Metropolitan Water District Foundational Actions Fund

San Juan Basin Groundwater and Desalinization Optimization Program Grant

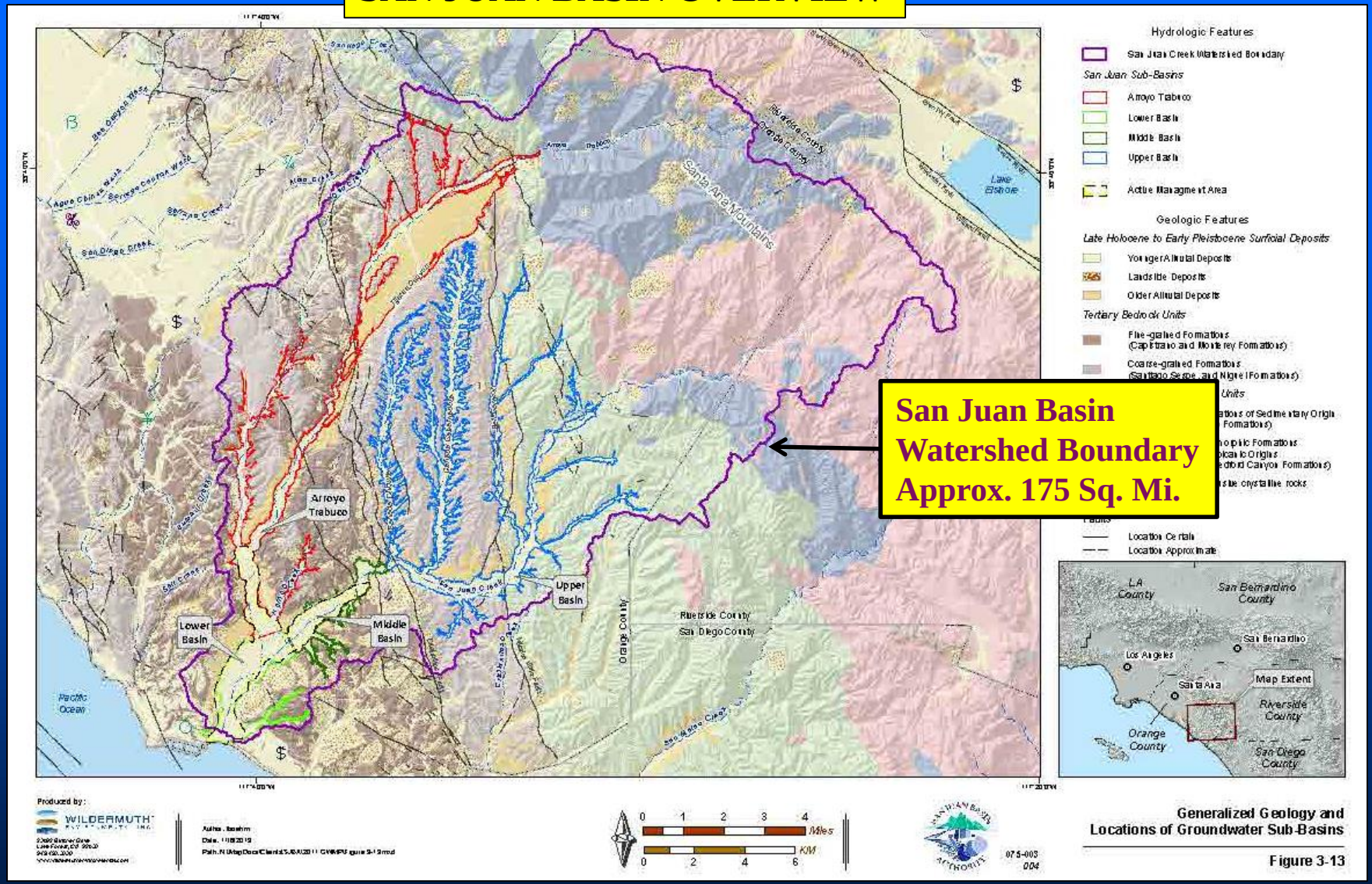
Project Status Presentation
September 14, 2015

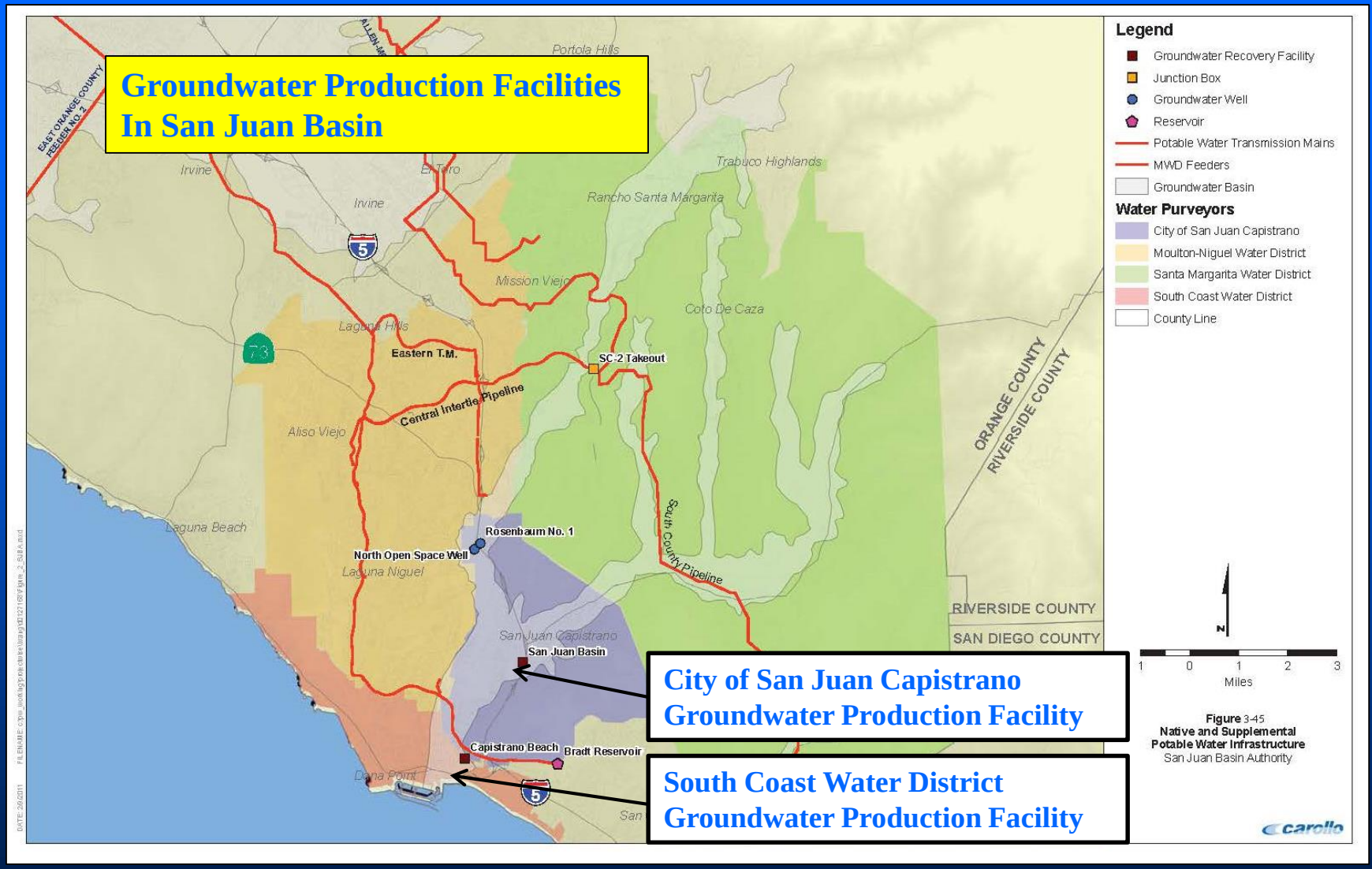
South Coast Water District
Providing Quality Water and Wastewater Services to the Coastal Communities

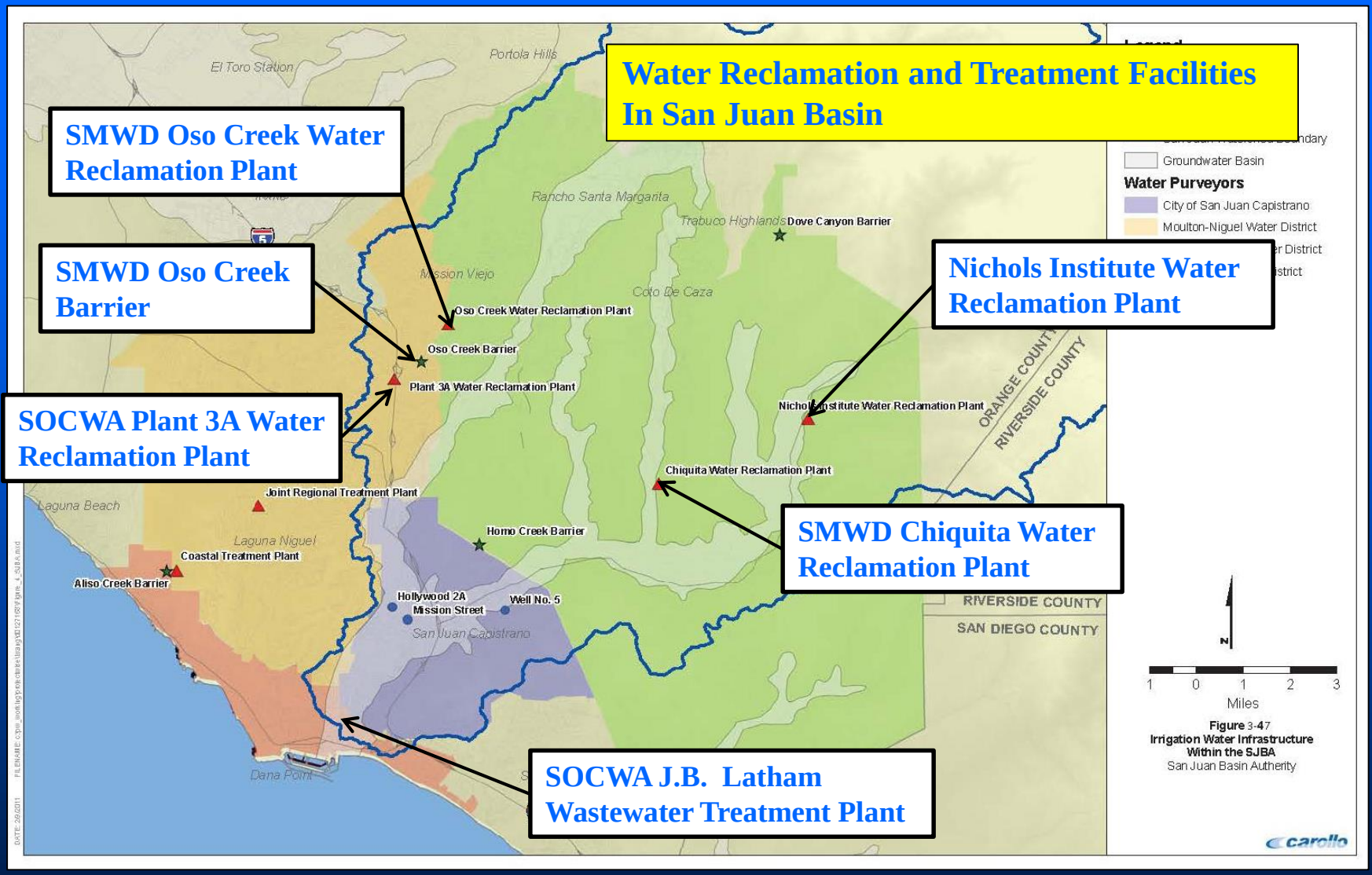
Moulton Niguel Water
Leading the Way in Service

