projected Safe Yield and assumptions of the transfer activity among the Parties. This process is described in detail in the 2020 SYR Report.

3.3.10 Future Management Programs

Beyond recalculation of the Safe Yield, the CVM is used to support other management goals pursuant to the Program Elements of the Chino Basin Optimum Basin Management Plan. These management goals include maximizing recharge in the basin, managing land subsidence, ensuring the management of water quality, and supporting riparian habitat. To address these management goals, future management actions may be required that would alter the projected supplies and demands (e.g., reducing pumping to mitigate subsidence).

3.4 Projected Climate Impacts on Land Surface Processes

The DWR (2018) climate change datasets in the form of change factors of precipitation, ET_0, and surface runoff for 2030 and 2070 were used to model climate change in the 2020 Safe Yield Recalculation. The impact of new conservation legislation was not included in the 2020 Safe Yield Recalculation.

4.0 POTENTIAL APPROACHES FOR CHARACTERIZING AND ADDRESSING UNCERTAINTY

This section presents a summary of the tools and approaches for characterizing model-parameter and predictive uncertainties that may exist in groundwater models, including errors introduced by model-design and process-simulation assumptions, incomplete knowledge of model parameters, and contributions to predictive uncertainty from estimated future system stresses, such as water demands, supply plans, policies, and climate (Doherty, Hunt, and Tonkin, 2011; Hunt and Welter, 2010).

Approaches to characterize uncertainty in simulation models range in complexity and include the following categories:

1. **Deterministic:** A deterministic approach assumes and simulates one possible future. For example, the 2020 CVM that was used to calculate Safe Yield assumed a single physical groundwater system realization (aquifer parameter distribution) and a future scenario that was developed based on the climate change factors provided by the DWR and the water suppliers' best estimates of the future water demand and supply plans.
2. **Robust Decision Making (RDM):** In this approach, numerous model scenarios are run with various input datasets to determine the possible outcomes against a wide range of plausible futures. The input datasets may include one or more of the following:
    - Alternate physical groundwater system realizations that meet the calibration criteria.
    - Alternate future climate projections (e.g., precipitation and ET_0 projections based on climate models).

- Alternate water demand and supply plans based on various assumptions of future population, water management policy implementation, and expected behavior of individual pumpers.
- Predetermined management actions or anticipated projects affecting the stresses in the model (e.g., additional wells or recharge basins). Most of the approved GSPs and Alternative GSPs simulate the groundwater responses to scenarios including management actions pursuant to the SGMA (e.g., Dudek, 2019; Santa Cruz Mid-County Groundwater Agency, 2019; MWH, 2016).

3. **Dynamic Planning:** In a dynamic planning framework, management actions are triggered by the state of the system, which can be a single variable or a combination of variables. For example, well field pumping can be dynamically adjusted based on the simulated groundwater level to prevent the groundwater level from dropping below a threshold level. In another example, stream flow diversion can be dynamically adjusted to ensure a minimum stream flow is maintained. Dynamic planning frameworks require a thorough understanding of potential triggers and actions which often assume centralized planning, where a single decision-maker determines management actions, which is often unrealistic in a real-world planning process (Giuliani et al., 2015). A dynamic planning framework may require iterative input from different sets of stakeholders (Quinn et al., 2017; Wu et al., 2016) and could be revised to represent a decentralized process in which multiple agents optimize for their individual benefits (Jenkins et al., 2017).

The current practice of periodic recalculations of the Safe Yield that involves periodic methodology review and stakeholder involvement is an example of a dynamic planning framework. However, the current deterministic approach of using a single calibration realization and projection scenario does not allow for an assessment of the uncertainties in model projections. The RDM approach is recommended for the development of groundwater models for SGMA compliance (Moran, 2016) without introducing additional complexities and potential uncertainties that may be present in a dynamic planning framework. Therefore, the recommended approaches in this TM are based on RDM principles.

4.1 Historical Data

Historical data includes records of precipitation, stream discharge, pumping, and other data sets described in Section 3.1. While there is some uncertainty in the historical data, it is our professional judgement that an uncertainty analysis of the historical data would be of limited value to the calibration of the model and the calculation of the Safe Yield. The 40 years of measured data used for calibration of the 2020 CVM was collected by numerous entities and it is appropriate to assume that these measurements have random errors overall. Therefore, for the uncertainty analysis of the calibration parameters, the uncertainty in observed data will not be addressed. This approach was agreed upon by the peer review committee at its October 26, 2021 meeting.

4.2 Model Parameters

The 2020 CVM (WEI, 2020) consists of HSPF and R4 surface-water models and a groundwater model based on MODFLOW-NWT (Niswonger et al., 2011). The surface-water models were calibrated manually. R4 was used to estimate DIPAW at the root zone, to estimate stormwater runoff and stormwater recharge, and to simulate the routing of water through lined and unlined channels across the model domain. The estimated DIPAW was used as groundwater recharge to the groundwater model by considering storage and travel time through the vadose zone. The estimated runoff values were diverted to applicable stream reaches. The routed water was sent to recharge basins or stream reaches. The groundwater model was calibrated by conducting a sensitivity analysis of model parameters using the parameter estimation code PEST (Doherty, 2018) to adjust sensitive parameters to improve the model representation of the

groundwater system by minimizing the differences between the historical and the model-calculated groundwater level elevations and discharge of the Santa Ana River at Prado Dam. A residual analysis of the observed versus simulated data was conducted to evaluate and characterize model error.

The problem of non-uniqueness needs to be addressed because parameter and predictive uncertainty is unavoidable. Justification for the use of a model in environmental management must not rest on an assumption that the model's predictions will be correct. Rather, justification for its use must rest on the premises that its use (i) enables predictive error and/or uncertainty to be quantified and (ii) provides a computational framework for reducing this predictive error and/or uncertainty to an acceptable level, given the information that is available. As such, by quantifying the uncertainty associated with predictions of future hydrologic system behavior, associated risk can inform the decision-making process (Doherty, Hunt, and Tonkin, 2011).

4.2.1 Approaches to Characterizing Uncertainty in Model Parameters

This section presents three selected methods to quantify predictive uncertainties and discusses each method's associated computational framework. The focus of each of the methods is to efficiently generate a sufficient number of calibrated groundwater system realizations (calibrated realizations) – each realization comprises a set of model parameters that meet the model calibration criteria. Once this is done, an ensemble of projection realizations can be generated by replacing the parameters of the projection model with the parameters of the calibrated realizations. The result of the ensemble of projection realizations is an ensemble of probable outcomes that can be used to determine the central tendency of projected Safe Yield and to quantify the uncertainty of the projected Safe Yield due to uncertainties in model parameters.

4.2.1.1 Generalized Likelihood Uncertainty Estimation (GLUE)

GLUE (Beven and Binley, 1992) is a statistical method used in hydrology for quantifying the uncertainty of model predictions. GLUE assumes the concept of equifinality of models, parameters, and variables. Equifinality originates from the imperfect knowledge of the system under consideration, and many sets of models, parameters, and variables may therefore be considered equal or almost equal simulators of the system. The GLUE methodology can be implemented in the following steps.

1. Select a group of model parameters with the highest relative sensitivity and define the distribution function of each selected parameter.
2. Conduct a Monte Carlo (Eckhardt, 1987; Tarantola, 2005) sampling analysis in the following steps:
    a. Randomly pick a set of parameters within their respective bounds.
    b. Modify the calibration model with the random set of parameters.
    c. Run the modified model and check for the calibration criteria. If the calibration criteria are met, save the set of parameters as a calibrated parameter realization.
    d. Repeat steps (a) to (c) until a defined number of realizations is reached.
3. Generate projection realizations. A projection realization is based on the parameters of a calibrated parameter realization and incorporates climate, hydrology, and supply/demand projections.
4. Conduct simulation runs of the projection realizations. Develop recommendations based on the simulation results of the realizations.

White (2018) applied the GLUE method on a synthetic model (Freyberg, 1988) with 100,000 realizations of five model parameters (i.e., hydraulic conductivity, historical recharge, future recharge, historical pumping rate multiplier, and future pumping rate multiplier) to quantify the efficacy of the Monte Carlo sampling analysis and to compare it with PESTPP-IES (see below). The Monte Carlo sampling analysis identified 275 calibrated realizations (an acceptance rate of 0.275 percent) that met a predefined calibration criterion. Had this method been applied to the 2020 CVM, which took four hours to complete a model run, it would take 45 years to obtain 275 realizations for the same acceptance rate. Due to the low acceptance rate, this method is often not practical for complex models with a long run time.

4.2.1.2 Null-Space Monte Carlo (NSMC)

NSMC (Tonkin and Doherty, 2009) is a method for generating calibrated realizations. Instead of creating a single calibrated realization, NSMC can be used to create multiple calibrated realizations. The NSMC methodology can be implemented in the following steps (Doherty, Hunt, and Tonkin, 2011).

1. Prior to implementation of a NSMC analysis, it is assumed that a model has been calibrated, a set of calibrated model parameters is available, and the distribution functions of each parameter are defined.
2. Conduct a NSMC sampling analysis in the following steps with the help of multiple programs (RANDPAR, FIELDGEN, PPSAMP, PNULPAR, FAC2REAL, and TWOARRAY) included in the PEST Groundwater Data Utility (Watermark Numerical Computing, 2020).
    a. Randomly pick a set of parameters within their respective bounds.
    b. The calibrated parameters are subtracted from the stochastically generated parameters.
    c. The result of step (b) is projected onto the calibration null space.
    d. The solution-space component of the stochastically generated parameters is replaced by the parameter field arising from the calibration.
    e. Recalibrate the model and save the set of parameters as a calibrated parameter realization. Ideally, because null-space parameter components do not appreciably affect model outputs that correspond to elements of the calibration dataset, the null-space processing of the optimal parameter set in step (d) should result in a calibrated model. In practice, however, the null-space-processed parameters commonly result in a slightly de-calibrated model. Recalibration of such a model normally requires only a fraction of the number of model runs per iteration as there are adjustable parameters.
    f. Repeat steps (a) to (e) until a desired number of calibrated parameter realizations is reached.
3. Generate projection realizations. A projection realization is based on the parameters of a calibrated parameter realization and incorporates climate, hydrology, and supply/demand projections.
4. Conduct simulation runs of the projection realizations. Develop recommendations based on the simulation results of the realizations.

Overall, the NSMC sampling analysis involves many computational steps that require specific programs and input parameters. A conceptual example for implementing the second level of parameterization is given in Part B of the Groundwater Data Utility (Watermark Numerical Computing, 2020).

4.2.1.3 Iterative Ensemble Smoother (iES)

Most algorithms for model parameter estimation (PE) and uncertainty quantification (UQ) are computationally constrained by number of adjustable parameters. Because of this constraint, assumptions must be employed to reduce the number of parameters, which is a form of model simplification. This simplification can lead to model error phenomena such as parameter compensation and undetectable forecast bias (White, 2018; Doherty and Christensen, 2011).

To relax or eliminate the computational bounds induced by the number of parameters, iterative ensemble smoothers (iES) have emerged as a class of algorithms for PE and UQ. Chen and Oliver (2012, 2013) introduced an efficient iES formulation, which was implemented by White (2018) and White et al. (2020) in the open-source code PESTPP-IES. Based on the nature of the iES algorithm, the number of model runs per estimation iteration depends on the number of desired calibrated groundwater system realizations and does not depend on the number of adjustable parameters. Additionally, the iES algorithm yields an ensemble of the calibrated parameter realizations that can be used to quantify uncertainty in forecasts of interest.

PESTPP-IES can be applied in the following steps.

1. Construct a model and prepare for parameter estimation according to the input instructions of PEST and PESTPP-IES, including the pilot points as well as variograms and covariance matrices of adjustable model parameters. Covariance matrices can be generated based on the variograms of adjustable parameters.
2. Run PESTPP-IES to generate the desired number of calibrated parameter realizations. In order to achieve a good fit between model outputs and the calibration dataset, the number of the desired calibrated parameter realizations (and hence the number of model runs) must be greater than the dimensionality of the solution space of the inverse problem. The dimensionality of the solution space often must be guessed. An ensemble size of a few hundred (and often less) is suitable for most occasions (Doherty, 2019).
3. Generate projection realizations. A projection realization is based on the parameters of a calibrated parameter realization and incorporates climate, hydrology, and supply/demand projections.
4. Conduct simulation runs of the projection realizations. Develop recommendations based on the simulation results of the realizations.

In comparison with the NSMC method, the iES-based solution is relatively straightforward. The required utility programs for preparing required input data for PESTPP-IES are readily available as well.

4.2.2 Recommendation

All methods described above can be used to address parameter uncertainties. However, a comparison of the major criteria shown in Table 2 suggests that the iES is the most favorable method due to the computation time being independent of the number of adjustable parameters, which results in a relatively lower computing cost. The iES method and its software implementation PESTPP-IES are recommended to be used for quantifying parameterization-related uncertainties. Attachment A documents the use of a synthetic model to illustrate the detailed steps to generate calibrated parameter realizations with PESTPP-IES and other utility programs.

To reduce the complexity of combining calibrated realizations of the HSPF, R4, and MODFLOW models, it is recommended to run a deterministic simulation of the HSPF and R4 models, and then include the R4-estimated DIPAW and subsurface inflows to the MODFLOW model as adjustable parameters in PESTPP-IES.

Table 2. Comparison of Methods to Quantify Predictive Uncertainties

Criteria	GLUE	NSMC	iES
Simplicity of the Method	Simple	Complex	Moderate
Computing Cost (relative number of required model runs)	High (due to low acceptance rate)	Moderate (due to the requirement of recalibration of each parameter set)	Low
Does the computing cost grow with the number of adjustable parameters?	Yes	Yes	No
Ability to incorporate heterogeneity in calibrated realizations	Yes (at a very high computing cost)	Yes (at a very high computing cost)	Yes

4.3 Demand and Supply Plan Projections

Water demand and supply plans depend on various assumption of future conditions, such as population, climate, and regulatory requirements. The uncertainty associated with water demand and supply plans should be quantified because water demand and supply plans include projections of pumping, recharge, and storage which can affect groundwater levels and the net recharge of the Chino Basin.

4.3.1 Approaches to Characterizing Uncertainty in Demand and Supply Plan Projections

Several water resource planning studies in the Santa Ana River watershed and North America have employed RDM or similar approaches to address uncertainties in future water demands and supply plans (USBR, 2012; Dennehy, 2021; Miro et al., 2021; Valley Water, 2022). The planning studies that employ RDM generally have the objective of evaluating uncertainties in future conditions to inform management or planning decisions. The amount of detail applied to develop scenarios using RDM is not prescribed and depends on the available data to characterize external drivers, management schema, and planning objectives (Groves et al., 2019).

San Bernardino Valley Municipal Water District (Valley District) recently employed RDM in their water resources planning (Miro et al., 2021), which included development of four scenarios of future demands and nine scenarios of future imported water supply. The demand futures were developed with the Valley District's retail agencies to understand the drivers in water demand and the uncertainties in projecting changes in water demand. The range in potential future imported water supplies were derived from the Metropolitan Water District of Southern California's simulated operational scenarios of the State Water Project, the imported water supply in the region.

4.3.2 Recommendation

The current Safe Yield Reset methodology would be improved by shifting from a deterministic approach to an RDM approach involving multiple discrete demand and supply plan scenarios. To quantify the uncertainty

in demands and supply plans in the Chino Basin and develop demand and supply plan scenarios, a method similar to what Valley District employed to implement the RDM approach (Miro, et al., 2018; Miro, et al., 2021) is recommended. The proposed method to execute this approach includes the following:

1. Develop a list of the drivers of changes to future water demands and supplies. Examples of these drivers include population growth, land use, policies (e.g., conservation mandates), and climate change. Conduct one to three workshops with the Parties and wholesale agencies that serve the Chino Basin to ensure that the most significant drivers are considered.
2. Use the drivers identified in step 1 above to develop demand and supply plan scenarios. These scenarios will include assumptions of each driver and its effect on future demands and water supply plans.
3. Select a subset of the demand and supply scenarios developed in step 2 that will be incorporated into the projection realizations.
4. Develop quantitative water supply plans for the selected demand and supply scenarios. This will rely on a review of relevant planning information (e.g., Urban Water Management Plans, regional water resources planning studies [Groves and Syme, 2022], and data on cultural conditions collected pursuant to the 2017 Court Order) and workshops with the Parties and wholesale agencies. This effort will leverage existing planning studies to define the scenarios and will not include the development of any new planning studies (e.g., Oxnard, 2017; Miro, et al., 2018; Valley Water, 2022).
5. Conduct at least two workshops with the Parties and wholesale agencies to refine and iterate the water supply plans. If desired, the Parties may provide feedback to aid in the assignment of non-uniform likelihoods to the chosen water demand and supply plan scenarios. For example, one scenario could be chosen as the "most likely" scenario, the results of which may be assigned a higher weight than the results of other scenarios in the interpretation of the ensemble (see Section 5.0).
6. Translate the demand and supply scenarios and water supply plans into model inputs (e.g., groundwater pumping, outdoor urban water use, managed recharge, imported water, others) and integrate into projection realizations.

