

Groundwater Extraction Annual Reporting System (GEARS)

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Groundwater Management (SGMA) Program

SGMA – short version (...a little light reading)

- No groundwater control law in CA until 2014 (SGMA)
- SGMA ensures sustainable groundwater resources by 2042
- DWR regulates GSAs in locally controlled basins; GSAs implement GSPs
- SWRCB manages individual pumpers that are unwilling or unable to maintain local control; Unmanaged areas and Probationary basins

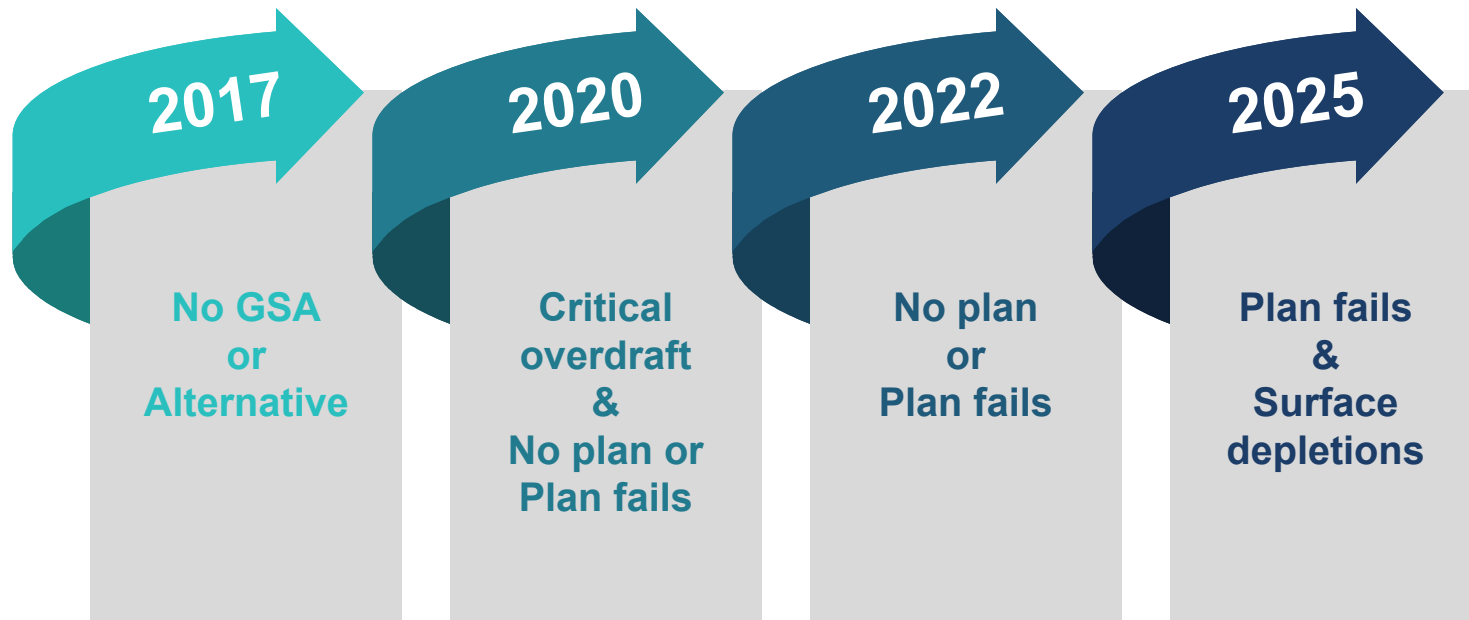
“ [W]here a local groundwater sustainability agency is not managing its groundwater sustainably, **the state needs to protect the resource** until...a local groundwater sustainability agency can sustainably manage the groundwater basin.”

California Legislature

Primary Board Responsibilities

- Collect required data (Reporting to the Board)
- Manage basin groundwater
- Administer probationary designation hearings
- Ensure compliance with issued Orders
- Facilitate return to local control

TRIGGERING the BACKSTOP



State intervention can happen before 2040 if GSP is deemed inadequate or the basin is underperforming relative to interim milestones.

