



**moulton niguel** water district

# CONDITION ASSESSMENT OF THE CENTRAL INTERTIE PIPELINE

Citizens Advisory Committee Board Meeting

April 13, 2016

# DISTRICT'S POTABLE SYSTEM SUPPLY



## Legend

- Major OC Reservoirs
- Takeout Structures
- Lg. Dia. Feed Lines
- District Boundary

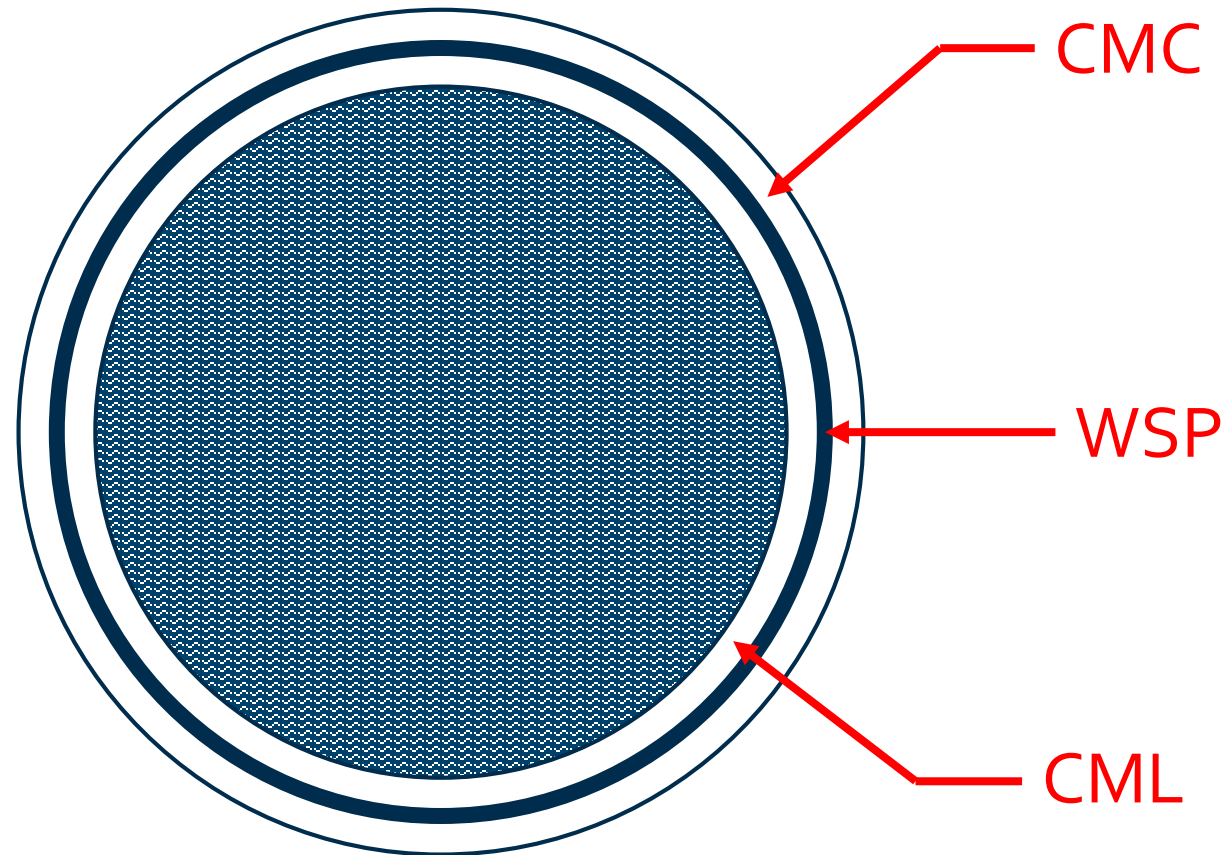
# PROJECT FACILITY

- CIP- Central Intertie Pipeline
- 54-inch cement mortar lined and coated welded steel pipeline
- Constructed throughout 1990s (4 contracts)



# PROJECT FACILITY DETAIL

- Welded steel pipe (WSP)
- Cement mortar lining (CML)
- Cement mortar coating (CMC)
- Field mortaring



# PROJECT HISTORY

- Previous Studies:
  - 2012 CH2M Hill Corrosion Assessment
  - 2014 Current Interruption Study
- Evaluation of available technologies
- Current Study: 2015/2016 Magnetic Flux Leakage (MFL) Condition Assessment
- Why MFL?

