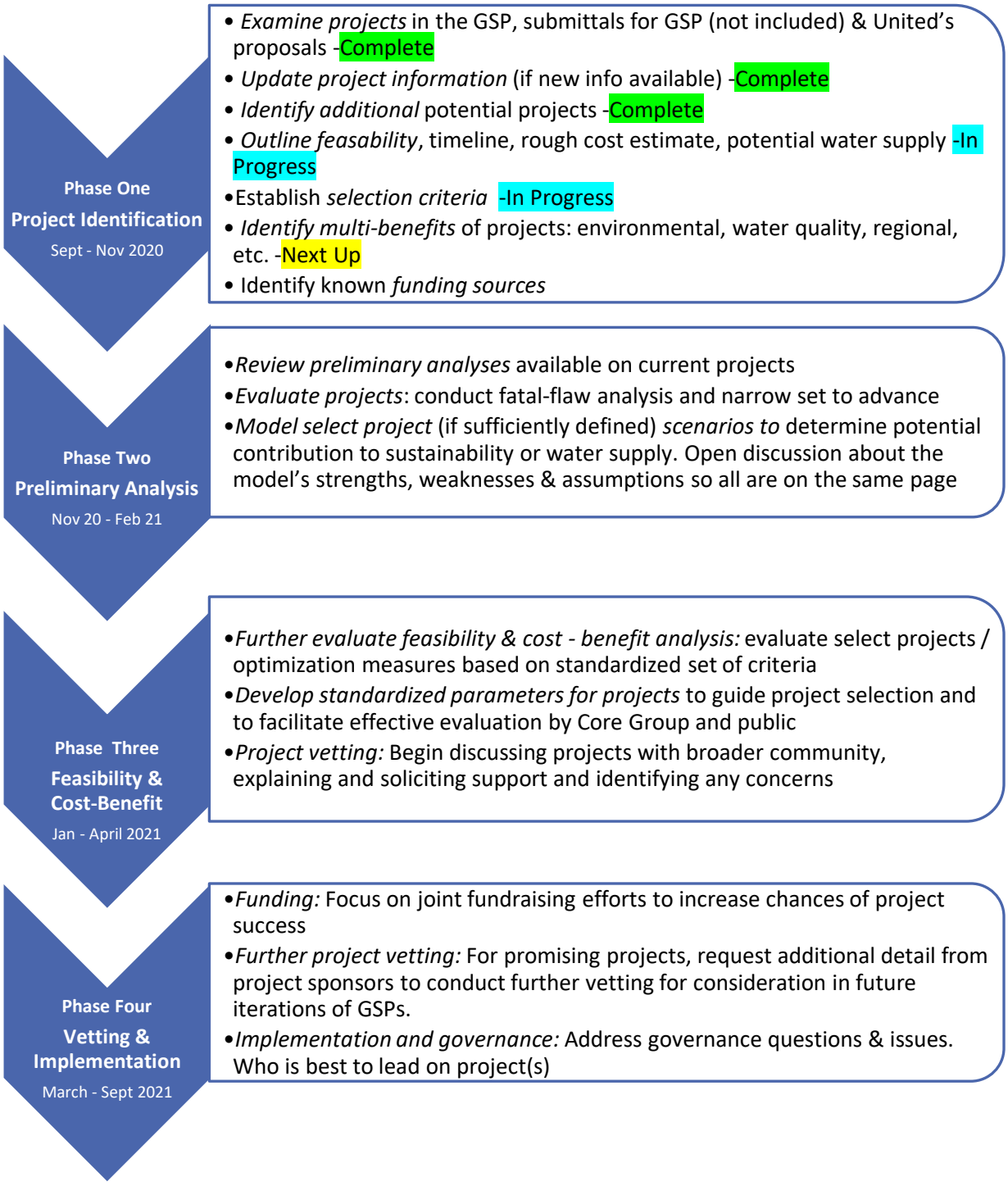
Project Committee Progress Update – 11/17/2020

Summary of Projects & Optimization Measures under Consideration

The project committee's work to date has focused on exploring potential projects to expand beyond the set of projects included in the Groundwater Sustainability Plans. This summary presents updated information on projects included in the GSPs, an overview of the new projects the committee has identified, and information on optimization measures that could inform project prioritization. This summary also presents three project scenarios that describe how some of the key projects and optimization measures could fit together.