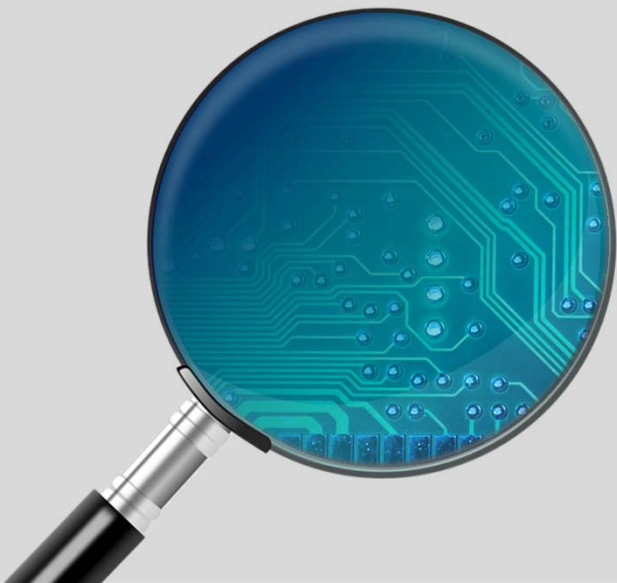
Reporting Process (staff view)





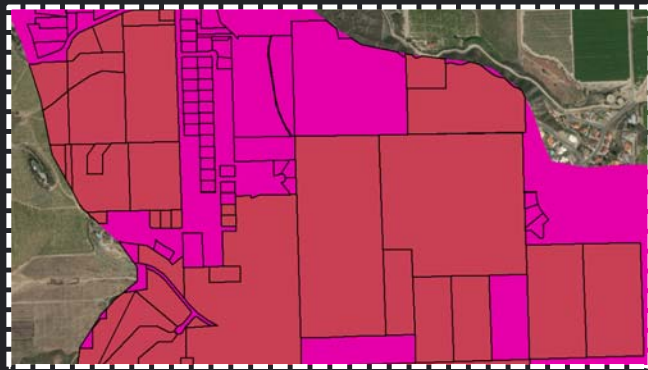
Information on extraction reports is available at www.waterboards.ca.gov/water_issues/programs/gmp/reporting.shtml.

Data-Driven Parcel Identification Process



- Land Use
- Safe Drinking Water
- Pesticide Regulation
- Well Completion Report
- Integrated Water Quality
- Remote Sensing