Santa Margarita Water District

SAN JUAN BASIN OVERVIEW




Groundwater Production Facilities
In San Juan Basin
Legend
Groundwater Recovery Facility
Junction Box
Groundwater Well
Reservoir
Potable Water Transmission Mains
MWD Feeders
Groundwater Basin
Water Purveyors
City of San Juan Capistrano
Moulton-Niguel Water District
Santa Margarita Water District
South Coast Water District
County Line
Portola Hills
Irvine
El Toro
Trabuco Highlands
Rancho Santa Margarita
Mission Viejo
Coto De Caza
Laguna Hills
Eastern T.M.
SC-2 Takeout
Central Intertie Pipeline
Aliso Viejo
Laguna Beach
Rosenbaum No. 1
North Open Space Well
Laguna Niguel
South County Pipeline
San Juan Capistrano
San Juan Basin
Capistrano Beach
Bradt Reservoir
Dana Point
ORANGE COUNTY
RIVERSIDE COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
EAST ORANGE COUNTY FEEDER NO. 2
City of San Juan Capistrano Groundwater Production Facility
South Coast Water District Groundwater Production Facility
N
1 0 1 2 3
Miles
Figure 3-45
Native and Supplemental Potable Water Infrastructure
San Juan Basin Authority
carollo


Water Reclamation and Treatment Facilities In San Juan Basin
SMWD Oso Creek Water Reclamation Plant
SMWD Oso Creek Barrier
SOCWA Plant 3A Water Reclamation Plant
Nichols Institute Water Reclamation Plant
SMWD Chiquita Water Reclamation Plant
SOCWA J.B. Latham Wastewater Treatment Plant
El Toro Station
Portola Hills
Rancho Santa Margarita
Trabuco Highlands
Dove Canyon Barrier
Mission Viejo
Coto De Caza
Oso Creek Water Reclamation Plant
Oso Creek Barrier
Plant 3A Water Reclamation Plant
Nichols Institute Water Reclamation Plant
Chiquita Water Reclamation Plant
Joint Regional Treatment Plant
Laguna Beach
Laguna Niguel
Coastal Treatment Plant
Aliso Creek Barrier
Homo Creek Barrier
Hollywood 2A
Mission Street
Well No. 5
San Juan Capistrano
Dana Point
ORANGE COUNTY
RIVERSIDE COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
Groundwater Basin
Water Purveyors
City of San Juan Capistrano
Moulton-Niguel Water District
N
1 0 1 2 3
Miles
Figure 3-47
Irrigation Water Infrastructure Within the SJBA
San Juan Basin Authority
carollo

SJBA

San Juan Basin Authority formed in 1971 to jointly fund facilities to make water available to member agencies

SJBA is currently comprised of

- City of San Juan Capistrano
- South Coast Water District
- Moulton Niguel Water District
- Santa Margarita Water District

San Juan Basin Authority Mission Statement

To develop and maintain a reliable, high quality economical local water supply for the residents in the San Juan Basin by maximizing water use through management of local ground and surface water of San Juan Creek and its tributaries, with due consideration for preservation, enhancement, and conservation of the environment, including, but not limited to, the natural resources, fish and wildlife, infrastructure improvements, and the cultural heritage of the area.

SAN JUAN BASIN BACKGROUND INFORMATION

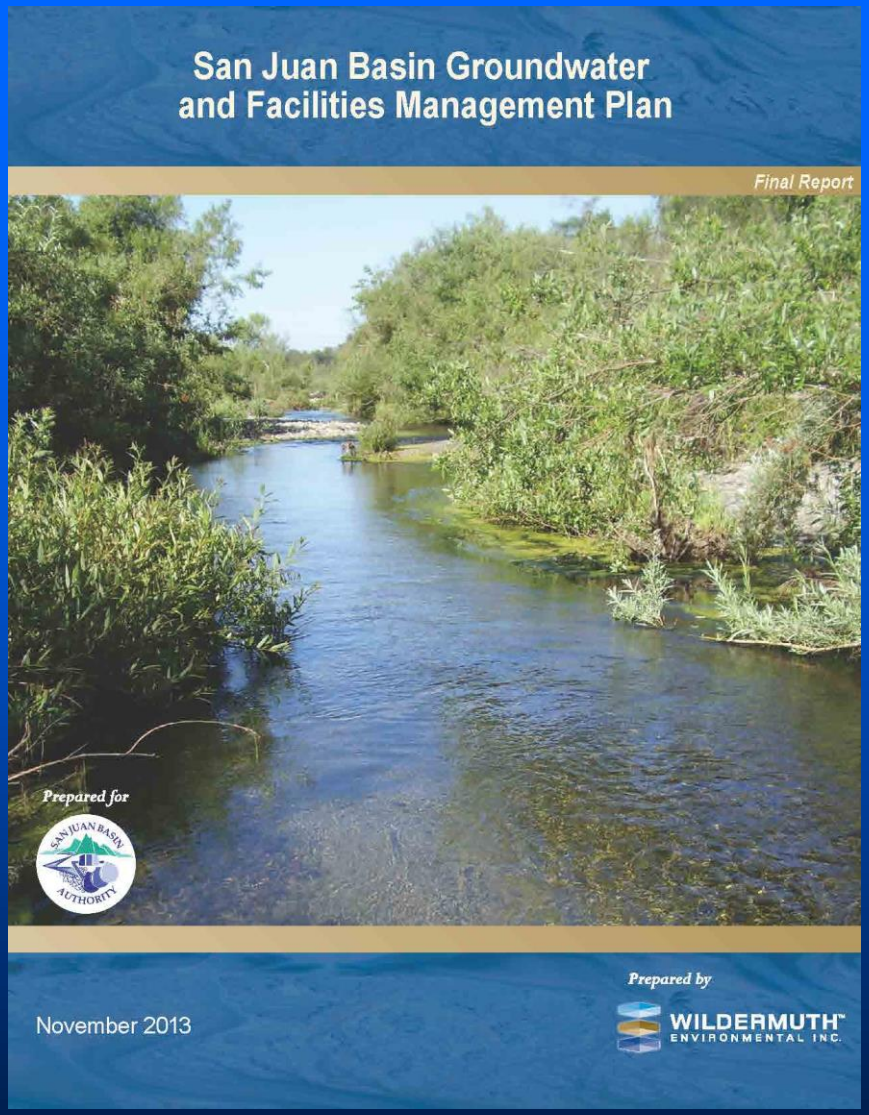
Data Summarized From The Following Reports:

- **NBS/Lowry San Juan Basin Groundwater Management and Facility Plan** (1994) prepared for SJBA
- **Stetson/Boyle Unappropriated Water Report** (1998) prepared for SJBA
- **Geoscience Phase 1 Hydrogeology Investigation** (2005) prepared for MWDOC
- **Psomas Well Siting Report** (2009) prepared for SJBA

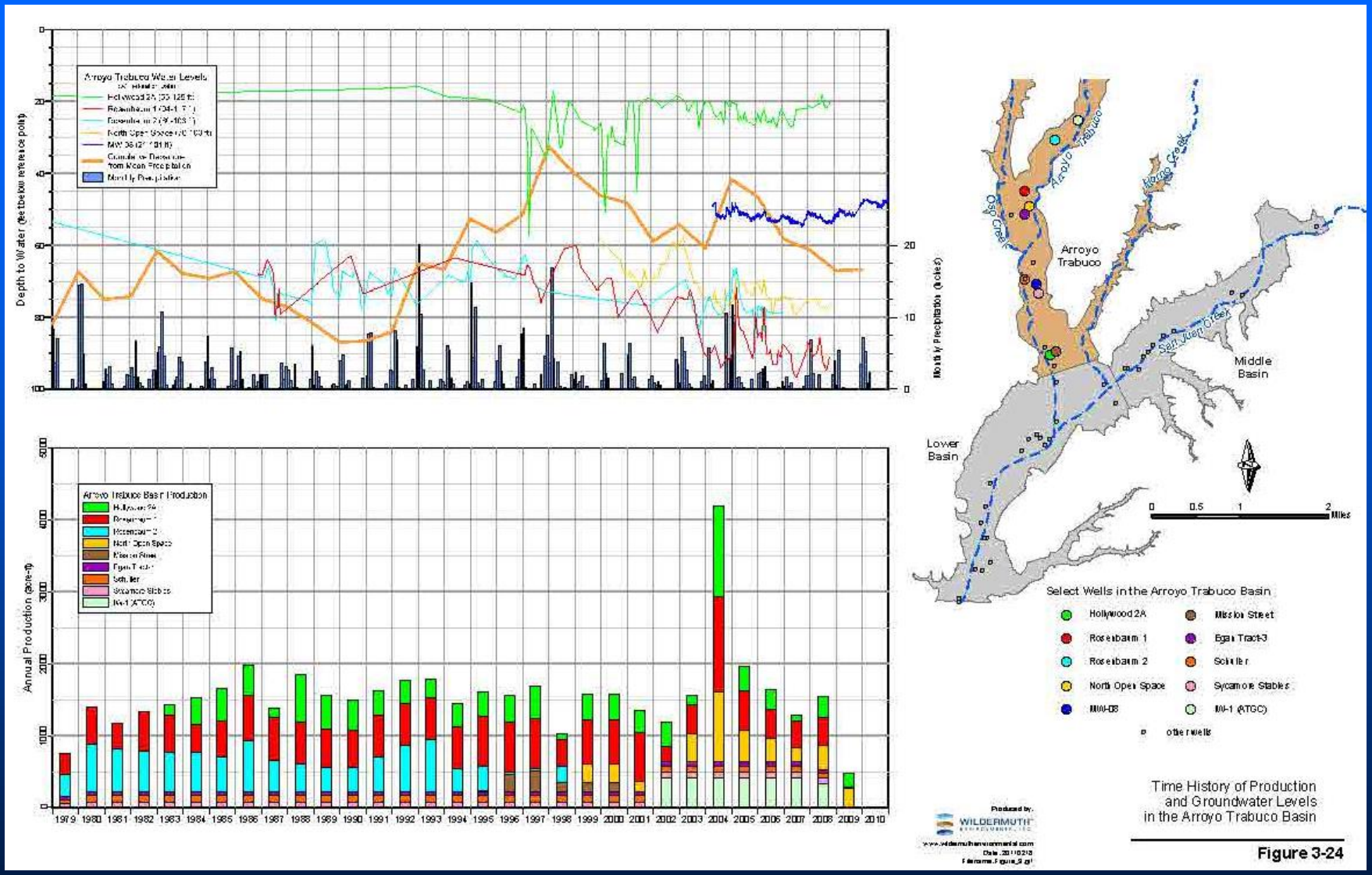
  (originally contracted as Paleochannel Study)
- **Geoscience San Juan Basin Regional Watershed and Groundwater Model Report** (2013) prepared for South Orange Coastal Ocean Desalination Project
- **Geoscience/PACE San Juan Creek Watershed Model** (2014 HSPF Model)
  (Hydrologic Simulation Program – Fortran input to MODFLOW)
- **Geoscience San Juan Basin Groundwater Model** (2014 SJB Regional Model)
  (USGS MODFLOW-2000 w/ MT3DMS Module - checked against SEAWAT)
- **Wildermuth Environmental San Juan Basin Groundwater and Facilities Management Plan** (November 2013) prepared for SJBA
- On-Going Groundwater Monitoring Letter Reports

SJBA GFMP

- Developed for San Juan Basin Authority (stared in 2010 adopted in December 2014)
- Regional Hydrologic Model and Basin Groundwater Model prepared by Geoscience Support Services
- Report prepared by Wildermuth Environmental
- Peer Review by Todd Engineers and National Water Research Institute

