

Build-A-Portfolio

Proposal Number: 30

Submitted by: Sarah Mansergh

Name of Proposal: Water, water everywhere

Brief Description:

- 1) Pre-in lieu recharge (in-lieu with existing infrastructure) Pre-Block 1
- 2) Operational modifications/bottleneck relief
- 3) Injection ASR build up (Block 2 with Ranney collectors)
- 4) IPR research/small scale operation Pre-Block 5

80 WORD
LIMIT!

Long Description attached

Timeline Attached

Map n/a

Unresolved questions: See in timeline and long description

A few notes about the Proposal Form...

As well as being resoundingly wise and creative, your proposals should be organized to be as easy to follow and compare to other proposals as is practical.

To start with, per Greg Pepping, you have numbers:

- Baskin et al uses # 10 (and 11, 12, 13... as necessary)
- Mark et al gets # 20 (21, 22, 23 ...)
- Sarah gets # 30!

The form then requires:

- A short descriptive name
- A short description, maximum 80 words, that answers the “what does this get you?” question.
- The proposal itself
 - A narrative
 - A map, if appropriate
 - A timeline, if appropriate
 - List of unresolved questions (optional)
 - Appendices as needed (useful for keeping core proposal nice and short)
- Your ratings of your proposal block by block for some of the criteria;¹ and
- Proposal-wide ratings for the remaining criteria²

*Note: there’s a lot of white space for the criteria because we put one per page—but if you want, all you have to do is ‘circle one’ (or **bold**) for each scale and just power through to the next page. They will go by pretty quickly!*

However, if you want to persuade your colleagues of the accuracy of key ratings, you may wish to add a short paragraph to support a specific rating. This also has the virtue of helping to keep your main proposal short.

If your proposal includes an **adaptation strategy**, please use the following language for the sake of consistency:³

- *Contingencies* include both *performance measures* and *changes in external conditions*, each of which might result in a shift to your plan; and
- *Decision structures* describe how you decide to adapt to contingencies.

¹ *Technical Feasibility, Regulatory Feasibility, Legal Feasibility, Administrative Feasibility, Political Feasibility, Cost and Energy.*
Please note: *Time to Demonstrate* and *Time to Produce* are such a basic part of your proposal that it seemed silly to make you turn around and rate for something you obviously will have addressed in your proposal.

² *Adaptive Flex, Supply Reliability, Supply Diversity, and Environmental.*

³ Or let Carie know why it doesn’t work for you!

Proposal-wide Ratings

Adaptive Flexibility (Scalability)

Adaptive Flexibility measures the capacity of a set of blocks to respond to changing conditions, for example to higher or lower demands, to more or less impact of climate change. Adaptive flexibility enhances the ability to meet the requirements of changing circumstances in a timely and cost effective manner. When you rate your proposal, for now just consider the adaptability of the blocks together—this isn't meant to be a rating of your process (contingencies/decision structure etc). We will get to those later.)

Question: How adaptable or flexible is this proposal likely to be in the face of changing climate conditions, demand levels or streamflow requirements?

- Proposal provides significant adaptive flexibility benefits;
- Proposal provides moderate adaptive flexibility benefits;
- Proposal provides minimal additional adaptive flexibility benefits;
- Proposal does not increase or decrease adaptive flexibility;
- Proposal reduces or eliminates existing adaptive flexibility in the system.

Optional: provide a rationale for your rating.

Supply Reliability

Reliability of water supply relates to how much water can be produced under various climate conditions such as drought or extreme precipitation and includes the system's ability to perform well in a variety of conditions, for example, high flow conditions that may increase turbidities in source waters. The focus of this criterion is on the likelihood that your proposal will improve the reliability of the Santa Cruz water system.

Question: How adaptable or flexible is this proposal likely to be in the face of changing climate conditions, demand levels or streamflow requirements?

