Evolution of Groundwater Management in Los Angeles

Sustainable L.A. Grand Challenges
UCLA
15 June 2016
Background

- Over decades, pumping rights and management has evolved in the adjudicated groundwater management areas of L.A. County

- Imported water facilitated groundwater adjudications and development of Southern California’s water management agencies

- Growing scarcity, climate change, and population growth will strain available water imports for groundwater recharge
Current Groundwater Rights Holders

(data collected for 2011-13)
• **Control of groundwater rights** is evolving, becoming more *public* and *consolidated*
  – Smaller rights’ holders selling or leasing to larger public agencies and water utilities

<table>
<thead>
<tr>
<th>Judgment</th>
<th>West Coast</th>
<th>ULARA*</th>
<th>Six Basins</th>
<th>Raymond</th>
<th>Main San Gabriel</th>
<th>Central</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>13,486</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9,252</td>
<td>35,335</td>
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<tr>
<td>Public</td>
<td>0</td>
<td>55,970</td>
<td>6,657</td>
<td>29,140</td>
<td>33,400</td>
<td>46,598</td>
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<td>0</td>
<td>6,705</td>
<td>2,299</td>
<td>33,400</td>
<td>46,598</td>
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<tr>
<td>Non-Profit</td>
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<td>0</td>
<td>2,972</td>
<td>11,025</td>
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<tr>
<td>Total</td>
<td>29,229</td>
<td>55,970</td>
<td>16,334</td>
<td>31,439</td>
<td>53,677</td>
<td>81,933</td>
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<td>Current</td>
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<td></td>
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<td></td>
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<tr>
<td>Private</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>22,565</td>
<td>86,495</td>
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<tr>
<td>Public</td>
<td>19,495</td>
<td>279,671</td>
<td>12,740</td>
<td>36,397</td>
<td>24,613</td>
<td>13,029</td>
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<td>Publicly-Regulated</td>
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<td>6,888</td>
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<tr>
<td>Non-Profit</td>
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<td>0</td>
<td>5,467</td>
<td>0</td>
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<tr>
<td>Total</td>
<td>64,083</td>
<td>279,671</td>
<td>25,095</td>
<td>36,397</td>
<td>64,926</td>
<td>99,524</td>
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</table>

*Table 1: Distribution of pumping rights among the top five rights’ holders in six basins of the study area. The trend shows a consolidation in pumping rights among large users*

• **Allocation of rights** varies by basin across different types of users (Figure 1)
West Coast Basin

1965 Adjudicated Rights

- City
- County
- Investor-Owned Utility
- Mutual Water Company
- Oil and Chemical Company
- Private Entity
- Sanitation District
- Unified School District
- Water Investment Company
- Water Replenishment District

2013 Extraction Rights

- Publicly-Regulated
- Public
- Private
- Non-Profit

Adjudicated Rights (ac-ft)

Bar Charts:
- Publicly-Regulated
- Public
- Private
- Non-Profit

Bar Chart Ranges:
- 0 to 40,000 ac-ft
Raymond Basin

1955 Adjudicated Rights

- City
- County Water District
- Investor-Owned Utility
- Irrigation District
- Mutual Water Company
- Private Entity

2013 Extraction Rights

- City

Bar charts showing Adjudicated Rights (ac-ft) for 1955 and 2013 for Publicly-Regulated, Public, Private, and Non-Profit categories.
Findings

• **Per capita groundwater rights** vary widely throughout the region
  – For instance, the City of Santa Fe Springs has ~220 gallons/person/day (gpd), while the City of Artesia has less than 2 gpd
  – Across the county, Upper Basin users tend to have more per capita pumping rights

• The majority of cities with rights (28) have rights of less than 100 gpd
  – Twelve cities have rights less than 22 gpd.
  – Many cities in the region would not meet even conservative estimates of per capita daily water use with current groundwater rights

• **Nearly one-third of cities have no groundwater rights** and no direct access to groundwater for water supply.
  – Water managers throughout L.A. increasingly look to use distributed stormwater infrastructure to improve water quality and recharge groundwater basins
  – Cities must pay for stormwater infrastructure upgrades, but if they have no pumping rights, they cannot use projected water supply revenues to pay for new stormwater systems.
Percent supply from groundwater (left) and per capita pumping rights (right) for water retailers in LA County.
Beyond Groundwater

- **Cities and groundwater rights:**
  - With pumping rights in adjudicated basins, cities have more options for over-year storage
  - Stormwater and recharge: Municipal permits
Beyond Groundwater

• Cities and groundwater rights:
  – With pumping rights in adjudicated basins, cities have more options for over-year
  – Stormwater and recharge: Municipal permits
  – storage

LA City Stormwater Capture Master Plan
Findings

• Management system is highly fragmented across the region and still divided by urban water sectors (groundwater, stormwater, water supply)

• Despite challenges, the complex and polycentric system of groundwater management has managed to adapt over time
  – Actors of varying sizes and organizational structures negotiate transactions and water transfers, moving water from areas of greater abundance to areas of scarcity
  – But these are short term adaptations, not long term changes for climate change
  – Limited in scope as well: landscaping needs to evolve, infiltration, stormwater capture and water recycling need substantial inter and transjurisdictional institutional reform

• Adaptive capacity is constrained by established allocations of rights, limited cost-effective storage, diverse institutional knowledge, and decreasingly available imported water
### Policy Recommendations

<table>
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<tr>
<th>Reduce reliance on imported water</th>
<th>Watermasters must plan for long-term reductions in available imported water for recharge. Management must focus on reducing water demands and replenishment of basins from captured local stormwater.</th>
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<tbody>
<tr>
<td>Identify capacity for water reuse</td>
<td>Water reuse can reduce imports, but it requires assessments available groundwater basin capacity, where water can be stored, as well as new infrastructure for piping. New regulations enabling collective storage pools in groundwater basins can allow agencies to develop collective reuse projects.</td>
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<tr>
<td>Reallocate groundwater rights</td>
<td>Codified groundwater rights inhibit system flexibility and adaptability to meet future scarcity challenges. More equitable access to groundwater will help greater water self-reliance but will require reallocating some extraction rights as agencies store more water in groundwater basins to meet water shortages during droughts.</td>
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<td>Regulate groundwater for this century</td>
<td>L.A. County’s diverse groundwater management system mirrors statewide fragmentation and local control. State and regional agencies must manage across diverse climates and cultures. New sustainable groundwater management regulations should build on the knowledge of L.A. approaches but, unlike L.A., reduce institutionalized reliance on imported water.</td>
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All information from this presentation was gathered from a publication included in CCSC’s 2015 research report to the Haynes Foundation, *Water Management in Los Angeles*, available [here](#).