# GOALS, SCOPE & CHALLENGES

- Goals
  - True condition assessment
  - Strategic repairs
  - Establish “baseline”
- Scope
  - Dewatering
  - Appurtenance removal
  - Pipe ovality inspection
  - MFL inspection
  - Engineering analyses
  - Welded steel patch repairs
  - Commissioning CIP
- Challenges

# PIPELINE PREPARATION: APPURTENANCE REMOVAL



# MFL TOOL BUILD

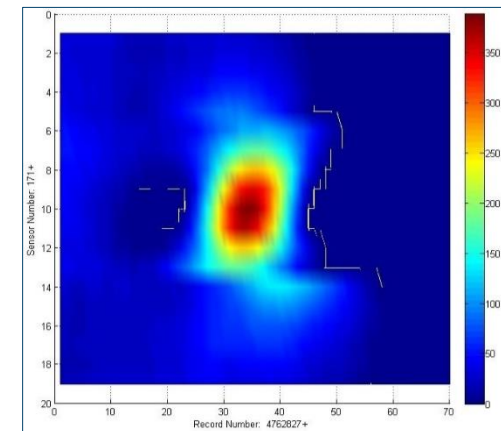
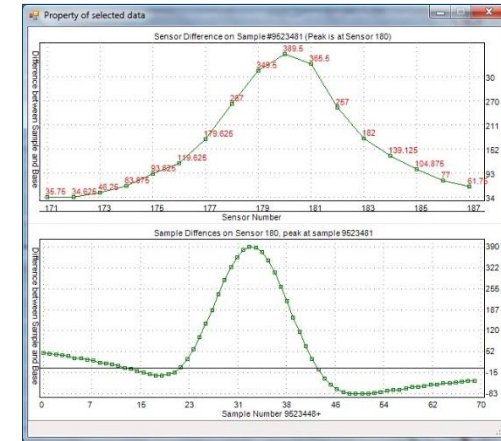
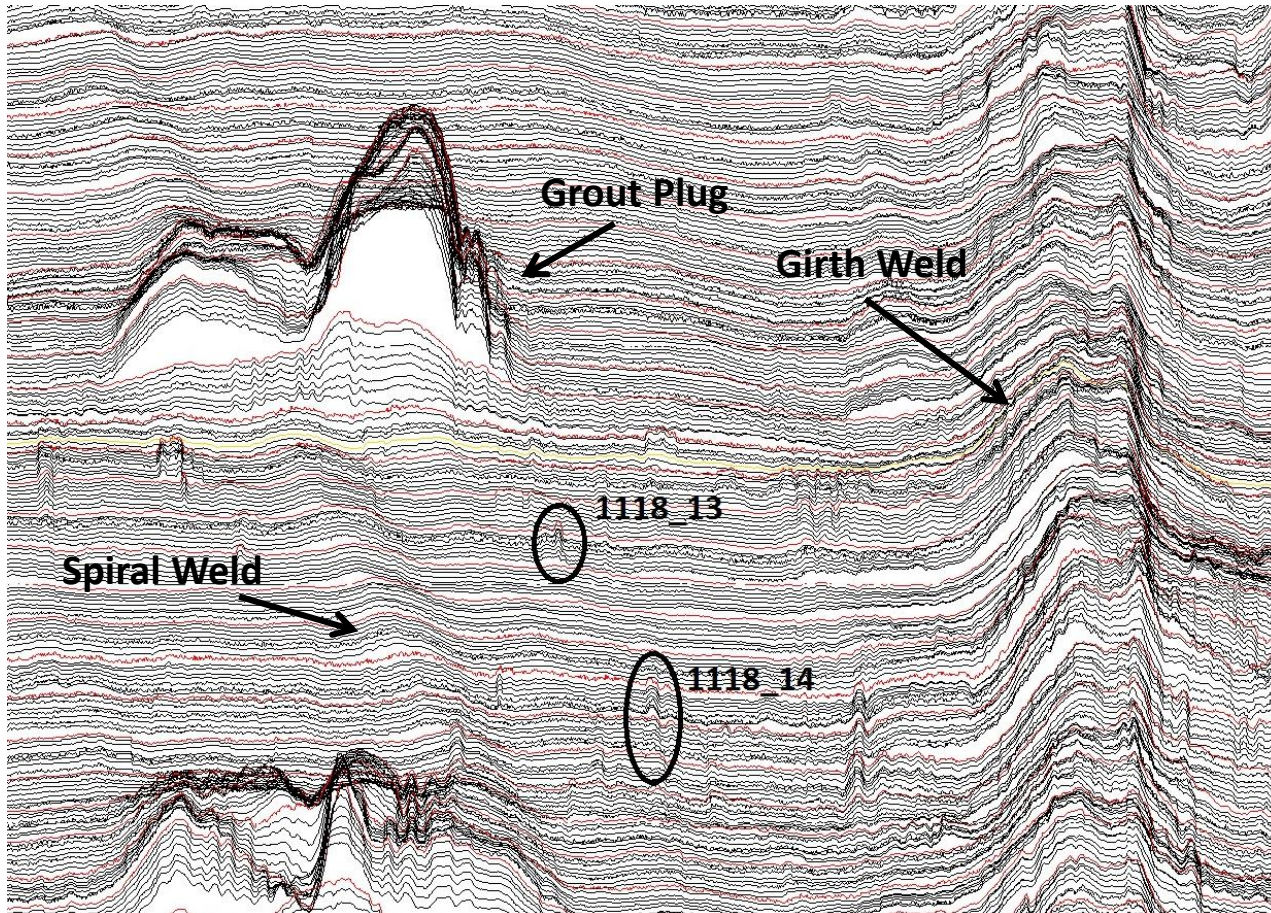