Demand and supply plan scenarios should be developed to be consistent with the chosen climate scenarios to capture plausible combinations of drivers (e.g., population growth, water conservation, and restriction of imported water) and their effect on water demand and supply plans.

4.4 Climate Projections

As described in Section 2.1.4, the climate directly and indirectly impacts the groundwater system through recharge and changes in groundwater use. To incorporate the climate impacts in a groundwater model projection, future precipitation and ET_0 values must be estimated. In the 2020 CVM, future precipitation and ET_0 values were obtained by adjusting the historical records by the DWR Change Factors (DWR, 2018). Since the DWR Change-Factors were derived based on the ensemble average of 20 selected model runs from CMIP5, the 2020 CVM implemented a deterministic climate scenario representing the projected central tendency of future climate. In this approach, the uncertainty in the projected Safe Yield due to individual climate projections could not be characterized.

To overcome this limitation, relevant literature was reviewed to explore the feasibility of estimating future precipitation and ET_0 values based on the available climate model datasets. The following sections document the findings and recommendations from the literature review.

4.4.1 Approaches to Characterizing Uncertainty due to Climate Change

This section provides an overview of the state of global climate model research and the available datasets from the climate models.

4.4.1.1 State of Global Climate Models (GCMs)

GCMs are numerical models and are the most advanced tools currently available for simulating the response of the global climate system to increasing greenhouse gas concentrations. Many GCMs were developed in the past decades by research institutes across the world. GCMs vary in their capabilities, including algorithms, grid resolutions, and simulated earth system processes. Global climate research efforts are coordinated by the Intergovernmental Panel on Climate Change (IPCC) through a series of the Coupled Model Intercomparison Projects (CMIPs). In each iteration of the CMIPs, prescribed assumptions of future climate forcing factors and boundary conditions are implemented by various GCMs. As a result of variations in GCMs, their projected outcomes are different despite having the same prescribed forcing assumptions and boundary conditions.

The change factors provided by DWR are based on the GCMs from the fifth iteration of CMIP (CMIP5) that was completed in 2012 (Taylor and others, 2012). The sixth iteration of CMIP (CMIP6) (PCMDI, 2021) is the most recent update. The models included in CMIP6 improve the representation of atmospheric and biogeochemical processes (e.g., cloud formation), have denser grids, and are better able to simulate historical conditions than the CMIP5 models (Thorarinsdottir et al., 2020). Furthermore, there are more future scenarios available for CMIP6 that can be chosen to couple with the water demand and supply plan scenarios.

4.4.1.2 Downscaled Climate Model Datasets

All GCMs of each CMIP are required to produce a set of simulation results, including time series of precipitation and near-surface temperature at each model grid cell. Raw GCM output, however, is not always adequate to be used directly in groundwater and surface-water models. Two primary impediments to impacts studies are the coarse spatial scales represented by the GCM (grid cells are typically between 150 and 400 miles long on the ground surface), and the GCM raw output contain biases relative to observational data, which preclude its direct use. A variety of downscaling methods can be used to process and refine GCM output with the aim of producing output more suitable for planning models. The refined output aims to address the limitations of coarse resolution and/or regional biases in the GCM output.

Downscaling methods can be divided into two broad categories: dynamical and statistical. Dynamical downscaling refers to the use of high-resolution regional simulations to dynamically interpolate the effects of large-scale climate processes to regional or local scales of interest. Statistical downscaling involves the use of various statistics-based techniques to determine relationships between large-scale climate patterns resolved by global climate models and observed local climate responses. These relationships are applied to GCM results to transform climate model outputs into statistically refined products. The available downscaled climate model datasets are summarized below.

Statistical Downscaled Datasets

- NASA Earth Exchange (NEX) Downscaled Climate Projections (NEX-DCP30)
  - Description: This dataset comprises downscaled climate scenarios for the conterminous United States that are derived from the GCM runs conducted under CMIP5 and across the four greenhouse gas emissions scenarios known as Representative Concentration Pathways

(RCPs). Each of the climate projections includes monthly averaged maximum temperature, minimum temperature, and precipitation at a resolution of 800 meters for the periods from 1950 through 2005 (Retrospective Run) and from 2006 to 2099 (Projection Run).

  - Website: https://ds.nccs.nasa.gov/thredds/catalog/bypass/NEX-CP30/bcsd/catalog.html
  - Data access: https://www.nccs.nasa.gov/services/data-collections/land-based-products/nex-dcp30

- NASA Earth Exchange Global Daily Downscaled Projections (NEX-GDDP-CMIP6)
  - Description: This dataset comprises global downscaled climate scenarios derived from the GCM runs conducted under CMIP6 and across two of the four "Tier 1" greenhouse gas emissions scenarios known as Shared Socioeconomic Pathways (SSPs). Each of the climate projections includes daily averaged maximum temperature, minimum temperature, and precipitation at a resolution of 0.25 degrees (approximately 17.5 miles at equator) for the periods from 1950 through 2014 (Retrospective Run) and from 2015 to 2100 (Projection Run).
  - Website: https://ds.nccs.nasa.gov/thredds/catalog/AMES/NEX/GDDP-CMIP6/catalog.html
  - Data access: https://www.nccs.nasa.gov/services/data-collections/land-based-products/nex-gddp-cmip6

Dynamical Downscaled Datasets

- CMIP6 Downscaling Using the Weather Research and Forecasting model (WRF-CMIP6).
  - Description: This dataset comprises dynamically downscaled climate scenarios derived from the GCM runs conducted under CMIP6 using the WRF model. Each of the climate projections consists of 37 daily variables including temperature, precipitation, evapotranspiration, wind speed at a resolution of 2 miles (3 km) for the periods from 1980 through 2100.
  - Website: https://dept.atmos.ucla.edu/alexhall/downscaling-cmip6
  - Data access: https://dept.atmos.ucla.edu/sites/default/files/alexhall/files/aws_tiers_dirstructure_Jan22.pdf

4.4.2 Recommendation

Given the range of improvements in the CMIP6 models and the greater variety of scenarios, using data sets derived from the CMIP6 models is the most defensible approach to apply to the CVM. Two options for applying the CMIP6 datasets to the CVM are using the Change Factors or using the dynamically downscaled datasets. The former is infeasible as CMIP6-based Change Factors are not yet available. The remaining option is to use the dynamically downscaled datasets.

The two available CMIP6-based downscaled datasets are the NEX-GDDP-CMIP6 and WRF-CMIP6 datasets. The statistically downscaled dataset NEX-GDDP-CMIP6 is only available at a spatial resolution of 0.25 degrees, which is not sufficient to capture the topographic and orographic drivers of precipitation and temperature patters across the Chino Valley watershed. The dynamically downscaled dataset WRF-CMIP6 is available at a 3-km resolution and is appropriate to apply to the CVM. The development of the WRF-CMIP6 datasets is an ongoing project. Currently, the downscaled datasets of nine GCM scenarios are available, and it is expected that additional datasets for other GCM scenarios will be available when

the projections for the forthcoming Safe Yield recalculation will be developed.[11] Therefore, the WRF-CMIP6 datasets are recommended to be used in the updated Safe Yield calculation methodology to account for the effects of future climate variations.

Results of available historical runs of UCLA WRF-CMIP6 models will be compared to historical PRISM dataset over the concurrent time period. The results of each comparison will be used to rank the WRF-CMIP6 models. The ranking will be used for model selection. The proposed selection of GCMs and scenarios will be presented at a peer review workshop for feedback prior to implementation.

As climate conditions are coupled with water demands and supplies, combinations of climate scenarios and the water demand and supply plan scenarios should be chosen to ensure consistency. For example, a warmer and drier climate generally drives increased demand, assuming no additional water conservation. Therefore, the WRF-CMIP6 model projections that are warmer and drier should be coupled with demand and supply plan scenarios that reflect a warmer and drier climate. The proposed selection of projection scenarios (climate and water demand and supply plans) will be presented at a peer review workshop for feedback prior to implementation.

The following method is proposed to implement the dynamically downscaled CMIP6 data into the CVM.

1. Review and select a subset of the available dynamically downscaled datasets (i.e., combinations of GCMs and scenarios). The selected subset should be representative of plausible future patterns of precipitation, ET_0, and temperature of the CVM watershed. Watermaster will host a peer review workshop to present the proposed selected datasets and gather feedback.
2. Review and select representative future cultural conditions consistent with the water demand and supply plan scenarios. This includes a combination of future land use and applied water patterns. As the Chino Basin is expected to be built out by 2040, and the land use change from agricultural to urban uses is not expected to significantly affect DIPAW, it is practical to assume a single future land use to combine with the selected range of applied water patterns to characterize representative future cultural conditions.
3. Incorporate the chosen combinations of climate datasets and cultural conditions into the CVM:
    - Execute the HSPF and R4 models with the land use data, precipitation, and ET_0 datasets from the climate projection. The results of the HSPF and R4 simulation (including DIPAW, stormwater discharge to streams, and stormwater recharge) will be used as input data of the MODFLOW model of CVM.
    - Develop SAR discharges from the upper SAR watershed at Riverside Narrows based on results from other regional models that include the same or similar climate projections as part of the model input. If appropriate regional models are unavailable, then a method will be developed to estimate future discharges. The estimated SAR discharges at Riverside Narrows will be used as input data to the MODFLOW model of CVM.

[11] Correspondence with Stefan Rahimi-Esfarjani, March 31, 2022

5.0 RECOMMENDED PROCESS TO CALCULATE THE SAFE YIELD

Section 4.0 outlined the potential approaches and recommended methods for addressing uncertainty in the model parameterization, future water demands and supply plans, and future climate scenarios. This section describes the proposed updated Safe Yield Reset methodology.

5.1 Update Model and Generate Calibration Realizations

The process to update the model and generate calibration realizations will include the following steps:

- Update the HSPF and R4 surface-water models for the historical period. The HSPF and R4 models may not need to be recalibrated for this model update; at a minimum, surface-water model outputs will be compared to measured data (e.g., discharge, applied water, stormwater recharge) to verify the models.
  - Note: To simplify the uncertainty analysis and the model update, the proposed process includes deterministic runs of the HSPF and R4 models to generate MODFLOW model input data (e.g., DIPAW, boundary fluxes) which will be treated as adjustable parameters during model calibration using PESTPP-IES.
- Update the MODFLOW model for the historical period based on observation data and the results of HSPF and R4.
- Select adjustable model parameters (e.g., horizontal hydraulic conductivity) and prepare input files to incorporate characteristics of those parameters for PESTPP-IES (such as pilot points, variograms, and covariance matrices).
- Prepare observation data as calibration targets, such as time series of groundwater elevations at wells and stream discharge.
- Use PESTPP-IES to estimate model parameters and generate a set of calibrated model realizations. Prepare statistics and water budgets to characterize each realization.
- Review the outputs and water budgets from the calibrated realizations to rank the calibration realizations. Determine which calibration realizations should be selected and whether more calibrated realizations should be added. Conduct peer review process to share calibration results. Repeat the PESTPP-IES process and review outputs until enough calibrated model realizations are developed.

5.2 Prepare Projection Realizations

Implementing the recommended methods in Section 4.0 will result in the development of multiple projection scenarios, which are unique combinations of future demands, water supply plans, and climate scenarios. The chosen projection scenarios must comprise consistent combinations of demands, water supply plans, and climate/hydrology as defined in Section 4.2.2. The peer review process will be critical to the successful development of the projection scenarios, particularly to define the plausible range of future water demands and supply plans.

A projection realization is a unique combination a calibrated model realization and a projection scenario. An "ensemble of projection realizations" will be developed which will be equal to the product of the calibrated model realizations and the projection scenarios.

5.3 Simulate Ensemble of Projection Realizations

The steps to simulate the ensemble of projection realizations are:

1. Specify a minimum number of projection realizations to be simulated.
2. Simulate projection realizations in a random order and calculate the average net recharge of all simulated realizations.
3. Simulate an additional projection realization and calculate the average net recharge of all simulated realizations.
4. Check for convergence of average net recharge.
5. Repeat steps 3 and 4 until the convergence of average net recharge is reached or a specified maximum number of projection realizations are simulated. The upper limit of projection realizations will be determined with input from the peer review committee prior to implementation.

5.3.1 Computational Feasibility of Simulating Projection Realizations

The following hypothetical example illustrates the computational feasibility of simulating the ensemble of projection realizations. A total of 40 calibrated model realizations and 15 projection scenarios would result in 40 x 15 = 600 projection realizations. If the simulation of each realization takes a day to complete, a single computer CPU will need 600 days to simulate the ensemble of 600 realizations. Simulating several hundred projection realizations will require significant computing power, which can be acquired from commercial cloud computing services. For example, Amazon Web Services (AWS) currently charges a monthly cost of $94 for a 4-CPU-WorkSpace that can simulate three realizations simultaneously (1 CPU is needed for the operating system). A total number of 40 4-CPU-WorkSpaces will be needed to complete the simulation of 600 realizations in five days. The total monthly cost for 40 4-CPU-WorkSpaces will be $3,760. It is anticipated that three to six months of the computing services will be needed. Minimal staff time will be required to maintain and debug the model runs on the remote workspaces.

5.3.2 Storing Input and Output Files for the Model Ensemble

Since a projection realization can produce about 50 gigabytes of simulation results, it is impractical to store complete model outputs for several hundred to thousands of simulations. Therefore, an automated process will need to be developed to simulate all realizations and to extract/post-process only the model results necessary to quantify net recharge, potential Material Physical Injury (MPI), and the state of hydraulic control. After the simulation of each projection realization, the time series of annual water budget components (e.g., change in storage) and net recharge will be calculated, the potential MPI will be assessed, and the state of hydraulic control will be determined based on the same approach that has been implemented in prior Chino Basin modeling studies (WEI, 2018b; WEI, 2020; WY, 2021). To preserve the reproducibility of the model results without having to store all input and output files, computer scripts or tools that are used to develop input files will be saved.

5.4 Quantify Results of Projection Realizations

The water budget, net recharge, Safe Yield, the potential for MPI, and the state of hydraulic control will be quantified for each projection realization. The model results will be stored for each projection realization for subsequent statistical analyses.

5.5 Conduct Statistical Analyses of the Results of Projection Realizations

The statistical analyses will be conducted to include:

- The annual water budget for the Chino Basin including the annual net recharge and annual change in groundwater storage over the planning period, including the range and distribution of ensemble results. The planning period will be no less than 50 years which is consistent with the planning period required by SGMA and long enough to evaluate the long-term response of the Chino Basin to evaluate for MPI and undesirable results.
- Determination of the Safe Yield over a specified 10-year period (e.g., 2026-2035) as the 10-year average of the ensemble mean annual net recharge. If the water demand and supply plan scenarios are weighted with non-uniform likelihoods, then the Safe Yield would be calculated as the likelihood-weighted 10-year average of the ensemble mean annual net recharge.
- The potential for MPI. The statistics will include the extent of potential MPI as well as details of the projection realization, including type of demand/supply plans, climate/hydrology, or parameter realizations. These statistics will allow for identifying the factors causing MPI.
- The state of hydraulic control. The statistics will include the projection scenarios and their projected time series of groundwater discharge from the Chino-North Groundwater Management Zone to the Prado Basin Management Zone. Hydraulic control is maintained if the groundwater discharge is less than the de minimis threshold of 1,000 acre-ft per year.

5.6 Evaluate the Risk of MPI and Undesirable Results

The risk of potential MPI and undesirable results associated with the ensemble of projection realizations will be evaluated based on the statistics generated in 5.5. If the water demand and supply plan scenarios are weighted with non-uniform likelihoods, then the risk of potential MPI and undesirable results would be calculated as the weighted ensemble statistics. If the risk of MPI and undesirable results is significant (based on a defined threshold), then Watermaster will "identify and implement prudent measures necessary to mitigate [MPI and undesirable results], set the value of Safe Yield to ensure there is no [MPI and undesirable results], or implement a combination of mitigation measures and a changed Safe Yield." Mitigation measures should be guided by an examination of the projection realizations that indicate MPI and/or undesirable results.

5.6.1 Considerations for Interpreting Ensemble Results

Figure 1 shows a hypothetical time series of calculated annual net recharge for all projection realizations in the ensemble. The solid blue line represents the ensemble mean annual net recharge, and the shaded blue band indicates the spread in annual net recharge of all the projection realizations. The solid red line represents the annual mean net recharge of the ensemble for the period of 2026 through 2035.

For a single projection realization, the Safe Yield for a given period (e.g., 2026 to 2035) will be calculated as the annual mean net recharge of that realization over the given period. The Safe Yield for the ensemble of projection realizations will be calculated as the 10-year average of the ensemble mean net over the given period, weighted by likelihood (see the solid red line on Figure 1). The range and standard deviation of the Safe Yield for the ensemble will be calculated based on the Safe Yield of individual projection realizations.

