SEASIDE GROUNDWATER BASIN

2018 BASIN MANAGEMENT ACTION PLAN (BMAP)

MONTGOMERY & ASSOCIATES

Presented to the Seaside Basin Technical Advisory Committee

December 12, 2018

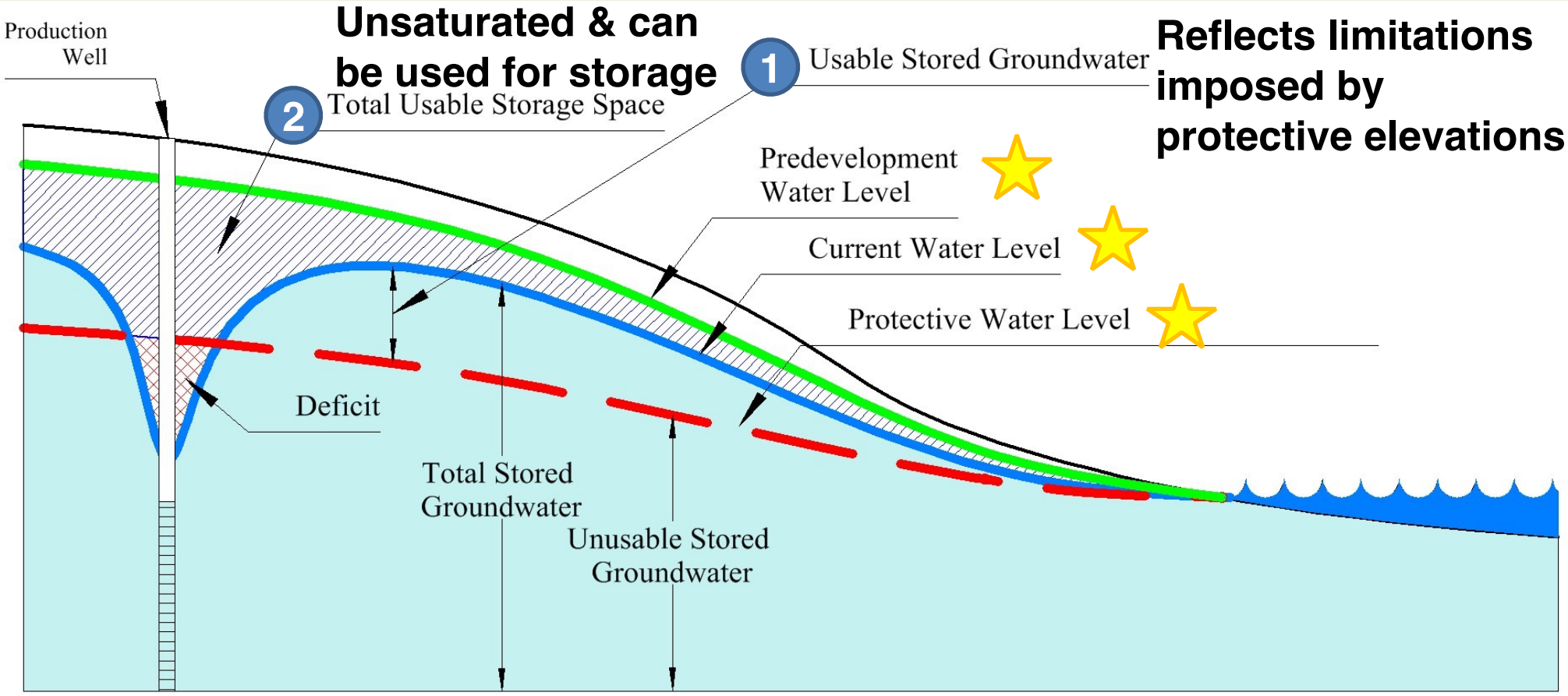
BACKGROUND & SCOPE

- Update of the 2009 BMAP
- Contents include:
  - Description of State of the Basin
  - Groundwater Storage
  - Groundwater Budget
  - Review of Natural Safe Yield
  - Supplemental Supplies
  - Management Actions
  - Recommendations