- Proposal provides significant adaptive flexibility benefits;
- Proposal provides moderate adaptive flexibility benefits; **YES**
- Proposal provides minimal additional adaptive flexibility benefits;
- Proposal does not increase or decrease adaptive flexibility;
- Proposal reduces or eliminates existing adaptive flexibility in the system.

Optional: provide a rationale for your rating.

Adding additional groundwater storage allows for the use of this water during drought conditions. Providing multiple locations allows for some relief of supply disruptions not available with only Loch as storage.

Supply Diversity

This criterion measures the how well prepared or positioned the system will be to respond to future uncertainties based on the diversity of its supply portfolio. The premise is that supplies coming from different sources are less likely to be as vulnerable to the same kinds of uncertainties.

Questions How does this Approach affect the diversity of Santa Cruz water sources?

- Proposal significantly increases the diversity of Santa Cruz's supply portfolio.
- Proposal somewhat increases the diversity of Santa Cruz's supply portfolio. **YES**
- Proposal does not increase the diversity of Santa Cruz's supply portfolio.

Optional: provide a rationale for the rating.

Once established the portfolio will offer significant supply diversity-via locale and source but needs ramp up time and streamflow dependent at first.

Environmental Profile:

The environmental profile of a proposal takes into account all the potential environmental impacts and benefits associated with that proposal.

Question: What is the environmental profile of this proposal?

- The Environmental profile of this proposal provides significant environmental benefits
YES
- This proposal has some environmental benefits
- The environmental profile of this proposal is acceptable without mitigation
- The environmental profile of this proposal is acceptable with appropriate and effective mitigation
- The environmental profile of this proposal is not acceptable and/or cannot be made acceptable even with effective mitigation

Optional: provide a rationale for this rating.

Aquifer recharge allows for restoration of some natural flows to tributaries and streams, helps relieve seawater intrusion and allows for greater flexibility of water source for release.

Political Feasibility

The extent to which a proposal will claim and retain the support of the community, both formal political entities as well as informal social and political groups and the community at large.

Question: What level of political support is the proposal likely to have?

- Widely acceptable **YES**
- With timely and appropriate informational and educational outreach to the community may be acceptable in the near future;
- Not acceptable now but highly likely to be acceptable in the future – 5 or more years out;
- Not acceptable now and highly uncertain about acceptability in the future;
- Likely never acceptable.

Optional: provide a rationale for your rating.

Aquifer restoration has significant acceptability with our constituency. The use of IPR to research questions and feeds toilets should be an acceptable form of recycling end use.

Block-by-Block Proposal Ratings

Regulatory Feasibility: Rate each block

Regulatory Feasibility addresses the certainty, ease and likely timeframe of receiving necessary regulatory approvals for the block. If you are worried about a lawsuit regarding a regulatory permit, that concern should be addressed here (not in *Legal Feasibility*).

Question: How easy or difficult would the regulatory approval process be for this Block? (Indicate one; cut and paste if you need more scales)

Block Pre-1 Rating: (bold, circle or otherwise indicate your rating)

- Highly certain for regulatory reviews and approvals to be easy and quick; regulatory issues are limited, routine, and/or non-controversial; **YES**
- Regulatory review process likely to be slow but relatively sure; regulatory issues include some challenges but approvals and completed processes likely achievable within 6 to 12 months;
- Regulatory review process likely to be slow but with some questions due to number or complexity of regulatory issues needing to be resolved; Can probably acquire; achievable within 12 to 36 months;
- Regulatory approvals likely to be difficult to acquire; new regulations may need to be developed, the scope or number of regulatory process or approvals involves complex, contentious issues, timeframe for completion likely more than 3 years;
- Significant regulatory challenges make approvals or completion of the regulatory review process in a reasonable, predictable time highly uncertain, likely would be expensive and require more than 5 years, if ever, to complete.