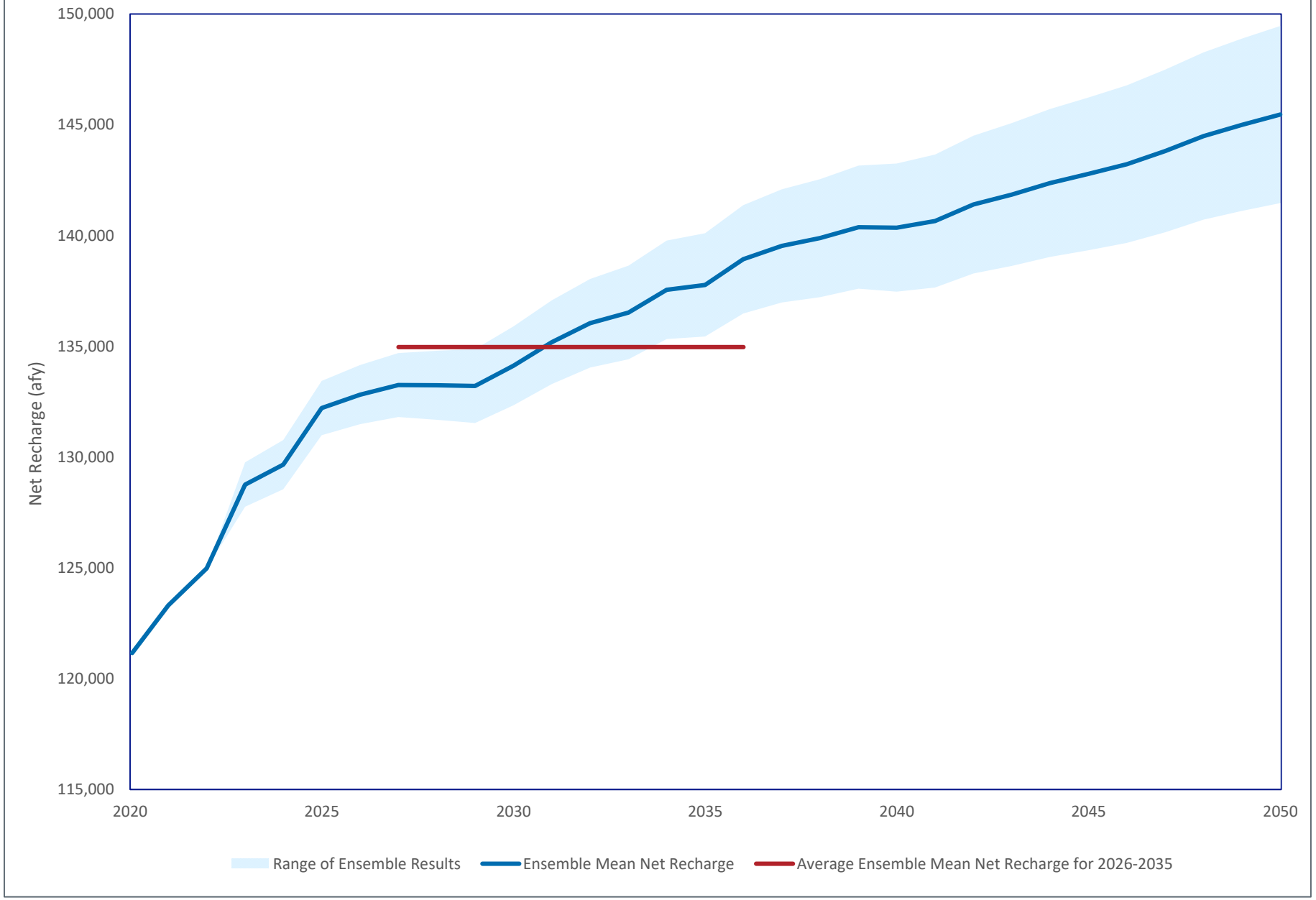
The probability of MPI and undesirable results will be derived from the likelihood-weighted time series of the state of hydraulic control and the potential for MPI. The results of the projection realizations will be

examined to determine the drivers of any losses of hydraulic control or the occurrences of MPI (e.g., high groundwater pumping, lower precipitation, etc.). This analysis can inform planning for potential mitigation actions. To guide the analysis, thresholds of significance will be defined to determine the risk of MPI and undesirable results. For example, if less than five percent of the projection realizations in the ensemble indicate a loss of hydraulic control, then the risk that hydraulic control would be lost at the ensemble mean Safe Yield would be considered insignificant.

5.7 Identify Data Gaps

The BMPs for modeling under SGMA (see Section 2.2) point out that an uncertainty analysis can "identify high-value data gaps" that can improve the model's ability to "[provide] useful information to support effective basin management decisions." During the execution of the proposed updated Safe Yield Reset methodology, it is likely that data gaps will be identified that would improve the model calibration, reduce the uncertainty of an aspect of the model, or both. These data gaps will be documented in the final model documentation.

Figure 1. Hypothetical Projected Net Recharge Using Ensemble Approach



5.8 Comparison of the Current and Proposed Safe Yield Reset Methodologies

Table 3 compares the major differences between the current and proposed Safe Yield Reset methodologies.

Table 3. Comparison of Current and Proposed SY Reset Methodologies

Step	Current SY Reset Methodology	Proposed SY Reset Methodology
Calibration of groundwater model	Calibrate groundwater model with parameter zones and PEST to generate one calibrated model realization.	Calibrate groundwater model using pilot points and PESTPP-IES to generate multiple calibrated model realizations.
Incorporation of demand and supply plans in scenario development	Using the current planning data collected from the Parties and other sources to develop a single projection scenario of future demands and water supply plans. Minimal stakeholder engagement beyond clarifying the collected data.	Collecting the same data sets as in the current SY Reset methodology. A stakeholder process will be implemented using RDM principles to understand the drivers and potential responses to stresses to aid in the development of multiple plausible projections for demand/supply plans.
Projection realization development	One projection scenario is developed based on a combination of the best estimates of future demands, supply plans, and long-term expected value hydrology adjusted for climate change.	Multiple projection realizations will be developed as unique combinations of calibrated model realizations, future demands and water supply plans, and future climate and hydrology.
Evaluation of model results	The projection scenario is evaluated based on whether the projected groundwater pumping "*will cause or threaten to cause 'undesirable results' or 'Material Physical Injury'.*"	The method to evaluate model results is like the current SY Reset methodology, but the method is automated and applied to the ensemble of projection scenarios. Ensemble statistics are generated to characterize the potential for MPI and state of hydraulic control and identify the drivers that may cause MPI or loss of hydraulic control.
Calculation of Safe Yield based on model results	Safe Yield is calculated as the 10-year average of net recharge for a single model projection realization.	Safe Yield is calculated as the ensemble mean of the 10-year average net recharge for the ensemble of projection scenarios, possibly weighted by assigned likelihood of water demand and supply plan scenarios.

6.0 COST ESTIMATE AND SCHEDULE

Implementing the proposed updated Safe Yield Reset methodology will occur as part of the Court-ordered reevaluation of the Safe Yield that must be completed by June 30, 2025[12] (2025 Safe Yield Reevaluation). A cost estimate to implement the 2025 Safe Yield Reevaluation has been prepared and is based on (i) an understanding of the cost of implementing the uncertainty analysis (based on the process documented in Attachment A), (ii) prior modeling experience in the Chino Basin, and (iii) estimates of future billing rates. A table detailing the anticipated tasks and their estimated costs is included as Attachment D. The cost estimate is broken down into seven tasks:

[12] Page 17 of the 2017 Court Order

- Task 1. Update Hydrogeologic Conceptual Model and Surface Water Models
- Task 2. Recalibrate Groundwater Model and Generate Calibration Realizations
- Task 3. Prepare Ensemble of Projection Scenarios
- Task 4. Simulate Ensemble of Projection Scenarios and Calculate Safe Yield
- Task 5. Prepare Safe Yield Reevaluation Report
- Task 6. Support Court Approval Process for Updated Safe Yield
- Task 7. Project Management

Task 6 will only be necessary if this work causes the Watermaster to recommend to the Court that the Safe Yield be changed by an amount greater (more or less) than 2.5 percent of the current Safe Yield[13]. The cost estimate to perform the entire scope of work is $1.46 million over three years. The annual costs are expected to occur as follows:

- **FY 2022/23**: $259,000
- **FY 2023/24**: $540,000
- **FY 2024/25**: $659,000

These cost estimates are preliminary. Some tasks are dependent on the results of prior tasks and recommendations coming out of the peer review process. Before each fiscal year, Watermaster will refine the cost estimates as part of its normal annual budgeting process.

[13] Pages 15-16 of the 2017 Court Order

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Attachment A

Applying PESTPP-IES to Generate Calibrated Parameter Realizations

ATTACHMENT A. APPLYING PESTPP-IES TO GENERATE CALIBRATED PARAMETER REALIZATIONS

Attachment A documents the effort to understand and demonstrate the applicability of using PESTPP-IES to calibrate and generate calibrated realizations of the Chino Valley Model (CVM), as demonstrated on a smaller, idealized (synthetic) model. Our goal is to understand (1) how to generate horizontal hydraulic conductivity (HK) distribution fields from pilot points that can be used by PEST and PESTPP-IES as input parameters, (2) how to generate calibrated parameter realizations with PESTPP-IES, and (3) how to run a model using the ensemble of calibrated parameter realizations.

This synthetic model, adapted from Using PESTPP-IES (Doherty, 2021), is used as an example to illustrate the steps generate an ensemble of calibrated parameter realizations and to conduct model simulations with the ensemble of calibrated parameter realizations.

A.1 Overview of the Synthetic Model

The model has three layers and several observation points in each model layer, as shown in Figure A-1. The elevation of the top of the first model layer ranges from 137.5 to 178 meters and each model layer has a constant thickness of 50 meters. The western (left) boundary of the first model layer is a constant head boundary with the head value of 150 [m]. The model cells in an impervious area on the eastern (right) boundary are set as inactive cells and excluded from the flow simulation. All other model boundaries are impervious boundaries. The model is configured for a steady-state simulation with a single stress period. The model domain has a constant recharge rate of 0.002 [m/day]. There are two pumping wells in layer 3 with the pumping rates of 30,000 [m3/day] and 40,000 [m3/day], respectively.

The observed head values at the observation points are specified. The values and distribution of the horizontal hydraulic conductivity (HK) and vertical hydraulic conductivity (VK) in the model layers need to be adjusted to minimize the difference between the model-calculated and observed head values. A variogram is available and is assumed to be applicable to HK and VK in all model layers.

The parameter estimation software PESTPP-IES will be used to calibrate the model and generate calibrated parameter realizations. Many commercial graphical user interface software (GUI) for MODFLOW can be used to develop model input files. The files of the present example are available upon request.

A.2 The Pilot Point Method

Conventional calibration uses the method of parameter zones. This methodology involves defining a limited number of zones in each model layer and assigning parameters within each zone as constant values. Parameters are then adjusted to calibrate the parameters until the fit between model-calculated and observed data is as good as possible. If the goodness of fit obtained based on these zones was not acceptable, then extra zones would be introduced into the model domain and calibration process would be repeated.

There are several shortcomings associated with the parameter zone approach. First, the procedure can be time-intensive. Second, zones of piecewise uniformity are a coarse approximation of the nature of the aquifer material, and using zones limits the ability to explore the effects of small-scale heterogeneities on model predictive uncertainty.

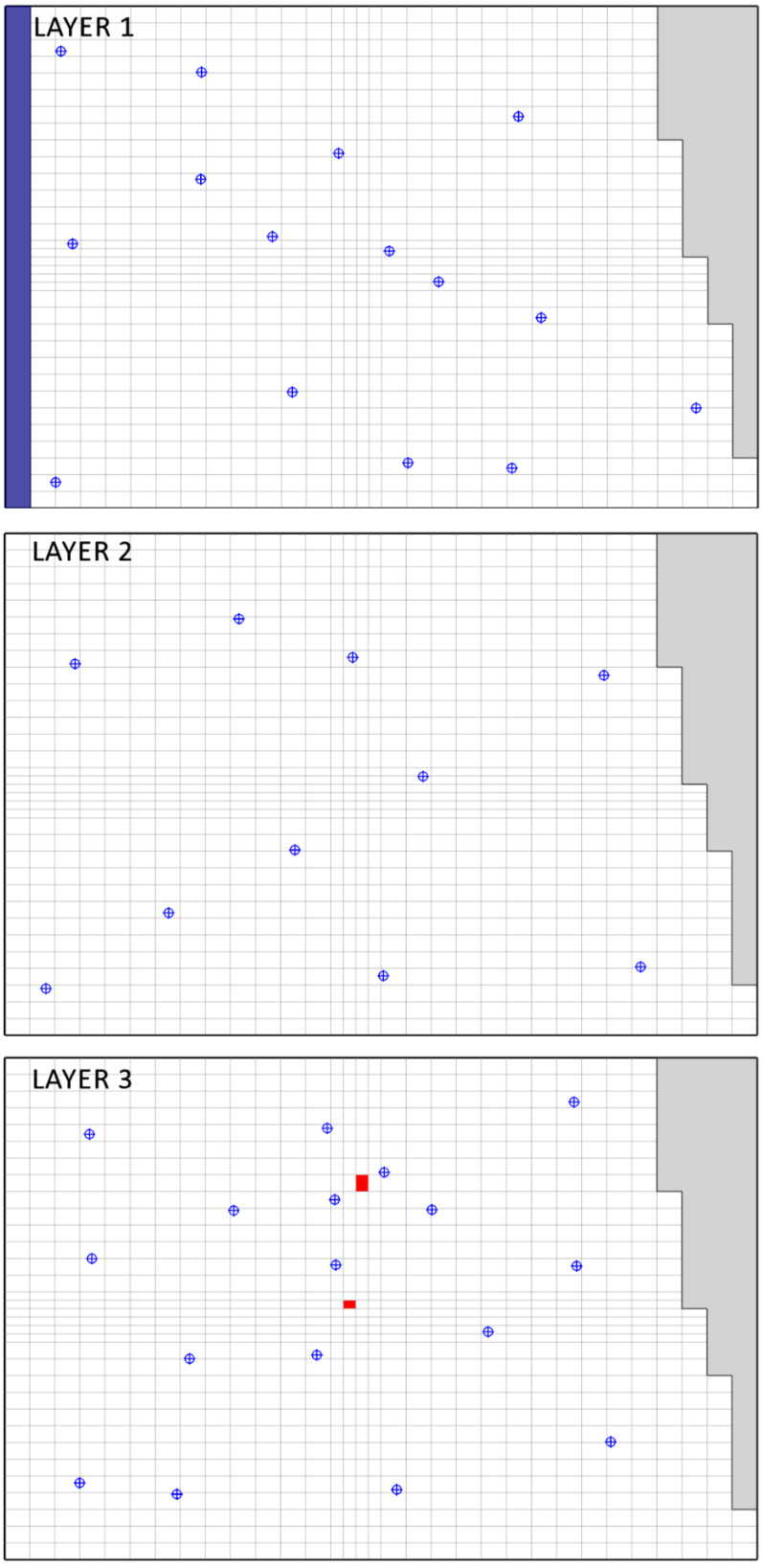

Figure A-1. Layers and Head Observation Points of the Synthetic Model. Red blocks in Layer 3 represent the pumping wells.

The Pilot Point Method can be used to overcome these problems. In this method, several points with hydraulic parameters (i.e., HK and VK values in the present example) are introduced to the model domain, such as shown in Figure A-2. PEST is used to adjust the hydraulic parameters at each pilot point.

Two utility programs, PPK2FAC and FAC2REAL, from the PEST Groundwater Data Utility suite (Watermark Numerical Computing, 2020) can be used to spatially interpolate hydraulic properties associated with the pilot points to the model cells based on the Kriging method. Details of these utility programs are given in the next section.

PPK2FAC undertakes the first stage of the Kriging method. PPK2FAC generates a set of Kriging factors based on the pilot point locations and user-supplied, nested variograms, each with an arbitrary magnitude and direction of anisotropy. Individual pilot points can be assigned to different zones within the model domain. Only those points assigned to a particular zone can be used in calculating parameter values throughout that zone using the Kriging interpolation procedure. The variogram upon which Kriging is based can be different in each zone, reflecting differences in the geology, or in the level of heterogeneity, expected within each geological unit. If only one pilot point is assigned to a particular zone, then a uniform parameter value is assigned to all cells within that zone.

FAC2REAL undertakes the second stage of the Kriging method. FAC2REAL calculates the interpolated value at each model cell as the sum of the products of the Kriging factor and hydraulic property of the pilot points within the search range of the cell. Upper and lower limits can be applied to interpolated values if desired. The calculation results are saved in a MODFLOW-compatible real array file.