# MFL INSPECTION



# MFL DATA ANALYSIS



# MARKING DEFECTS AND REMOVING MORTAR



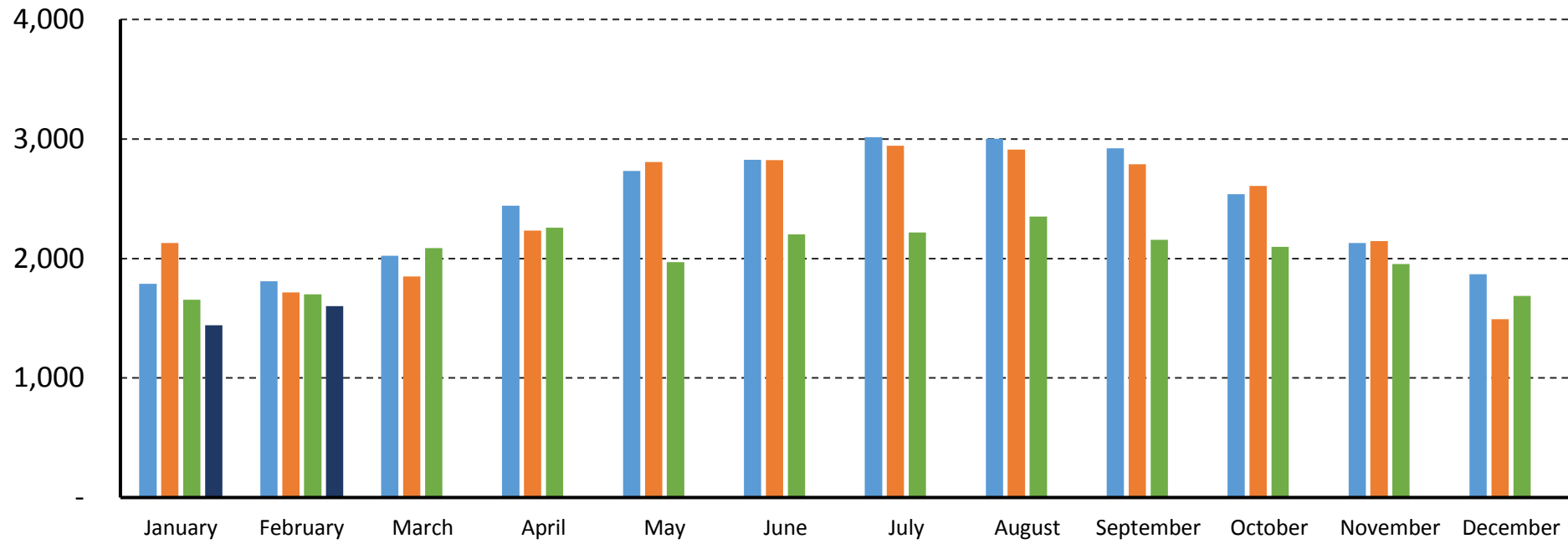
# WELDED STEEL PATCH REPAIR



# RESULTS AND CONCLUSIONS

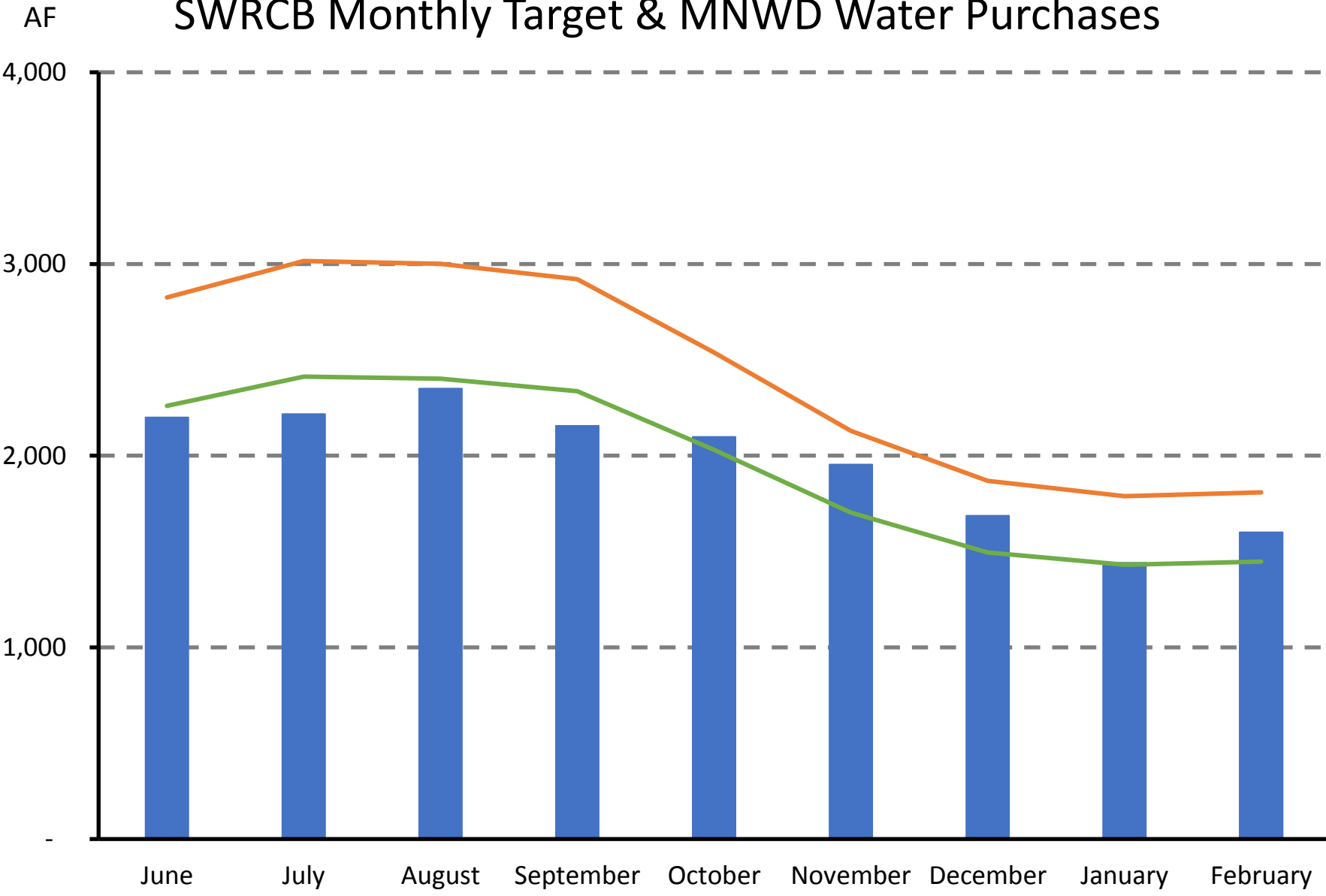
- Multiple engineering analyses performed
- A number of “anomalies” identified
- 31 repairs (i.e. steel patches) performed
- Worthwhile investment in critical District asset
- Uncertainty has been eliminated
- True 2015 “baseline” has been established
- Despite repairs, action is still required
  - Installation of active cathodic protection (CP) system
  - Establishment of future assessment schedule for CIP