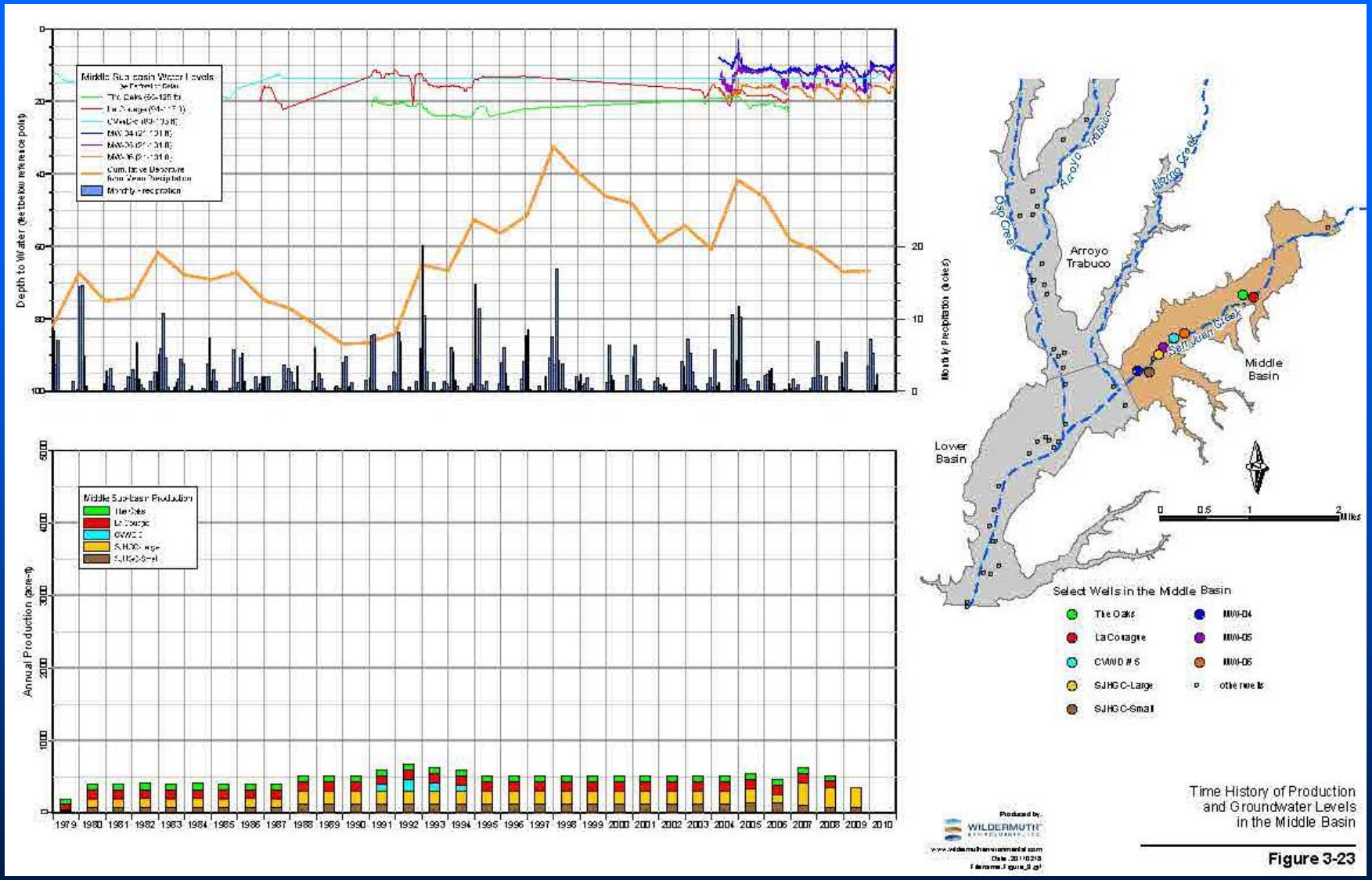


GROUNDWATER PRODUCTION AND WATER LEVEL ARROYO TRABUCO

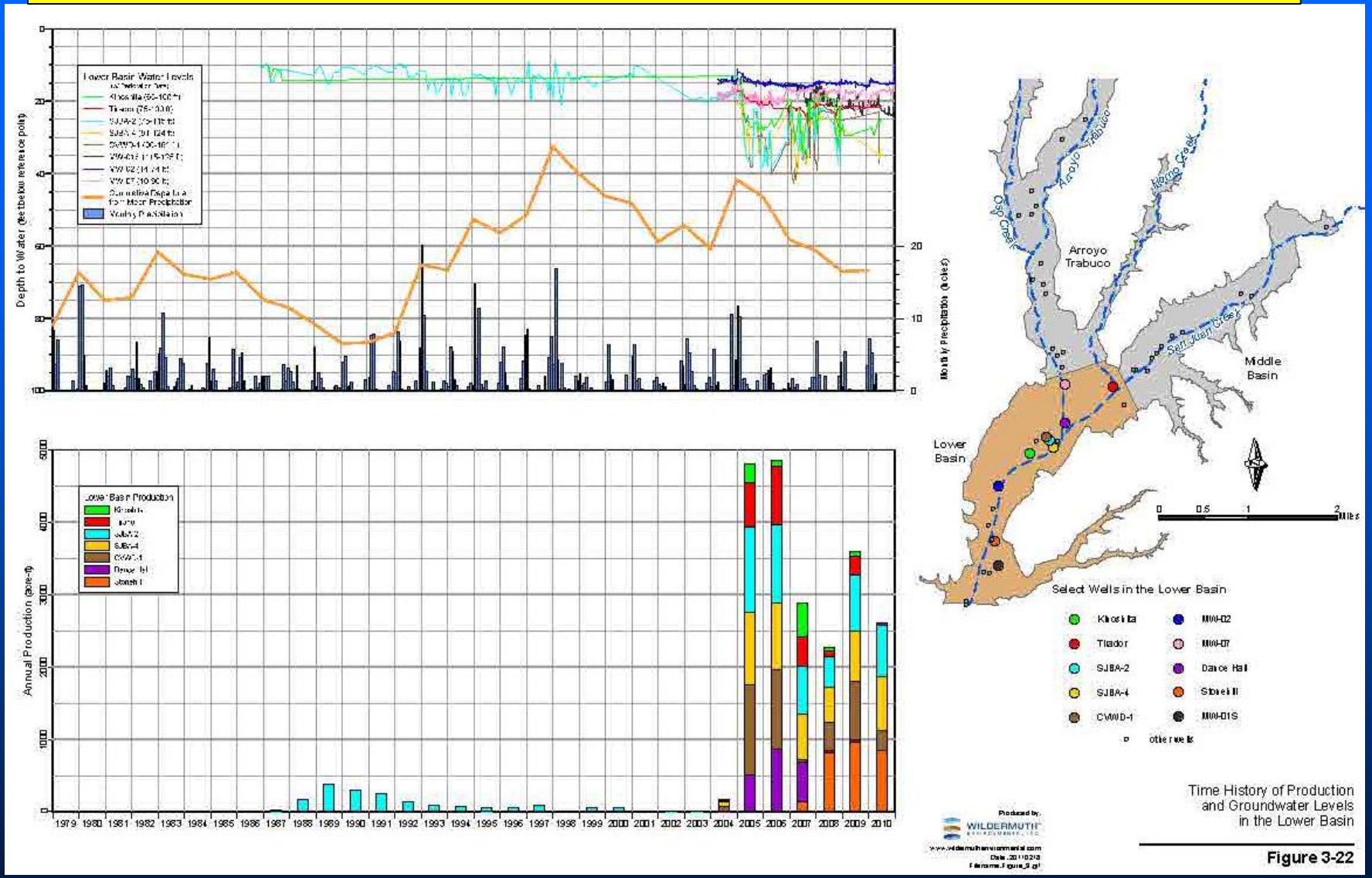


SJBA Preliminary Adaptive Production Management Alternatives

GROUNDWATER PRODUCTION AND WATER LEVEL SAN JUAN CREEK

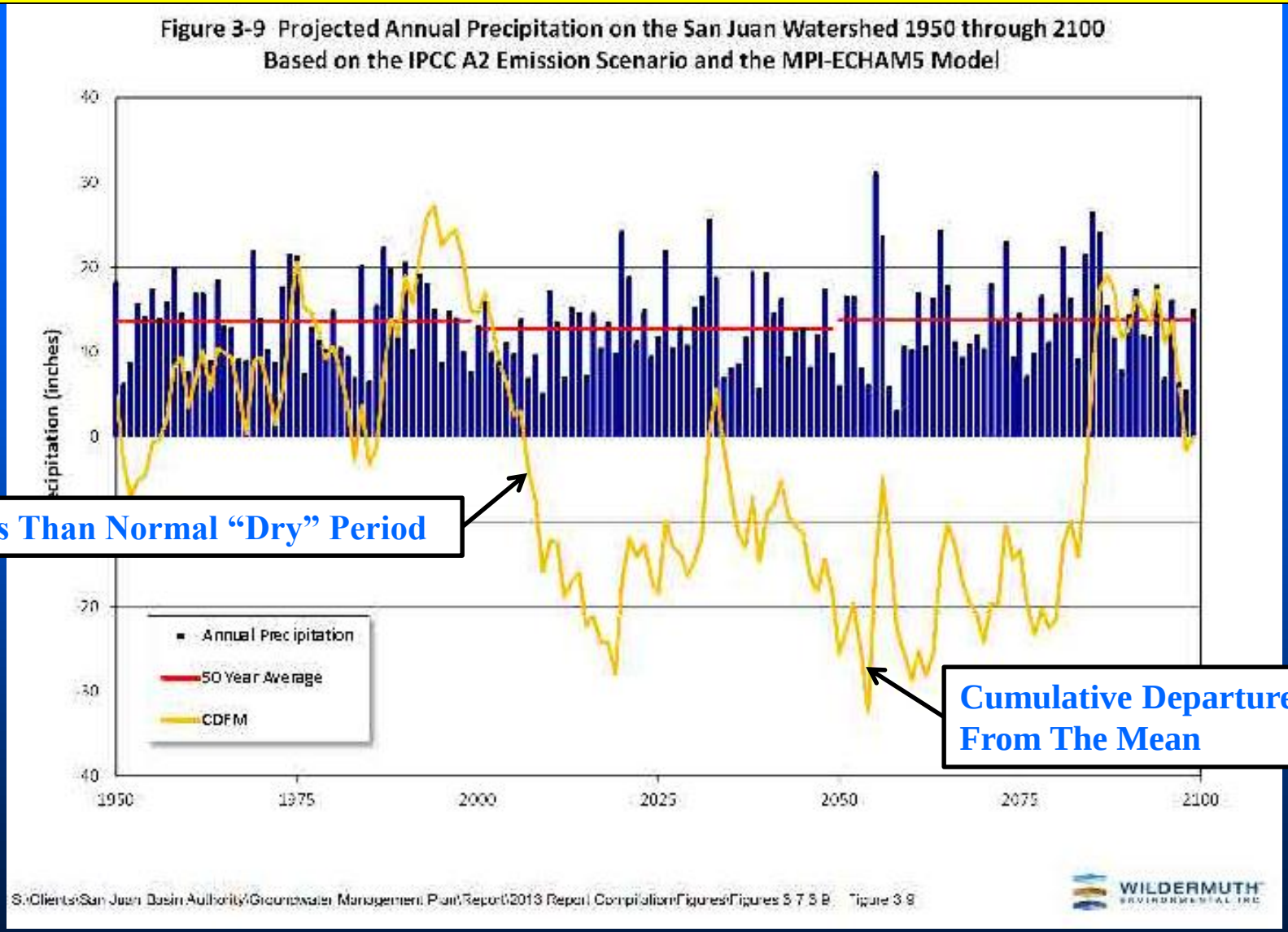


GROUNDWATER PRODUCTION AND WATER LEVEL SAN JUAN CREEK

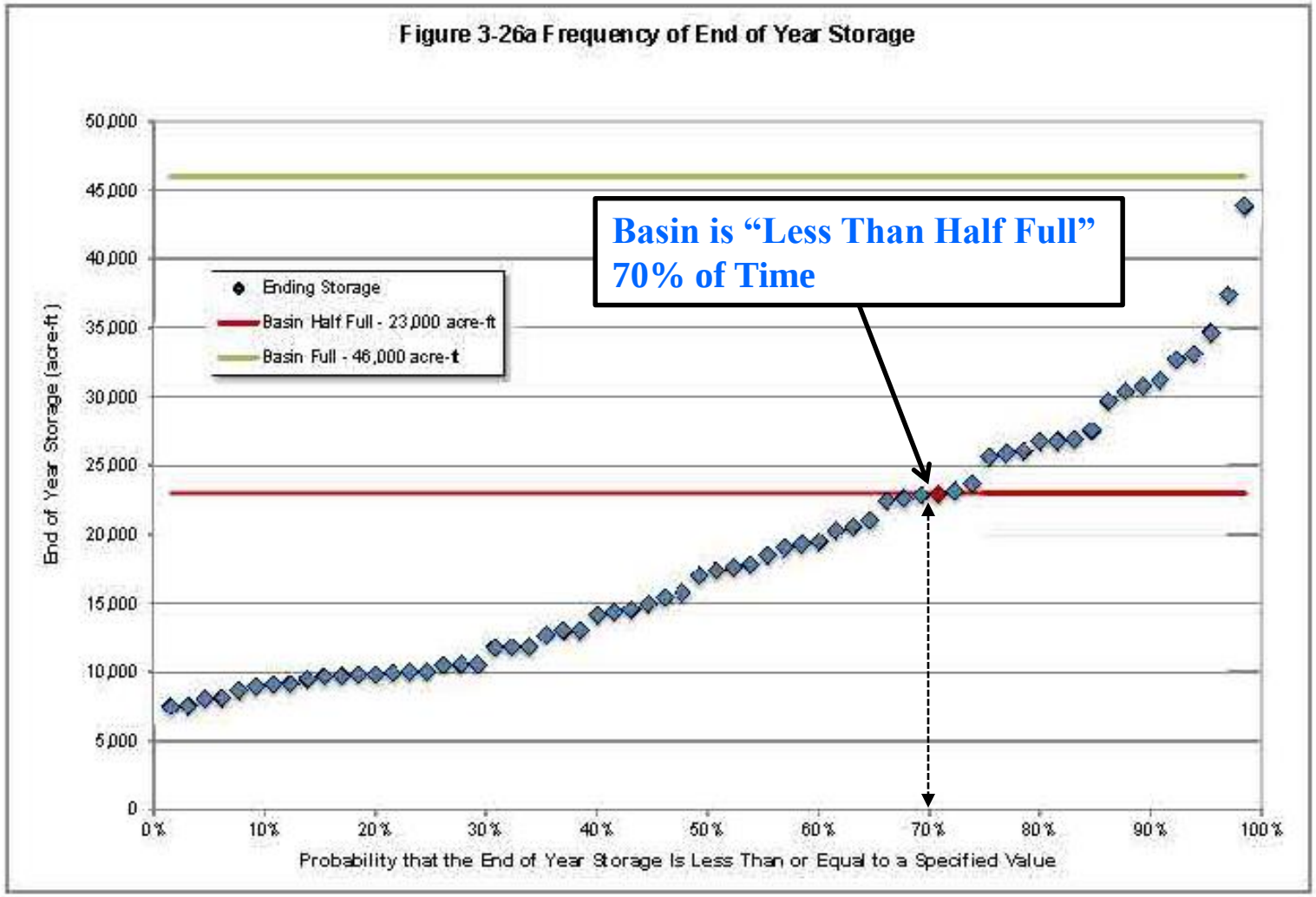


SJBA Preliminary Adaptive Production Management Alternatives

PAST/PROJECTED PRECIPITATION FOR SAN JUAN BASIN WATERSHED



PROBABILITY OF WATER STORAGE VOLUME IN SAN JUAN BASIN



S:\Clients\San Juan Basin Authority\Groundwater Management Plan\Report\FINAL_GWPM_20130810\Figures\Figures 3-25_ 26a_26b.xlsx_figure 3-26a

WILDERMUTH ENVIRONMENTAL INC

ADAPTIVE MANAGEMENT PLAN GOALS

The common goals arrived at by the SJBA Participating Agencies included:

1) **Enhanced Basin Water Supplies**
   a) Increasing Recharge of Stormwater
   b) Introduction of Recycled Water For Basin Recharge
   c) Dry-Weather Discharge to Creek
2) **Protect and Enhance Water Quality**
   a) Capture and treat contaminated groundwater for direct use
   b) Implement Stormwater Recharge
   c) Improve Waste Discharge Management
3) **Maximize Unused Basin Storage Space**
   a) Implement maximum basin drawdown for storage during "rainy periods"
   b) Promote well operational flexibility (on/off over time)
4) **Satisfy State Requirements for a Groundwater Management Program**
5) **Establish Equitable Share of Funding, Benefits, and Cost for Basin Management.**

ADAPTIVE MANAGEMENT PLAN STRATIGIES

Groundwater Production Variations Based on "Springtime Basin State"

Basin Full

- Groundwater production matches Agency demand
- Implement Basin Recharge Strategy

Basin <Full but >Half Full

- Groundwater production "set" based on basin "spring" storage volume\
- Production may be reduced based on spring rainfall and groundwater levels
- Production Wells may be varied based on drawdown impacts
- Production may be reduced based on evidence of seawater intrusion
- Implement Basin Recharge Strategy

Basin < Half Full

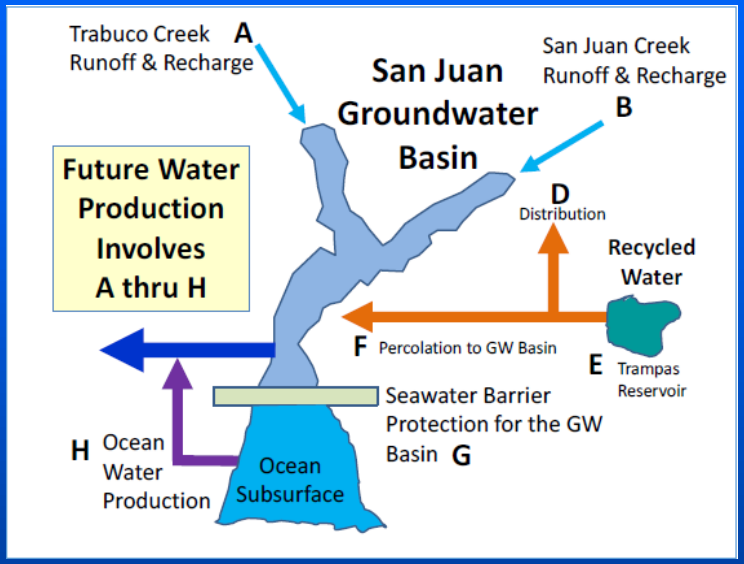
- Groundwater production restrictions imposed based on "spring" storage volume
- Production may be further reduced based on late spring rainfall and groundwater levels
