

# Pajaro Valley

# COVERED FALLOW PLAN

Prepared by the Resource Conservation District of Santa Cruz County in collaboration with the Community Water Dialogue with support from the County of Santa Cruz. Funding for the Pajaro Valley Covered Fallow Plan was provided through the California Air Resources Board's Greenhouse Gas Reduction Fund.

## FEBRUARY, 2018

### EXECUTIVE SUMMARY

#### **Goal**

The goal of the Pajaro Valley Covered Fallow Plan is to incentivize covered fallow rotations to conserve water and achieve co-benefits for sustaining agriculture in the Pajaro Valley.

#### **Background**

The Resource Conservation District of Santa Cruz County (RCDSCC), working with stakeholders of the Community Water Dialogue (CWD), facilitated the development of this Pajaro Valley Covered Fallow Plan. The plan comes in response to landowner and grower interest in exploring rotational fallowing as one of many actions for conserving water. The results of this planning process can inform future incentive programs.

“Covered Fallow” refers to incorporating a fallow period within an existing crop rotation and planting a cover crop during that period, instead of leaving bare soil exposed. Developing a rotational cover cropped fallowing plan can help achieve multiple conservation objectives, including: water savings, soil health, erosion control and carbon capture.

The benefits of incorporating covered fallow rotations to the farm operation include:

- » Potential increases in marketable yield in subsequent years
- » Disrupting the cycle of soilborne plant diseases and phytoparasitic nematodes
- » Water savings
- » Improving soil quality and better retention of nitrate in the soil (useful for nitrate reporting)
- » Facilitating transition to organic production

The benefits of increasing adoption/acreage of covered fallow rotations to the community include:

- » Reduced pressure on limited groundwater resources (cover crops require less water than marketable crops)
- » Reduced greenhouse gas emissions (through reduced use of farm equipment and pumping and carbon sequestration during the covered fallow rotation)
- » Reduced runoff of nitrogen and sediment into local waterways

According to a recent economic analysis (Highland Economics, 2017), the costs of including a cover crop are driven primarily by the costs of forgoing a market crop rotation. Within the predominant annual market crop rotations in our area (strawberries and vegetable row crops, organic or conventional) these costs can range from an estimated \$1220/acre (2 months of cover crop within a 3 month spring/summer fallow replacing conventional spinach or leaf lettuce) to \$6,935/acre (8 months of cover crop within a 12 month fallow replacing organic strawberries). The most likely private costs and public benefits of different covered fallow scenarios are summarized in Table ES-1. Most likely water savings from covered fallow range from 1-3 AF/acre (depending on the market crop replaced) with the private costs of water saved ranging from \$465 to \$4,610 per AF (Table ES-2). Most of the scenarios evaluated in the economic analysis fall within the cost/AF range of projects considered in the Pajaro Valley Basin Management Plan (Figure ES-1). Therefore, based on the assumptions used in the Highland Economics analysis (2017), a covered fallowing program (particularly focused on conventional vegetable and strawberry production) appears to be a cost-effective strategy to help achieve sustainable groundwater management compared to the alternatives.

Table ES-1: Summary of most likely costs and benefits per acre per year for implementing covered fallow rotations in different cropping scenarios (Highland Economics, 2017).

Scenario	Cover Crop within Fallow Period	Crop Replaced by Cover	Most Likely Costs /Acre (Foregone Revenue Plus Cover Crop costs)	Water Saved (AF/Acre)	Carbon Emissions Avoided Plus Carbon Sequestration (Tons/Acre)	Nitrogen Loss Avoided (Pounds/Acre)	Sediment Loading Avoided (Tons/Acre)
1	Winter cover (4 month cover within 5 month fallow period)	None (minority of vegetable prod.)	\$240	0	-0.04	0	3.83
2	Spring / summer cover (2 month cover within 3 month fallow)	Spinach or Leaf Lettuce	\$1,220	0.86	1.8	22	1.92
2a	Spring / summer cover (2 month cover within 3 month fallow)	Organic Spinach or Leaf Lettuce	\$4,950	1.03	1.8	22	1.92
3	Full year - 8 month cover within 12 month fallow	Broccoli and Leaf Lettuce	\$1,300	2.8	2.7	119	7.67
3a	Full year - 8 month cover within 12 month fallow	Organic Broccoli and Leaf Lettuce	\$5,800	2.97	2.8	119	7.67
4	Full year - 8 month cover within 12 month fallow	Strawberry	\$2,680	2.22	2.8	56	7.67
4a	Full year - 8 month cover within 12 month fallow	Organic Strawberry	\$6,935	2.22	3.8	56	7.67