# AF 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	5	3.88	3.24	2.35
2016	1.87	3.82										

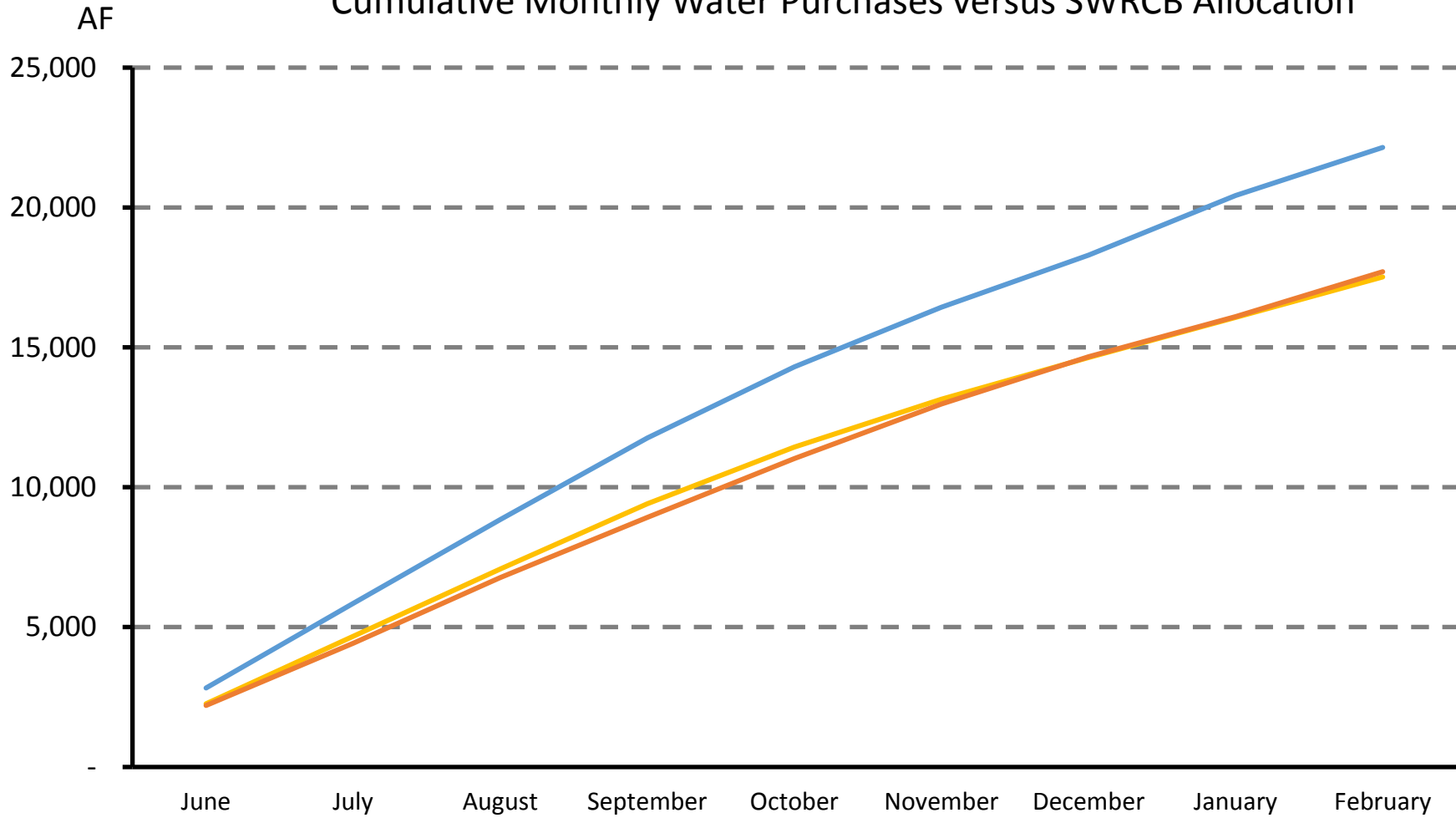
# SWRCB Monthly Target & MNWD Water Purchases



■ 2015/2016 Production    — 2013 Production    — SWRCB Target

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# Cumulative Monthly Water Purchases versus SWRCB Allocation