- Production reduced based on evidence of seawater intrusion
- Groundwater production prohibition based on continued drought and dropping groundwater levels
- Live Stream Recharge???

SJBA Preliminary Adaptive Production Management Alternatives

SAN JUAN BASIN OPTIMIZATION CONCEPT

The Basin Optimization Project has three primary elements to increase the regional reliability and help with drought-proofing the basin:

- Active groundwater recharge utilizing stormwater, urban return flows and Title 22 Recycled Water
- Development of a seawater intrusion barrier utilizing a trough developed by either coastal desalination slant wells or a brackish water extraction barrier
- Increased groundwater pumping and treatment to drinking water standards.



The scale of the potential project is to increase the long-term reliable production up to approximately 24,000 acre feet per year if all element are implemented. The plan proposes and active management approach to utilize as much storm flows as possible in wet years and supplement with urban return flows and recycled water during summer months and longer periods during dry years.

METROPOLITAN WATER DISTRICT FOUNDATIONAL ACTIONS FUND GRANT

In 2013 SJBA submitted a proposal to Metropolitan for a Foundation Actions Fund (FAF) [Matching Grant] to perform studies related to:

- further augment the hydrologic and hydrogeologic models for the basin,
- evaluate potential stormwater and recycled water recharge along the middle and upper San Juan Creek areas
- evaluate potential for enhanced groundwater production
- evaluate methodologies for controlling / abating seawater intrusion in the lower basin area

The Agreement between Metropolitan and SJBA, in conjunction with Municipal Water District of Orange County (MWDOC), was executed on January 30, 2014. MWDOC is the coordinating funding agency between SJBA and Metropolitan. The Agreement extends from January 30, 2014 through June 30, 2017.

MET FOUNDATIONAL ACTIONS FUND
SJBA FAF PROJECT OBJECTIVES

A. Conduct Groundwater Modeling Studies for Proposed Seawater Extraction Barrier

B. Conduct Hydraulic Investigations to Increase Stormwater Recharge

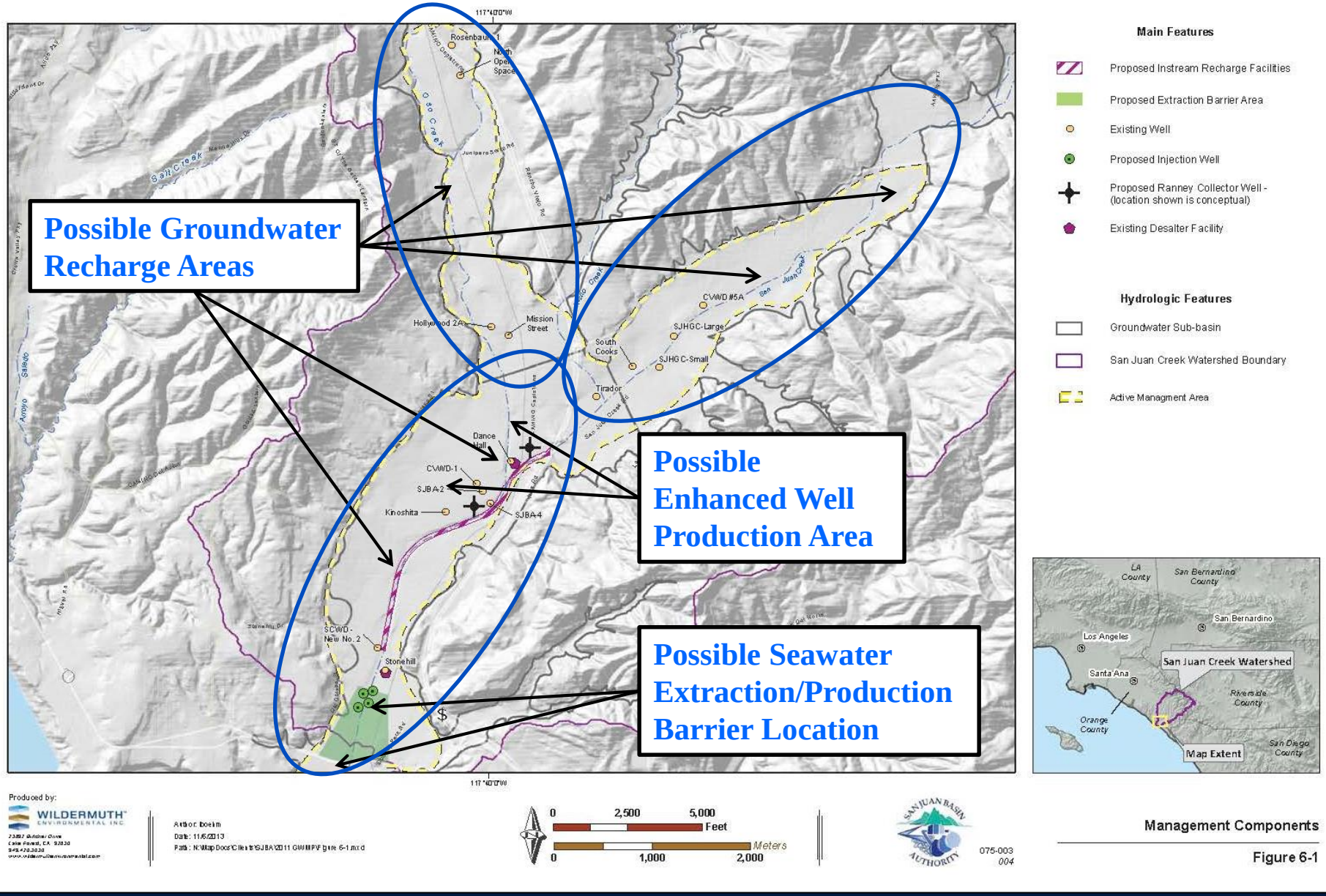
C. Conduct Hydraulic Investigations to Recycled Water Recharge