Block 2 Rating:

- Highly certain for regulatory reviews and approvals to be easy and quick; regulatory issues are limited, routine, and/or non-controversial;
- Regulatory review process likely to be slow but relatively sure; regulatory issues include some challenges but approvals and completed processes likely achievable within 6 to 12 months; **YES**
- Regulatory review process likely to be slow but with some questions due to number or complexity of regulatory issues needing to be resolved; Can probably acquire; achievable within 12 to 36 months;
- Regulatory approvals likely to be difficult to acquire; new regulations may need to be developed, the scope or number of regulatory process or approvals involves complex, contentious issues, timeframe for completion likely more than 3 years;
- Significant regulatory challenges make approvals or completion of the regulatory review process in a reasonable, predictable time highly uncertain, likely would be expensive and require more than 5 years, if ever, to complete.

Block Pre-5 Rating:

- Highly certain for regulatory reviews and approvals to be easy and quick; regulatory issues are limited, routine, and/or non-controversial;
- Regulatory review process likely to be slow but relatively sure; regulatory issues include some challenges but approvals and completed processes likely achievable within 6 to 12 months; **YES**

- Regulatory review process likely to be slow but with some questions due to number or complexity of regulatory issues needing to be resolved; Can probably acquire; achievable within 12 to 36 months;
- Regulatory approvals likely to be difficult to acquire; new regulations may need to be developed, the scope or number of regulatory process or approvals involves complex, contentious issues, timeframe for completion likely more than 3 years;
- Significant regulatory challenges make approvals or completion of the regulatory review process in a reasonable, predictable time highly uncertain, likely would be expensive and require more than 5 years, if ever, to complete.
-

Optional: provide a rationale for your rating(s)

Block Pre-1 utilizes existing water rights and is research oriented with the added benefit of water storage now. Block 2 will require some regulatory approval but should not pose significant challenges. Block Pre-5 should be an acceptable end use/research component within the regulatory framework moving forward.

Energy – Rate by Block

This criterion focuses on the acceptability of the energy use of the block.

- How much energy will this block require per million gallons of water produced?

In the meantime, please use this rating scale:

Block _Pre-1___ Rating:

- The energy profile of this block is acceptable without mitigation **YES**
- The energy profile of this block is acceptable with appropriate mitigation
- The energy profile of this block is not acceptable and/or cannot be made acceptable with mitigation

Block _2___ Rating:

- The energy profile of this block is acceptable without mitigation
- The energy profile of this block is acceptable with appropriate mitigation **YES**
- The energy profile of this block is not acceptable and/or cannot be made acceptable with mitigation

Block _Pre-5___ Rating:

- The energy profile of this block is acceptable without mitigation
- The energy profile of this block is acceptable with appropriate mitigation **YES**
- The energy profile of this block is not acceptable and/or cannot be made acceptable with mitigation

Optional: provide a rationale for your rating(s)

Pumping water back and forth does require energy but can be mitigated with energy efficiency implementations-VFDs on pumps, using gravity etc.

Legal Feasibility: Rate each block

Legal Feasibility addresses siting including acquisition of land, easements or rights of way, water rights, or other legal rights relevant to implementing the alternative as envisioned. This criterion is distinct from Regulatory Feasibility, which relates to specific regulatory approvals that would be required, separate from the legal requirements addressed here. Lawsuits about regs are still part of 'regulatory feasibility.'

Question: Does this Proposal have the necessary rights in the form needed?

Block Pre-1 Rating:

- Unambiguous “yes;” legal issues are routine, non-controversial; **YES**
- Yes, but with some ambiguities; achievable within 6 to 12 months from the start point;
- Can probably acquire; achievable within 12 to 24 months from the start point;
- Difficult to acquire; complex, contentious issues involved, likely requiring more than 2 years to resolve from the start point;
- Very unlikely; significant and contentious legal issues involved, likely requiring more than 5 years from the start point, if ever, to resolve.