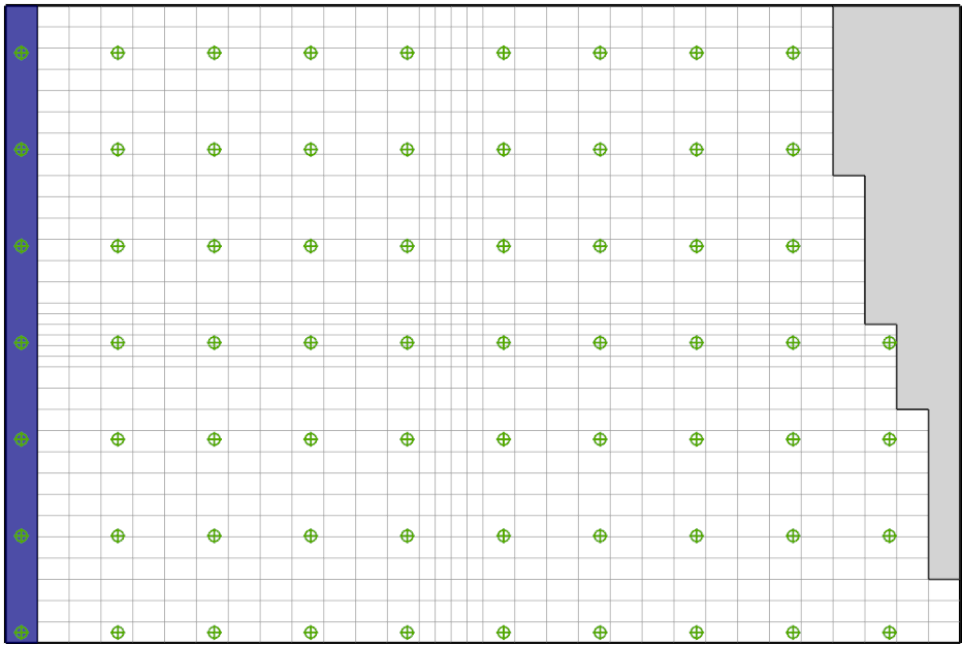

Figure A-2. Pilot points

A.3 Spatial Interpolation with Pilot Points

This section demonstrates the use of the utility programs PPK2FAC and FAC2REAL. First, PPK2FAC will be used to create a Kriging factor file, and then FAC2REAL will be used to spatially interpolate HK values associated with pilot points to model cells. The required input data files for these programs are shown below. The formats of these files are specified in the PEST suite (Doherty, 2018) and PEST Groundwater Data Utility suite (Watermark Numerical Computing, 2020).

- PPK2FAC input files:
  - Grid specification file: defines the grid location and column/row spacing.
  - Pilot points file: defines the location of pilot points.
  - Zonal integer array file: an integer array containing the pilot point zones.
  - Structure file: defines structures with variograms.
- FAC2REAL input files:
  - Kriging factor file: contains kriging factors calculated by PPK2FAC
  - Pilot points file: defines the location of pilot points.

Calculation of Kriging factors can be a very time-consuming task if the number of pilot points is large. Fortunately, Kriging factors are independent of the values assigned to the pilot points and therefore just need to be calculated once for each set of pilot points.

A.3.1 Running PPK2FAC

The utility program can be started by double-clicking the executable file "ppk2fac.exe" in Windows Explorer. Once the program is started, it will prompt for user's input. Figure A-3 shows the prompts and the corresponding user's inputs in red. In the present example, the calculated kriging factors are stored in the file "krigingfactor1.dat."

The utility program can also be started in a Windows Command Prompt by typing "ppk2fac < ppk2fac.in" followed by Enter. This instructs PPK2FAC to read the user's input from the text file "ppk2fac.in" that contains the pre-recorded user's inputs.

Generation of MODFLOW and MT3D input arrays based on PPK2FAC-generated Kriging factors is carried out by FAC2REAL. Separation of the time-consuming, factor-generation process from the array construction process facilitates automatic parameter estimation based on pilot points using software such as PEST, for Kriging factors are unchanged as values assigned to the pilot points are adjusted through the parameter estimation process (Watermark Numerical Computing, 2020).

A.3.2 Running FAC2REAL

The utility program FAC2REAL can be started by double-clicking the executable file "fac2real.exe" in Windows Explorer. Once the program is started, it will prompt for user's input. Figure A-4 shows the prompts and the corresponding user's inputs in red. The pilot point file "points1.dat" and the output file "krigingfactor1.dat" from PPK2FAC is used as input to FAC2REAL. The interpolation results are stored in the file "kx1.dat". Figure A-5 shows a contour map based on the interpolation results of the synthetic model.

The utility program can also be started in a Windows Command Prompt by typing "fac2real < fac2real.in" followed by Enter. This instructs FAC2REAL to read the user's input from the text file "fac2real.in" that contains the pre-recorded user's inputs.

The hydraulic property values assigned to the pilot points can be different from those provided in the pilot points file read by PPK2FAC. Nevertheless, it must list the same points in the same order, and each point must be assigned to the same zone.

```
Program PPK2FAC calculates point-to-cell factors by which kriging is
undertaken from a set of pilot points to the finite-difference grid.

Enter name of grid specification file: pest.gridspecification
        – grid specifications read from file pest.gridspecification
Enter name of pilot points file: points1.dat
        – data for 67 pilot points read from pilot points file points1.dat

Enter minimum allowable points separation: 0
Enter name of zonal integer array file: zones.dat
Is this a formatted or unformatted file? [f/u]: f
        – integer array read from file zones.dat
Enter name of structure file: struct.dat

The following zones have been detected in the integer array:
        For zone characterized by integer value of 1:-
        Enter structure name (blank if no interpolation for this zone): struct1
        Perform simple or ordinary kriging [s/o]: o
        Enter search radius: 2970
        Enter minimum number of pilot points to use for interpolation: 1
        Enter maximum number of pilot points to use for interpolation: 12

Enter name for interpolation factor file: krigingfactor1.dat
Is this a formatted or unformatted file? [f/u]: f
Enter name for output standard deviation array file: standarddeviation.dat
Write a formatted or unformatted file? [f/u]: f
Enter name for regularization information file: regularizationinfo.dat

Carrying out interpolation for integer array zone 1....
        Number of pilot points for this zone    =   67
        Mean data value for these pilot points  =  44.849
        Data standard deviation for these points =  31.894
        Working…
```

Figure A-3. Screen prompts of the utility program PPK2FAC and the user's inputs in red.

Program FAC2REAL carries out spatial interpolation based on interpolation factors calculated by PPK2FAC and pilot point values contained in a pilot points file.

Enter name of interpolation factor file: **krigingfactor1.dat**
Is this a formatted or unformatted file? [f/u]: **f**

Enter name of pilot points file [points1.dat]: **points1.dat**
– data for 67 pilot points read from pilot points file points1.dat

Supply lower interpolation limit as an array or single value? [a/s]: **s**
Enter lower interpolation limit: **1e-10**

Supply upper interpolation limit as an array or single value? [a/s]: **s**
Enter upper interpolation limit: **1e10**

Enter name for output real array file: **kx1.dat**
Write a formatted or unformatted file? [f/u]: **f**

Figure A-4. Screen Prompts of the utility program FAC2REAL and user's inputs in red

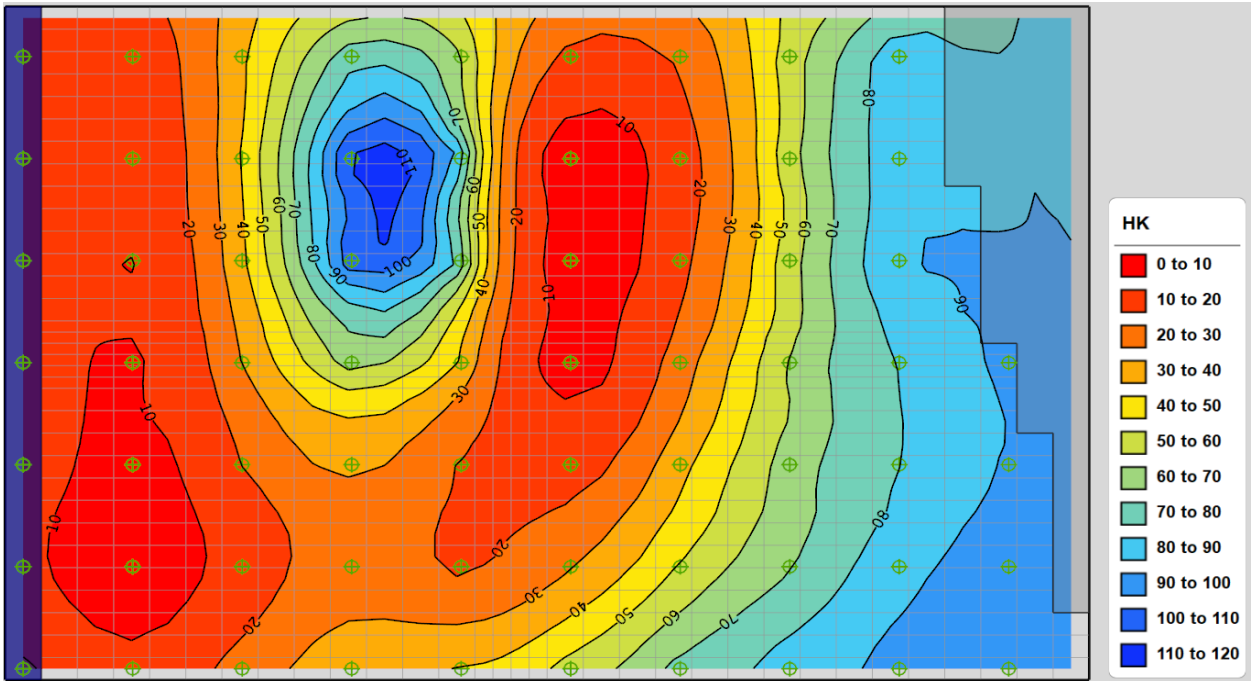

Figure A-5. A contour map based on the interpolation results created by FAC2REAL

A.4 Using the Pilot Point Method with PEST

Pilot points are integrated to a model by creating a batch file and inserting the name of a batch file to the "* model command line" section of a PEST control file. The batch file contains several instructions that together form a "composite model" used by PEST. Such a "composite model" includes instructions to manipulate data (such delete files, invoke utility programs, start model run, and postprocess model results) for a PEST iteration.

A.4.1 A Simple Composite Model

A simple composite model can consist of just a few instruction lines shown below.

```
del hk1.dat
fac2real < fac2real.in
mf2005 mymodel.nam
targpest
```

The lines of the simple composite model are as follows.

- The first line "del hk1.dat" deletes the "hk1.dat" file that contains the interpolated HK values from the previous calibration iteration.
- The second line "fac2real < fac2real.in" instructs FAC2REAL to read input values from the fac2real.in file. FAC2REAL generates the hk1.dat file based on the values associates with the pilot points that are updated by PEST for the current iteration of the calibration process. Note that the same kriging factor file cited in fac2real.in is reused for each iteration.
- The line "mf2005 mymodel.nam" starts MODFLOW-2005 with the Name file "mymodel.nam". The hk1.dat file is included in the "mymodel.nam" file as a part of the model input.
- The last line "targpest" runs the utility program Targpest, which extracts the model output data and save them in a form that can be read by PEST through specific instruction files need to be designed to match the output format of targpest. TARGPEST is distributed with the commercial software Groundwater Vistas. See its manual for details.

A.4.2 A Complex Composite Model

The batch file shown in Figure A-6 is an example of a complex composite model. Note that "mod2obs.exe," "layerweight.exe," "streamgage.exe," and "lakestage.exe" are utility programs of Processing Modflow (Chiang, 2022) that are designed to extract the model results and store the extracted data in the formats that can be read by PEST. Specific instruction files are designed in Processing Modflow to match the output of those utility programs.

```
del kx_array
del kz_array
fac2real < fac2real1.in
fac2real < fac2real2.in
MODFLOW-NWT_64.exe mymodel.nam
mod2obs.exe < pest.mod2obsheadinput
layerweight.exe pest.boreinfo pest.mod2obsheadoutput pest.headoutput
mod2obs.exe < pest.mod2obsdrawdowninput
```

Figure A-6. A complex composite model

The lines of the above example are as follows.

- The lines “del kx_array” and “del kz_array” respectively delete the kx_array and kz_array files that contain the interpolated HK and VK values from the previous calibration iteration.
- The line “fac2real < fac2real1.in” instructs FAC2REAL to read input values from the “fac2real1.in” file. FAC2REAL generates the kx_array file based on the values associates with the pilot points that are updated by PEST for the current iteration of the calibration process.
- The line “fac2real < fac2real2.in” instructs FAC2REAL to read input values from the “fac2real2.in” file. FAC2REAL generates the kz_array file based on the values associates with the pilot points that are updated by PEST for the current iteration of the calibration process.
- The line “MODFLOW-NWT_64.exe mymodel.nam” starts MODFLOW-NWT with the Name file “mymodel.nam.” The kx_array and kz_array files are cited in the “mymodel.nam” file as a part of the model input.
- The line “mod2obs.exe < pest.mod2obsheadinput” instructs MOD2OBS to read input values from the pest.mod2obsheadinput file. MOD2OBS interpolates model calculated cell-based head values to specific observation point locations and times.
- The line “layerweight.exe pest.boreinfo pest.mod2obsheadoutput pest.headoutput” instructs LAYERWEIGHT to read input values from the files cited in the line. LAYERWEIGHT calculates layer-weighted average head values for multi-layer head observations.
- The line “mod2obs.exe < pest.mod2obsdrawdowninput” instructs MOD2OBS to read input values from the pest.mod2obsdrawdowninput file. MOD2OBS interpolates model calculated cell-based drawdown values to specific observation point locations and times.
- The line “layerweight.exe pest.boreinfo pest.mod2obsdrawdownoutput pest.drawdownoutput” instructs LAYERWEIGHT to read input values from the files cited in the line. LAYERWEIGHT calculates layer-weighted average drawdown values for multi-layer drawdown observations.
- The line “streamgage.exe modflow.streamout pest.reach pest.strflowobstimes pest.streamout” instructs STREAMGAGE to read input values from the files cited in the line. STREAMGAGE calculates the weighted streamflow values at the times of interest for each observation point.

- The line "lakegage.exe modflow.lakeout pest.lakeobspt pest.stageobstimes pest.lakeoutput" instructs LAKEGAGE to read input values from the files cited in the line. LAKEGAGE calculates the weighted stage values at the times of interest for each observation point.

A.4.3 A Complete PEST Control File

Figure A-7 shows a complete PEST control file that includes the batch file "modelrun.bat" in the "* model command line" section. The modelrun.bat represents a complex composite model as shown in Figure A-6.

The lines in the "parameter data" section of the PEST control file list the names, initial values, and minimum/maximum bounds of parameters.

The first six lines in the "model input/output" section of the PEST control file list two pairs of "pilot point template file and pilot point file." A template file contains the parameter names that PEST will replace with estimate values of the corresponding parameters. Once the parameter names in a template file are replaced with values. PEST writes the results to the corresponding pilot point file. The pilot point files with updated parameter values are interpolated to model cells by FAC2REAL in the next iteration.

The last line in the "model input/output" section of the PEST control file list pairs of the instruction file and corresponding output file from the composite model. This instruction file is tailored to instruct PEST to correctly read desired model output data from the matching output file. Those model output data are compared with the observed counterparts during the parameter estimation process. For details of the PEST control file, template file, and instruction file, see the PEST manual (Doherty, 2018).

```
pcf
* control data
restart estimation
        402     42      2       0       3
6 1 single point 1 0 0
20 -3.0 0.3 0.01 7 999 lamforgive
10 10 0.001
0.1 1 noaui noboundscale
50 0.01 3 3 0.01 3
0 0 0 PARSAVEITN
* singular value decomposition
    1
    402 5.0e-007
    1
* parameter groups
Kp          relative   0.01 0     switch 2 parabolic
Kz          relative   0.01 0     switch 2 parabolic
* parameter data
KpKp1 log factor 100 1 10000 Kp 1.0 0.0 1
    [lines deleted]
KzKz200 log factor 10 0.1 1000 Kz 1.0 0.0 1
KzKz201 log factor 10 0.1 1000 Kz 1.0 0.0 1
* observation groups
head1
head2
head3
* observation data
o1 163.04 1 Head1
o2 154.00 1 Head1
[lines deleted]
o42 156.90 1.5 Head3
* model command line
modelrun.bat
* model input/output
points1.tpl points1.dat
points2.tpl points2.dat
```

Figure A-7. A Complete PEST Control File

A.5 Steps to Calibrate Model and Generate Calibrated Parameter Realizations

PESTPP-IES can be used to calibrate a model and generate calibrated parameter realizations for the model at the same time. Two types of files are required to enable this feature of PESTPP-IES — a Parameter Uncertainty File and a Covariance Matrix File. The Parameter Uncertainty File acts a container of all covariance files of a model. The Covariance Matrix File contains the covariance of pairs of parameters.