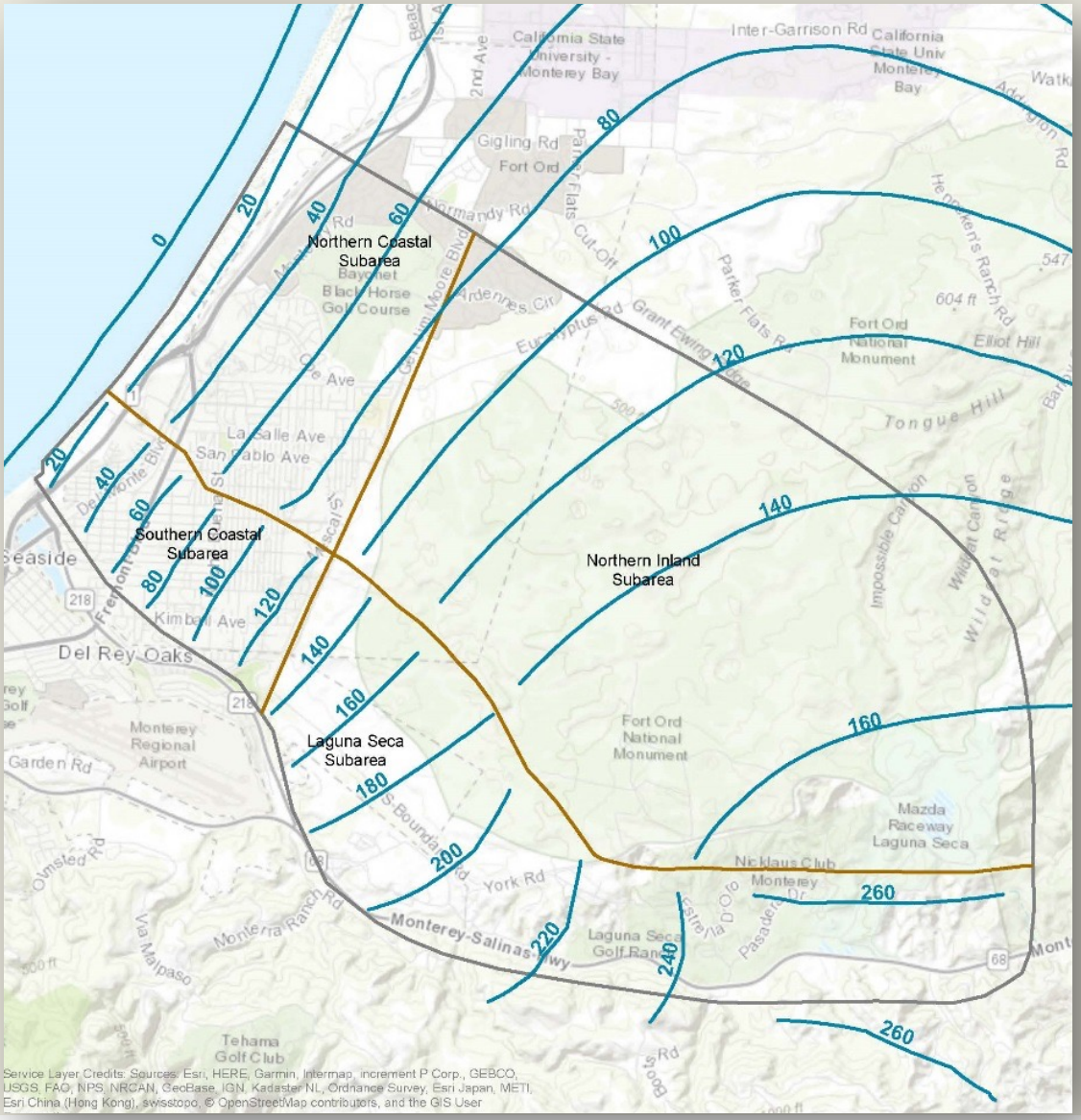
STATE OF THE BASIN

- Groundwater levels continue to decline, except in Southern Coastal Subarea and in shallow coastal wells
- All of the Northern Coastal Subarea levels are below sea level
- Protective elevation are not met in any of the 3 monitoring wells with deep aquifer protective elevations
- Protective elevation are not met in 2 of the 3 monitoring wells with shallow aquifer protective elevations