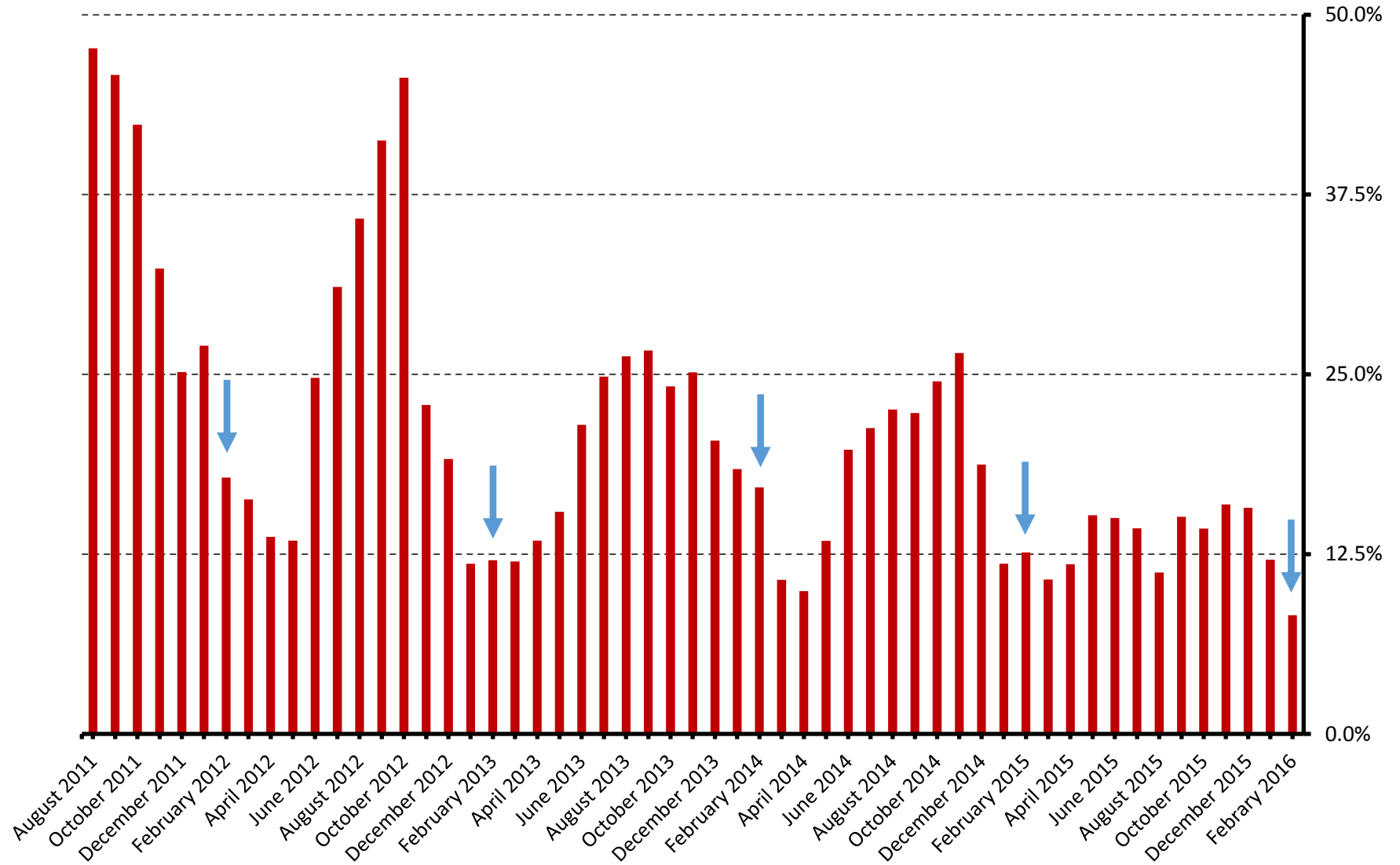


— 2013/2014 Production    — SWRCB Target    — 2015/2016 Production

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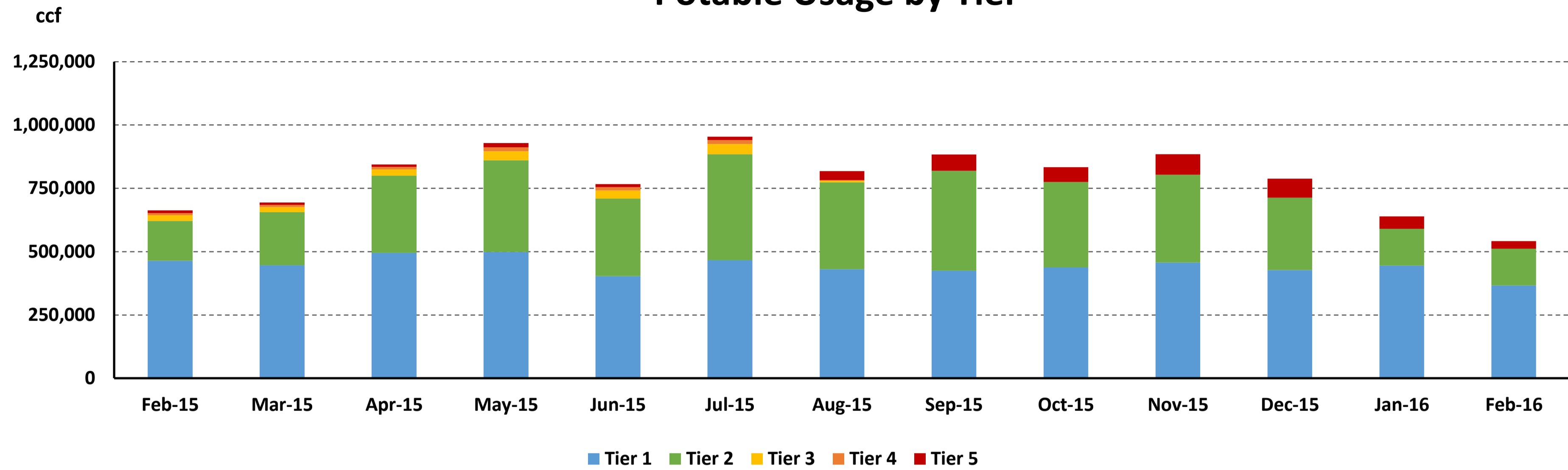


