Research & Innovation: Water Source Alternatives

Jerome E. Paul, MSEE
For the Soquel Creek Water District (SqCWD)

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Jerome E. Paul, MSEE

- Design engineer--200 products
- Managed Training & Consulting
- Executive-level strategies
- Managed negotiations among tech & biz entities
- Founding member of Engineers for Water Alternatives (EWA), specializing in:
  - Hydrology: Water production management
  - Geology: Pipeline and dam construction
  - Civil Engineering: University faculty
  - Other engineering: Other construction
Proposal

Phase I: Report on work to date (950 hours)
• Lochquifer Alternative, v. 7
• 5 other original water project Alternatives
• 15 strategies

Phase II: Consulting
  – Objective evaluation of Alternatives including Desal
  – Research; support adopted measures
  – Communicate with stakeholders, regulators
New Alternatives

- The Lochquifer Alternative
  - up to 6300 AFY; quick, robust drought-proofing
- CP – pipeline; may be favored by regulators
- BA – no water rights application required; cheap
- SR – percolation; low cost
- AP set – no water rights application required
- NS set – meet 1500 AFY goal before each summer

Costs including financing and mitigations in the $20M to $80M range, SqCWD pays part
• Plumbing
• Cooperation
• Regulatory
# Strategies Regarding Water Rights

## California Water Code Requirements for Water Rights Changes and Transfers

<table>
<thead>
<tr>
<th>Water Code Section</th>
<th>Temporary Urgency Change</th>
<th>Permanent Change</th>
<th>Temporary Change Involving Transfer</th>
<th>Long-Term Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulations Article (CCR Title 23)</td>
<td>16.5</td>
<td>15</td>
<td>16</td>
<td>17</td>
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</tbody>
</table>

### Required Findings Include:

1. Urgent need for water: X  
2. No injury to other legal users of water: X X X X  
3. No unreasonable effect on fish or wildlife: X X X X  
4. Involves only water consumptively used or stored: X  
5. If part of long term action, show diligence in seeking a regular permit change: X

<table>
<thead>
<tr>
<th>Duration</th>
<th>Temporary Urgency Change</th>
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<th>Temporary Change Involving Transfer</th>
<th>Long-Term Transfer</th>
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<tbody>
<tr>
<td>180 Days (renewable)</td>
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### Compliance with CEQA

1. Normal CEQA process: Required Required Exempt Required

### Comments

1. Petition fees required. (Water Code 1547): $100 per Application $100 per Application $100 or 25% of Application fee (out of basin transfers only.) $100 or 25% of Application fee (out of basin transfers only.)
2. Board provides notice and opportunity for hearing; and review information from interested parties: Objection(s) Protest(s)** Objection(s) Protest(s)*
3. Board hearing may be required to: Consider objections and make required findings Consider protests and objections Consider objections & make required findings Consider protests and objections

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** A water right hearing is required if there are unresolved protests on major projects (see Water Code 1704).
Strategic Question: Reject Alternatives requiring water rights adjustments?

Not Necessarily. 3 classes of reasons:

– at least 3 “tide-over” Alternatives
– Legislation/Expediting
– Inherent benefits of the water rights Alternatives
19 Compelling Reasons

1. ≥ 3 Alternatives which do not require water rights might tide us over until rights arrive.
2. Some Alternatives could help tide us over using temporary water rights.
3. Legislative changes currently gathering political momentum could reduce the wait.
4. After new legislation, we’ll be at the head of the line--if we apply soon & beat the rush.
5. Strategic expediting measures might reduce the wait for water rights.
6. Lower capital costs and/or lower operating costs.
7. Offers from other agencies to share costs of capital, financing and/or operation.
8. Lower water bills for customers.
9. Longer operating lifetime = more water per dollar of capital and financing.
10. Lower energy consumption, superior carbon footprint.
11. Larger total water volume. Earlier aquifer recharge completion. Save more wells.
13. To prevent more aquifer mining--as water-rights application hesitancy has led to so far.
14. To take over for a “stopgap” project (temporary, aging, expensive to operate, etc.).
15. To help make peace with regulators; to quickly obtain their permissions henceforth.
16. To keep more money circulating locally.
17. To help fulfill the needs of neighboring agencies in trade for them helping us.
18. To employ Alternatives which excel at bringing back threatened species.
19. To seize this temporary window with citizens, who may now be most willing.