GROUNDWATER STORAGE



PRE-DEVELOPMENT GROUNDWATER ELEVATION



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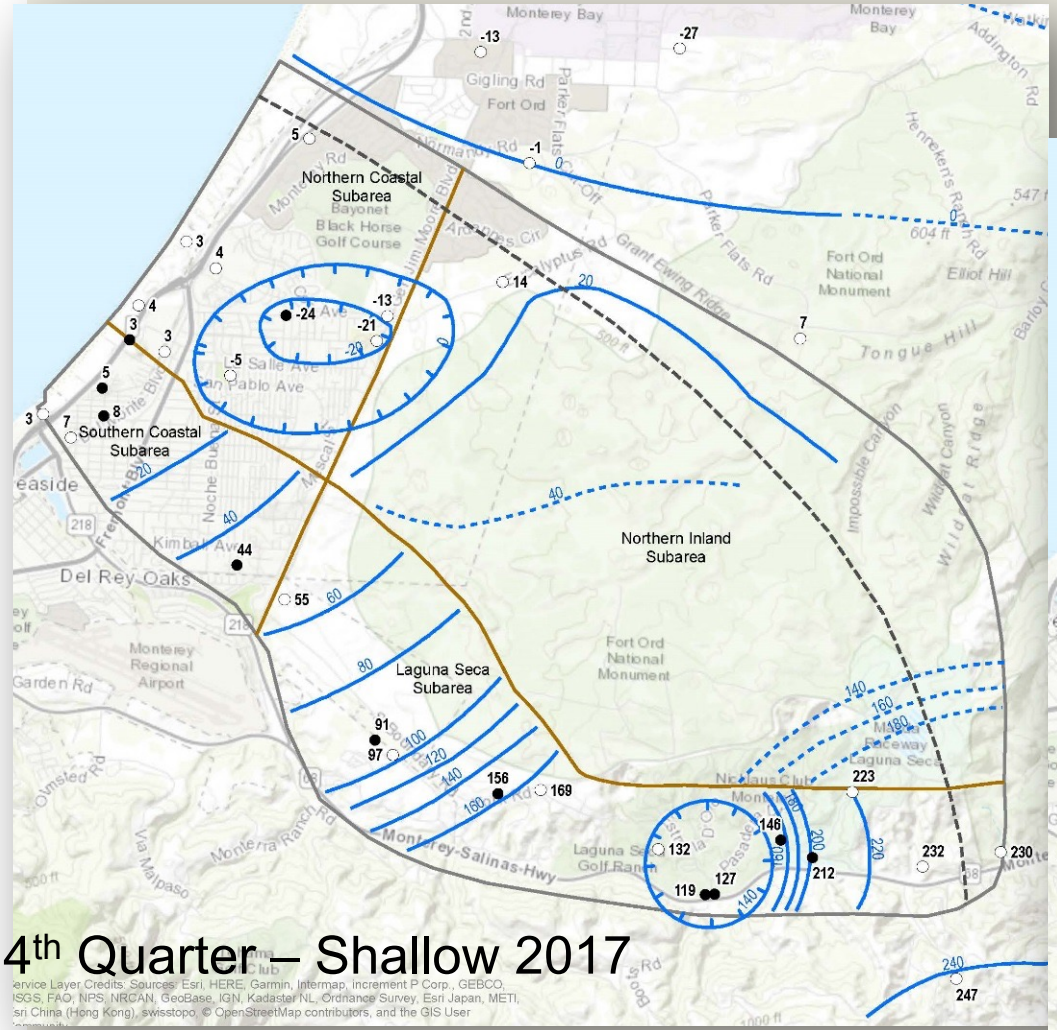
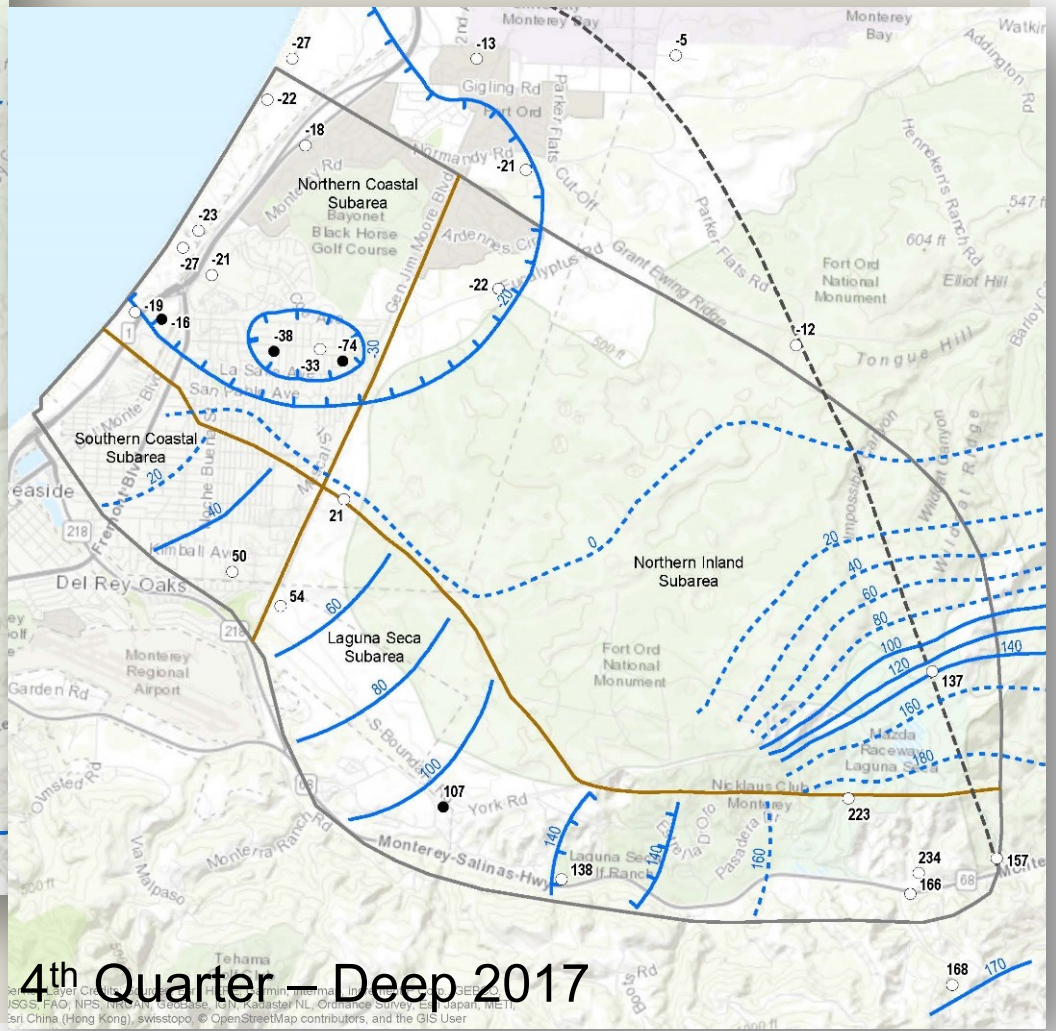
CURRENT GROUNDWATER ELEVATIONS