D. Develop Adaptive Production Management For Basin

PROJECT BUDGET SUMMARY

The project budget remains per the original proposed budget as presented below:

	Total Project Cost	Maximum Cost To Metropolitan
Task 1 - Project Management	$68,000	$34,000
Task 2 - Develop Preliminary Alternatives For Each Program Element	$64,400	$32,200
Task 3 - Evaluate Feasibility of All Program Elements	$162,400	$81,200
Task 4 - Develop Implementation Plan	$47,000	$23,500
Task 5 - Prepare Project Report	$58,200	$29,100
Grand Total	**$400,000**	**$200,000**

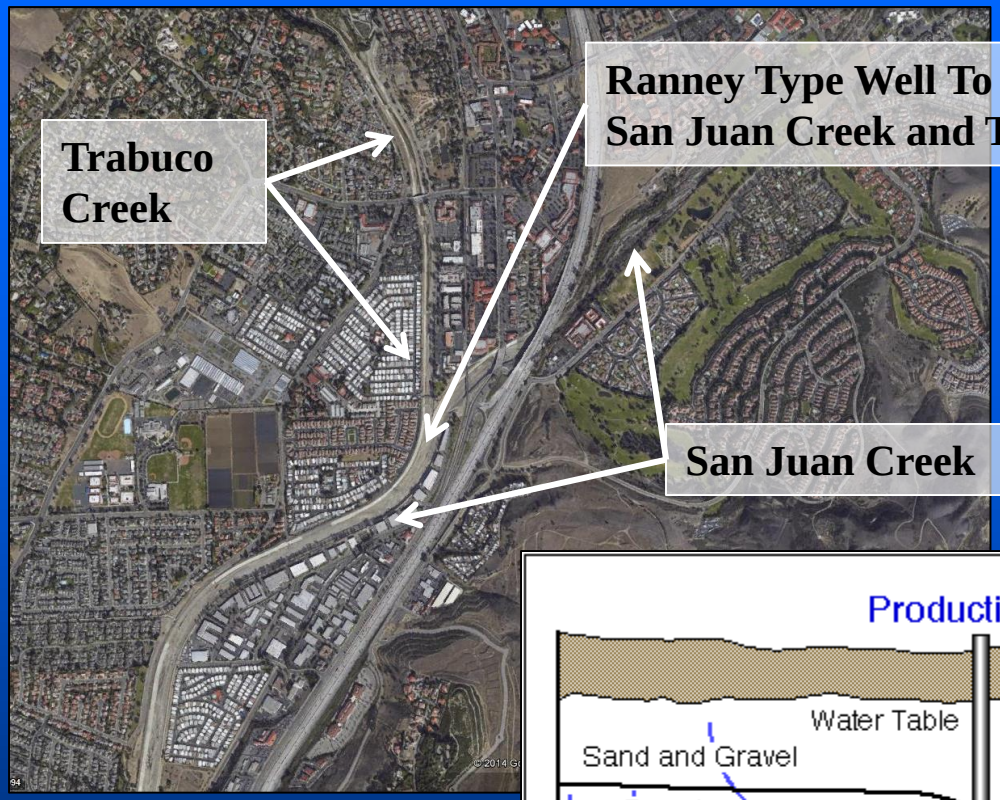


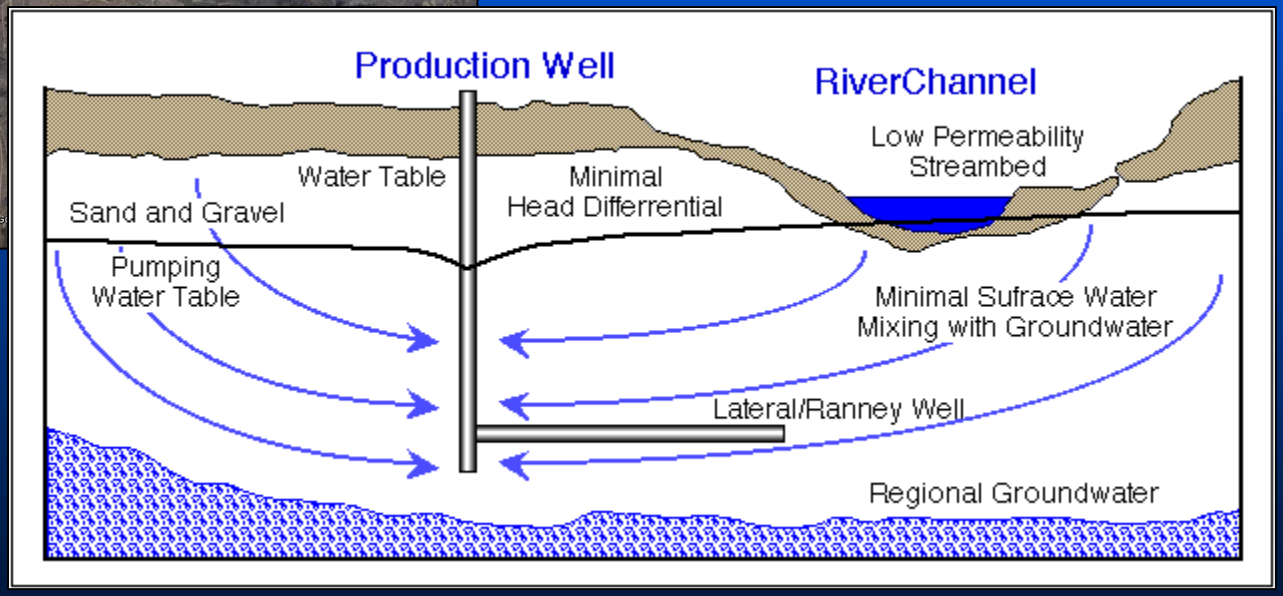
SJBA Preliminary Adaptive Production Management Alternatives

“In-Stream / Near-Stream Recharge Option”

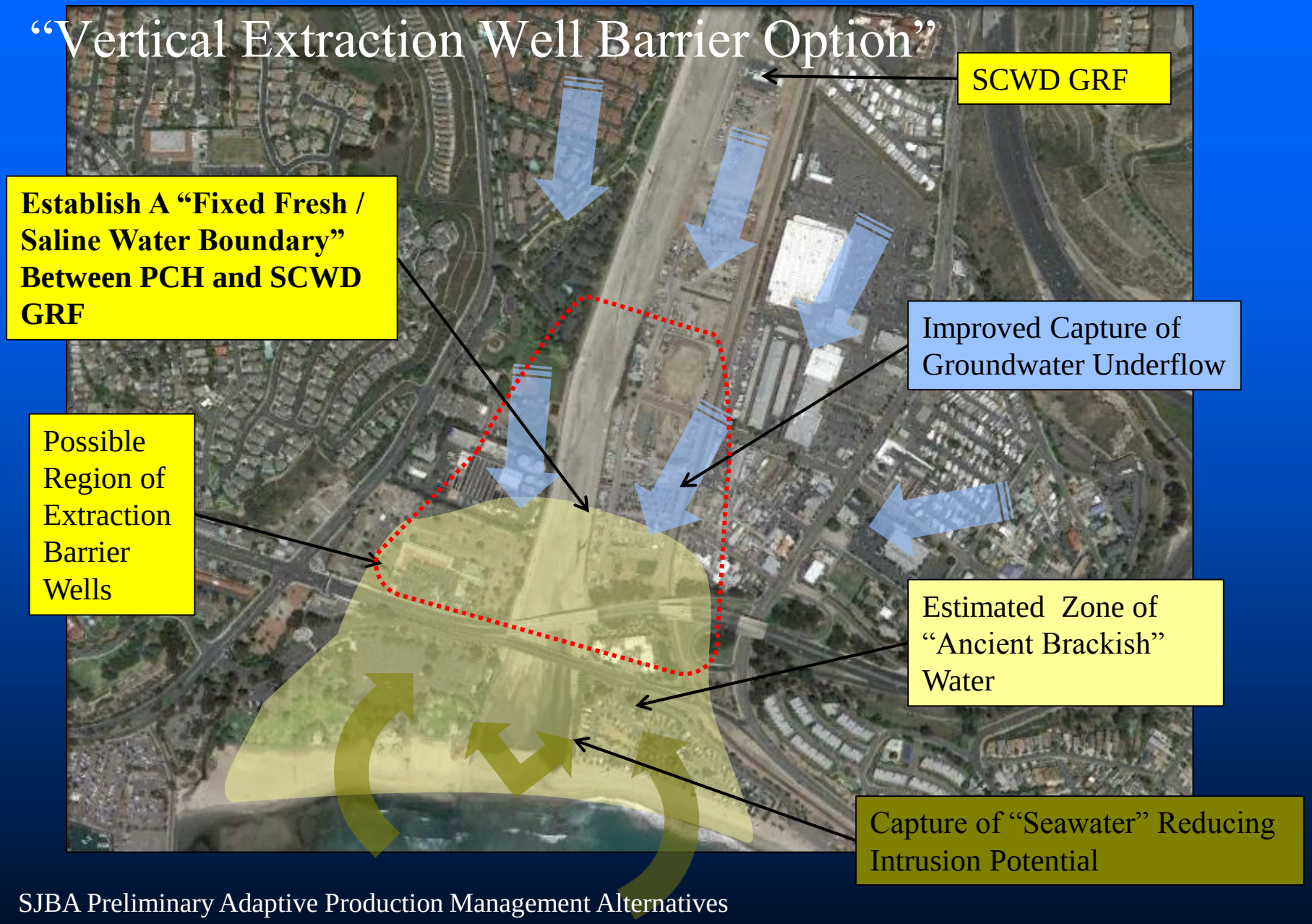
“T Levee Recharge Option”

"Ranney Type Well Option"





"Vertical Extraction Well Barrier Option"