A.5.1 Covariance Matrix File

Covariance matrix files can be generated by using the PPCOV utility from the PEST Groundwater Data Utility suite. The utility program PPCOV can be started by double-clicking the executable file "ppcov.exe" in the Windows Explorer. Once the program is started, it will prompt for user's input. Figure A-8 shows the prompts and the corresponding user's inputs in red. The pilot point file "points1.dat" and the "struct.dat" files are used as input to PPCOV and the calculated covariance matrix is stored in the "cov_kx1.mat" file.

```
Program PP2COV prepares a covariance matrix file for pilot point parameters
based on a geostatistical structure file.
Enter name of pilot points file: points1.dat
        – data for 67 pilot points read from pilot points file points1.dat
Enter minimum allowable separation for points in same zone: 0
Enter name of structure file: struct.dat
Enter structure to use for pilot point zone 1: struct1
Enter name for output matrix file: cov_kx1.mat
Enter pilot point prefix for parameter name (<Enter> if none): kp
Filling covariance matrix....
            – file cov_hk1.mat written ok.
Warning: in any future processing of this covariance matrix, sensitivities
for parameters with a log-variogram must be taken with respect to the log
of the parameters.
```

Figure A-8. Screen prompts of the utility program PP2COV and the user's inputs in red.

A.5.2 Parameter Uncertainty File

PESTPP-IES requires a parameter uncertainty file that defines the covariance matrices of the estimable parameters. Figure A-9, for example, shows a parameter uncertainty file that contains two covariance matrix files for the first model layer of the example model – "cov_kx1.mat" for the HK parameters and "cov_kz1.mat" for the VK parameters. The product of a matrix and the corresponding variance_multiplier is the covariance between parameter pairs that is used by PESTPP-IES.

```
START COVARIANCE_MATRIX
    file cov_kx1.mat
    variance_multiplier 0.25
END COVARIANCE_MATRIX

START COVARIANCE_MATRIX
    file cov_kz1.mat
    variance_multiplier 0.25
END COVARIANCE_MATRIX
```

Figure A-9. A Parameter Uncertainty File that defines covariance matrices of estimable parameters

A.5.3 Running PESTPP-IES

Once a parameter uncertainty file and its related covariance matrix files are created, they can be included in a PEST control file that can be used by PESTPP-IES to calibrate and generate calibrated parameter realizations in the following way.

First, insert the lines shown in Figure A-10 to the end of a PEST control file. The line "++ies_num_reals(80)" set the desired number of calibrated parameter realizations; the line "++parcov(param.unc)" informs PESTPP-IES the name of the Parameter Uncertainty file; the line "++ies_subset_size(2)" instructs PESTPP-IES to devote two realizations to determining the best Marquardt lambda and line search factor to use during each iteration; the last line "++ies_save_binary(true)" instructs PESTPP-IES to record iteration-specific, updated parameter ensembles, as well as corresponding iteration-specific, updated model output ensembles, in binary JCB files (use "++ies_save_binary(false)" to save ASCII files). If the parcov() control variable is omitted from a PEST control file, then PESTPP-IES calculates prior uncertainties from parameter bounds supplied in that control file.

```
++ ies_num_reals(80)
++ parcov(param.unc)
++ ies_subset_size(2)
++ ies_save_binary(true)
```

Figure A-10. Lines to invoke the iterative ensemble smoother of PESTPP-IES

Once the lines shown in Figure A 10 are inserted to the PEST control file, PESTPP-IES can be started by running the following command in Command Prompt. This line starts the executable "ipestpp-ies.exe" and instructs it to read the PEST control file "example.pst".

```
ipestpp-ies example.pst
```

A.6 PESTPP-IES Output Files

All output files written by PESTPP-IES use the same filename base as the PEST control file. In our present example, some of the output files are JCB files as the line "++ies_save_binary(true)" was included in the PEST control file. The JCB files contain parameter and observation values comprising each parameter and observation realization; the iteration number to which these values pertain is included in the filename extension, "example.N.par.jcb" and "example.N.obs.jcb" respectively, where N is the iteration number.

PESTPP-IES also writes the "example.phi.actual.csv" file that stores the iteration-by-iteration history of the objective functions. Inspecting of this file allows the modeler to determine the goodness of the fit.

A.7 Inspecting Parameter Ensembles

The program JCB2CSV (a member of the PEST suite of utility support programs) can be used to convert the contents of a JCB file to a CSV file. To obtain a CSV file listing parameter values comprising all realizations updated during iteration 10, use the command:

```
jcb2csv example.10.par.jcb example.10.par.csv nt
```

The "nt" component of the above command stands for "no transpose". Each row of the resulting CSV file contains a single parameter realization. If you prefer that parameter realizations be ascribed to columns rather than rows, use the above command with "t" (for transpose) instead of "nt".

If you import file "example.10.par.csv" into EXCEL, you will note that realizations are named "base" and then "0" to "78", this amounting to 80 realizations in all. Initial parameter values for the base realization are initial parameter values in the PEST control file.

A.8 Running a Model using Ensembles

Individual parameter realizations stored in a JCB file can be extracted and applied to a calibration or projection model in the following steps. A simple script (for example, written in Python) can be used to automate the process.

1. The JCB2PAR utility (supplied with the PEST suite) is used to extract an individual parameter realization from a JCB file and save the parameters in a PEST parameter value file (i.e., a PAR file). The following command, for example, extract the 60th parameter realization from iteration 10 to the PEST parameter value file "realization60.par".

   ```
   jcb2par example.10.par.jcb 60 realization60.par
   ```

2. Replace the parameter values in the pilot points files (for the present example, "points1.dat", "points2.dat", etc.) with the parameter values in the PEST parameter value file.
3. Use FAC2REAL as shown in Section A.3.2 to create MODFLOW-compatible parameter matrix files with the updated Pilot Points files.
4. Finally, the parameter matrix files can be applied to a MODFLOW model with the REPARRAY utility program or through the MODFLOW Open/Close option in the model's NAME file.

5. The model result (for example, a safe yield time series) of the parameter realization is calculated.
6. Repeat the steps 1 to 5 for all parameter realizations.

Running a model using the ensemble of parameter realizations will yield an ensemble of model results that can be used to quantify the predictive mean and uncertainties.

Attachment B

Comments and Responses on the May 5, 2022 and July 12, 2022 Draft TMs

STATE OF CALIFORNIA DEPARTMENT/JOHN WOOD GROUP PLC (RICHARD REES, PG, CHG)

Comment No. 1 (May 5, 2022 Draft)

The Revised Safe Yield Reset Methodology Watermaster and its Engineer have proposed in the Technical Memorandum (TM) appears to be a technically sound response to previous comments and requests made by parties, but it is relatively complex. We believe that groundwater modeling should follow the simplest approach that meets the modeling objectives. Based on the scale and complexity of the Chino Basin and the various requests made by parties, we understand the initially proposed methodology is complex, but believe that the proposed methodology could be simplified during implementation, with additional complexity added only if necessary.

Response: We generally agree with the comment. We have updated the Draft TM to address your and others' requests for simplification.

Comment No. 2 (May 5, 2022 Draft)

(Section 3: Uncertainty in the CVM and its Use in the Safe Yield Reset) This section describes the nature and sources of available data for model inputs and uncertainties associated with the data. Based on previous work, Watermaster and its Engineer should be very familiar with the model and should have a clear picture of the model's sensitivity to each parameter or type of input. Although a description of sensitivity is provided for some parameters, it is not described for most parameters. It would be very helpful to include information in this section to indicate the relative importance and sensitivity associated with each parameter or type of data. This would help the reader understand the extent to which uncertainty associated with an individual parameter or type of data would be expected to have a major influence on model results. For example, some parameters with a high level of uncertainty may not matter (e.g., stream properties), while other parameters are much stronger drivers of model results such that even relatively small changes in parameter value makes a notable difference in model results (e.g., storage coefficient). Some discussion of this nature is included in Section 4, and is helpful, but introducing this information in Section 3 would provide context for the rest of the TM.

Response: The relative sensitivity of the model parameters is discussed in Section 3.2. Beyond the discussion provided in Section 3.2, we have not performed a sensitivity analysis of the historical data or data used for projections.

Comment No. 3 (May 5, 2022 Draft)

(Section 4: Potential Approaches for Characterizing and Addressing Uncertainty) of the three approaches to uncertainty described (deterministic, robust decision-making [RDM], and dynamic), we agree RDM appears to be the appropriate approach. The details and level of complexity that go along with this approach may vary, however, from those recommended in the TM.

Response: This comment does not require a response.

Comment No. 4 (May 5, 2022 Draft)

(Section 4.2: Model Parameters) We agree an Iterative Ensemble Smoother (iES) is an appropriate tool for use in addressing uncertainty in model parameter values. The TM states, "Based on the nature of the iES algorithm, the number of models runs per estimation iteration depends on the number of desired calibrated groundwater system realizations and does not depend on the number of adjustable parameters." Please examine whether limiting the number of adjustable parameters (perhaps to those selected based on previous sensitivity analysis results) could reduce the complexity and effort of future steps? Also, this section appears focused on parameters in the groundwater flow model but does not appear to explain parameters and uncertainties associated with the HPSF and R4 models. During the May 19th Workshop, there was some discussion on how parameters of the HPSF and R4 model output would be incorporated into the model. Additional information on this approach should be provided.

Response: As stated in the draft TM, increasing the number of adjustable parameters does not increase the effort of implementing iES for the uncertainty analysis. We do not plan to conduct an uncertainty analysis on the HSPF and R4 models. We plan to update the HSPF and R4 models and use them similar to our current methodology. It is not recommended that the HSPF or R4 models be subject to the uncertainty analysis. Rather, the HSPF/R4 estimated DIPAW and subsurface inflows to CVM will be included as adjustable parameters in PESTPP-IES. We have updated the draft TM to clarify the proposed process.

Comment No. 5 (May 5, 2022 Draft)

(Section 4.3: Demand and Supply Projections) The process described in this section seems reasonable. The number of scenarios (up to 6) resulting from this process may be greater than necessary and may lead to unnecessary effort in this and subsequent steps (only 3 demand and supply scenarios are noted in the example given in Section 5.1). We recommend a smaller number of scenarios be targeted with more scenarios added only if necessary. Also, in this and subsequent sections, consider whether the selected demand and supply scenarios should be weighted differently in subsequent steps based on whether the participating agencies deem them to be more likely/best estimates or less likely/bracketing scenarios.

Response: We agree with your recommendation to target a smaller number of scenarios. The number of demand and supply projection scenarios will be recommended based on workshops with the Parties and wholesale agencies. As reflected in Section 5.2 of the updated draft, we propose to first simulate a limited subset of projection realizations, adding additional simulations only if necessary. We will define the limit of projection realizations prior to simulations with input from the peer review committee. We respond to your recommendation of weighting scenarios in response to Comment No. 7.

Comment No. 6 (May 5, 2022 Draft)

(Section 4.4: Climate Projections) The procedure recommended in the TM includes, "Review and select a subset of the available dynamically downscaled datasets (i.e., combinations of GCMs and scenarios). The selected subset should be representative of plausible future patterns of mean precipitation, ET0, and

temperature of the CVM watershed." For consistency with the previous section, we recommend that an approximate or maximum number of datasets be proposed, as this will impact the level of effort for subsequent steps. We also suggest that some explanation be provided for how plausibility will be determined and agreed. In addition, we note that other modeling being conducted by Watermaster's Engineer to support an update to the Salt and Nutrient Management Plan for the Chino Basin involves incorporation of assumed future climate conditions as requested by the RWQCB. We recommend that those same assumed future climate conditions be included in one or more of the simulations conducted as part of the Safe Yield Reset process.

Response: We have updated the draft TM to describe our proposal to select climate scenarios and gradually increase the number of simulated projection realizations until the results of the simulated net recharge of the ensemble converge. We will present the available climate datasets and our proposed selected datasets at a peer review workshop to gather feedback before implementation. We will ensure consistency in the planning scenarios, including future climate, across other Chino Basin planning studies.

Comment No. 7 (May 5, 2022 Draft)

(Section 5.1: Recommended Implementation of Ensemble Approach) While the approach described seems reasonable for some types of uncertainties, it may not consider likelihood or weighting that might be appropriate for others. Specifically, it may be feasible for parties to assign a degree of likelihood or certainty to various water demand and supply projections. If so, would the recommended approach include weighting or other methods to account for this? What is the basis for the stated 40 calibrated model realizations? Would it be possible to start with a smaller number of realizations, review results, add more realizations, and identify statistically when increasing the number of realizations resulted in a change in the overall range of results that did not exceed a pre-determined threshold?

Response: We have added text in the referenced section and other sections to include provisions for weighting the likelihood of the water demand and supply plan scenarios. It is possible for Parties to assign likelihoods to the demand and supply plan scenarios, which may aid in constraining the plausible outcomes when recalculating the Safe Yield. Weighting the likelihood of these demand and supply plan scenarios would add some complexity to the interpretation of the model results but may be valuable.

40 calibration realizations were suggested as an example to demonstrate the process to generate calibrated realizations and the scale of resources necessary to implement the proposed methodology. There is no way to know the distribution of potential model results before conducting the uncertainty analysis, and there is therefore no way to identify an adequate number of model realizations to characterize the plausible range of model parameters beforehand. The actual number of calibrated realizations will be determined based on the pattern of results. We propose to start with a smaller number of calibrated realizations, review the results with the peer review committee, and add complexity only if necessary. We have updated the draft TM to clarify the proposed process.

Comment No. 8 (May 5, 2022 Draft)

(Section 5.1.1: Simulation Process and Results) Although saving complete output files for all simulations may not be practical or necessary, saving output files for specific simulations (or at least saving input files or enough information to allow re-creating the results) may provide value for purposes not specifically related to the Safe Yield Reset envisioned at this time. As noted in the following comment on Section 5.2, we recommend that time-series storage and change in storage values be saved for each realization.

Response: We agree with your comment. We plan to save the software codes and adequate data to re-create the input files sufficient to regenerate the results of the model ensemble. We have updated the draft TM to clarify.

Comment No. 9 (May 5, 2022 Draft)

(Section 5.2: Proposed Updated Methodology to Calculate the Safe Yield) Section 5.2 indicates the water budget will be quantified for each realization. It is not clear whether this includes time-series output for all individual water budget terms. We recommend the methodology in this topic be clarified and that time-series storage and change in storage be saved for each realization. In addition, the methodology used for calculation of Safe Yield should account for any weighting of more-likely or less-likely scenarios as noted above in the comments on Section 5.1.

Response: We propose to save the time series of storage and storage change as one of the water budget components saved in each realization. We have updated the draft TM to clarify.

Comment No. 10 (July 12, 2022 Draft)

P. 9, first enumerated paragraph. This paragraph identifies that the uncertainty analysis can also identify high-value data gaps that could be "prioritized to improve confidence in the model outputs." We believe that Watermaster is evaluating data gaps every time it updates the model. Consider adding identification of high-value data gaps as a step in the methodology in Section 5.3 to take credit for work that Watermaster already plans to do. Data gap evaluation could be added as a final step of the methodology as suggestions to improve the model in future iterations if high-value data gaps are identified.

Response: We have added Section 5.7 to the TM to explicitly include the identification of data gaps into the proposed updated Safe Yield Reset methodology.

Comment No. 11 (July 12, 2022 Draft)

P. 24, last paragraph, fourth sentence. Should this be "… converge or a specified maximum number of projection realizations is reached"?

Response: You are correct. We have updated the TM accordingly.

Comment No. 12 (July 12, 2022 Draft)

P. 27, first paragraph, last sentence. This sentence is a double negative. It should be "…if less than five percent of the models in the ensemble indicate a violation…"

Response: You are correct. We have updated the TM accordingly.

Comment No. 13 (July 12, 2022 Draft)

P. 27, enumerated bullet number 5. Similar to the comment on page 24, should this be "Repeat steps 3 and 4 until convergence is reached or a specified maximum number of projection realizations are simulated."

Response: You are correct. We have updated the TM accordingly.

APPROPRIATIVE POOL (THOMAS HARDER, PG, CHG)

Comment No. 1 (May 5, 2022 Draft)

In general, the Watermaster's engineer, West Yost (WY), is following an approach and methodology for applying uncertainty analysis to reevaluate the Chino Basin Safe Yield that is responsive to my recommendation following the previous Safe Yield Reset process (letter dated April 23, 2020) and is consistent with the California Department of Water Resources (CDWR) Best Management Practices for predictive model analysis. What was not anticipated was that the cost to implement the analysis is estimated to be $1.75 million to $2.3 million over the cost of analyzing the Safe Yield without it. At the workshop, most of our comments to the proposed methodology were associated with recommendations to streamline the uncertainty analysis with the goal of reducing the amount of time, and therefore the cost, to conduct the analysis, considering the planning estimate. Those recommendations, and some additional ones, are described below.

