Sonoma Water

Water Shortage Allocation Model Update

Presentation to the Water Advisory Committee and Technical Advisory Committee

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Brown AND Caldwell

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Background

2006 - original annual shortage allocation model developed, based on Restructured Agreement (Section 3.5)

- Intended for “in the river” shortage conditions

2014 - model updated in response to Resolution No. 10-0085 (adopted Feb 2010)

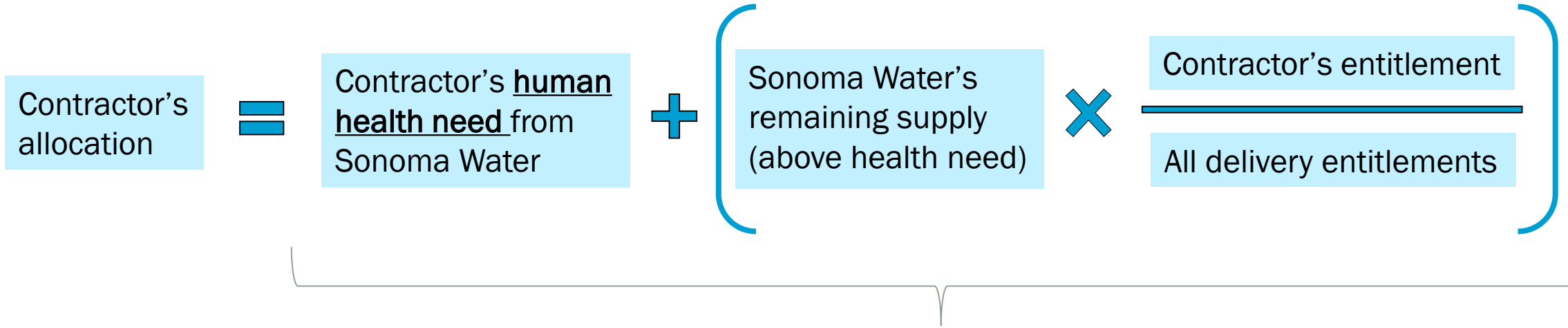
- Updated annual shortage allocation methodology
- Developed monthly shortage allocation methodology
- Developed a user friendly, transparent model (Excel spreadsheet based)

2021 - additional refinements made in coordination with the TAC

Status

- 2014 model was approved by the WAC through 2016 and was never adopted by the Sonoma Water Board of Directors.
  - One outstanding question/concern around how the model handles commercial, industrial, and institutional (CII) demands.
- 2021 changes address the CII concern and other questions from water contractors.
  - Collaborated with TAC Ad Hoc Committee on adjustments to model.

Allocation Approach (based on Section 3.5 of RA)



Capped at the contractor's **reasonable requirement** from Sonoma Water (excess is redistributed to contractors whose allocations are less than their reasonable requirement from Sonoma Water)

Two Key Parameters

- **Human health, sanitation, and fire flows** – serves as initial "base" allocation (if Sonoma Water's total supply exceeds human health need)
  - Refined in 2021 to consider CII separately

- **Reasonable requirement** – serves as the "cap" (i.e., max allocation during a shortage)
  - Refined in 2021 so that reasonable requirement does not exceed recent actual water use (based on three-year average)
    - MMWD capped at 4 mgd (May to Sept) in monthly model per agreement

RA Section 3.5(c)(1) – determining human health need

- The Agency *shall* take into account the level of water conservation achieved by the Customer and . . . the **hardening of demand** resulting from such conservation.

- The allocations. . . *shall* be [based] upon **no greater than average indoor per capita water use** determined from recent retail billing records for winter water use by all the of the Water Contractors.

- *If necessary or appropriate for equitable purposes*, **considers CII water uses separately** and determines that element . . .based on winter water use from recent retail billing records for CII uses.

