Pajaro Valley
Groundwater Resources Update

Leadership Santa Cruz
Pajaro Dunes

March 24, 2017
Presentation Overview

• Who We Are

• What We Do

• Why We Do It

• How We Do It
Who Are We?

• Formed by the CA State Legislature in 1984

• PV Water Mission: to prevent further increase in, and to reduce long-term overdraft and provide and ensure sufficient water supply in the Pajaro Valley.

• Multi-jurisdictional: City of Watsonville, parts of Santa Cruz, Monterey and San Benito Counties
PVWMA Directors
Four Elected
Three Appointed
- Rosemarie Imazio, Chair
- Dave Cavanaugh
- Javier Zamora

PVWMA Directors
- Dwight Lynn, Division A
- Don Bussey, Division B
- Amy Newell, Division C
- VACANT, Division D

PVWMA Electoral Divisions

Explanation
- Cities & Towns
- Streets
- Division A
- Division B
- Division C
- Division D

Miles
Revenues and Expenditures

2015-16 Expenditures
$17,373,174

2015-16 Revenue
$13,379,264

- Augmentation Charges 75%
- Delivered Water 13%
- Grants, Interest & Other Income 9%
- Management Fees 3%
- Capital Projects 42%
- Basin Management 7%
- Facility Operations 21%
- Debt Service 23%
- Administration 7%

$13,379,264
$17,373,174
Recent Long-Term Refinancing Saves BIG Money

Debt Service Summary, July 2016
Fiscal Years 2017-2037

$73,073,669

Before Refinancing

After Refinancing

$42,323,578

Refinancing of long-term debt saves $30,750,090.
Rates fund projects and programs that protect our water resources

<table>
<thead>
<tr>
<th>User Group</th>
<th>Current Rates FY 2015/16</th>
<th>Scheduled Rates for FY 2019/20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmentation Charge, Metered Users - Outside Delivered Water Service Area</td>
<td>$191/AF</td>
<td>$246/AF</td>
</tr>
<tr>
<td>Augmentation Charge, Metered Users - Inside Delivered Water Service Area</td>
<td>$235/AF</td>
<td>$338/AF</td>
</tr>
<tr>
<td>Augmentation Charge, Unmetered(^1) – (Rural Residents)</td>
<td>$92/Year per Residence</td>
<td>$115/Year per Residence</td>
</tr>
<tr>
<td>Delivered Water Charge</td>
<td>$348/AF</td>
<td>$392/AF</td>
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</tbody>
</table>

Note: 1. Unmetered Customers are currently charged for an estimated annual consumption of 0.6 AF per year for each known residence connected to an unmetered well. The proposed new rate estimates 0.5 AF per year consumption due to conservation.
State of the Basin
Basin Monitoring

• Surface Water
  – Rainfall Accumulation & Streamflow
  – Quality
• Groundwater
  – Production
  – Elevation (Δ Storage)
  – Quality
• Water Supply Facilities (Delivered Water)
  – Quality
  – Quantity
  – Soils
• Land Use
  – Crop Type
Agro-Economy
- >28,000 Irrig Acres
- 2013 Crop Value ~ $900,000,000

Source: BMP Update

Pajaro Valley Land Use Summer 2015

Explanation
- San Andreas Fault Trace
- Pajaro River
- Waterbody
- PVWMA Boundary

Land Use Classifications
- Native Vegetation / Riparian
- Turf (Urban)
- Fallow
- Vegetable Row Crops
- Strawberries
- Caneberries
- Vines
- Orchards
- Urban (Turf)
- Other

Urban (Turf) 17%  
Irrigated agriculture 37%  
Non-irrigated agriculture 3%

Native Vegetation / Riparian 43%

Sources: Esri, DeLorme, HERE, GEBCO, USGS, FAO, NPS, NRCA, Ordnance Survey, Esri Japan, METI, and the GIS User Community
Valley-wide Water Use
- Agriculture ~ 85%
- M & I ~ 13%
- Rural Residential ~ 2%

Water Sources
- 98% Groundwater
  - ~850 Ag Wells
  - ~1,200 RR Wells
- 1% Surface Water
- 1% Recycled Water
Hanson, et al, 2014
Number of wells with measured water levels in 2011 and 2015 = 131
Number of wells with water levels that declined from 2011 to 2015 = 127
Median change in water level from 2011 to 2015 = -5.6 feet
Change in Water Level of Monitored Wells from Fall 2015 to Fall 2016

Number of wells with measured water levels in 2015 and 2016 = 147
Number of wells with water levels that declined from 2015 to 2016 = 36
Median change in water level from 2015 to 2016 = 1.04 feet
Existing Groundwater Condition: Nitrate – NO3
Existing Groundwater Condition: Total Dissolved Solids

[Map showing the distribution of Total Dissolved Solids concentrations in an area, with a legend indicating different concentration ranges (230-450, 451-1,000, 1,001-1,800, >1,800-24,785 mg/L).]