Table ES-2: Cost effectiveness of covered fallow rotations as a water conservation strategy (Highland Economics, 2017).

Scenario	Practice	Cover Crop Within Fallow Period	Crop Replaced by Cover	Costs Per Acre	Most Likely AF Water Saved	Most Likely Cost/AF Water Conserved
1	Conventional	Winter cover (4 month cover within 5 month fallow period)	None (minority of vegetable prod.)	\$245	-	N/A
2	Conventional	Spring / summer cover (2 month cover within 3 month fallow)	Spinach or Leaf Lettuce	\$1,220	0.86	\$1,325
2a	Organic	Spring / summer cover (2 month cover within 3 month fallow)	Spinach or Leaf Lettuce	\$4,950	1.03	\$4,610
3	Conventional	Full year - 8 month cover within 12 month fallow	Broccoli and Leaf Lettuce	\$1,300	2.8	\$465
3a	Organic	Full year - 8 month cover within 12 month fallow	Broccoli and Leaf Lettuce	\$5,800	2.97	\$1,950
4	Conventional	Full year - 8 month cover within 12 month fallow	Strawberry	\$2,680	2.2	\$1,220
4a	Organic	Full year - 8 month cover within 12 month fallow	Strawberry	\$6,935	2.2	\$3,150

### Incentive Program Structure

The following guidelines for a Covered Fallow Incentive Program structure were developed based on community input.

**Covered Fallow Plan conservation target:** Conserve 1000 AFY through voluntary covered fallow rotations (this represents 20% of the Pajaro Valley BMP conservation target).