ACCOMPLISHMENTS

Task 2 - Develop Preliminary Alternatives For Each Program Element

- ✓ G3 Completed Geotechnical Data Review including reviewing data developed for the Village of Sendero and San Juan Polo Fields to further understand groundwater recharge and transfer between the upper and lower basins across/through bedrock mound and the Cristianitos Fault
- ✓ G3 Completed Remote Sensing Analysis (Using LANDSAT Imagery) to evaluate groundwater recharge and rate of movement through upper and middle basins
- ✓ G3 and GeoVision Completed Geophysical Studies to determine the characteristics of the basin for groundwater flow
- ✓ Geoscience Completed 2012-2014 Basin Model Updates
- ✓ John Thornton/Psomas Completed Basin Well Survey
- ✓ WEI and TAC Evaluating Continued Drought Impacts, Seawater Intrusion, and Reduced Groundwater Production
- ✓ WEI Completed Groundwater Recharge Alternative Studies
- ✓ Geoscience Completed Vertical Extraction/Production Well Analysis
- ✓ BV Completed Recycled Water Source & Treatment Alternative Studies
- ✓ BV Completing Recycled Water Delivery System Options
- ✓ G3, WEI, BV Evaluating “Water Banking” and “Potable Water Use” for Extracted Saline/Brackish Water

CURENT WORK FLOW

Task 3 – Evaluate Feasibility of Program Elements

- ✓ Michael Welch Proceeding With Groundwater Recharge Permitting
  - "Direct Stream Discharge" (Waters of the US) EPA, RWQCB Prohibitions
  - "Live Stream Recharge" EPA, RWQCB, OC Health Restrictions
  - "Near Stream Recharge" RWQCB Limitations
  - "Direct Inject Recharge" RWQCB and OC Health Limitations
- ✓ WEI Proceeding With Groundwater Recharge Studies
- ✓ BV Proceeding With Recycled Water Source & Treatment Options
- ✓ BV Proceeding With Recycled Water Delivery System Options

SUPPLEMENTAL GRANT FUNDING

United States Bureau Of Reclamation WaterSMART Development of Feasibility Studies under the Title XVI Water Reclamation and Reuse Grant Program for FY 2014: *SMWD San Juan Groundwater Basin Recharge, Reclamation, and Reuse Feasibility Study*

SJBA Preliminary Adaptive Production Management Alternatives

Asset Management Plan Overview

September 14, 2015

Moulton Niguel Water
Leading the Way in Service

Asset Management Assessment

- Engaged Westin Consulting to Develop Study
- Develop Full Understanding of District Operations
- Compare Current Practices to Industry Standards
- Develop Prioritized Asset Management “Roadmap”
- Create Immediate and Long Term Recommendations to Guide Plan Implementation
- Schedule & Budget

AMP Action Plan

- Implement “Initial Actions” to improve AM practices
  - Water Loss Control Program
  - Fleet Management Needs Assessment
  - GIS Optimization
  - Manhole Condition Assessment
  - Valve Replacement Program
  - Cathodic Protection Monitoring of Tanks
  - Sewer Cleaning Assessment
- Schedule CMMS Selection Process in 2015
- Provide regular updates to Board

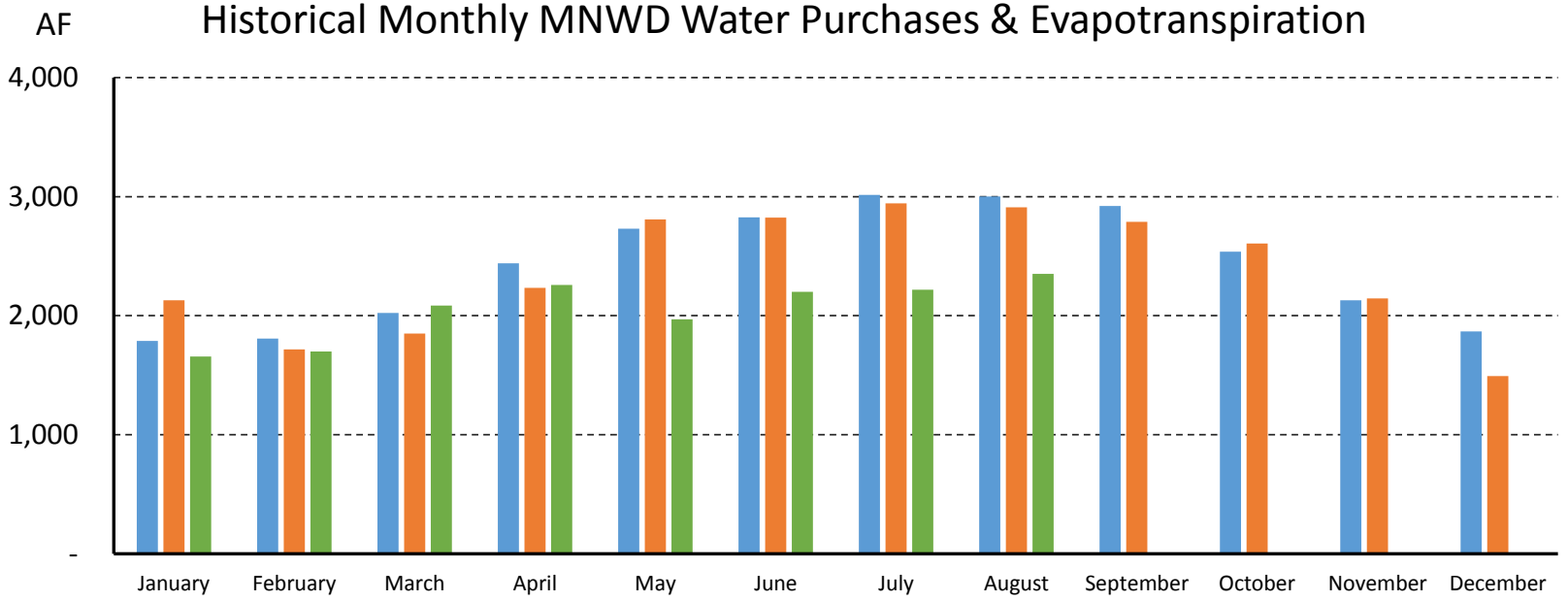
Next Steps

- Continue “Initial Actions” Implementation
  - Water Loss Control Program
  - GIS Optimization
  - Manhole Condition Assessment
  - Valve Maintenance and Replacement Program
  - Sewer Cleaning Assessment
- Retain consultant to support CMMS Selection Process
- Select CMMS
- CMMS Implementation

Asset Management Program - Schedule

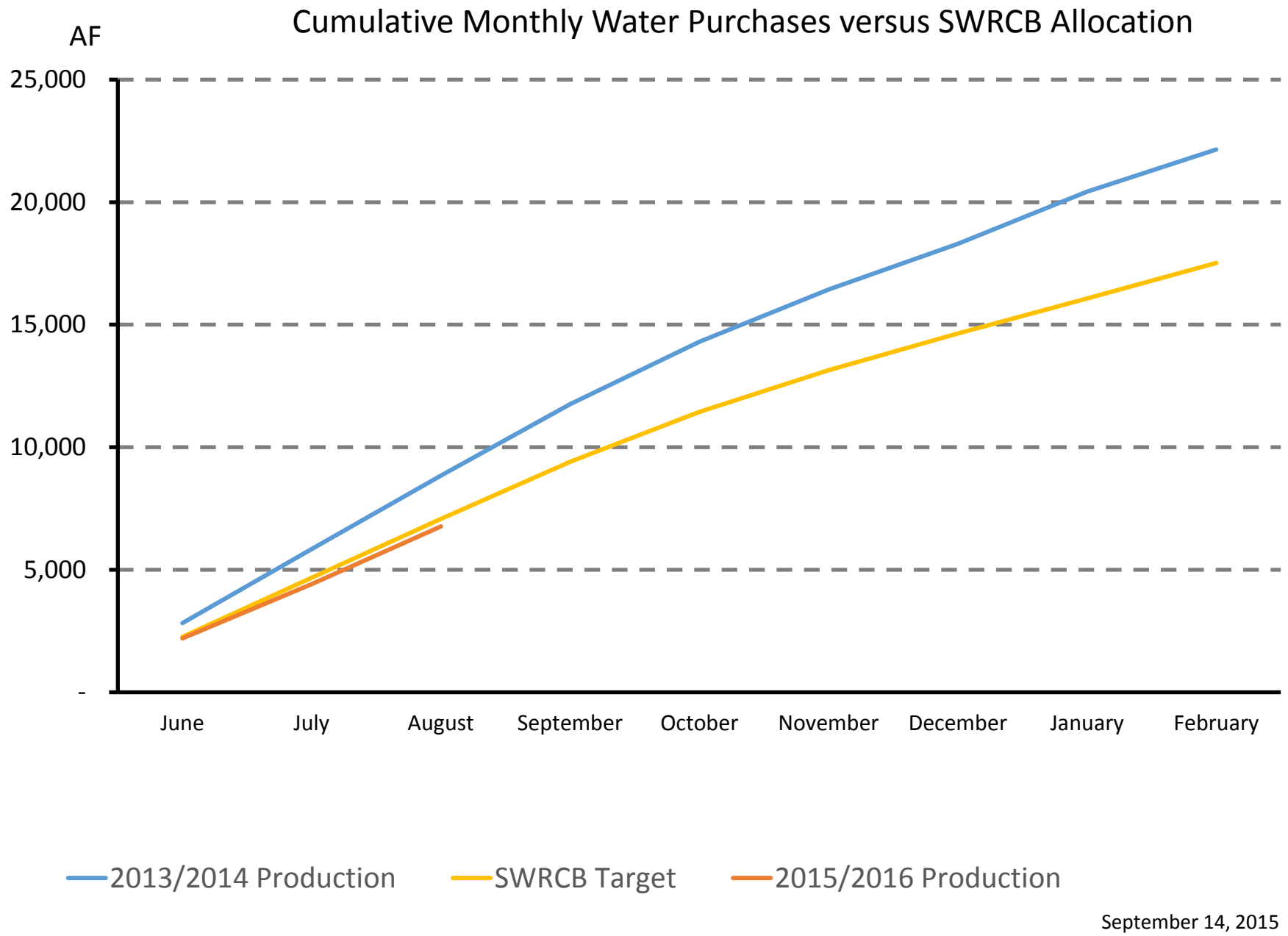
Activity	FY 2015-16				FY 2016-17				FY 2017-18			
AM Workplan - Preliminary	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
1. Employ an Effective CMMS												
- Retain CMMS Selection Consultant												
- CMMS Selection												
- CMMS Implementation												
2. Fully Utilize the District's GIS												
- Populate GIS key attributes												
- Implement Mobility Solution												
3. Define District's R&R Program												
- High Level R&R Estimates												
- Detailed R&R Estimates and Integration												
4. Establish Service Level Performance Measures												
- Tier 1 Measure Program Development												
- Tier 2 Measures												
- Business Intelligence Solution												