Projects Work Plan



Projects included in the GSP's Sustainable Yield Estimates

The sustainable yield estimates in the GSPs include the following projects:

- Delivery of 4,600 AFY of recycled water from the Oxnard GREAT Program to farmers in the vicinity of Hueneme Road.
- Expansion of the GREAT Program to increase groundwater recharge by 4,500 AFY in the Saticoy Spreading Grounds.
- Approximately 2,740 AFY reduction of pumping, principally in the LAS, through temporary fallowing of farmland in the area of the pumping depression.

Oxnard Recycled Water Project Expansion

AWPF can be expanded from 7,000 AFY to 10,500 AFY using existing wastewater flow.
AWPF Expansion Costs: The estimated AWPF expansion capital cost (from 7,000 AFY to 10,500 AFY) is ~ $31 million. The estimated cost also includes a new recycled water reservoir.
The estimated annual O&M cost is $400-600 per AF.

AWPF Expansion Costs: The next stages of AWPF expansion would add 3500 AFY or 3.125MGD of capacity for a total of 7000 AFY at a cost of ~ $31 million for design, build, etc.
The estimated annual O&M cost for the AWPF is $400-600 per AF.

Riverpark-Saticoy GRRP Recycled Water Project

Artificial recharge using City of Oxnard's recycled AWPF water in UWCD's Saticoy basins. Potential gains to sustainable yield already captured in GSPs as part of AWPF. Potential new water creation: 5,000 + AF/Yr. Project cost estimate: $6.4 million in capital costs (~$30 AFY produce) and $5-7.5 million in annual costs ($1,000 – 1,500 AF/ yr produce). Project status: Delivery of recycled water from the AWPF to United's spreading grounds for groundwater recharge does not seem to be a viable project due to the fact that Oxnard is planning to use the water for the City's ASR project.

Fallowing

The GSP included a project to pay farmers to fallow land on a temporary basis. Farmers would stop groundwater pumping; that water demand would be retired during the contractual period. The GSP assumed fallowing was strategically applied in particular areas. This was targeted to reduce pumping from the Lower Aquifer System.

Fallowing in the GSPs yielded these results in reduced pumping:

- 2200 AFY in Pleasant Valley
- 500 AFY in Oxnard

Projects and Optimization Measures to Increase Sustainable Yield and / or Yield New Water

Projects that Take Advantage of the AWPF

Storm Water Capture as source for AWPF

Developing new water by feeding Oxnard's stormwater to the AWPF system

Storm water sources are from Tsumas Creek and Ormond lagoon waterway.
Benefits of this project could include: 1) The source of water would be year-round and 2) The project does not require a lot of infrastructure. Challenges that would need to be addressed: 1) Siphoning water from the local wetlands may yield project opposition; 2) Elevated boron concentrate in the Ormond Lagoon Waterway; 3) May provide recharge water to the semi-perched aquifer on route to the Pacific Ocean which in turn may provide a water supply for groundwater dependent ecosystems (GDEs).

There are no current estimates of costs and potential supply for this project. The original GSP submittal included a preliminary estimate of a 1,000 – 2,000 AFY increase in sustainable yield.

Leveraging Hueneme Canyon Extraction Wells to feed AWPF [Unlikely to advance]

This water source has high total dissolved concentrations that exceed AWPF design criteria.

Leveraging the Semi-Perched Aquifer to feed AWPF [Unlikely to advance]

Due to the relatively low transmissivity of the semi-perched aquifer, it would be difficult to extract sufficient groundwater near the AWPF to provide source water. In addition, pumping from the semi-perched aquifer to feed the AWPF may cause environmental concerns (i.e., affect groundwater supply to coastal wetlands).

Using Ventura Wastewater to feed AWPF [Unlikely to advance]

The City of Ventura is pursuing VenturaWaterPure Program and will rely on its wastewater so a joint project with Oxnard's AWPF would not be possible.

United Projects

Freeman Expansion

Increase capacity of UWCD's existing diversion and groundwater recharge system, benefitting the basins of the Oxnard coastal plain by expanding and extending water conveyance and recharge capacity, taking advantage of the reclaimed Rose and Ferro aggregate mining pits.

Potential increase in sustainable yield: 6,000 to 9,000 AFY (long-term average). Project cost estimate: $50 million spread over two phases of project development.