While we have not had access to the detailed work breakdown that resulted in the planning level cost estimate for the uncertainty analysis, two aspects of the Chino Valley Model (CVM) appear to be factoring into long analysis times, which presumably result in higher cost of analysis. These are:

- The relatively long runtime of the MODFLOW model (approximately four hours), and
- The complicated configuration of the CVM (it is comprised of four models – MODFLOW, R4, HSPF, and HYDRUS).

Response: We agree that the uncertainty analysis should be streamlined where practical. To clarify the reference to the cost estimates:

- The total cost of the 2020 Safe Yield Recalculation was about $1 million.

- The total cost to implement the updated Safe Yield Reset methodology is estimated to be about $1.75 million to $2.3 million over three years.[1]

The planning-level cost estimate was partially based on the proof-of-concept of the PESTPP-IES method documented in Attachment A of the first draft TM. We anticipate the cost due to the additional runtime of the ensemble to be a small, as there is little staff time necessary to track and debug the model runs once, they are initiated. The primary reasons for the increase in cost and effort to implement the proposed updated SY Reset methodology compared to the 2020 SY Recalculation are the following:

- Conversion of the CVM to a pilot point method of calibration to facilitate the use of PESTPP-IES.
- Development and application of PESTPP-IES tools.
- Development of tools to generate scenarios for projection realizations.
- Development of tools and methods to systematically assess MPI and undesirable results for the ensemble of projection realizations.
- Additional peer review to ensure stakeholder understanding during the uncertainty analysis, development of the projection scenarios, and the interpretation of the ensemble results.
- Added complexity and content of reporting.

The uncertainty analysis is proposed to only cover the MODFLOW model. The other models will be used as they have in the past for calibration. The HSPF and R4 models will be used to simulate the effects of the chosen climate datasets and water demand and supply plan scenarios. The HYDRUS model was used to determine the vadose zone travel times across the Chino Basin. We propose to use the existing data from the HYDRUS model. The draft TM has been updated to clarify the proposed use of the HSPF, R4, and HYDRUS models.

Comment No. 2 (May 5, 2022 and July 12, 2022 Drafts)

The following are recommendations to speed up run times and simplify the configuration.

Comment No. 2.1

Increase the cell size - The current cell size is a uniform 200 ft by 200 ft across the model area. Increasing the cell size would reduce the number of cells through which the model has to perform calculations, which will reduce run times.

Response: The cell size of the CVM was determined based on a balance of tractable computation time with the precision necessary to adequately represent the locations of wells, recharge basins, and streams. Choosing a cell size larger than this would reduce its precision and applicability to be used for other studies, such as the simulation of salinity transport or subsidence management alternatives. Based on our

[1] This cost estimate has been revised since the responses to comments on the May 5, 2022 Draft TM. See Attachment D.

prior modeling experience, the work to coarsen the model grid is greater than the additional cost of conducting the uncertainty analysis using the current grid cell size.

Response by Thomas Harder on July 12, 2022 Draft: We disagree with this assessment. While this model, or a version thereof, may be used in other applications, its primary purpose here is for updating the Safe Yield of the Basin, which does not have a water quality or land subsidence component. Increasing the cell size from 200 foot squares to 400 foot squares would significantly reduce the number of model computations and associated run time without compromising the representation of wells (very few wells in the basin are located within 400 feet of each other and if they are, their combined pumping can be simulated in a single cell), recharge basins, and streams (the Stream Flow Routing package in MODFLOW simulates stream width independent of cell size). Increase the cell size - The current cell size is a uniform 200 ft by 200 ft across the model area. Increasing the cell size would reduce the number of cells through which the model has to perform calculations, which will reduce run times.

Response: We have developed a cost estimate to coarsen the model grid at about $90,000 to $100,000. The steps to coarsen the model grid would include the following:

- Updating the model geometry and aquifer properties
- Updating each of the MODFLOW packages for the calibration and the projection scenarios. The MODFLOW packages that would need to be updated include DRN, ETS, FHB, HFB, RCH, WEL, and SFR
- Running the model and debugging as necessary
- Comparing the results of the calibration model and the projection scenario to the model used in the 2020 SYR to verify the efficacy of the coarsened model

It would be necessary to manually review and revise the coarsened layer geometry along the faults in the model, and to compare the results of the coarsened model grid to the results of the 2020 SYR model, as the model coarsening and the assumptions made in the processing may result in differences in the model results. These differences and this comparison should be documented to support the use of the new model.

While it is possible to coarsen the model grid as described above, we do not recommend doing so for several reasons. First, a coarser model grid does not allow for a more precise assessment of MPI. By averaging groundwater-level impacts due to transient groundwater pumping over a larger area, potential drawdown due to transient groundwater pumping may be less visible. Coarsening the model renders the CVM a less useful tool to quantify MPI, which is a required element to calculate the Safe Yield.

Second, coarsening the model grid will result in a new separate model, rather than an update to the existing model as contemplated in the 2025 Safe Yield Reevaluation (see Attachment D). A new separate model may lead to challenges to conclusions derived from prior models. Furthermore, this would result in the maintenance of multiple models for multiple applications (e.g., one model with 200-ft cells for salinity modeling and one model with 400-ft cells for the Safe Yield evaluations). This would increase the work required to maintain and document these models and would increase the cost to the Parties.

Finally, the cost of coarsening the model will likely be greater than the cost savings of the reduced run times due to a coarser model. As noted in the TM, the costs of staff time due to model run time are minimal; most of the cost savings would be due to saving time in model debugging and some post-processing. We estimate that the time saved with a coarser model would amount to around $80,000, which is less than the estimated cost of coarsening the model (i.e., $90,000 to $100,000).

For the reasons stated above, West Yost does not recommend coarsening the model.

Comment No. 2.2

Reduce the number of model layers - The model currently has five layers. Two of the layers were added during the 2020 SYR to accommodate simulation of land subsidence in the MZ-1 area. As use of the CVM for land subsidence simulations is no longer proposed, the layers could be removed, which would increase model run times significantly. Based on conversations at the Workshop, it is understood that removing model layers would, in and of itself, require time and effort. However, if cost savings from run times outweigh the cost increase to remove the layers, this may still be a cost-effective step to consider.

Response: The cost of reducing the model layers will increase the overall cost of the modeling and may be greater than the cost of increased simulation time if the layering was not simplified. Reducing the number of model layers will increase the numerical dispersion of the salinity transport simulations that are conducted for the salt and nutrient management planning. Therefore, reducing the number of model layers will result in a less realistic vertical mix of groundwater and increase the uncertainty of the simulation results.

Response by Thomas Harder on July 12, 2022 Draft: It is acknowledged that this structural change to the model could result in work that costs more than the time saved in reduced simulation time. However, it is emphasized that the primary purpose of this model is for updating the Safe Yield of the Basin, not for salt and nutrient management.

Response: This does not necessitate a response.

Comment No. 2.3

Discontinue use of the HSPF and R4 surface water routing models – These 'ancillary models' provide estimates of deep infiltration of precipitation and applied water, which are used as input to MODFLOW via the standard packages. Incorporating them into the PEST calibration will slow down the process significantly. Alternatively, use the HSPF and R4 values from previous model runs as "initial values" in PEST and let IES vary the parameters during calibration.

Response: The HSPF and R4 models will need to be updated and run to estimate DIPAW for the historical calibration period and develop DIPAW projections for the projection realizations. We do not plan to include these models in the PEST calibration. We have updated the draft TM to reflect this response.

Response by Thomas Harder on July 12, 2022 Draft: It's our understanding the HSPF and R4 models provide input to MODFLOW packages. It's our further understanding that the parameters within those MODFLOW packages are varied within plausible ranges as part of PESTPP-IES. If our understanding is correct, we agree with the recommendation to use a single realization of HSPF and R4. This should simplify the uncertainty analysis significantly.

Response: Your understanding is correct. No further response is required.

Comment No. 2.4

Reduce timesteps – Some models can run successfully with one time step per stress period. If this is the case with the CVM, it would reduce model run time.

Response: The CVM currently runs with one time step per stress period.

Comment No. 2.5

Change the configuration of the solver – The MODFLOW portion of the CVM utilizes the NWT solver. Start with the 'SIMPLE' configuration of the NWT solver and ramp up to 'MODERATE' and 'COMPLEX' settings as necessary.

Response: Thank you for the suggestion. We will consider using this in our calibration and uncertainty analysis.

Response by Thomas Harder on July 12, 2022 Draft: In the upcoming detailed cost estimate we are requesting for implementing the revised Safe Yield Reset Methodology, we would like it noted in the estimate if it reflects our recommendation.

Response: We intend to implement this recommendation. It is reflected in Task 2 of our cost estimate (Attachment D).

Comment No. 2.6

Implement PLPROC Kx relationship equations - These seem to do a good job of stabilizing the model and reducing run times.

Response: Thank you for the suggestion. We will consider using this in our calibration and uncertainty analysis.

Response by Thomas Harder on July 12, 2022 Draft: In the upcoming detailed cost estimate we are requesting for implementing the revised Safe Yield Reset Methodology, we would like it noted in the estimate if it reflects our recommendation.

Response: We have reviewed the PLPROC documentation, and several of the functions in PLPROC may be applicable to our model. Our cost estimate assumes that we can identify efficiencies to reduce run times, possibly including PLPROC.

Comment No. 2.7

Remove outlier observations – Assign a zero weight to groundwater level observations that are considered outliers. This will help constrain IES and reduce run times.

Response: Thank you for the suggestion. We will consider using this in our calibration and uncertainty analysis.

Response by Thomas Harder on July 12, 2022 Draft: In the upcoming detailed cost estimate we are requesting for implementing the revised Safe Yield Reset Methodology, we would like it noted in the estimate if it reflects our recommendation.

Response: We will not use outlier observations when selecting groundwater level calibration targets.

Comment No. 3 – Incorporation of Distribution System Losses into the Water Budget for the Model (May 5, 2022 and July 12, 2022 Drafts)

As stated in my review letter on the Draft Data Collection and Evaluation Report for Fiscal Year 2020/21, dated April 28, 2022, and discussed at the Workshop, the AP would like to account for water distribution losses explicitly in the water budgets for the model analysis to reset the Chino Basin Safe Yield. Adding this input, which is currently missing from the water budget, would make the other less constrained aspects of the model (e.g., boundary conditions) more representative. We would like a cost estimate to incorporate system losses into the CVM for the upcoming Safe Yield Reset.

Response: As discussed in the May peer review meeting, any potential work to include system losses (water main leaks) in the updated CVM is not necessary to finalize the Safe Yield Reset methodology.

To incorporate water main leaks into the CVM, we would need to develop defensible assumptions for the location and magnitude of recharge resulting from these leaks over the calibration and planning periods. While the ability of the water agencies to calculate the location and magnitude of these leaks is improving,[2] there remains a high degree of uncertainty in developing historical and projected estimates. We have yet to receive sufficient information to quantify water main leaks, and information that we have reviewed in the Basin (e.g., 2020 Urban Water Management Plans) does not indicate enough certainty in the magnitude and location of water main leaks to warrant inclusion in the CVM.

[2] Amanda Coker (on behalf of Cucamonga Valley Water District) suggested at the May 19, 2022, peer review meeting that the data for water main leaks has improved recently. We will follow up with Amanda to acquire more detail and determine whether this could be considered in our CVM update.

We will develop a cost estimate in FY 2022/23 to include water main leaks in the CVM during the forthcoming model update. The ability to incorporate water main leaks in the model update is contingent on receiving reliable data on the magnitude and location of water main leaks from the Appropriative Pool Parties. This process will include additional data collection, data processing, and peer review to develop estimates of the location and magnitude of the historical and projected water main leaks that result in groundwater recharge.

Response by Thomas Harder on July 12, 2022 Draft: Application of water distribution losses explicitly into the water budgets for groundwater flow models can be accomplished and the required assumptions do not result in any less certainty than other recharge components that are already explicitly included in the model water budget (e.g. individual septic return flow, vadose zone travel times via HYDRUS, horizontal flow barrier permeability at the Redhill Fault, etc.). We look forward to providing input into how this water budget component can be added to the Safe Yield Reset model and reviewing the cost estimate to incorporate water distribution system losses into the model.

Response: We have developed a cost estimate to update the CVM to explicitly include recharge from water distribution losses, which is summarized in the table below:

Cost estimate to update the CVM to explicitly include recharge from water distribution losses			
Task	Description	Labor Hours	Budget, dollars
1.1	Prepare data request for information on historical/future water main leaks	16	3,080
1.2	Collect historical data and future projections of water main leaks (location, magnitude)	20	3,664
1.3	Review data and determine applicability to CVM	30	6,288
1.4	Prepare draft TM documenting data and recommendations	48	10,048
1.5	Prepare presentation materials	34	7,120
1.6	Meet with Watermaster staff to review presentation materials	12	3,056
1.7	Conduct workshop	32	7,528
1.8	Review stakeholder comments with Watermaster staff	12	3,056
1.9	Prepare responses to comments	20	5,000
1.10	Develop method and tools to convert data to RCH package	44	8,936
1.12	Update RCH file for calibration scenario	20	4,440
1.13	Update RCH file for projection scenario	20	4,440
1.14	Prepare report appendix documenting process and data to incorporate water distribution losses into the CVM	40	8,384
	Total (Plus 20 percent contingency)		**$90,048**

This cost estimate is dependent on receiving sufficient data to develop defensible estimates of historical and future water distribution losses in the Chino Basin. The cost estimate also assumes that this work would occur in FY 2022/23 concurrent with the update of the hydrogeologic conceptual model, and a budget amendment would be required.

Comment No. 4 – 2022/23 Budget for Conceptual Model Updates (May 5, 2022 Draft)

In the January 24, 2022, letter from WY entitled "Planning-Level Scope, Schedule, and Budget for Engineering Support of the Implementation of the 2017 Court Order through Fiscal Year 2025," a budget of $270,000 is described for Task 3 "Update Model and Reevaluate Safe Yield" in Table 1 (pg. 6). On page 4 of the same letter, while there are seven subtasks under Task 3, the only subtask that appears to be scheduled for FY 2023 is Task 3.01 – Update Hydrogeologic Conceptual Model. As such, it is assumed that the budget of $270,000 for Task 3 in Fiscal Year 2023 is for the hydrogeological conceptual model. During the Workshop, I requested the details of what specific work was included for the $270,000 budgeted for this task. To date, we have not received that detail.

Response: The planning-level budget for FY 2022/23 that you reference has been superseded by Watermaster's Engineering budget for FY 2022/23 that was approved by the Watermaster Board on May 26, 2022. The approved budget included about $260,000 budget for the update of the CVM, which generally comprises the following tasks:

- Routine collection and evaluation of data/reports related to the Chino Basin hydrogeology, such as borehole data, remote sensing data, water quality data, and studies of the area conducted by outside agencies.
- Identification of assumptions that may be updated in the hydrogeologic conceptual model based on new information.
- Begin reconfiguration of the CVM to use pilot points and facilitate the uncertainty analysis tool (PESTPP-IES).
- Collection of data to update the R4 model (zero cost – data are already collected through existing Watermaster tasks).
- Extend the HSPF and R4 models over the historical period to calculate initial estimates of DIPAW (some overlap with concurrent Watermaster efforts; cost of overlapping scope is not included in this budget).
- Develop initial estimates of subsurface inflow from adjacent basins and mountain/hillside boundaries.
- Prepare materials for and facilitate peer review meeting to present the updated hydrogeologic conceptual model.
- Prepare materials for and facilitate one stakeholder workshop to identify drivers of changes to future water demands and supplies.

Comment No. 5 – Additional Recommendations (July 12, 2022 Draft)

Based on Section 5.2 Recommended Implementation of Ensemble Approach in the July 12, 2022 TM, it appears that WY is planning on running 40 calibrated model realizations against 15 projection scenarios. While multiple calibrated model realizations will be obtained during the PESTPP-IES process for the historical model calibration, there is only a need to use one historical calibration realization for the projection scenarios. Our recommended approach to determine the historical calibration for use in analyzing the projection scenarios is as follows:

- Assuming our recommendations regarding cell size are implemented, we recommend an ensemble size of no less than 500 for the PESTPP_IES model calibration. In the PESTPP_IES setup, suppress as much output as possible as this will reduce run times because the model doesn't have to write large files during the process. For example, configure the output control file to not write the head and drawdown files and suppress writing arrays to the list file.

- Assuming a 3-hour model run time during parallel processing and 25 agents, one iteration is expected to be on the order of 60 hours of run time. Further assuming the model is sufficiently

calibrated after 5 iterations, the total run time for the calibration is expected to be on the order of 300 hours (12.5 days or two weeks; models run 24/7). This is a conservatively long estimate as some members of the ensemble will likely drop out during the process thereby reducing the run time required to complete each iteration.

- Given our understanding of the model, it is reasonable to expect that approximately half of the original members of the original ensemble will drop out during the calibration process.