Identifying EXTRACTORS

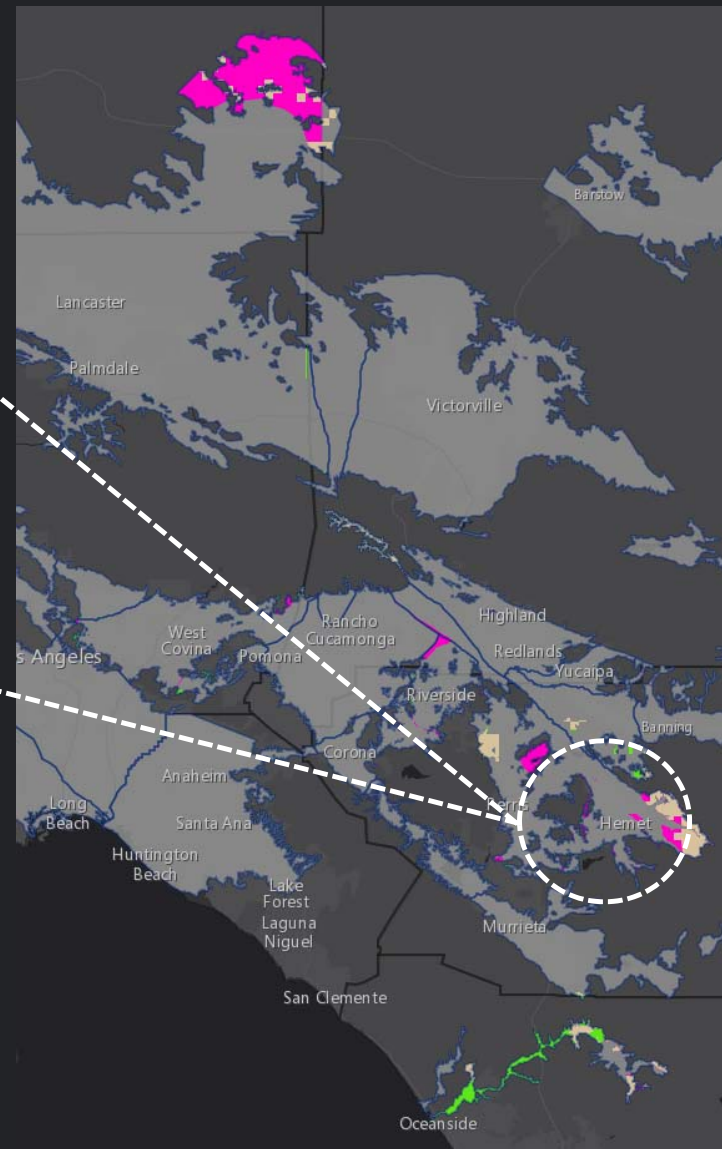


112,793 Reporting Acres

1,876 Total Parcels

427 Parcels Mailed

235 Land Owners



Shifting GEARS...

Considerations for GEARS system architecture

Irregular reporting volume: from dozens to many thousands of reporters at anytime makes planning difficult (staff & hardware)

Unfamiliar reporters: Reporters may not be familiar with regulatory reporting, or may lack tech skills

Changing rules and regulations: System needs, users, and technology will change over the 40 year timeline

“It is the intent of the legislature
to...**improve data collection**
and understanding about
groundwater.”

Water Code Section 10720.1(f)

Purpose-built data system architecture

Reporting volume: AWS Scalable architecture to accommodate any number of reporters, geospatial tracking, case/fee mgmt.,

Unfamiliar reporters: Quality control of reported data at input to ensure accurate reporting, EZ UI/UX, help and hover-overs

Changing rules: Extensible - own code base for enhancement, modifiable fee schedule, configurable fields

The (Agile) build

1. Final diagramming and documentation
2. Joint Application Development (JAD)
3. User Story development
4. 12 sprints + regression testing (we are on Sprint 5 today)
5. Maintenance & enhancement

GEARS build timeline

1. Started diagramming in early 2015
2. S1BA summer 2016, RFI directly after
3. RFO in spring 2017
4. Contract awarded in summer 2017
5. Joint Application Development in fall 2017
6. Sprints 1-5 Jan-March 2018 (~42% complete this morning)
7. Sprints 6-12 March-August 2018 (1st contract complete)

GEARS Architecture Overview (Modules)

1. Users and Authentication
2. Well Details
3. Place of Use Details
4. Extraction Reporting
5. Outreach and Mail Tracking
6. Fee Calculations
7. Compliance Tracking
8. Uploads and Comments
9. Report/Data Generation

Groundwater Extraction Analysis and Reporting System (GEARS)

Data System Rationale and Architecture

7 October 2016

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Improved extractor reporting processes

- Ease of reporting and data access for a diverse reporter base (UI/UX)
- Simple well location and Place of Use area (map) plotting
- Storage of GIS & user info for future reporting (big time saver)
- Download of geospatial assets for external GIS work

Improved staff support for large areas/volumes

Geospatial tracking of issued letters (large areas)

Automatic tracking of reporters against issued letters (spatial compliance)

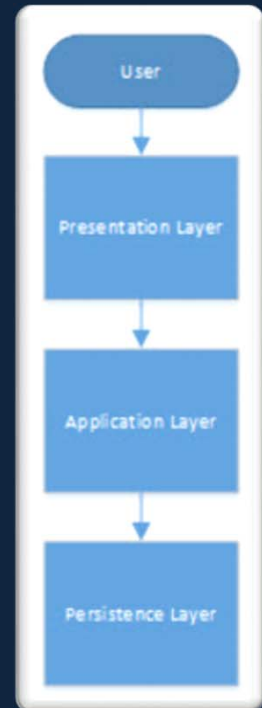
Case management of individual users & assets (high volume)

Auto-PDF report generation (template-based)