Historical Monthly MNWD Water Purchases & Evapotranspiration



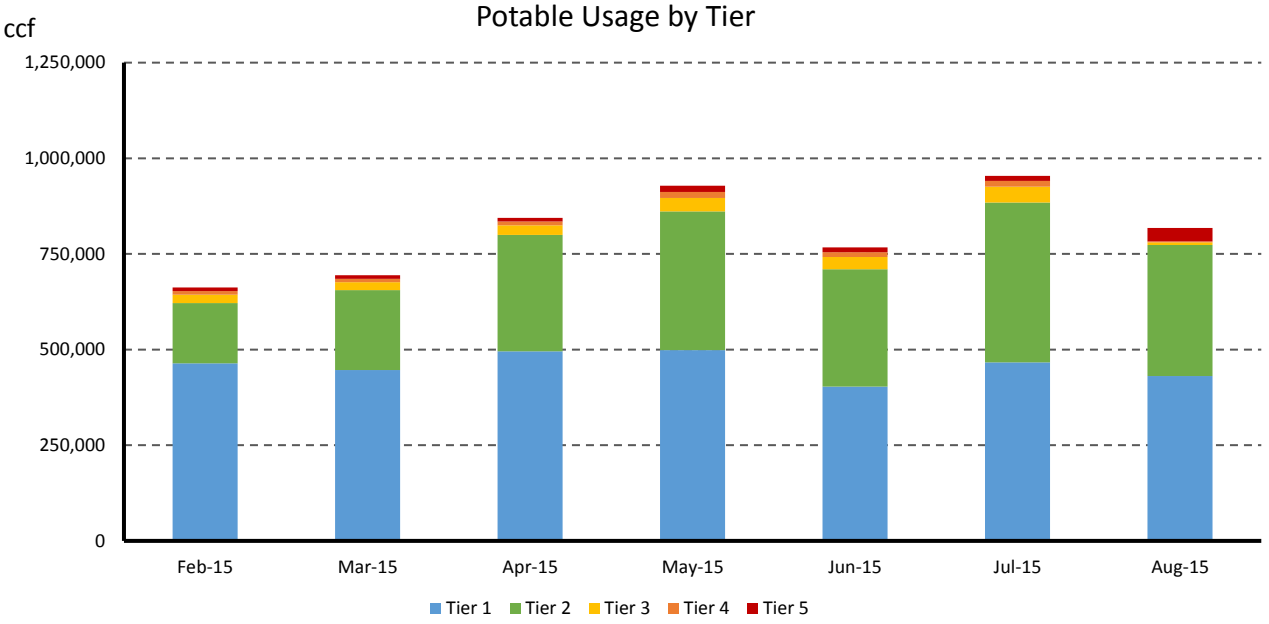
Year	ET (Inches)											
2013	2.54	2.88	4.08	4.79	5.99	6.07	5.81	6.53	5.26	3.92	2.52	2.49
2014	2.82	2.64	4.09	5.54	6.39	6.45	6.54	6.23	5.21	3.94	3.16	1.91
2015	2.52	3.02	4.96	5.31	4.48	5.75	5.69	6.27				

September 14, 2015



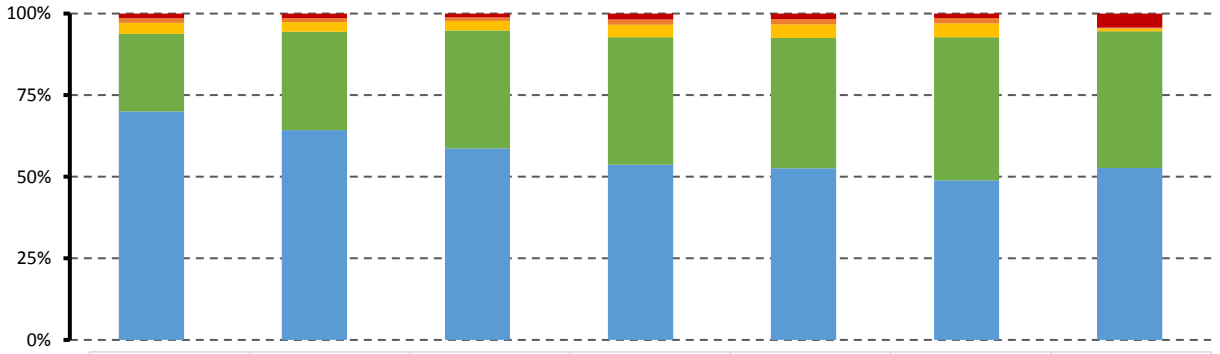
September 14, 2015

Potable Usage by Tier



AF in Tier 3, 4, 5	94	89	101	154	131	159	102

Percent Potable Usage by Tier

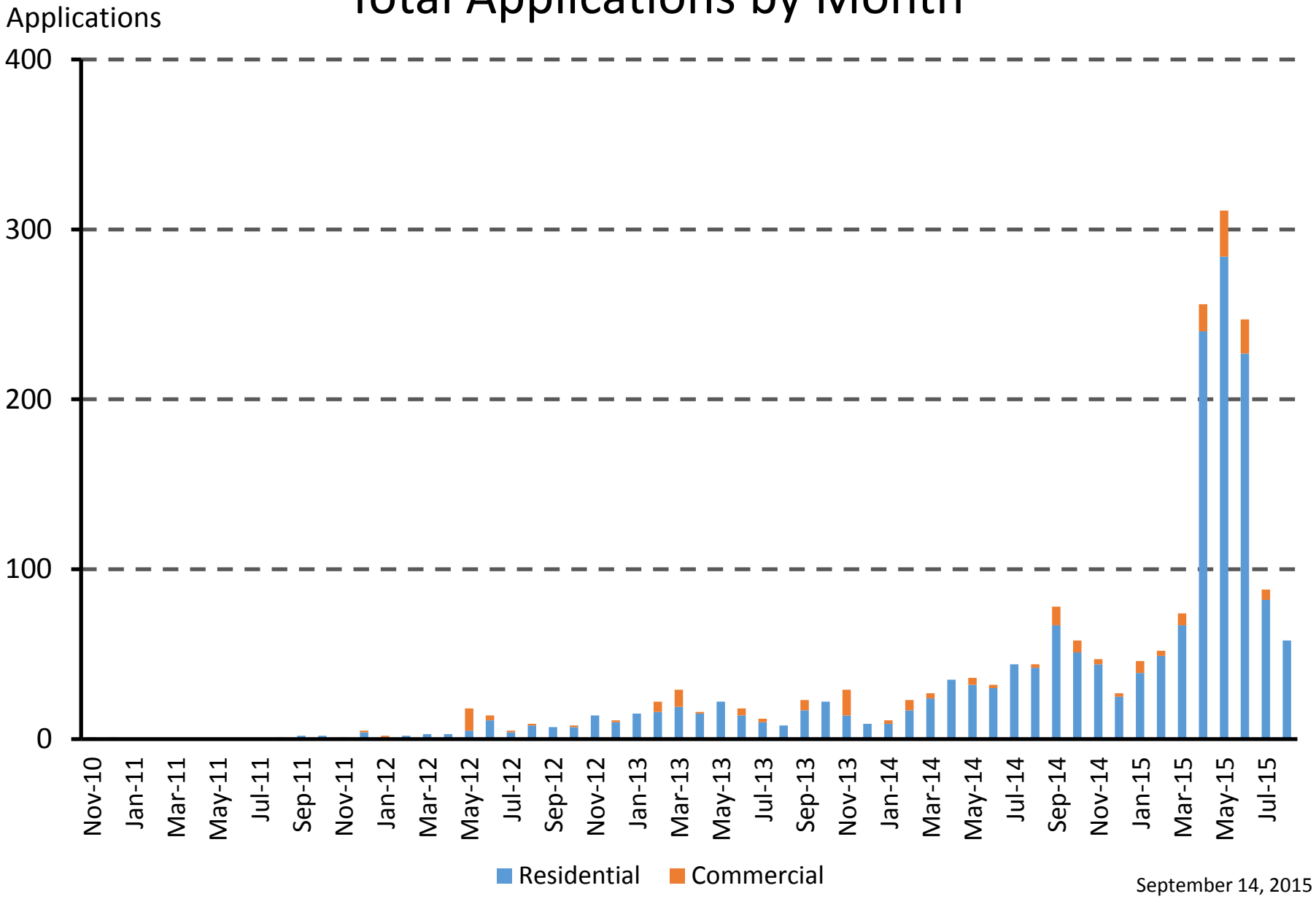


	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15
Tier 5	1.5%	1.4%	1.1%	1.8%	1.6%	1.4%	4.3%
Tier 4	1.4%	1.2%	1.1%	1.7%	1.7%	1.6%	0.3%
Tier 3	3.3%	3.0%	3.0%	3.8%	4.1%	4.3%	0.8%
Tier 2	23.8%	30.1%	36.1%	39.0%	40.0%	43.8%	41.9%
Tier 1	70.0%	64.3%	58.7%	53.7%	52.6%	48.9%	52.6%