- After PESTPP_IES has completed the calibration process, each of the remaining calibrated members of the ensemble (realizations) will need to be run in MODFLOW to process the water budget information necessary to estimate the historical Safe Yield from the data. Assuming the PESTPP_IES process results in 250 acceptable calibrated realizations and each model requires three hours to run, the total model run time is expected to be on the order of 750 hours or 62.5 days. Assuming 25 agents can be run in parallel, this run time is reduced to 2.5 days. Again, suppress as much output as possible. Everything needed to estimate historical Safe Yield for each run is available from the List files and spreadsheets of imported water deliveries.

- The historical Safe Yield for each calibrated model realization should be plotted on a cumulative probability curve. The Safe Yield value selected from the probability curve would be the value used for analysis of the 15 projection simulations.

- Typically, the 50th percentile historical Safe Yield is selected for use in the projection simulations. However, we would like to review the results of the historical calibration prior to analyzing the projection scenarios.

This process will be far less work than is implied by Section 5.2 of the TM, which suggested running 40 calibrations against 15 projection scenarios (600 projection realizations). The approach described above will result in 1 model calibration run against the 15 projections (15 projection realizations).

Response: As we note in Section 5.2, the 40 calibration realizations and 15 projection scenarios are used as a hypothetical number to demonstrate the computational feasibility of the proposed approach. As outlined in the proposed methodology and emphasized in response to others' comments (see response to Rick Rees' Comment 7), we propose to select a smaller number of calibration realizations initially, review with the peer review committee, and add more calibration realizations if necessary, as we aim to make the process as efficient as possible.

To address the uncertainty in the Safe Yield calculation, the uncertainty in the model parameters should be included in the analysis. Using only one calibration realization undermines the objective of the uncertainty analysis, and therefore we disagree with the use of only one calibrated realization. Our recommended process efficiently achieves the desired outcome of an uncertainty analysis.

Regarding bullet 1: We will be suppressing outputs as much as possible.

Regarding bullets 1 through 4: We have considered these estimates in the development of our cost estimate and schedule in response to your subsequent comment.

Regarding bullet 5: We plan to use multiple calibration realizations in the projection simulations to characterize the uncertainty in model parameters. We plan to select calibration realizations based on statistics derived from the model results.

Regarding the final two paragraphs: We will be reviewing the calibration results with the peer review committee before choosing the calibration realizations that will be included in the projection realizations. As noted earlier, 600 projection realizations is a hypothetical number used for demonstration. We believe that our recommended process is responsive to the Court Order and the Parties' comments, is cost-efficient, and is consistent with best management practices.

Comment No. 6 – Final Comments (July 12, 2022 Draft)

As Watermaster finalizes the Safe Yield calculation methodology with the uncertainty analysis, we would like to see a detailed scope of work, cost estimate and schedule to implement the methodology. This would include a detailed work breakdown structure of line items for the uncertainty analysis and their associated cost. Based on discussions at the most recent workshop, it is our understanding that a fully functional IES setup can be developed in the range of three to four weeks. The above approach should require on the order of an additional month to accomplish. That is, it is expected that a cumulative probability curve of historical safe yield values can be developed in roughly 2 months. The projection simulations used to estimate the Safe Yield of the Chino Basin for the next 10 years would follow.

Response: We have updated the TM to include the requested scope, schedule, and budget estimate to implement the methodology. See Attachment D.

CITY OF CHINO/GEOPENTECH (DAVE CROSLEY, PE; ERIC FORDHAM, PG, CEG, CHG) – MAY 5, 2022 DRAFT

Paragraph 1

Comments previously provided to the Watermaster regarding the Safe Yield Reset methodology, identified, and requested the need to include uncertainty analysis in the groundwater flow modeling process as a best management practice. All conceptual and numerical models have some level of uncertainty that is the result of simplifying a complex hydrologic system. The Chino Valley Model (CVM) is no different and includes parameter and prediction uncertainty despite the quality of model calibration. The CVM model is used to assess the basin's safe yield for various planned demand and supply scenarios and whether hydraulic control is maintained, and material physical injury (MPI) would occur. The benefits and risks of the various demand and supply scenarios should be weighed by decision makers that are able to consider a quantified understanding of the safe yield uncertainty and probability of associated outcomes associated with those predictions.

Response: This paragraph does not necessitate a response.

Paragraph 2

Watermaster's consultant is planning on updating the existing CVM model by extending the calibration period to include recently collected data for the hydrologic models (HSP4 and R4) and the MODFLOW flow model, selecting adjustable parameters for calibration and assigning values to those parameters using improved numerical methods that incorporate pilot points, variograms and covariance matrices. The model should also be updated by including water distribution system losses as quantified by the Chino Basin water purveyors. The addition of this recharge function to the CVM would likely influence the resulting basin net recharge and aquifer parameter calibration. The recharge associated with distribution system losses is an important part of the Chino Basin water budget.

Response: Our response to the recommendation to include system losses in the CVM remains the same as prior responses (see the response to Thomas Harder's Comment 3 herein and our response to Thomas Harder's Comment 2 on the *Data Collection and Evaluation Report for FY 2020/2021*[3]).

Paragraph 3

Watermaster's consultant plans to conduct the calibration process using PESTPP-IES, a robust and efficient numerical solver that will estimate model parameter probability distributions and generate a specified number of calibrated model realizations with associated net groundwater recharge. The calibrated model realizations will then be run with up to three (3) supply plan scenarios and five (5) climate scenarios to generate multiple model results that will provide net recharge probability distributions that can be used to evaluate safe yield and compare against hydraulic control and MPI. While we agree with this approach for model calibration and uncertainty assessment, Watermaster's consultant may be over scoping the process to achieve the intended results as they provide an estimate to implement the analysis at $1.75 million to $2.3 million.

Response: This paragraph does not necessitate a response.

Paragraph 4

To successfully conduct an uncertainty analysis for the Chino Basin safe yield, and associated demand and supply scenarios, we request that Watermaster's consultant seek out means and methods to minimize the implementation cost. Mr. Tom Harder, in his June 23, 2022, letter to the Appropriative Pool provides 7 recommendations that should be considered to streamline the model analysis and reduce cost. We also recommend exploring means to reduce the number of calibrated model realizations to develop the net recharge probability distribution. Rather than using up to 40 realizations as an example suggested by

[3] The Data Collection and Evaluation Report for FY 2020/2021 can be found here https://cbwm.syncedtool.com/shares/folder/PaauzoQapiZ/?folder_id=303197856. Comments and responses can be found in Appendix C of the report.

Watermaster's consultant, a subset of the calibrated realizations could be ranked by net recharge and used for the analysis. An example would be to include realizations representing the maximum, mean and minimum modeled net recharge to sufficiently bracket the range of safe yield outcomes. In this case the number of model realizations could be reduced from 40 to perhaps 9 model realizations and when combined with the demand and supply scenarios (3) and climate predictions (5), would result in 135 projection realizations versus the 600 envisioned. Fewer projection realizations would reduce computing time, storage requirements, and post processing while preserving the intention of the uncertainty analysis by providing the range and probability of possible safe yield outcomes.

Response: We have responded to each of Mr. Harder's recommendations for reducing the cost and runtime of the uncertainty analysis above. We agree that it is desirable to limit the number of calibrated realizations while conducting a complete uncertainty analysis that covers the plausible range of parameters and model results. Please refer to our response to Rick Rees' Comment No. 7 herein.

Paragraph 5

In addition, it is our understanding that Watermaster's consultant has not conducted an uncertainty analysis for a hydrologic model as complicated as the CVM and unfamiliarity with the process may have led to an overly conservative scoped level of effort and associated costs. We recommend the consultant conduct independent research and process development to better understand the mechanics of their planned approach such that only the essential steps required for the CVM uncertainty analysis are recognized and the associated level of effort and costs can be defined. A detailed cost estimate should be prepared to conduct the CVM uncertainty analysis for the basin's safe yield that should be presented to the Chino Basin groundwater producers for their consideration.

Response: The draft TM documents the results of our research and process development on the proposed methodology to calculate the Safe Yield. The purpose of the TM and the current peer review process is to develop an updated Safe Yield Reset methodology to address Party comments and the requirements of the 2017 Court Order. While we have a confident understanding of the implementation process, there are inherent unknown variables in the process (e.g., number of calibration realizations) that warrant the range in cost estimate. More detailed annual budgets, such as the current budget for FY 2022/23, are presented for approval by the Advisory Committee and Board in the spring prior to the new FY. We present these budgets with clear assumptions on scope, schedule, and deliverables, and we will continue to do so during the implementation of the updated Safe Yield Reset methodology.

Attachment C

2022 Reset Technical Memorandum

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RESET TECHNICAL MEMORANDUM

DATE: September 1, 2022

Project No.: 941-80-22-32
SENT VIA: EMAIL

TO: Peter Kavounas, Chino Basin Watermaster

FROM: Garrett Rapp, PE, RCE #86007
Andy Malone, PG

SUBJECT: Methodology to Reset the Safe Yield of the Chino Basin

2022 UPDATED SAFE YIELD RESET METHODOLOGY

This technical memorandum summarizes the methodology to calculate the Safe Yield of the Chino Basin for the 2025 Safe Yield Reevaluation and subsequent Safe Yield evaluations. The methodology: (i) is consistent with professional custom, standard, and practice; (ii) incorporates current best management practices and hydrologic science; and (iii) is consistent with the definition of Safe Yield in the Judgment and the Physical Solution.

1. Use data collected since the implementation of the OBMP to re-calibrate the Watermaster's groundwater-flow model. The re-calibration period should be long enough to include wet and dry periods relative to the long-term historical precipitation record.

2. Conduct an uncertainty analysis of the re-calibrated groundwater-flow model to identify a plausible range of calibrated models.

3. Describe current and projected future cultural conditions, including but not limited to land use and water-management practices, such as: pumping, managed recharge, managed groundwater storage, impervious land cover, water recycling, and water conservation practices. Identify a possible range of projected future cultural conditions.

4. Using the most current research on future climate and hydrology, identify a possible range of projected future climatic conditions in the Santa Ana River watershed.

5. Using the results of [3.] and [4.] above, prepare an ensemble of multiple projection scenarios of combinations of future climate/hydrology and cultural conditions (herein called the "Projection Ensemble"). Assign likelihoods to each scenario in the Projection Ensemble.

6. Simulate the range for the potential future water budget and groundwater conditions in the Chino Basin over no less than a 50-year future period. This is accomplished by using:

    i. The range of calibrated models developed in [2.], and

    ii. The Projection Ensemble developed in [5.] as model input data.

7. Using the results of [6.] above, characterize the range in the model results for:

    i. Groundwater conditions, including: groundwater elevations, groundwater in storage, and groundwater flow directions, and

    ii. The water budget, including: basin inflows, outflows, change in storage, and net recharge.

8. Using the set of net recharge results from [7.ii], determine a tentative Safe Yield as the likelihood-weighted average net recharge over the 10-year prospective period for which the Safe Yield is being redetermined (Tentative Safe Yield).

9. Evaluate whether the groundwater production at the Tentative Safe Yield estimated in [8] above will cause or threaten to cause "undesirable results" or "Material Physical Injury." If groundwater production at Tentative Safe Yield will cause or threaten to cause "undesirable results" or "Material Physical Injury," then Watermaster will identify and implement prudent measures necessary to mitigate "undesirable results" or "Material Physical Injury," set the value of Safe Yield to ensure there is no "undesirable results" or "Material Physical Injury," or implement a combination of mitigation measures and a changed Safe Yield.

Attachment D

Cost Estimate for the 2025 Safe Yield Reevaluation

Table D-1. Cost Estimate for 2025 Safe Yield Reevaluation

Task/Subtask	Description	Year Completed	Is the Subtask Strictly Necessary for Uncertainty Analysis?	Labor Hours	Labor Cost[1]	Other Direct Costs[2]	Total Cost
Task 1. Update Hydrogeologic Conceptual Model and Surface Water Models							
1.1. Update geology - collect/compile/review historical information							
1.1.1	New well information (location, borehole lithology, geophysical logs, well construction, aquifer stress test, others)	FY 2022/23	No	40	$8,880		$8,880
1.1.2	New groundwater level, pumping and water quality data	FY 2022/23	No	56	$11,216		$11,216
1.1.3	Data collection and investigations conducted by others (USGS, OCWD, ACOE, RWQCB, DTSC, HCP, others)	FY 2022/23	No	52	$11,860		$11,860
1.1.4	Remote sensing data (InSAR, aerial photographs, others)	FY 2022/23	No	18	$3,388		$3,388
1.2. Update geology along Rialto/Colton boundary							
1.2.1	Review reports and GIS shape files from USGS	FY 2022/23	No	20	$3,944		$3,944
1.2.2	Review other new data and reports	FY 2022/23	No	20	$4,348		$4,348
1.2.3	Integrate new information into hydrostratigraphic sections	FY 2022/23	No	32	$7,528		$7,528
1.3. Update surface topo along the SAR and lower tributaries							
1.3.1	Acquire Lidar data sets from USGS, ACOE, and OCWD	FY 2022/23	No	28	$5,328		$5,328
1.3.2	Review Lidar data sets and prepare information for updating the geometry of SAR	FY 2022/23	No	48	$10,048		$10,048
1.4. Review geology, groundwater level, and chemistry data to infer flow system dynamics							
1.4.1	MZ1/subsidence (Includes new Pomona extensometer data)	FY 2022/23	No	40	$10,560		$10,560
1.4.2	Prado basin area	FY 2022/23	No	48	$11,664		$11,664
1.4.3	Groundwater basin boundaries subsurface inflows	FY 2022/23	No	8	$2,224		$2,224
1.4.4	Mountain and hillside surface water discharge and subsurface inflow	FY 2022/23	No	16	$3,888		$3,888
1.4.5	Stringfellow area paleo channel	FY 2022/23	No	8	$2,224		$2,224
1.4.6	Others	FY 2022/23	No	32	$7,248		$7,248
1.5. Update historical hydrology for calibration period (FY1978-2022) - collect/compile/review historical information							
1.5.1	Land use data (completed via other work)	FY 2022/23	No	0	$0		$0
1.5.2	Groundwater pumping data (completed via other work)	FY 2022/23	No	0	$0		$0
1.5.3	Artificial recharge data (completed via other work)	FY 2022/23	No	0	$0		$0
1.5.4	Non-tributary and tributary discharges (completed via other work)	FY 2022/23	No	0	$0		$0
1.5.5	Precipitation, evaporation, ET (completed via other work)	FY 2022/23	No	0	$0		$0
1.5.6	Livestock population data (completed via other work)	FY 2022/23	No	0	$0		$0
1.5.7	Supplemental water source and use data (completed via other work)	FY 2022/23	No	0	$0		$0
1.5.8	Riparian vegetation mapping and ET requirements	FY 2022/23	No	40	$8,136		$8,136
1.6. Update historical hydrology for calibration period (FY1978-2022) - Update recharge and discharge estimates							
1.6.1	Update groundwater pumping and artificial recharge estimates (completed via other work)	FY 2022/23	No	0	$0		$0
1.6.2	Update DIPAW	FY 2022/23	No	36	$8,328		$8,328
1.6.3	Update initial estimates of subsurface inflow from adjacent basins	FY 2022/23	No	32	$8,336		$8,336
1.6.4	Update subsurface inflow estimates from mountain and hillside boundaries	FY 2022/23	No	32	$7,496		$7,496
1.7. Update hydrostratigraphic characterization and convert to pilot points							
1.7.1	Finalize hydrostratigraphic sections, develop layering scheme	FY 2022/23	No	56	$12,024		$12,024
1.7.2	Generate pilot points on model area and assign initial parameter values	FY 2022/23	No	40	$11,120		$11,120
1.7.3	Determine variograms for aquifer parameters	FY 2022/23	No	76	$16,808		$16,808
1.8. Conduct workshop for stakeholders/consultants on conceptual model update							
1.8.1	Prepare materials for for review by peer reviewers	FY 2023/24	No	58	$13,924		$13,924
1.8.2	Prepare presentation materials	FY 2023/24	No	56	$13,345		$13,345
1.8.3	Meet with Watermaster staff to review presentation materials	FY 2023/24	No	16	$4,189		$4,189
1.8.4	Conduct workshop	FY 2023/24	No	40	$9,851	$200	$10,051
1.8.5	Review stakeholder comments with Watermaster staff	FY 2023/24	No	16	$4,189		$4,189
1.8.6	Prepare responses to comments	FY 2023/24	No	28	$7,222		$7,222
Subtotal for Task 1							**$229,516**