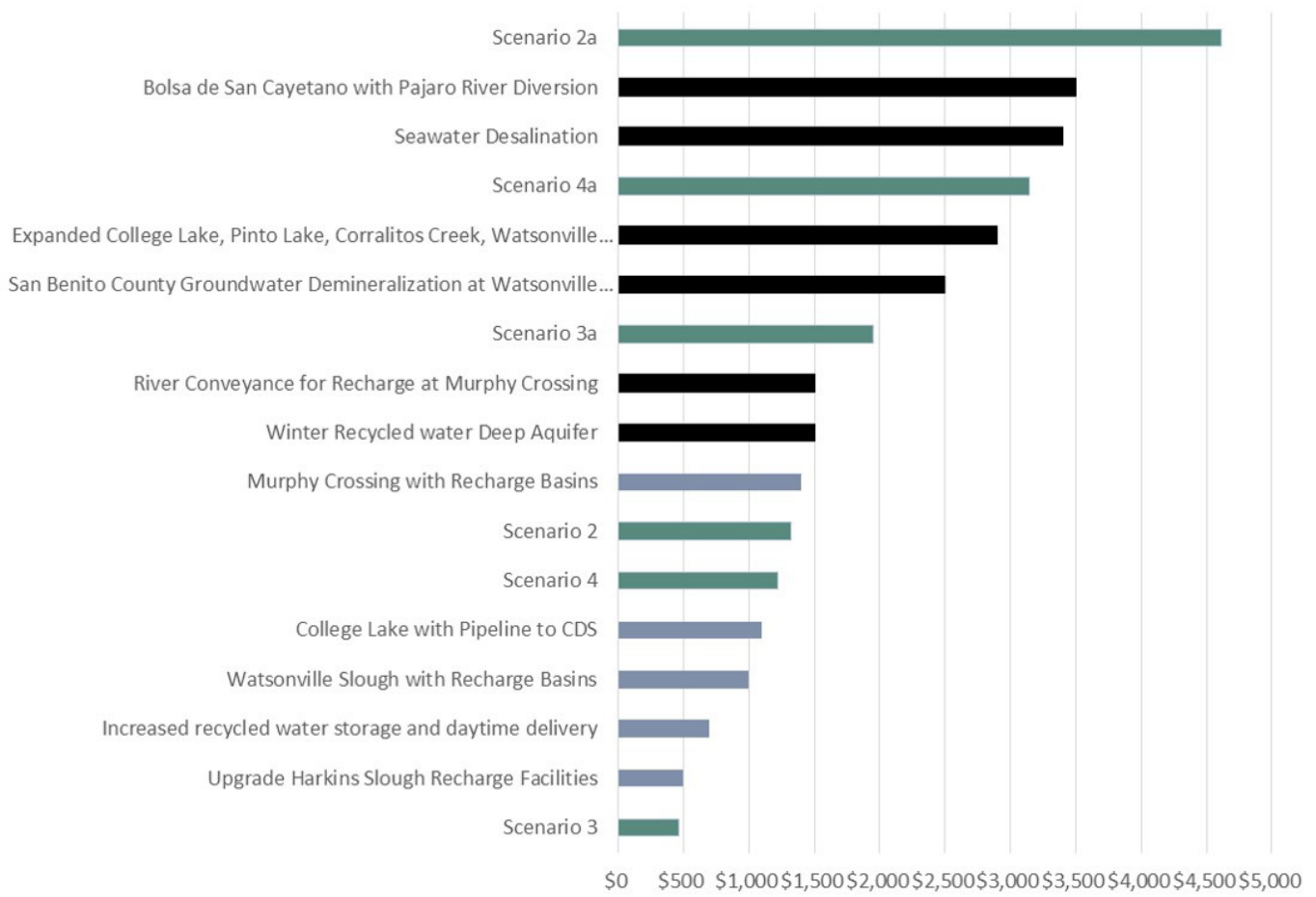


Figure ES-1: Costs per AF of groundwater benefit of covered fallow scenarios compared to projects in the Pajaro Valley Basin Management Plan, based on Highland Economics analysis (2017) and 2014 Basin Management Plan.

**Participating acreage:** Water savings per acre will vary depending on the market crop replaced and duration of the fallow period. The total number of acres needed to participate to achieve the water conservation target, therefore, will vary based on the composition of participating acres (different fallow durations and replaced crop types). Using the decision-support tool developed under this project (available online at <http://www.communitywaterdialogue.org/covered-fallow-plan>), program administrators are able to estimate how many acres of which type(s) of crop(s) need to participate in the covered fallow program in order to achieve the conservation target.

As an example, if half of the 1000 AFY target were to be achieved by cover crop replacing conventional strawberries for 12 months, and half through cover crop replacing 12 months of conventional vegetables (as summarized in Table ES-3), given the anticipated water savings per acre of each replaced crop the required participating acreage would be around 400 acres per year (which represents a 19% increase in fallowed summer acreage in the Pajaro Valley). Achieving the water conservation and participating acreage targets of this covered fallow plan will be a stepwise process, depending in part on available resources and incentives.

Table ES-3. Hypothetical number of acres needed to participate in a covered fallow program to achieve the desired water conservation target.

