APPENDIX 8d

Solano Agricultural Scenario Planning System

The Solano Agricultural Scenario Planning System (SASPS) is a web-based application that GSAs and other local agencies can use to design voluntary programs to engage agricultural producers in on-farm sustainable groundwater management projects. Developed by TFT, with support from the USDA Natural Resources Conservation Service (NRCS) and in collaboration with the Dixon and Solano RCDs, SASPS is customized for the Solano Subbasin.

GSAs that need to engage the agricultural community in on-farm sustainable groundwater management projects can use SASPS to view key agricultural metrics in their area of interest, design custom programs to meet their management objectives or budget targets, and identify optimal areas for efficient recruitment of landowners. Practices covered by the tool focus on distributed recharge including managed aquifer recharge (MAR) and cover crops plus demand reduction via irrigation efficiency upgrades. GSAs can identify specific agricultural fields where these practices are feasible, view the site-specific economic cost burden to farmers implementing these practices (over 10 years), and see the impact across a suite of water resource metrics, including farm-level changes in the annual volume of: (i) groundwater or surface water use, (ii) infiltrated water, and (iii) runoff. GSAs can use this data to develop programs that contribute to sustainable groundwater management.

To develop SASPS, TFT classified all farm fields across the Solano Subbasin by agricultural type, and irrigation system, and other physical characteristics (including soils, subsurface texture, and topography). A field-scale feasibility assessment was completed to determine which, if any, of these on-farm practices can be implemented on each field, either alone or in combination in the Subbasin. Environmental and economic modeling were completed for all potential on-farm “projects” and for multiple program design scenarios, which can be evaluated against comparable current condition scenarios.

SASPS allows users to design a custom program, by:

1. Selecting a service area such as a GSA boundary, other entity boundary, area of potential interest, etc.,
2. Defining an environmental water resource target,
3. Setting a budget constraint, and/or,
4. Specifying the expected level of recruitment.

A User Guide for SASPS is under development. The full data sets and methodologies that underly SASPS are described in the final grant report for NRCS Conservation Innovation Grant 69-3A75-17-287, completed in 2020.

This program contributes to the Solano Subbasin sustainability by providing GSAs and their partners with a tool to design outreach, technical assistance, and incentive programs to address localized

groundwater supply or demand issues. Programs can also be designed to improve surface water flows (through reduced irrigation demand) and improve surface water quality through reduced sediment and nutrient loading in agricultural return flows.

Metrics for Evaluation

SASPS is an optional tool that GSAs can maintain and use on an as-needed basis to address program development needs in response to potential changes in Subbasin conditions. Potential metrics for evaluation of the Grower Outreach and Engagement Program are summarized below:

Metric	Question
Agency adoption:	How many agencies have adopted SASPS to design sustainable groundwater management programs?
Program design:	How many spatially explicit water conservation programs have been developed using SASPS?
Grower adoption:	How many farmers have adopted practices recommended by SASPS?

Expected Benefits

At the landscape-level, SASPS provides an understanding of the potential changes in groundwater and surface water supplies and demands that are achievable within a specific area of interest through changes in agricultural management and on-farm improvements. SASPS also provides the likely economic cost of achieving specific volumes of groundwater supply and demand modifications over time in specific areas through distributed changes to agricultural management.

At the agricultural field or farm level, SASPS provides estimated economic costs and groundwater benefits of specific management changes, which informs prioritization and decision-making for the funding, incentivization, outreach, and technical assistance aimed at promoting these practices. Finally, SASPS also provides an estimation of the ancillary benefits of implementing these practices on individual fields or groups of fields, including reduced sediment and nutrient pollution runoff, flood reduction, etc.

Through its ability to identify feasible, prioritized, and optimized farm management changes given user-defined goals and constraints, SASPS can reduce the cost of maintaining groundwater sustainability. SASPS can identify the most cost-effective sites for specific changes to agricultural management, which can inform strategies for outreach, technical assistance, funding, and incentivization of sustainable agriculture.

Timetable for Implementation

Field-scale data analyses generated in the development of the SASPS tool were applied to two PMAs in the Solano Subbasin GSP: the Westside Streams PMA and Rain-MAR PMA. To remain current, the field

classification that drives the analyses of SASPS should be updated for the Subbasin at approximately 3-year intervals.

Cost Factors

SASPS may be maintained and supported by GSAs on an as-needed basis to address changing needs in the Subbasin. Estimated costs for maintenance and support of the SASPS tool are as follows:

- *Application maintenance and updates*. The SASPS tool has already been developed for and applied in the Solano Subbasin, dramatically reducing costs going forward. The tool will likely require maintenance costs of approximately $25,000 per year to remain current and functional. As noted above, upgrades, including a reclassification of field-input data will be required every 3 years at an approximate cost of $75,000.
- *User support*. Planning staff at GSAs and partner agencies will need periodic training and technical support at an approximate bi-annual cost of $20,000.
- *Grower outreach*. When a GSA develops a program, partner agencies such as the Dixon RCD and Solano RCD would be the logical conduit to assist with grower outreach and engagement. These costs would be determined on a case-by-case depending on the size and scale of the program.

Sources of funding for the Grower Outreach and Engagement Program may include:

- *GSA fees*. SASPS is designed to optimize GSA investments in sustainable groundwater management practices. GSA fees may be warranted to maintain the tool for use in program development.
- *Public agency grants* may be available to develop specific programs that address groundwater issues in the Subbasin. Application maintenance fees, user support costs, and grower outreach costs may be recoverable from grants for program development and implementation.

The water budget for the Solano Subbasin is relatively balanced over the baseline period of analysis, and projects and programs are focused on localized areas of interest. Use of the SASPS tool by GSAs will likely vary based on the level of perceived future need.