Table D-1. Cost Estimate for 2025 Safe Yield Reevaluation

Task/Subtask	Description	Year Completed	Is the Subtask Strictly Necessary for Uncertainty Analysis?	Labor Hours	Labor Cost[1]	Other Direct Costs[2]	Total Cost
Task 2. Recalibrate Groundwater Model and Generate Calibration Realizations							
2.1. Extend the calibration period from FY 2018 to FY 2022							
2.1.1	Convert the WEL Package to Multi-Node (MNW) well package through FY 2022	FY 2022/23	No	64	$15,248		$15,248
2.1.2	Revise and extend the SFR package through FY 2022	FY 2022/23	No	48	$12,072		$12,072
2.1.3	Extend the DRN Package through FY 2022	FY 2022/23	No	8	$2,012		$2,012
2.1.4	Extend the ETS Package through FY 2022	FY 2023/24	No	26	$6,415		$6,415
2.1.5	Extend the FHB Package through FY 2022	FY 2023/24	No	40	$9,801		$9,801
2.2. Generate calibrated realizations							
2.2.1	Establish calibration targets (time series of head and stream discharge observations)	FY 2023/24	No	58	$15,115		$15,115
2.2.2	Prepare input files to PEST/PESTPP-IES	FY 2023/24	No	84	$21,420		$21,420
2.2.3	Get PESTPP-IES to run, debug as needed	FY 2023/24	No	108	$27,477		$27,477
2.2.4	Execute PESTPP-IES to generate calibrated realizations	FY 2023/24	No	100	$26,046		$26,046
2.2.5	Run flow simulation with the calibrated realizations and conduct residual analysis of calibrated realizations and develop a script to automate the process. Results will be used for selecting a subset of calibrated realizations.	FY 2023/24	No	110	$28,386		$28,386
2.2.6	Ranking calibrated realizations based on the results of residual analysis and other criteria	FY 2023/24	No	32	$8,039		$8,039
2.3. Prepare draft TM on calibration and generate calibration results							
2.3.1	Prepare draft TM with exhibits from Task 2.2	FY 2023/24	No	64	$16,299		$16,299
2.3.2	Create maps of selected parameters of selected realizations	FY 2023/24	No	36	$8,644		$8,644
2.3.3	Create maps of residuals of selected calibrated realizations	FY 2023/24	No	34	$8,176		$8,176
2.3.4	Groundwater hydrographs and scatter plots of selected calibrated realizations	FY 2023/24	No	34	$8,176		$8,176
2.3.5	Surface water hydrographs and scatter plots of selected calibrated realizations	FY 2023/24	No	20	$4,900		$4,900
2.3.6	Assess calibration statistics and water budgets and select set of calibrated realizations	FY 2023/24	No	44	$10,957		$10,957
2.4. Workshop to review draft TM on model calibration							
2.4.1	Prepare exhibits and presentation materials for workshop	FY 2023/24	No	58	$14,753		$14,753
2.4.2	Meet with Watermaster staff to review presentation materials	FY 2023/24	No	6	$1,624		$1,624
2.4.3	Conduct workshop	FY 2023/24	No	24	$6,498	$200	$6,698
2.4.4	Review stakeholder comments with Watermaster staff	FY 2023/24	No	16	$4,295		$4,295
2.4.5	Respond to comments	FY 2023/24	No	24	$6,498		$6,498
2.5. Follow-up workshop, finalize TM							
2.5.1	Prepare exhibits and presentation materials for workshop	FY 2023/24	No	52	$13,129		$13,129
2.5.2	Meet with Watermaster staff to review presentation materials	FY 2023/24	No	6	$1,624		$1,624
2.5.3	Conduct workshop	FY 2023/24	No	32	$8,228	$200	$8,428
2.5.4	Respond to comments and prepare final TM	FY 2023/24	No	22	$5,809		$5,809
2.5.5	Meet with Watermaster staff to review final TM	FY 2023/24	No	12	$3,249		$3,249
2.5.6	Finalize TM and distribute to Parties	FY 2023/24	No	22	$5,040		$5,040
Subtotal for Task 2 with 20 percent contingency							**$360,401**
Task 3. Prepare Ensemble of Projection Scenarios							
3.1. Initial workshop to identify drivers for water demand and supply plans							
3.1.1	Prepare exhibits and presentation materials for workshop	FY 2022/23	Yes	52	$12,624		$12,624
3.1.2	Meet with Watermaster staff to review presentation materials	FY 2022/23	Yes	12	$3,124		$3,124
3.1.3	Conduct workshop	FY 2022/23	Yes	32	$7,912	$200	$8,112
3.1.4	Review stakeholder comments with Watermaster staff	FY 2022/23	Yes	12	$3,124		$3,124
3.2. Assess climate data for development of scenarios							
3.2.1	Download and organize available WRF-CMIP6 data	FY 2023/24	No	8	$1,731		$1,731
3.2.2	Prepare and test tools for processing and visualizing WRF-CMIP6 data for the Chino Basin watershed	FY 2023/24	No	68	$17,014		$17,014
3.2.3	Characterize WRF-CMIP6 data for the Chino Basin watershed	FY 2023/24	No	36	$9,085		$9,085
3.2.4	Review and select climate scenarios for use in model	FY 2023/24	No	44	$11,398		$11,398
3.3. Develop supply and demand scenarios, document in draft TM, and conduct workshop							
3.3.1	Develop qualitative descriptions of projection scenarios (water demands/supply plans and climate)	FY 2023/24	Yes	8	$1,872		$1,872
3.3.2	Develop quantitative water supply plans for selected projection scenarios	FY 2023/24	No	68	$16,149		$16,149
3.3.3	Prepare draft TM documenting proposed projection scenarios	FY 2023/24	Yes	52	$11,960		$11,960
3.3.4	Review draft TM with WM staff	FY 2023/24	Yes	8	$2,057		$2,057

Table D-1. Cost Estimate for 2025 Safe Yield Reevaluation

Task/Subtask	Description	Year Completed	Is the Subtask Strictly Necessary for Uncertainty Analysis?	Labor Hours	Labor Cost[1]	Other Direct Costs[2]	Total Cost
3.3.5	Finalize draft TM and distribute to Parties	FY 2023/24	Yes	10	$2,232		$2,232
3.3.6	Prepare exhibits and presentation materials for workshop	FY 2023/24	No	28	$7,143		$7,143
3.3.7	Meet with Watermaster staff to review presentation materials	FY 2023/24	No	6	$1,624		$1,624
3.3.8	Conduct workshop	FY 2023/24	No	32	$8,228	$200	$8,428
3.3.9	Prepare responses to comments	FY 2023/24	No	14	$3,607		$3,607
3.3.10	Review stakeholder comments with Watermaster staff	FY 2023/24	No	6	$1,624		$1,624
3.4. Follow-up workshop, finalize TM							
3.4.1	Prepare exhibits and presentation materials for workshop	FY 2023/24	Yes	24	$6,207		$6,207
3.4.2	Meet with Watermaster staff to review presentation materials	FY 2023/24	Yes	12	$3,249		$3,249
3.4.3	Conduct workshop	FY 2023/24	Yes	32	$8,228	$200	$8,428
3.4.4	Respond to comments and prepare final TM	FY 2023/24	Yes	12	$3,249		$3,249
3.4.5	Meet with Watermaster staff to review final TM	FY 2023/24	Yes	6	$1,624		$1,624
3.4.6	Finalize TM and distribute to Parties	FY 2023/24	Yes	10	$2,232		$2,232
Subtotal for Task 3 including 20 percent contingency							**$177,479**
Task 4. Simulate Ensemble of Projection Scenarios and Calculate Safe Yield							
4.1. Prepare model runs							
4.1.1	Define the required results and define file formats for storing the results	FY 2024/25	No	20	$5,555		$5,555
4.1.2	Convert the Well package of the projection period to the MNW package	FY 2024/25	No	52	$13,113		$13,113
4.1.3	Develop method to generate future flows at Riverside Narrows (RN) based on climate projections	FY 2024/25	No	32	$8,246		$8,246
4.1.4	Prepare MODFLOW input files for the initial projection scenario	FY 2024/25	No	52	$13,113		$13,113
4.1.5	Prepare MT3D input files for the initial projection scenario	FY 2024/25	No	32	$8,246		$8,246
4.1.6	Prepare ZoneBudget input files for the hydraulic control assessment	FY 2024/25	No	20	$5,096		$5,096
4.2. Develop tools to generate projection realizations							
4.2.1	Tool to update the input file to the UPW package with the aquifer parameters from a calibrated realization (generate matrices based on the calibrated pilot point data, replace the matrices in UPW with the new ones)	FY 2024/25	Yes	72	$17,981		$17,981
4.2.2	Tool to update HSPF input file with climate data (precip & ET) and execute HSPF	FY 2024/25	Yes	48	$12,140		$12,140
4.2.3	Tool to update R4 input file with climate data (precip, ET, flow at RN), water demand (applied water assumptions), and HSPF output, and to execute R4	FY 2024/25	Yes	56	$14,087		$14,087
4.2.4	Tool to update input files to the RCH, FHB, and SFR packages with R4 output and flow at RN	FY 2024/25	Yes	56	$14,087		$14,087
4.2.5	Tool to update input file to the ETS package with climate data	FY 2024/25	Yes	48	$12,140		$12,140
4.2.6	Tool to update the input files to the MNW and FHB packages based on water supply plan	FY 2024/25	Yes	72	$17,981		$17,981
4.3. Develop tools to conduct flow simulations and process results							
4.3.1	Tool to execute MODFLOW-NWT, including iterations to calculate net recharge time series, to stabilize imported water estimates, and to calculate safe yield	FY 2024/25	No	28	$7,043		$7,043
4.3.2	Tool to update MT3D input file (with specific yield as effective porosity in the BTN package), to execute MT3D, and to extract the desired simulation results	FY 2024/25	No	28	$7,043		$7,043
4.3.3	Tool for Hydraulic Control assessment (i.e., calculate groundwater discharge from Chino North MZ to Prado with ZoneBudget)	FY 2024/25	No	24	$6,299		$6,299
4.3.4	Tool for pumping and subsidence sustainablity assessment (i.e., calculate sustainability metric values)	FY 2024/25	No	18	$4,495		$4,495
4.4. Execute the developed tools for the first scenario							
4.4.1	Generate projection realization (executing, reviewing generated files, and debugging)	FY 2024/25	No	96	$23,536		$23,536
4.4.2	Conduct flow and transport simulation and postprocess results (executing, reviewing results, and debugging)	FY 2024/25	No	96	$23,536		$23,536
4.5. Execute the developed tools for the remainder of the ensemble							
4.5.1	Generate projection realization on AWS (setting up AWS instances, executing, reviewing generated files, and debugging)	FY 2024/25	Yes	92	$23,856		$23,856
4.5.2	Conduct flow and transport simulation and postprocess results on AWS (setting up AWS instances, executing, reviewing results, and debugging)	FY 2024/25	Yes	92	$23,856	$40,000	$63,856
4.5.3	Evaluate results, create statistics of safe yield, prepare output charts and graphics	FY 2024/25	Yes	108	$27,152		$27,152
4.4. Workshop to review the results of the model runs							
4.6.1	Prepare exhibits and presentation materials for workshop	FY 2024/25	No	60	$15,380		$15,380
4.6.2	Meet with Watermaster staff to review presentation materials	FY 2024/25	No	16	$4,279		$4,279
4.6.3	Conduct workshop	FY 2024/25	No	32	$8,558	$200	$8,758
4.6.4	Review stakeholder comments with Watermaster staff	FY 2024/25	No	24	$6,758		$6,758
4.6.5	Prepare responses to comments	FY 2024/25	No	36	$9,907		$9,907
Subtotal for Task 4 with 20 percent contingency							**$448,420**

Table D-1. Cost Estimate for 2025 Safe Yield Reevaluation

Task/Subtask	Description	Year Completed	Is the Subtask Strictly Necessary for Uncertainty Analysis?	Labor Hours	Labor Cost[1]	Other Direct Costs[2]	Total Cost
Task 5. Prepare Safe Yield Reevaluation Report							
5.1. Prepare Safe Yield Reevaluation Report							
5.1.1	Develop report outline and submit to Watermaster for review	FY 2024/25	No	24	$6,758		$6,758
5.1.2	Finalize report outline	FY 2024/25	No	8	$2,176		$2,176
5.1.3	Prepare admin draft report and submit to Watermaster staff for review	FY 2024/25	No	200	$48,888		$48,888
5.1.4	Review admin draft report with Watermaster staff and agree on changes	FY 2024/25	No	24	$6,758		$6,758
5.1.5	Prepare draft report and submit to stakeholders for review	FY 2024/25	No	60	$14,991		$14,991
5.1.6	Prepare presentation materials for Watermaster Board workshop	FY 2024/25	No	48	$12,910		$12,910
5.1.7	Conduct workshop	FY 2024/25	No	32	$8,558	$200	$8,758
5.1.8	Review stakeholder and Board member comments with Watermaster staff	FY 2024/25	No	24	$6,758		$6,758
5.1.9	Prepare responses to comments	FY 2024/25	No	96	$25,820		$25,820
5.1.10	Prepare final report	FY 2024/25	No	36	$8,540	$1,000	$9,540
Subtotal for Task 5 with 10 percent contingency							**$157,693**
Task 6. Support Court Approval Process for Updated Safe Yield							
6.1. Support Court approval process for updated Safe Yield							
6.1.1	Support Court approval process for updated Safe Yield	FY 2024/25	No	104	$28,978	$600	$29,578
Subtotal for Task 6 with 20 percent contingency							**$35,494**
Task 7. Project Management							
7.1. Project management							
7.1.1	PM FY 2022/23	FY 2022/23	No	66	$14,988		$14,988
7.1.2	PM FY 2023/24	FY 2023/24	No	66	$16,436		$16,436
7.1.3	PM FY 2024/25	FY 2024/25	No	66	$17,094		$17,094
Subtotal for Task 7							**$48,518**
Totals							
Total Estimated Cost for Subtasks in FY 2022/23[3]							**$259,163**
Total Estimated Cost for Subtasks in FY 2023/24							**$539,656**
Total Estimated Cost for Subtasks in FY 2024/25							**$658,700**
Total Estimated Cost of Tasks 1 through 7							**$1,457,519**

[1] Staff billing rates are based on the Watermaster Engineer's approved billing rates for FY 2022/23 and assumes a four percent increase in rates for FY 2023/24 and FY 2024/25.

[2] Other direct costs include travel for workshops (multiple subtasks), renting cloud computing (subtask 4.5.2), and printing copies of final report (subtask 5.1.10).

[3] The currently approved engineering budget for groundwater modeling in FY 2022/23 is about $260,000.

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RESET TECHNICAL MEMORANDUM

DATE: September 1, 2022

Project No.: 941-80-22-32
SENT VIA: EMAIL

TO: Peter Kavounas, Chino Basin Watermaster

FROM: Garrett Rapp, PE, RCE #86007
Andy Malone, PG

SUBJECT: Methodology to Reset the Safe Yield of the Chino Basin

2022 UPDATED SAFE YIELD RESET METHODOLOGY

This technical memorandum summarizes the methodology to calculate the Safe Yield of the Chino Basin for the 2025 Safe Yield Reevaluation and subsequent Safe Yield evaluations. The methodology: (i) is consistent with professional custom, standard, and practice; (ii) incorporates current best management practices and hydrologic science; and (iii) is consistent with the definition of Safe Yield in the Judgment and the Physical Solution.

1. Use data collected since the implementation of the OBMP to re-calibrate the Watermaster's groundwater-flow model. The re-calibration period should be long enough to include wet and dry periods relative to the long-term historical precipitation record.
2. Conduct an uncertainty analysis of the re-calibrated groundwater-flow model to identify a plausible range of calibrated models.
3. Describe current and projected future cultural conditions, including but not limited to land use and water-management practices, such as: pumping, managed recharge, managed groundwater storage, impervious land cover, water recycling, and water conservation practices. Identify a possible range of projected future cultural conditions.
4. Using the most current research on future climate and hydrology, identify a possible range of projected future climatic conditions in the Santa Ana River watershed.
5. Using the results of [3.] and [4.] above, prepare an ensemble of multiple projection scenarios of combinations of future climate/hydrology and cultural conditions (herein called the "Projection Ensemble"). Assign likelihoods to each scenario in the Projection Ensemble.
6. Simulate the range for the potential future water budget and groundwater conditions in the Chino Basin over no less than a 50-year future period. This is accomplished by using:
    i. The range of calibrated models developed in [2.], and
    ii. The Projection Ensemble developed in [5.] as model input data.

7. Using the results of [6.] above, characterize the range in the model results for:

    i. Groundwater conditions, including: groundwater elevations, groundwater in storage, and groundwater flow directions, and

    ii. The water budget, including: basin inflows, outflows, change in storage, and net recharge.

8. Using the set of net recharge results from [7.ii], determine a tentative Safe Yield as the likelihood-weighted average net recharge over the 10-year prospective period for which the Safe Yield is being redetermined (Tentative Safe Yield).

9. Evaluate whether the groundwater production at the Tentative Safe Yield estimated in [8] above will cause or threaten to cause "undesirable results" or "Material Physical Injury." If groundwater production at Tentative Safe Yield will cause or threaten to cause "undesirable results" or "Material Physical Injury," then Watermaster will identify and implement prudent measures necessary to mitigate "undesirable results" or "Material Physical Injury," set the value of Safe Yield to ensure there is no "undesirable results" or "Material Physical Injury," or implement a combination of mitigation measures and a changed Safe Yield.