Project status: United plans to expand the Freeman Diversion in two phases, with Phase 1 completed in 2028 and Phase 2 completed in 2036. Yields and costs are contingent on some factors outside of United's control, such as permitting and fish passage.

Challenges: Permitting & weather dependent

Purchase/exchange/transfer of State Water Project (SWP) imported Article 21 and other Table A Water

Likely gains to sustainable yield: 6,000 AFY. Assumes average cost of $400 per AF for water, $50 per AF incremental cost for planning, permitting, and O&M efforts.

Challenges: Weather dependent

Brackish Water Extraction & Treatment, Southern Oxnard Plain

Desalt brackish Upper Aquifer System water in areas south of Hueneme Road

Potential net gains to sustainable yield: 10,000-20,000 AFY, with an additional 2,000-4,000 AFY of net new water supply (total max net benefit of 12,000-24,000 AFY, combining both net "product water" and gain in sustainable yield). Project cost estimate: $300 million spread over two phases (10,000 AF/yr each) of project development. Estimated total cost per acre foot is about $1,500 / AF. Modeling is in progress, so there is still uncertainty regarding whether the second phase would be necessary or achievable.

Of note, a seawater intrusion barrier project would make most of the possible inland and northward optimization measures redundant. An important aspect of a SWI barrier (compared to counting solely on optimization) is that optimization is going to do better during wet years than in drought years, while a barrier should work well virtually all the time. Additionally, a SWI barrier provides additional control because barrier wells can be strategically placed in select locations. At this time, United suspects that combining an extraction barrier with a modest optimization scenario will likely result in the best cost-benefit

ratio for enhancing sustainable yield of the basin while providing good hydraulic control of seawater intrusion. However, significant modeling and design will be required in 2021 to firm up estimates of costs and benefits.

Challenges: First of its kind in California, permitting, brine disposal, TDS similar to ocean water

Injection Barrier, Southern Oxnard Plain

Creation of a seawater intrusion barrier via injection wells

This approach to the seawater intrusion barrier could theoretically have the potential to create similar gains in sustainable yield as the extraction barrier (10,000-20,000 AFY). However, it does not create additional new "product" water. In fact, it is unclear where the water to be used for injection would come from. There are no current cost estimates for this project, however the costs could be less than an extraction barrier because treatment of brackish water would not be included.

This project concept will require a water source which has yet to be identified (though the amount of water necessary for the injection could be significantly less than the optimization that the injection barrier yields).

Challenges: Lack of injection water source

New Projects under Consideration

Recycled Water Tile Project

Recycling tile drain water in Pleasant Valley to generate a new water source.

Bottom line – this project is perhaps a low return on investment.
Benefits to the basin are likely limited to about 190 AFY at a cost of ~ $2 million in treatment technology, $300,000 - $500,000 in operating cost and the additional cost of pipeline builds. Three water supply level scenarios were analyzed by the Pleasant Valley County Water District. Two of the scenarios would have yielded greater than 190 AFY (potentially up to 800 AFY) but they proved unfeasible due to insufficient water supply to blend with the tile water and reduce chloride levels. Environmental impacts could also undermine this project's viability.

Challenges: High cost & low yield

Santa Paula Basin Purchases

Purchase water from the Santa Paula basin for delivery to OPV

Bottom line- unlikely to see progress on this project as a real option until the Santa Paula Basin Technical Advisory Committee completes its yield-enhancement evaluations in 2022. Santa Paula basin's groundwater pumping is adjudicated, and extractions are approximately equal to the estimated safe (not "sustainable") yield of 25,500 AFY. Additionally, the Santa Paula Basin Judgment prohibits additional exports. Fillmore basin, under the right set of agreements, might be able to send water downstream but there are concerns that would need to be considered. If the ASAP pipeline progresses it would create additional opportunity to take advantage of these flows.

Conejo Creek Storage Expansion

Develop a storage facility to hold water from Conejo Creek for potential future deliveries to users

This project could create between 1,000-3,000 AFY of water and could be viewed as almost shovel ready because it is only contingent upon construction of a storage facility. However, Camarillo sanitary district requirements also need to be considered.

Imported Water

Purchase imported water from MET through Calleguas MWD.