# Single Family Residential Accounts Above Tier 2



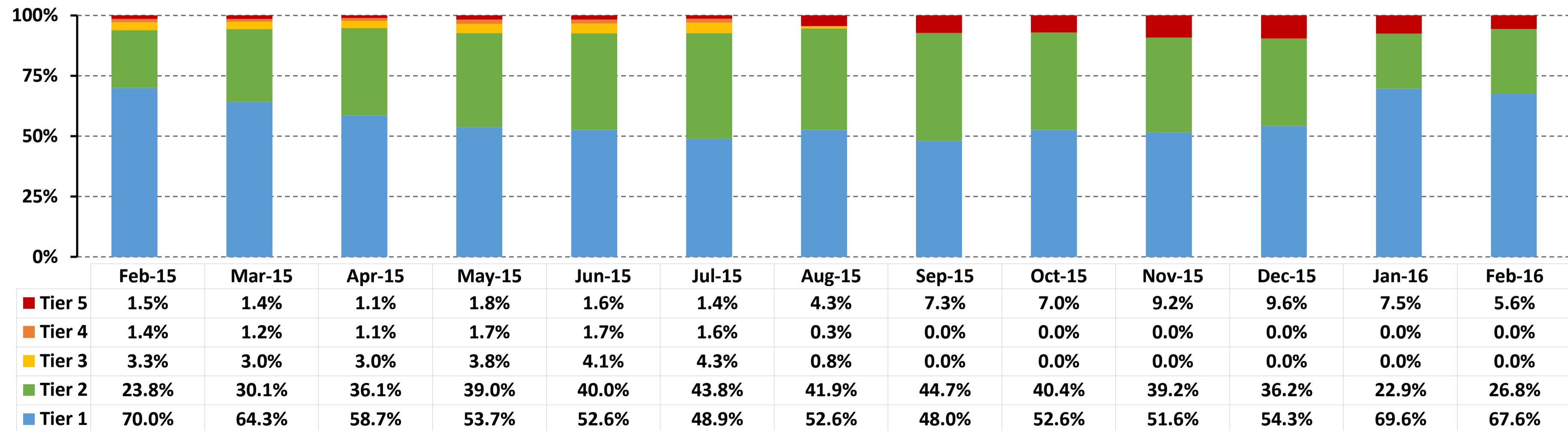
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## Potable Usage by Tier



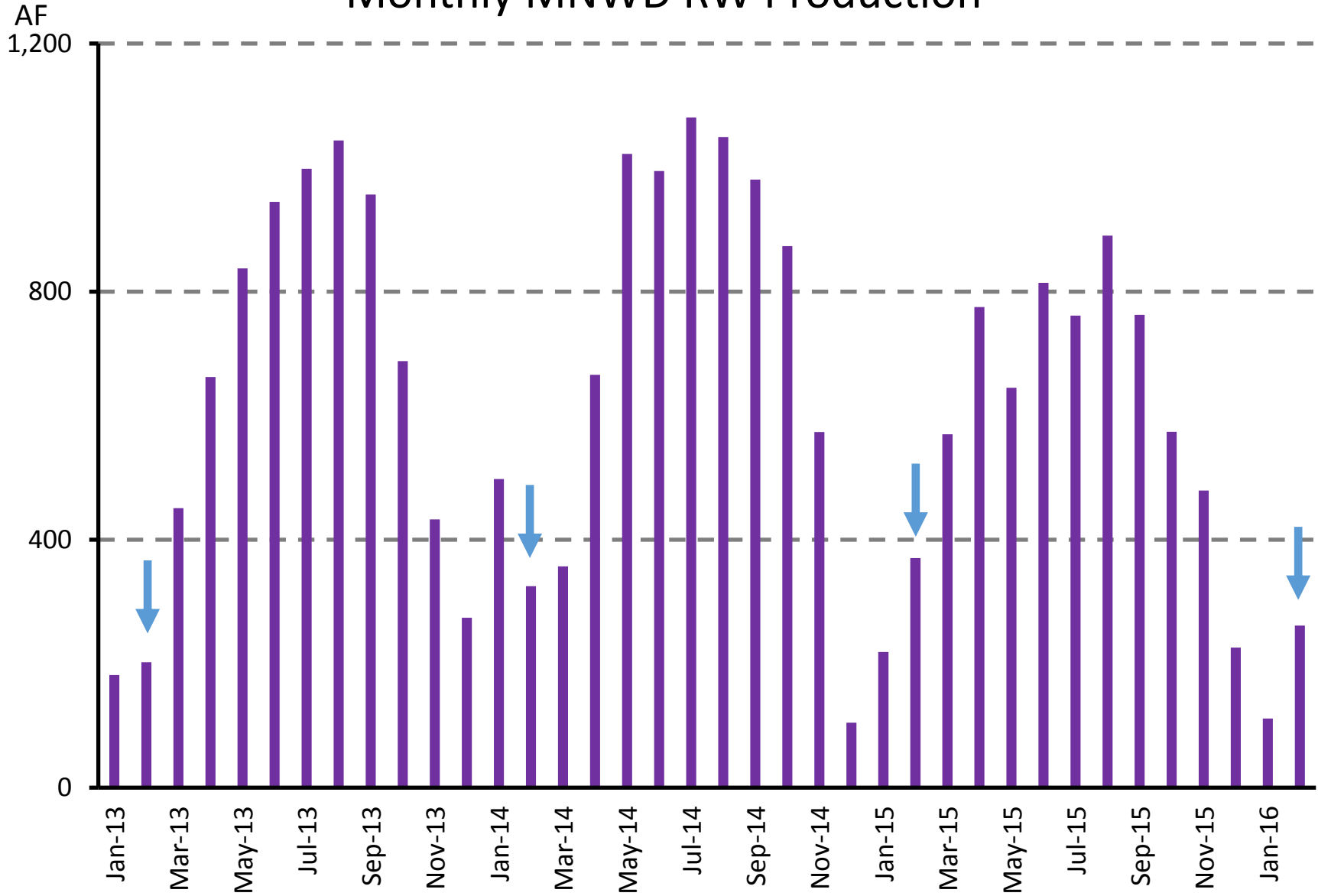
AF in Tier 3, 4, 5	94	89	101	154	131	159	102	148	134	187	173	110	70
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## Percent Potable Usage by Tier