Technical bits

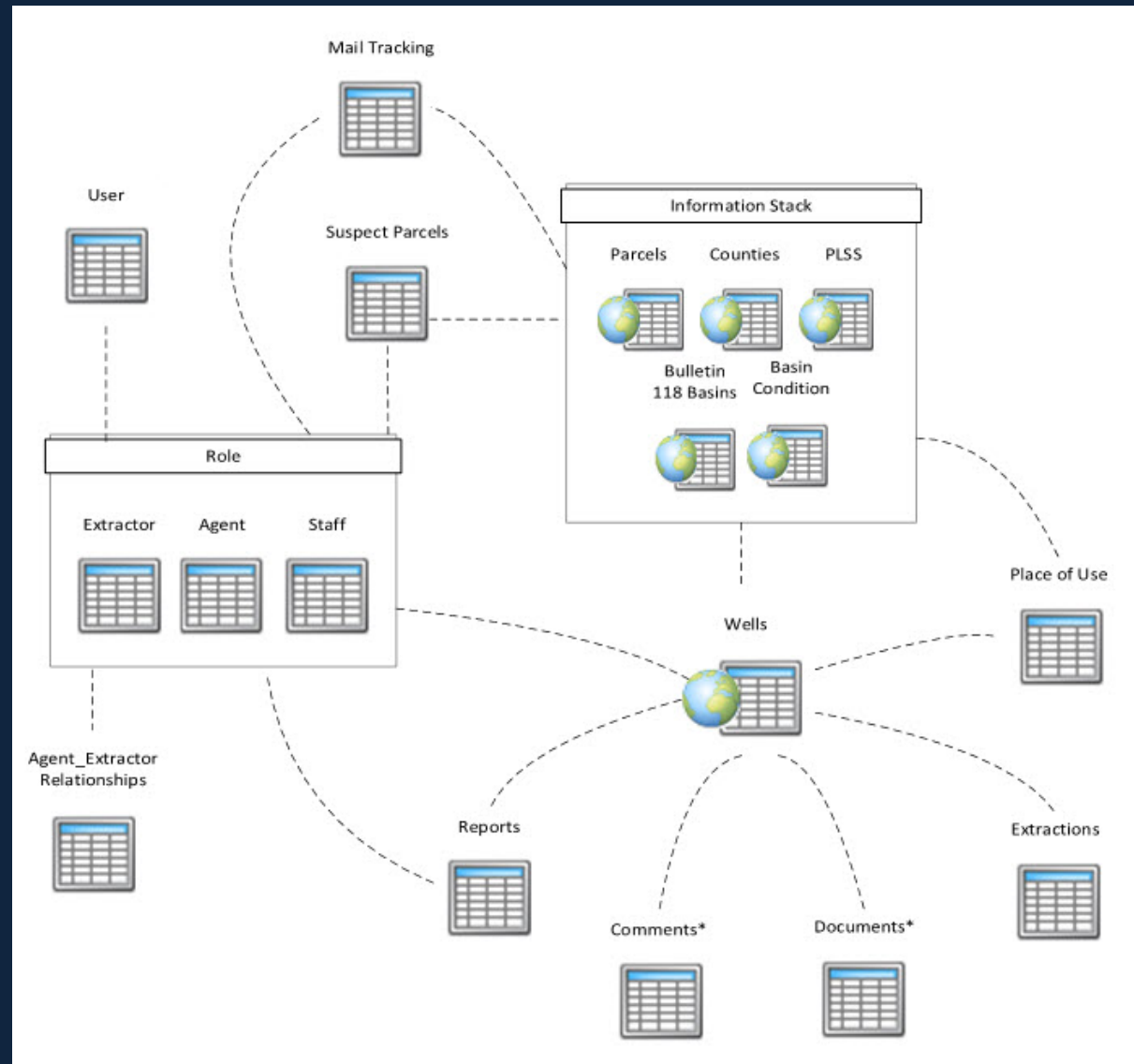
N-tier architecture: Presentation (HTML5, JS, C# classes) -> Application (.dll) -> Persistence (SQL Server, C#)

Technology stack: SQL Server (DB), ESRI ArcGIS Server/Web adapter (GIS), .NET, C#...



Logical data model...

...enough tech talk, lets demo!



“California will no longer be the only Western state that does not manage its groundwater. The cost of doing nothing is the biggest economic gamble.”

- *Senator Fran Pavley*

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Groundwater Management Program

www.waterboards.ca.gov/gmp