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Pajaro Valley Water Solutions
Existing Facilities
Grants to Fund Water Supply Projects

• Approximately half of constructed project costs were funded by grant money.

• PV Water projects, which focus on water conservation and optimize use of local resources, are competitive for federal and state funding.
Existing Water Supply Facilities to Stop Overdraft & Seawater Intrusion

• **Harkins Slough Facility**
  – Managed Aquifer Recharge & Recovery
  – Stream flow diversion
  – 8,000 AF recharged since 2002

• **Recycled Water Facility**
  – 4,000 AFY irrigation season capacity
  – Drought tolerant supply
  – Reduces discharge of secondary effluent to marine sanctuary

• **Coastal Distribution System**
  – Over 21 miles of water conveyance pipeline

• **Blend Supplies**
Harkins Slough Managed Aquifer Recharge & Recovery
Recycled Water Facility
Coastal Distribution System Water Deliveries

33,800 AF thru 2016 = 11 Billion Gallons
Hydrograph of a Well on Springfield Terrace

Monterey County Water Deliveries Begin in 2009

Mean Sea Level
Pajaro Valley Water Solutions
Planning for Future Projects & Programs
Pajaro Valley Hydrologic Model

- A hydrologic flow model to guide water management decisions
- Designed to reproduce all natural & human components of the hydrologic system, and related climatic factors
- Management & planning tool
- Offset in water budget: 12,100 AFY
Basin Management Plan Update

• 21 Member Stakeholder Committee

• 44 Potential Solutions Discussed
  – 7 Projects & Programs recommended

• > 1,500 person hours over 2 years
# Ad Hoc BMP Committee Members

<table>
<thead>
<tr>
<th>Committee Member</th>
<th>Member Type</th>
<th>Representative Entity</th>
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</thead>
<tbody>
<tr>
<td>Dave Cavanaugh (Chair)</td>
<td>Appointed</td>
<td>Pajaro Valley Water Management Agency</td>
</tr>
<tr>
<td>Kirk Schmidt (Vice Chair)</td>
<td>Appointed</td>
<td>Agricultural</td>
</tr>
<tr>
<td>Rosemarie Imazio</td>
<td>Appointed</td>
<td>Pajaro Valley Water Management Agency</td>
</tr>
<tr>
<td>Rich Persoff</td>
<td>Appointed</td>
<td>Pajaro Valley Water Management Agency</td>
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<tr>
<td>John Ricker</td>
<td>Appointed</td>
<td>County of Santa Cruz</td>
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<tr>
<td>Ryan Kelly</td>
<td>Appointed</td>
<td>County of Monterey</td>
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<tr>
<td>Steve Palmisano</td>
<td>Appointed</td>
<td>City of Watsonville</td>
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<tr>
<td>Harry Wiggins</td>
<td>Appointed</td>
<td>Pajaro Sunny Mesa Community Services District</td>
</tr>
<tr>
<td>John E. Eiskamp</td>
<td>Appointed</td>
<td>Santa Cruz County Farm Bureau</td>
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<tr>
<td>Dave Kegebein</td>
<td>Appointed</td>
<td>Monterey County Farm Bureau</td>
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<tr>
<td>John Martinelli</td>
<td>Appointed</td>
<td>Landowner Group</td>
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<tr>
<td>Chuck Allen</td>
<td>Appointed</td>
<td>Community Dialogue Effort</td>
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<tr>
<td>Vicki Morris</td>
<td>Appointed</td>
<td>Aromas Water District</td>
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<tr>
<td>Ron Duncan</td>
<td>Appointed</td>
<td>At Large</td>
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<tr>
<td>Thomas Karn</td>
<td>Applicant</td>
<td>Rural Residential</td>
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<tr>
<td>Bob Culbertson</td>
<td>Applicant</td>
<td>Environmental</td>
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<tr>
<td>Amy Newell</td>
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<tr>
<td>Skip Fehr</td>
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<td>Mutual Water Agency</td>
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<tr>
<td>Stuart Kitayama</td>
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<td>Frank Capurro</td>
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<tr>
<td>Tom Rider</td>
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Basin Management Plan Update contains three primary components to achieve 12,100 AFY

- Development of New Water Supplies: 4,100 AFY
- Conservation of Existing Water Supplies: 5,000 AFY
- Optimization of Existing Water Supplies: 3,000 AFY
Summary of recommendations in terms of capital and operating costs