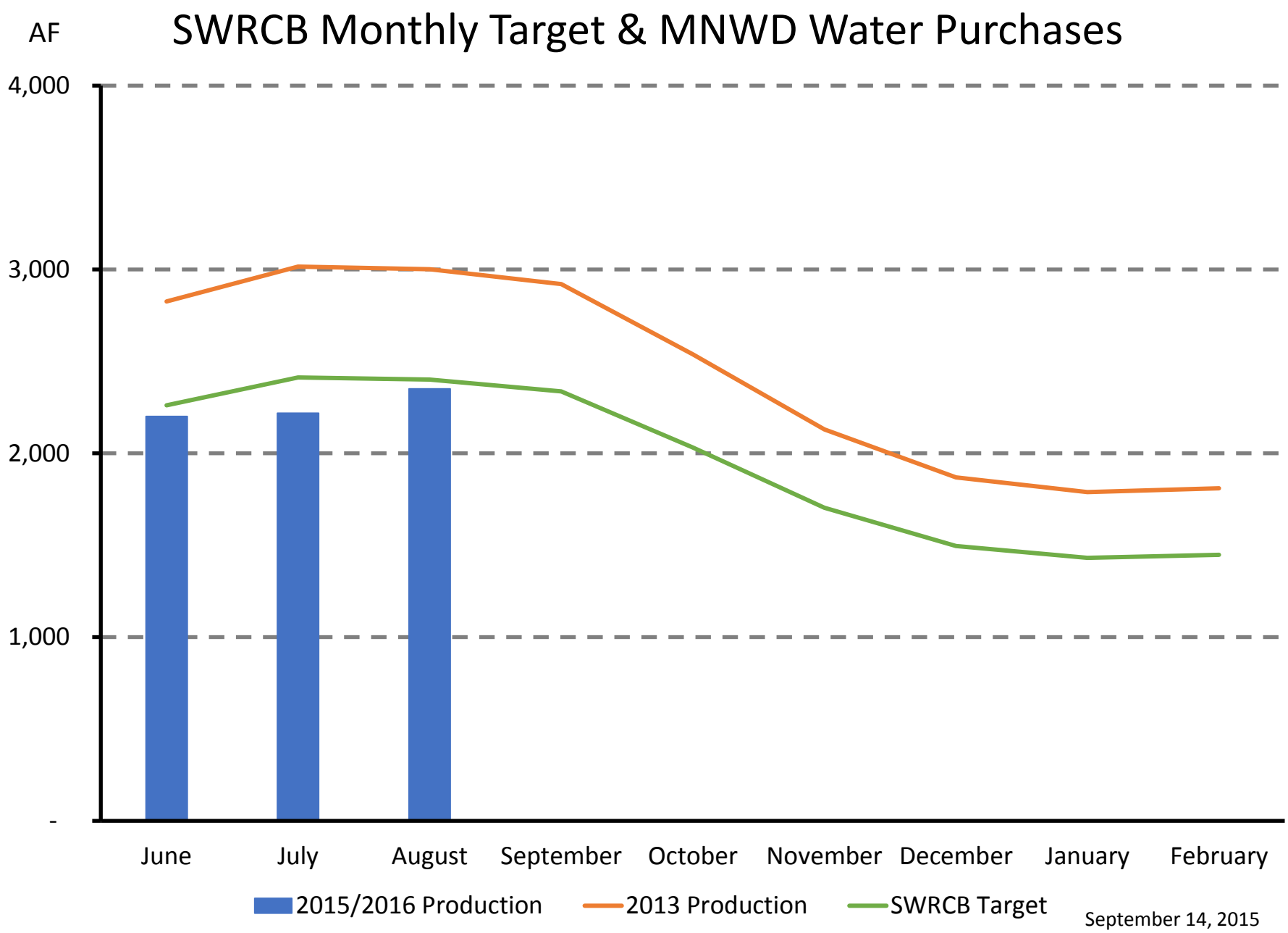
Tier 1 Tier 2 Tier 3 Tier 4 Tier 5

September 14, 2015

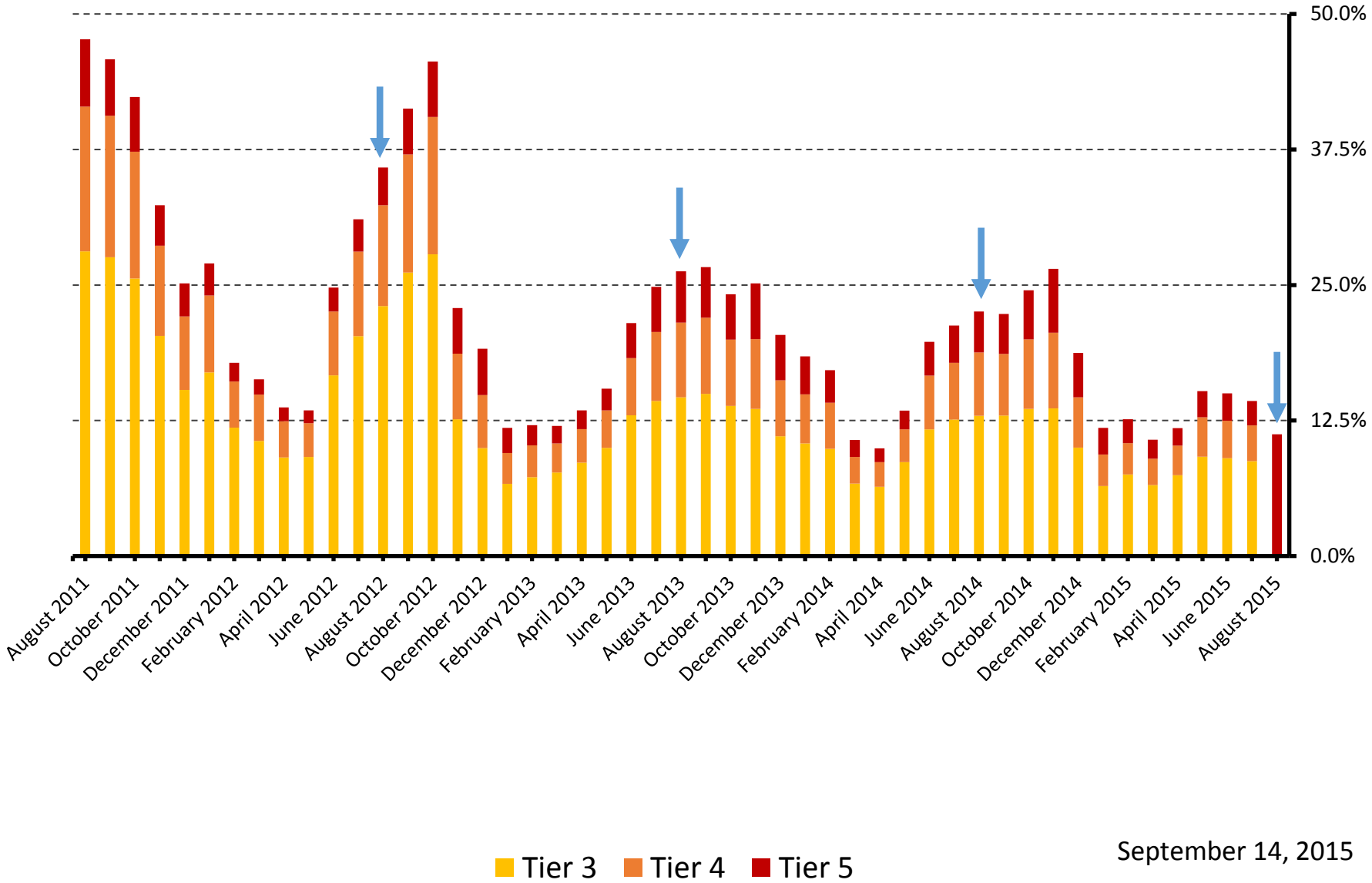
Total Applications by Month



September 14, 2015

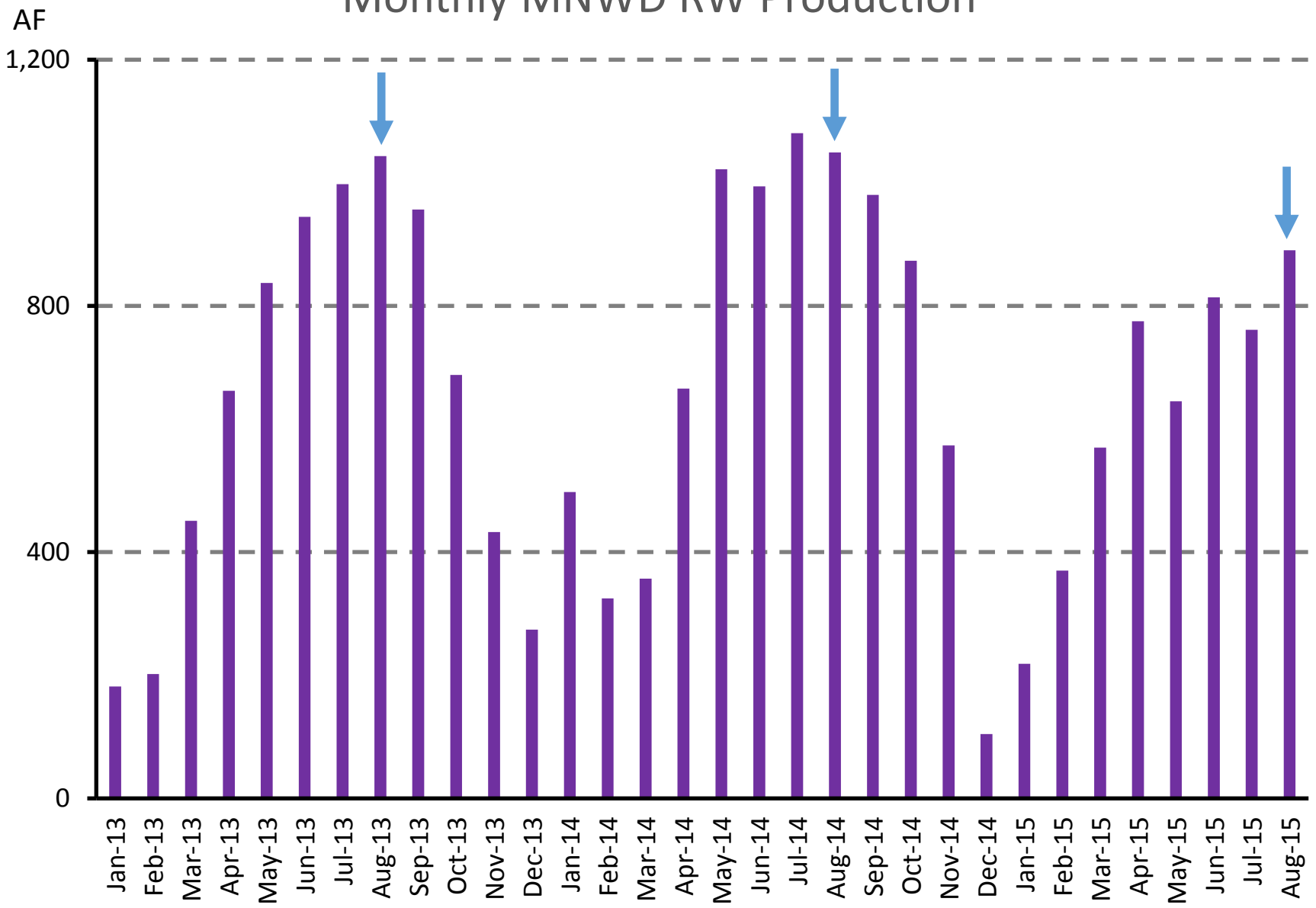

AF
SWRCB Monthly Target & MNWD Water Purchases
4,000
3,000
2,000
1,000
-
June
July
August
September
October
November
December
January
February
2015/2016 Production
2013 Production
SWRCB Target
September 14, 2015

Single Family Residential Accounts by Tier



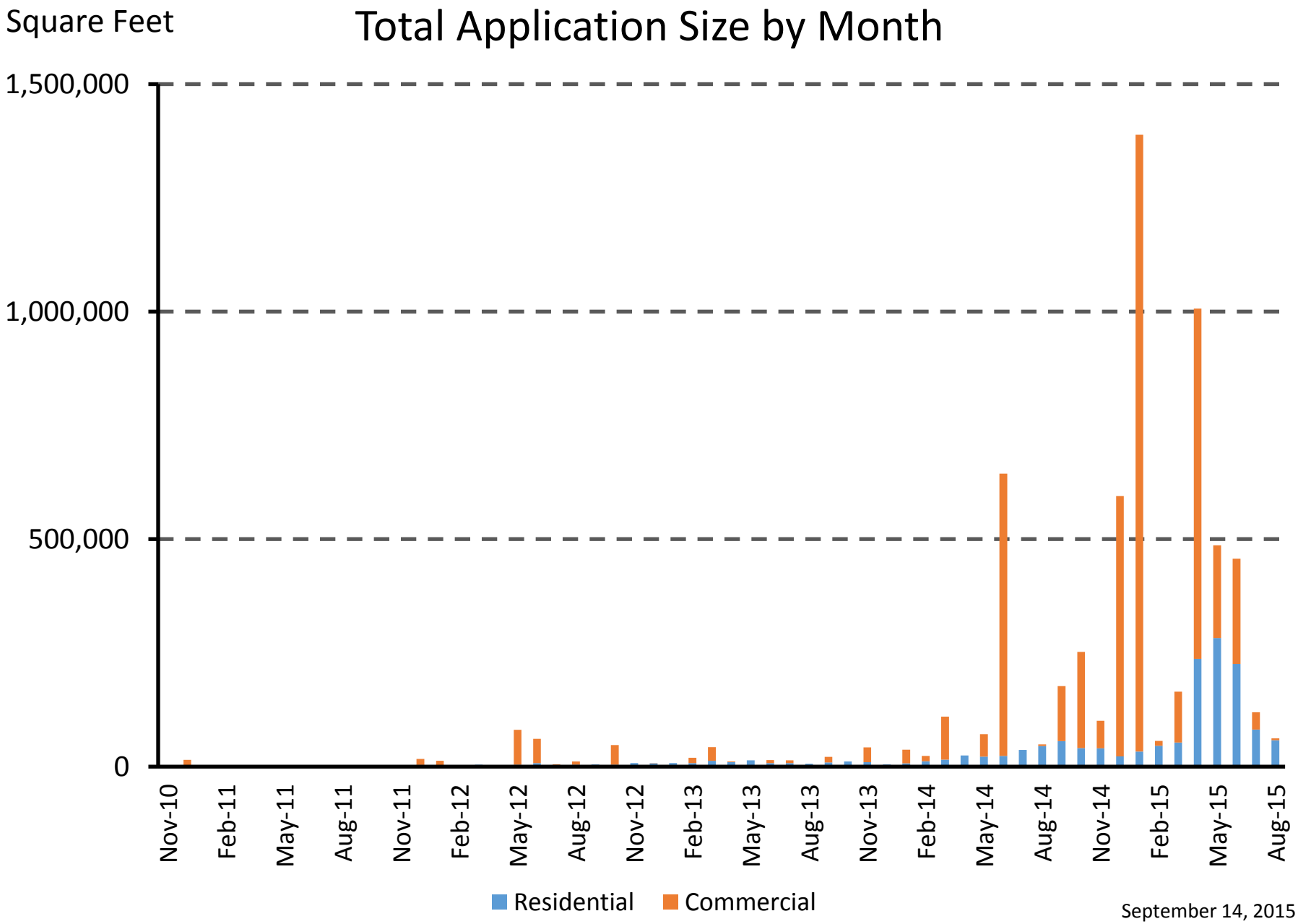
September 14, 2015

Monthly MNWD RW Production



September 14, 2015

Total Application Size by Month



September 14, 2015