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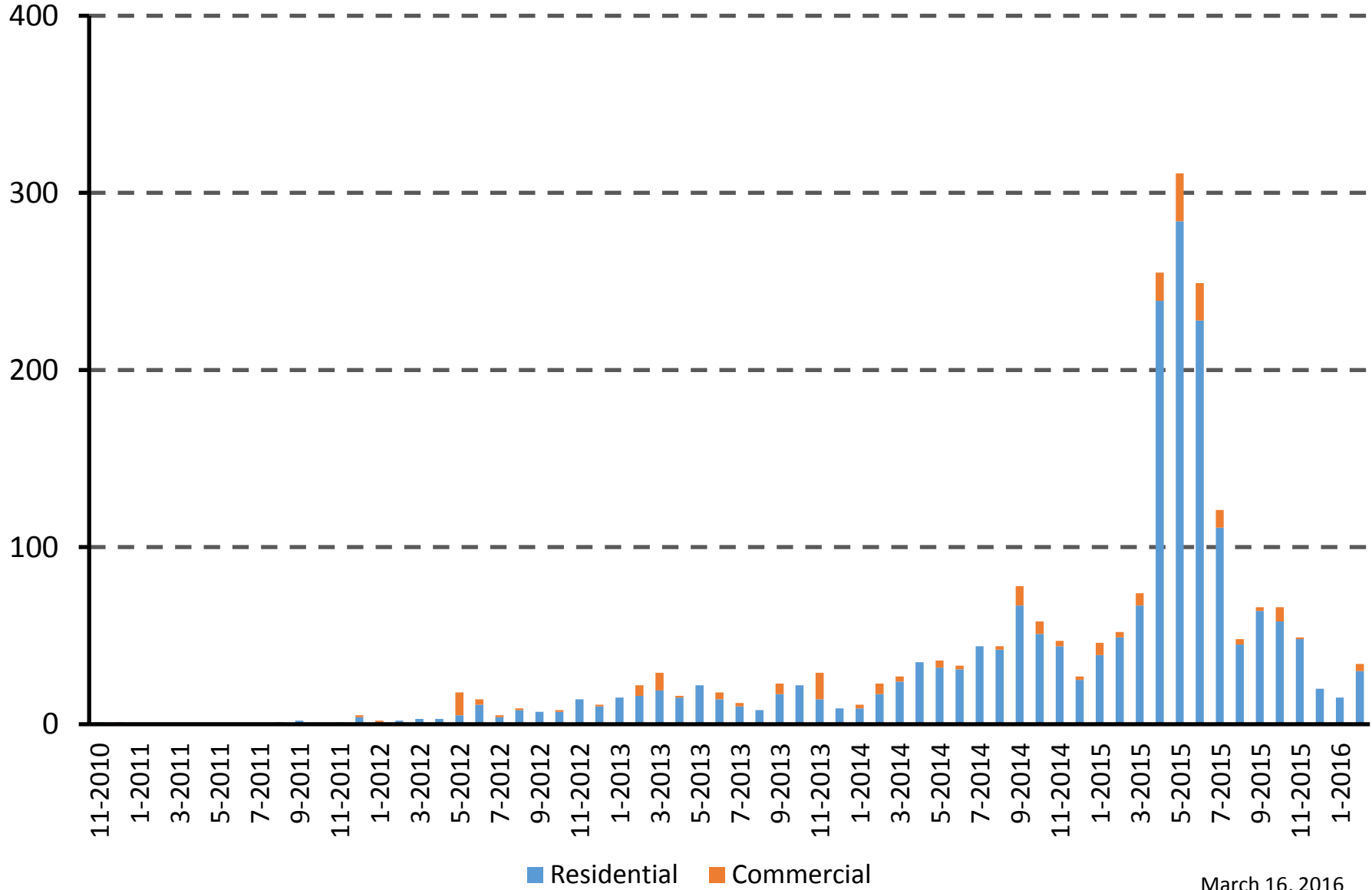
# Monthly MNWD RW Production



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# Total Turf Removal Applications by Month

Applications



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# Square Feet Total Turf Removal Application Size by Month