Target AF conserved	Required acreage participating (assuming 50% of the target is achieved through covered fallow replacing berries, 50% vegetables)  Anticipate 2.8 AF savings for replacing lettuce + broccoli, 2.22 AF savings for replacing strawberries	% of 2013-2015 reported acreage for this crop type in the Pajaro Valley	% Increase in summer fallowed acreage (baseline fallowed acreage is 2117 acres)
1000 AF	179 acres vegetables 225 acre strawberries 404 acres total	1.9% of vegetable acreage 3.4% of strawberry acreage 1.5% total ag land	19%

**Covered Fallow Incentive Program Rules:**

- » Applicants will be prioritized based on water conservation potential per acre put into covered fallow. Where available, crop-specific baseline water use data for the participating acreage will be used to estimate water conservation potential. Where such data is not available, water conservation potential will be estimated using the Highland Economics water use estimates based on fallow duration and foregone crop type (Highland Economics 2017, informed by UCCE research and local grower input).
- » Applicants must report their APN, well number, number of irrigated acres to be fallowed, crop type being replaced by covered fallow, and covered fallow duration. This information will be entered into the decision support tool by program administrators and used to estimate water conservation potential of the covered fallow acreage, to calculate payment, and to prioritize applicants when necessary.
- » Up to 4 inches of water may be applied during the fallow period to establish and/or maintain cover crops.
- » Participating acreage must have been in production for at least 1 out of the last 2 years.
- » Each participating ranch will be eligible to receive incentives for a maximum of 40 acres of the area they put in covered fallow during a given year (this is to diversify and geographically spread participation, and reach more/newer adopters)
- » An individual can receive incentives through the Covered Fallow Incentive Program for a maximum of two consecutive years (to reach more/newer adopters)
- » Applicants may select the start and end date of the fallow period. Payment rates will be adjusted based on the number of months committed to fallowing. Winter fallow alone will not be eligible for water conservation incentive payments.

**Payment Rate:** Payment will be a variable rate per acre based on fallow duration.

**Fund Disbursement and Monitoring:**

- » Applications for covered fallow incentives will be reviewed by a committee made up of members of CWD leadership and the funding entity, as appropriate.
- » Where available, crop-specific baseline water use data for the participating acreage will be used to estimate water conservation benefits. Where such data is not available, estimated water use per crop will be determined based on the Highland Economics water use estimates (Highland Economics 2017, informed by UCCE research and local grower input)
- » A third party will verify the covered fallow acreage with photo documentation
- » Pajaro Valley Water Management Agency (PVWMA) land use mapping should show an increase in the total number of fallowed summer acres over time.
- » PVWMA pump data should show a decrease in groundwater extractions on participating acreage and valley-wide over time.
- » Funds will be disbursed upon completion of the covered fallow period and submission of photo documentation.

**Priority Incentives:** Priority incentives identified by Pajaro Valley growers and landowners were direct payments to compensate for a portion of the private costs of implementing a covered fallow rotation (forgone revenue from the market crop replaced by cover or from lost rent revenue plus the cost of cover cropping), rent reduction, or a reduction on their water bill. Payment rates will be set based on available funds, but should aim to offset at least 50% of the private costs of implementing covered fallow rotations, which is at least \$995/acre on average for a 12 month conventional fallow.

**Potential Funding Sources and Implementation Strategies:**

1. PVWMA through the water augmentation fee paid by local water users. Action: RCDSCC and CWD leaders will present the Covered Fallow Plan along with lessons learned from the Fallow Lands Incentive Program pilot to the PVWMA board to inform future fallow incentive programs.
2. Water user (program beneficiaries) financial contribution separate from PVWMA. Action: RCDSCC and CWD leaders will scope the feasibility of a community-supported conservation fund with PV landowners and CWD stakeholders.
3. Non-profits or corporation donations/grants for protection of environmental quality. Some portion of the cover cropping program funding could come from environmental entities, particularly up to the public value of the benefits provided related to carbon and water quality. Action: RCDSCC and CWD leaders will develop collaborative grant proposals annually.
4. Rent reduction or other favorable lease agreements provided by landowners. Action: RCDSCC and CWD leaders will outreach to engage broader participation of Pajaro Valley landowners (including non-local landowners) to share strategies to support covered fallow and other water conservation efforts through lease agreements.

This document and the full plan are available online at: [www.communitywaterdialogue.org/covered-fallow-plan](http://www.communitywaterdialogue.org/covered-fallow-plan).