Human Health, Sanitation, and Fire Flows

- 3-yr average indoor water use for each contractor
  - Jan and Feb use
  - CII and residential (demand hardening adjustment applied to non-CII (residential) portion)
    - Summer population used for Sonoma
  - Fire flow
    - Annual-20 AFY (assumes 1 fire/month, 3,000 gpm, 3 hrs)
    - Monthly-0.08 mgd (assumes 1 fire/week, 3,000 gpm, 3 hrs)
- Minus local supplies for each contractor
  - Currently using 100% of projected available supplies
  - Model can also use a percentage 3-yr average local supplies, factor can be toggled
- Equals Sonoma Water human health allocation for each contractor
- Includes Sonoma Water's transmission system losses (3%) in total

2021 Update: Considers CII Separately

2006 model approach:

Human health need = (4-yr average total indoor water use * demand hardening adjustment) – (0.90 * local supply)

2014 model approach:

Human health need = (3-yr average total indoor water use * demand hardening adjustment + fire flow) – (0.75 * local supply)

2021 model approach:

Human health need = ((non-CII indoor water use * demand hardening adjustment) + CII indoor water use + fire flow) – (100% projected local supply)

2021 model only applies demand hardening adjustment to residential water use

Demand hardening adjustment based on the population-weighted average 3-yr indoor (Jan-Feb) residential water use

- Contractors with indoor residential gpcd below regional average have human health need escalated
- Contractors with indoor residential gpcd above regional average have human health need reduced

RA Section 3.5(c)(2) – determining reasonable requirements

- The fundamental purpose of the "reasonable requirements" limitation is to ensure that **no Customer receives more water during a shortage than that customer reasonably needs**.
- In determining "reasonable requirements". . . the Agency *may* take into account the **hardening of demand.**
- It is the intention . . . that the Agency make its "reasonable requirements" determination so as to **encourage Customers to implement water conservation**, recycled water, and local supply projects.

Reasonable Requirements

- Represents maximum reasonable water use during a shortage
- 3-yr average total water use for each contractor
  - Capped at 100% of 3-yr total water use (no demand hardening adjustment)
- Minus local supplies for each contractor
  - Currently using 100% of projected available supplies
  - Model can also use 3-yr average local supplies, factor can be toggled
- Equals Sonoma Water allocation for each contractor
- Includes Agency's transmission system losses (3%) in total

2021 Update: Caps reasonable requirement (RR) at 100% of three-year average water use

2006 model approach

RR from Sonoma Water = (two-year avg Sonoma Water supply * demand hardening adjustment)

2014 model approach:

RR from Sonoma Water = (three-year avg total water use * demand hardening adjustment) – (0.75 * local supply)

2021 model approach:

RR from Sonoma Water = (three-year avg total water use) – (100% of projected local supply)

In 2014 model, demand hardening adjustment increased the RR for contractors with per capita water use below the regional average (resulted in the RR exceeding actual average water use—not "reasonable" in a shortage).

2021 model caps the RR at 100% of the three-year average total water use and subtracts projected local supplies. (Local supply input can be adjusted).