Potential opportunities: would require reciprocal benefits to work and be consistent with existing policies restricting the benefit of imported water from Calleguas to the areas within its service area. Calleguas' connection to Metropolitan could provide wheeling options for State Water Project water that is available through the Ventura County Watershed Protection District's contractor and its sub-allocations to United WCD, Casitas MWD, and the City of Ventura.

Challenges: Annexation, and MET water is not for agricultural application

Optimization Implementation

This project would include destruction of existing LAS wells and installation of new UAS wells and pipeline infrastructure to move extraction from the LAS to the UAS and from coastal areas inland.

Additional Fallowing on top of Level Described in GSPs

If fallowing is to be proposed, the committee would need to consider the following:

- How to modify demand assumptions to incorporate fallowed lands
- How to calculate the pricing of fallowing (Some estimates put cost around $1,600 /AF)
- How fallowing intersects with the water market
- Anticipating grower interest or willingness to fallow land
- Requirement for California Environmental Quality Act (CEQA) evaluation, including the socioeconomic impact on community and County. --- Decrease in workers employed, and higher cost of food.

Factoring Optimization Measures into Project Planning

Summary of United's Analysis of Optimization Measures that could factor into Project Planning

United's proposed optimization scenarios are generally focused on shifting pumping away from the coast and raising pumping to the Upper Aquifer System (UAS). Estimates for yield and cost should be considered conceptual until United can model the optimization scenarios in detail:

- *Optimization Measure 1:* Stop pumping in the seawater intrusion area – increased yield: 2-4,000 AFY at $500 per AF
- *Optimization Measure 2:* Shift United's PTP wells from Lower Aquifer System (LAS) to UAS –increased yield: 1,000 AFY at cost of $500 AF
- *Optimization Measure 3:* Shift most remaining LAS pumping into UAS in northern areas— increased yield: 12,000 AFY at cost of $500 AF

Project Scenarios

A seawater intrusion barrier and full-scale optimization are by far the two highest potential opportunities to increase the sustainable yield / create additional water supply in OPV. However, these two routes are mutually exclusive: a seawater intrusion barrier would render most optimization measures redundant (though some select optimization efforts could complement a seawater intrusion barrier). For illustrative purposes, below we have summarized three project scenarios that represent pathways the Core Group might consider.

Scenario A is anchored around a seawater intrusion barrier concept. Scenario B is anchored around full scale optimization. Scenario C is anchored around a smaller-scale set of optimization measures ("optimization light").

Roughly speaking, Scenario A has the highest potential impact on sustainable yield and is also likely the most expensive route. Scenario B has the 2nd highest potential to increase

sustainable yield and would likely be less expensive then Scenario A. Scenario C would be the least expensive scenario, though would also have the least impact on sustainable yield.

Note: Projects without specific estimates for potential gains to sustainable yield were not included in the scenarios described below. Projects that were already factored into the sustainable yield estimate were also excluded from these scenarios.

Scenario A: Anchored on Seawater Intrusion Barrier

	Avg. Gain to Sustainable Yield (SY) (AFY) (2)	Max Gain to SY (AFY)	Min Gain to SY (AFY)	Anticipated Timeframe for coming Online	Capital Costs	Operational
					ROUGH estimate	ROUGH estimate
Purchase State Water Project	6,000	8,000	4,000	2021	$0	Assume average cost of $400 per AF for water, $50 per AF incremental cost for planning, permitting, and O&M efforts
United turnouts to recharge basins from Ventura's SWP Interconnect (flushing water and possibly purchased water from SWP, wheeled through CMWD)	500	1,000	0	2027	$5,000,000	$1,500 per AF (purchase of MWD water)
Brackish water extraction & treatment, southern Oxnard Plain, Phase 1	12,000	12,000	12,000	2027	$160,000,000	ROM estimate of $1,700-$1,300 per AF for total beneficial impact (increase in sust. yield + product water yielded by treatement process)
Remove & Replace Wells south of Hueneme	4,000	6,000	2,000	2027	$30,000,000	Assume $35 per AF
Freeman Expansion, Phase 1	4,000	5,000	2,000	2028	$25,000,000	Assume $50 to $100 per AF incremental O&M cost compared to current O&M for Freeman Expansion
Shift United pumping from LAS to UAS	2,000	3,000	1,000	2030	$30,000,000	Assume $20 per AF
Brackish water extraction & treatment, southern Oxnard Plain, Phase 2	12,000	12,000	12,000	2035	$140,000,000	ROM estimate of $1,700-$1,300 per AF for total beneficial impact (increase in sust. yield + product water yielded by treatement process)
Freeman Expansion, Phase 2	4,000	5,000	2,000	2036	$25,000,000	Assume $25 million (conceptual level cost estimate, +100%/-50%), $6.25 million paid with grants ($275 per AF)
AWPF / Storm Water	1,500	2,000	1,000			TBD
Total Gains to SY	**46,000**	54,000	36,000	*ROUGH Estimate*	*$410,000,000*	
Total Cuts Needed: (98,000 - 50,600) - Gains	1,400	-6,600	11,400			