Block 2 Rating:

- Unambiguous “yes;” legal issues are routine, non-controversial;
- Yes, but with some ambiguities; achievable within 6 to 12 months from the start point; **YES**
- Can probably acquire; achievable within 12 to 24 months from the start point;
- Difficult to acquire; complex, contentious issues involved, likely requiring more than 2 years to resolve from the start point;
- Very unlikely; significant and contentious legal issues involved, likely requiring more than 5 years from the start point, if ever, to resolve.

Block Pre-5 Rating:

- Unambiguous “yes;” legal issues are routine, non-controversial;
- Yes, but with some ambiguities; achievable within 6 to 12 months from the start point; **YES**
- Can probably acquire; achievable within 12 to 24 months from the start point;
- Difficult to acquire; complex, contentious issues involved, likely requiring more than 2 years to resolve from the start point;
- Very unlikely; significant and contentious legal issues involved, likely requiring more than 5 years from the start point, if ever, to resolve.

Administrative Feasibility: Rate each block Extent to which success of the proposal is dependent on the actions, cooperation, collaboration, financial participation or willingness to enter into intergovernmental agreements of other partners or players.

Question: To what degree does this proposal require the cooperation, collaboration, financial participation, and/or intergovernmental agreements to succeed, and how likely is it that these can be obtained?

Block _Pre-1___ Rating:

- Agreement with other parties is not essential
- Agreement is essential and highly likely **YES**
- Agreement is essential and likely
- Agreement is essential and not likely
- Agreement is essential but almost impossible

Block _2___ Rating:

- Agreement with other parties is not essential
- Agreement is essential and highly likely
- Agreement is essential and likely **YES**
- Agreement is essential and not likely
- Agreement is essential but almost impossible

Block _Pre-5___ Rating:

- Agreement with other parties is not essential **YES**
- Agreement is essential and highly likely
- Agreement is essential and likely
- Agreement is essential and not likely
- Agreement is essential but almost impossible

Cost Metrics: rate each block

Question: What is the unit cost for the water produced by this block, when compared across blocks? (\$/mg)

Block _Pre-1___ Rating:

- Unit cost is comparably low **YES**
- Unit cost is in the middle range
- Unit cost is high

Block __2__ Rating:

- Unit cost is comparably low
- Unit cost is in the middle range **YES**
- Unit cost is high

Block __Pre-5__ Rating:

- Unit cost is comparably low
- Unit cost is in the middle range
- Unit cost is high **YES**

Optional: provide a rationale for your rating(s)

Using the rationale field is especially important if you want to make the case “that’s not important here” (as you might for Block 5) or if your cost deviates from the costs in technical reports (for instance if you think your ‘flexed’ block is more cost-effective).

Block Pre-5 is high for the yield but we do get some benefit from it. Plus invaluable information.

Long Description (attach)

Goal:

To develop a portfolio that maximizes the use of our existing water rights by relieving operational bottlenecks, investing in infrastructure and solutions that create multiple benefits and addressing risks and uncertainties with scalability, contingency plans and adaptive management strategies.

Let's begin with what we have found already.

-We have 1 billion gallons less demand than was predicted in the past.

UNCERTAINTY-Shifts in industrial/manufacturing, technology, conservation behavior and others may change this. Should be able to prep for large shifts (manufacturing etc.) through land and planning uses.

-We have incorporated Fish and Game HCP plan projections that will require higher flows during critical habitat periods (mostly summer).

UNCERTAINTY-Still negotiating and if we can bring other mitigation measures to the table we may be able to reduce the absolute flow numbers with greater benefits for fish.

-We have incorporated climate change projections that will most likely create drier conditions overall.

UNCERTAINTY-Most likely periodic very wet with longer spells of dry in between. Other hypotheses may create different microclimate. Also, we don't know the timing of events.

End result: Want to be able to tap into a water source that can provide an additional 1 billion gallons in a critical year.