<table>
<thead>
<tr>
<th></th>
<th>Yield, AFY</th>
<th>Capital Cost 2016 Dollars</th>
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<tbody>
<tr>
<td>D-7 Conservation of Existing Water Supplies</td>
<td>5,000</td>
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<tr>
<td>D-6 Increased recycled water demand</td>
<td>1,250</td>
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<tr>
<td>S-22 Harkins Slough Recharge Facilities Upgrades</td>
<td>1,000</td>
<td>$5,800,000</td>
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<tr>
<td>R-6 Increased Recycled Water Storage*</td>
<td>750</td>
<td>$6,000,000</td>
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<tr>
<td>S-2 Watsonville Slough with Recharge Basins</td>
<td>1,200</td>
<td>$11,200,000</td>
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<tr>
<td>S-3 College Lake with Inland Pipeline to CDS</td>
<td>2,400</td>
<td>$28,500,000</td>
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<td><strong>S-1 Murphy Crossing with Recharge Basins</strong></td>
<td>500</td>
<td><strong>$8,100,000</strong></td>
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Notes:
* Project is under construction. The value shown is based on consultant and contractor agreements. Funding comes from four grants valued at $6,872,886: Title XVI, Prop. 1, Prop. 50, Prop. 84 and a low-interest financial agreement with the State Water Resource Control Board through the State Revolving Fund valued at $1,217,440 that also provide funding for the recent pipeline projects (K1 & Blend Well Improvements Project).

** Proposed to be included in Phase 2
BMP Water Conservation Program

**Agricultural Water Conservation Program**
- Conservation outreach and education
- Partner collaboration and coordination
- Irrigation efficiency technical and financial assistance
- Evaluation of progress toward the water conservation goal
- Agricultural Water Conservation Toolkit

**Home & Garden Water Conservation Program**
- Rebate program
  - Graywater: Laundry to landscape rebate
  - Rainwater catchment rebate
- Educational activities
  - In-school programs
  - Recycled Water Facility Tours
- Home and Garden Water Conservation Toolkit
Water Use and Precipitation Trends
Pajaro Valley 2000 - 2016

Acre-Feet

Calendar Year

Supplemental Irrigation Water (Ag)  Household Water  Pumped Agricultural Water  Rainfall
Most recent 5-yr period reflects 43% reduction in valley-wide groundwater use, and a 28% reduction in agricultural groundwater use.
Conservation Pilot Programs

• Recharge Net Metering
  – Provides financial incentive to landowners to capture and recharge surface water runoff (> 100 AF)
  – Will improve aquifer conditions (water level & quality)
  – Diversifies recharge opportunities
  – 5-year pilot program, collaborative effort with UCSC & RCD

• Fallow Land Incentive Program
  – Provides a financial incentive ($1,000 per acre up to 200 acres / $200,000) to growers who fallow agricultural land in 2017 to conserve water
  – 1-year pilot program
Increased Recycled Water Storage & Pump Station Improvements

• Grant Funded Project
  – $6 Million project largely funded by State and Federal Grants
College Lake with Inland Pipeline to CDS

- Projected Yield: 2,400 AFY
- Reliable water source
- Will eliminate need for using groundwater as blend source for recycled water
- Key component to solve overdraft and seawater intrusion problems
Watsonville Slough & North Dunes Recharge Basin

- Projected Yield: 1,200 AFY
- Similar to the existing Harkins Slough recharge & recovery facility
- Recharges the aquifer
- Improves groundwater quality
- Reduces coastal pumping
Average Water Level Change due to Implementing Selected Alternative

Figure 13: Average Water Level Change Due to Implementing Selected Alternative – Upper Aromas Aquifer
Figure 10: Extent of Simulated Seawater Intrusion – Upper Aromas Aquifer

1. This figure shows simulated location and relative degree of existing seawater intrusion and seawater intrusion after implementation of the selected alternative for one of three different aquifers.
2. The aggregated reduction in seawater intrusion for the three aquifers is 90%.
Timeline for proposed projects & programs

- Increased Recycled Water Storage
- Harkins Slough Recharge Facilities Upgrades
- College Lake with Inland Pipeline to CDS
- Watsonville Slough and North Dunes...
- Murphy Crossing with Recharge Basins
- Ongoing Conservation

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<thead>
<tr>
<th></th>
<th>Phase 1</th>
<th>Phase 2</th>
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<tbody>
<tr>
<td>2015</td>
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<td></td>
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<tr>
<td>2020</td>
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<td>2030</td>
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<tr>
<td>2035</td>
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- Permitting, Environmental, and Engineering Time
- Construction Time
Questions...

By phone: 831-722-9292

By email: info@pvwater.org

Or visit our website: pvwater.org