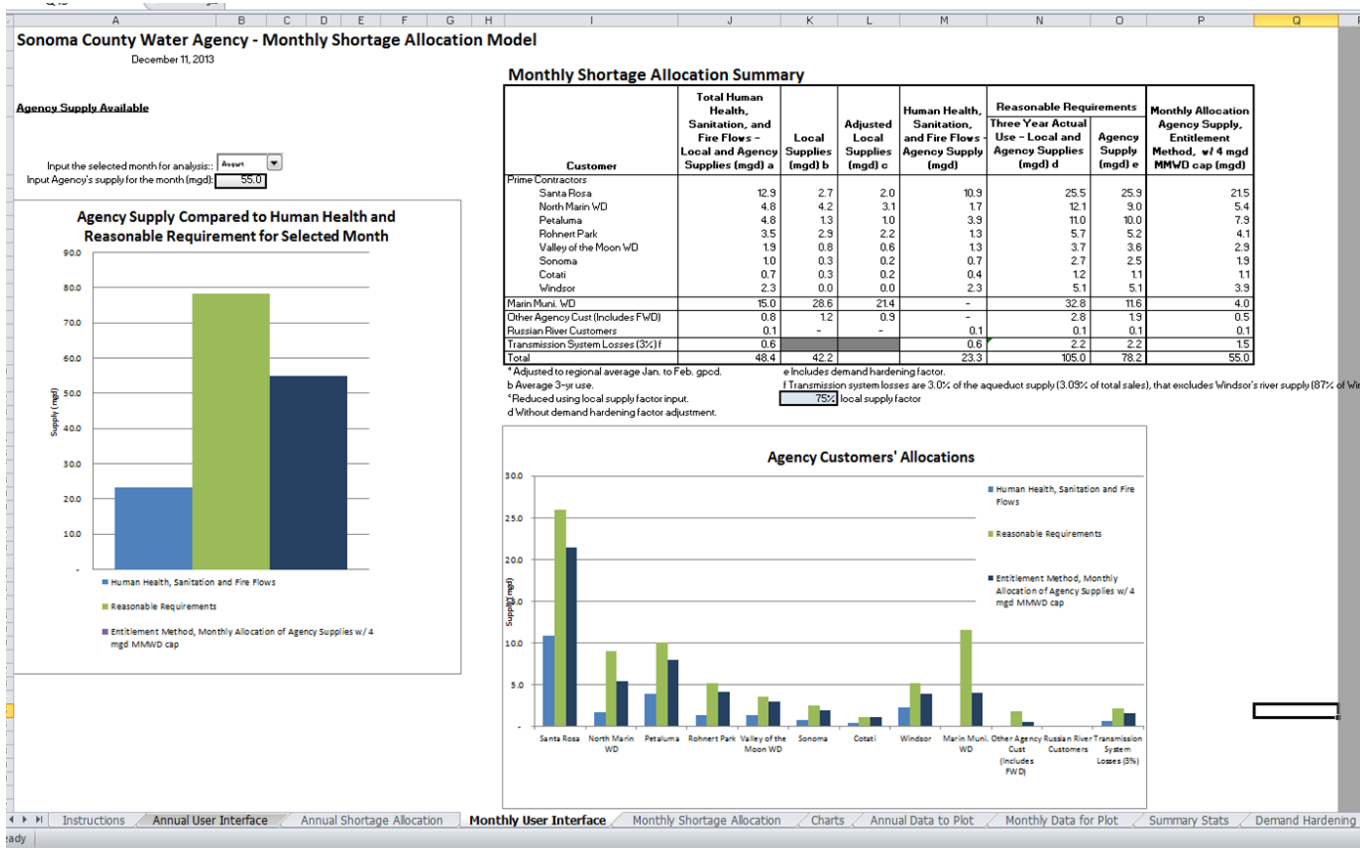
Summary of Model Changes

Parameter	2006 model	2014 model	Current model (2021)
Reasonable requirements for Sonoma Water water	2-yr average Agency supply	3-yr average of total supplies minus 75% of local supplies*	3-yr average of total supplies minus 100% of projected local supplies*
Human health, sanitation, and fire flow for Sonoma Water water	4-yr average Jan-Feb use minus 90% of local supplies	3-yr average Jan-Feb use minus 75% of local supplies*	3-yr average Jan-Feb use minus 100% of projected local supplies*
Fire flow	Not included	20 AFY/0.08 mgd for each contractor	20 AFY/0.08 mgd for each contractor
Demand hardening adjustment for reasonable requirement	1-yr average annual gpcd	3-yr average annual gpcd	N/A
Demand hardening adjustment for human health need	1-yr average Jan-Feb gpcd	3-yr average Jan-Feb gpcd	3-yr average Jan-Feb gpcd (only applied to non-CII water use)
Transmission system losses	Not included	3% of total	3% of total

*Local supply input can be adjusted (e.g., can use 3-year average supplies or manual input, and adjust percentage)

Model Features

- Instructions and definitions
- Consolidated annual and monthly models
  - Excel based
- User interface (annual and monthly)
  - Input available supply
  - Resulting allocations
- Individual customer data sheets
  - water use and population data



Next Steps

- Present to WAC/TAC
- Consider approval of updated methodology

Thank you.

Questions?