Why:

There are risks and uncertainties inherent in the values that we have set. We have decided to work towards an overall goal of being able to pull on 1.1 billion gallons in an extreme year. We do not know when that day may come but this need is not likely in the next couple of years (we have acceptable level of water in Loch Lomond and a populace that is primed to deal with drought).

How:

2015-2018

- 1) Pre-Building Block 1: Winter 2015/2016
 - a. In-lieu recharge with existing infrastructure to Soquel Creek with pre-1914 water rights. Potential for 1.4MGD. Target: 100-250 MGY
 - b. Investigate 2nd temporary pipe inside Loch Lomond as outlet to access water before 30-day residency (would be pumping out older water). The outlet would utilize existing pump station. Could offer more water accessible to send to Soquel Creek-designate water as a beneficial use to investigate relief of seawater intrusion via in-lieu recharge. Benefit-would not need to modify water rights at this point.
 - c. Change of use designation for Felton diversion application started
- 2) Demand Management Strategy Implementation: Winter 2015/16
 - a. Conservation Plan-HECW, Water Smart etc.
 - b. Assess DFG-5 mitigation measures-add benefits for fish but reduce flow requirement. Ex. Santa Margartia aquifer injection-base flow increases, dam removal at Felton (use of Ranney Collectors), aquifer restoration,
- 3) Fill Loch Lomond with tailing water diversions from Felton as per operations in 2015 winter season. Pipeline/pump construction.
- 4) Injection Well Recharge Research Started: 2016
 - a. New: Examine Ben Lomond Fault GW basin as potential for previously untapped groundwater/injection source Jeff Nolan and Erik Zinn research on 100'+ depth aquifer from SLV to Almar St.
 - b. Investigate Hanson Quarry as injection site-possibility of dual depth injection? Inject into Santa Margarita (for base flow mitigations) and Lompico (for longer term storage potential).
 - c. Investigate locales in Soquel Creek and Belz Wells systems.
- 5) Ranney Collector Research Started: 2016

2018-2022

2018 water in storage: $100\text{MG} \times 3 \text{ years} \times 60\% - 250\text{MG} \times 3 \text{ years} \times 60\% = 180-450\text{MG}$ recoverable. Target 200-300MG recoverable

Contingency Planning:

Feedback needed:

In-lieu recovery capabilities? Are we getting positive results?

Injection wells possible?

Current water demand-as projected?

Water Rights-change of use designation possible?

- 1) Begin Building Block 2
 - a. Upgrade pipeline intertie and pump to SqCWD
 - b. Install pipeline to SV

- c. Ranney Collector installation
- d. Additional treatment plant needs
- 2) Phase in Injection wells
 - a. Number based on research and needs
- 3) Demand Management Strategy Implementation
 - a. Conservation Plan-HECW, Water Smart etc. continue roll out
 - b. Assess DFG-5 mitigation measures-add benefits for fish but reduce flow requirement? Ex. Santa Margartia aquifer injection-base flow increases, dam removal at Felton (use of Ranney Collectors), aquifer restoration,
- 4) Start IPR research Pre-Building Block 5
 - a. Investigate enhancing current wastewater recycling treatment plant to send IPR to Santa Cruz Beach Boardwalk and Wharf rebuild for toilet flushing. 3 million visitors per year.....Cost effectiveness? Currently producing about 135000 gallons per day. 47 MGY. Additional capacity?
 - b. Monitor water for Rx and chemicals of emerging concern.
 - c. Test use of carbon adsorption (small pore and large pore) for Rx removal. Most likely post-oxidation.

2022-2035

2022 water in storage: 1050MG to start building capacity to 3 billion by 2030/2035

Injection well storage? Still performing?

- 1) Ramp up injection well construction and assessment
- 2) Address regulatory changes
- 3) Address demand changes
- 4) Address climate change effects
- 5) Assess IPR data and determine if implementation is feasible/necessary