Needing water rights may not be a fatal flaw, but only a factor
Early Buy-in

Benefits: quicker, smoother water rights acquisition
Strategy: Get stakeholders’ & regulators’ buy-ins *before* applying for water rights, by employing such methods as:

– free, open, frequent and deep communication;
– communicating on *their* turf;
– planting idea “seeds”;
– asking about their “dreams”;
– asking their preferences among multiple fleshed-out alternatives;
– asking, “What does it take?”, conditional closes;
– etc.

and modify our Alternative(s) accordingly.
Mid-County Surface Water

in round numbers

190,000 AFY  Average stream flow, SCWD + SqCWD
- 12,000 AFY  Diverted by SCWD (≈ 6%, about 1/16)
  178,000 AFY  Not diverted, flows into ocean (≈ 94%)
  1,500 AFY  Supplement needed by SqCWD (desal plan)
              (≈ 0.8% of mid-County stream flow)

4,200 AFY  SqCWD recent pumping rate
8,400 AF  Loch Lomond capacity (= 5.6 x SqCWD need)
30,000 AF  Purisima Aquifer debt (SqCWD & Live Oak)
15,000 AF  Santa Margarita Aquifer debt (SVWD)
45,000 AF  Total aquifer debt = 1500 AFY x 30 years

1500 AFY = 929 GPM* = 489 MGY = 2.07 CFS* = 1.34 MGD* = 0.538 D
*if sustained all year

Jerome E. Paul, Consultant
- Aquifers are mined
- Loch stays nearly full (~unused), for fear of drought
- Only a little San Lorenzo River water is stored
Past practice

San Lorenzo River

Loch Lomond

Aquifers overdrawn, threatened

Users in well-based water districts

Art by Erica Aitken

Lochquifer plan

Every winter

All year

Aquifers robustly protect us from droughts

Jerome E. Paul, Consultant
Lochquifer Features & Benefits

• Recharges Purisima Aquifer in as little as 7 years, and Santa Margarita Aquifer in as little as 4 years (11 total).
• Provides storage about 5 times larger than the Loch.
• Protects robustly against multi-year droughts.
• Captures extra winter water, even in some droughts.
• Uses about the same low amount of energy per gallon as the City’s current facilities. ➔ Good carbon footprint
• Capital cost is in the general neighborhood of $50M.
• Operating cost ≈ City’s current cost.
• Well pumping ≈ $0 in most years.
Lochquifer
Schematic Diagram

* = New facilities

San Lorenzo River

Ranney Coll.*

Pre-Treat*

Felton Div’n

Pre-Treat*

Felton Pump Stn.*

WTP*

Buffer Storage* (quarry?)

To GHWTP 725

To Intertie* 7MGD

Loch Lomond

Pump Stn.* 380

To GHWTP 725

Jerome Paul 2013-10-20

Jerome E. Paul, Consultant
Dan Kriege, former Board President of SqCWD said that if he were still on the Board, he would think it worthwhile to spend a little money to take advantage of the Phase I offer of completed research, to get a head start on the project.

Some other references:
• Terry McKinney, SCWD Production Superintendent
• Jan Bentley, former SCWD Production Superintendent
• Rick Longinotti, Desal Alternatives Chairman

If even one of the Phase I ideas is worthwhile, it will bring a big return on investment.
Consulting Data & Schedule

Phase I Report, 1 week from agreement:

• Lochquifer version 7,
• Written reports on 5 other Alternatives, and
• Disclosure regarding other work in process.
• Strategic Report (15 strategies) in 3 weeks
• Presentation(s) to the Board et al
• Work with SqCWD to optimize proposal for Phase II
Phase II Consult as directed by the District:

- As led by County, SCWD2, City, new entity, SqCWD...
- “Portfolio” to acquire data & approach agencies