Scenario B: Anchored on Full-scale Optimization

Project / Optimization Measure (1)	Avg. Gain to Sustainable Yield (SY) (AFY)	Max Gain to SY (AFY)	Min Gain to SY (AFY)	Anticipated Timeframe for coming Online	Capital Costs ROUGH estimate	Operational ROUGH estimate
Purchase State Water Project	6,000	8,000	4,000	2021	$0	Assume average cost of $400 per AF for water, $50 per AF incremental cost for planning, permitting, and O&M efforts
Optimization Ph. 1--Remove & Replace Wells south of Hueneme	4,000	6,000	2,000	2027	$30,000,000	Assume $35 per AF
United turnouts to recharge basins from Ventura's SWP Interconnect (flushing water and possibly purchased water from SWP, wheeled through CMWD)	500	1,000	0	2027	$5,000,000	$1,500 per AF (purchase of MWD water)
Freeman Expansion, Phase 1	4,000	5,000	2,000	2028	$25,000,000	Assume $50 to $100 per AF incremental O&M cost compared to current O&M for Freeman Expansion
Optimization Ph. 2--Shift United pumping from LAS to UAS	2,000	3,000	1,000	2030	$30,000,000	Assume $20 per AF
Optimization Ph. 3--Large scale shifting of pumping in Oxnard and PV basins "upward and northward")	12,000	16,000	8,000	2035	$120,000,000	Assume $50 per AF
Freeman Expansion, Phase 2	4,000	5,000	2,000	2036	$25,000,000	Assume $25 million (conceptual level cost estimate, +100%/-50%), $6.25 million paid with grants ($275 per AF)
AWPF / Storm Water	1,500	2,000	1,000			TBD
Total Gains to SY	**34,000**	46,000	20,000	*ROUGH Estimate*	*$235,000,000*	
Total Cuts Needed: (98,000 - 50,600) - Gains to SY	13,400	1,400	27,400			

Scenario C: Anchored on "Optimization Light"

Project / Optimization Measure (1)	Avg. Gain to Sustainable Yield (SY) (AFY)	Max Gain to SY (AFY)	Min Gain to SY (AFY)	Anticipated Timeframe for coming Online	Capital Costs ROUGH estimate	Operational ROUGH estimate
Purchase State Water Project	6,000	8,000	4,000	2021	$0	Assume average cost of $400 per AF for water, $50 per AF incremental cost for planning, permitting, and O&M efforts
Remove & Replace Wells south of Hueneme	4,000	6,000	2,000	2027	$30,000,000	Assume $35 per AF
United turnouts to recharge basins from Ventura's SWP Interconnect (flushing water and possibly purchased water from SWP, wheeled through CMWD)	500	1,000	0	2027	$5,000,000	$1,500 per AF (purchase of MWD water)
Freeman Expansion, Phase 1	4,000	5,000	2,000	2028	$25,000,000	Assume $50 to $100 per AF incremental O&M cost compared to current O&M for Freeman Expansion
Shift United pumping from LAS to UAS	2,000	3,000	1,000	2030	$30,000,000	Assume $20 per AF
Freeman Expansion, Phase 2	4,000	5,000	2,000	2036	$25,000,000	Assume $25 million (conceptual level cost estimate, +100%/-50%), $6.25 million paid with grants ($275 per AF)
AWPF / Storm Water	1,500	2,000	1,000			TBD
Total Gains to SY	**16,000**	22,000	8,000	*ROUGH Estimate*	*$115,000,000*	
Total Cuts Needed: (98,000 - 50,600) - Gains to SY	31,400	25,400	39,400			