4th Quarter – Shallow 2017



4th Quarter – Deep 2017

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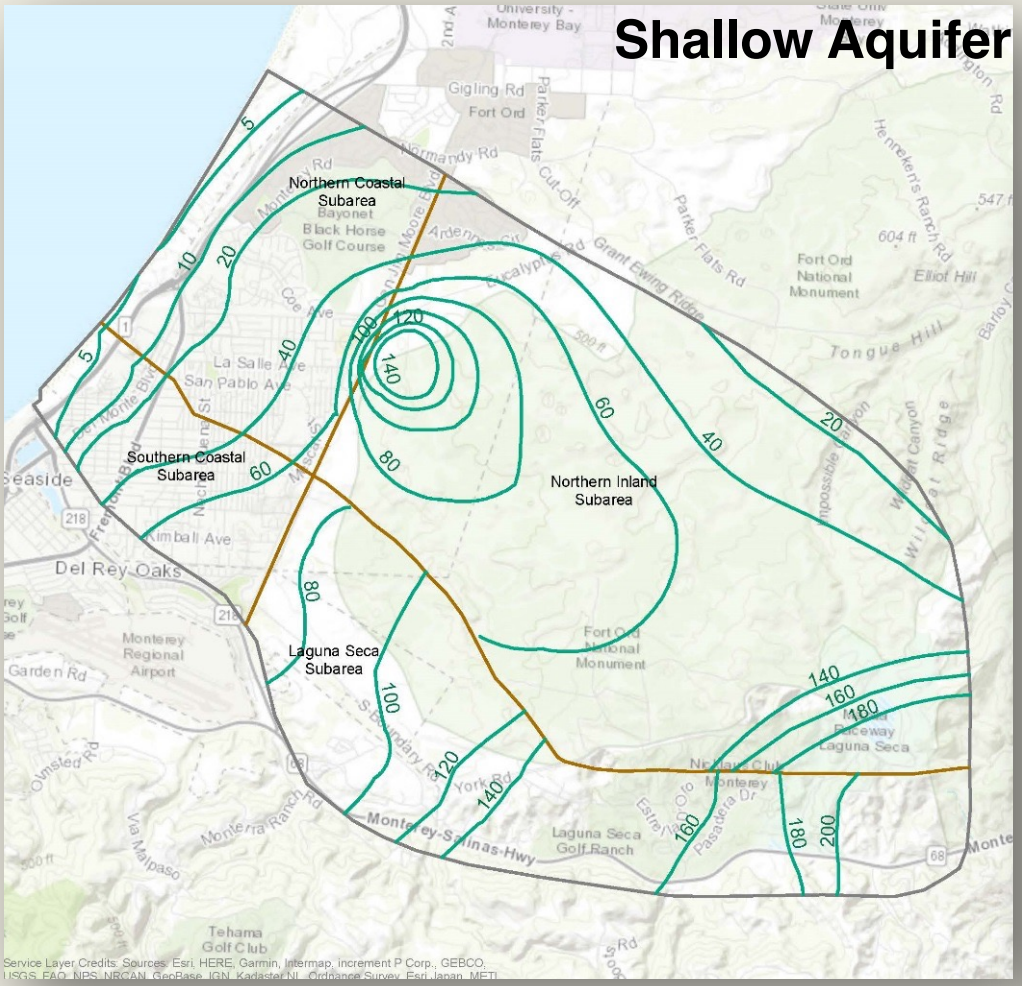
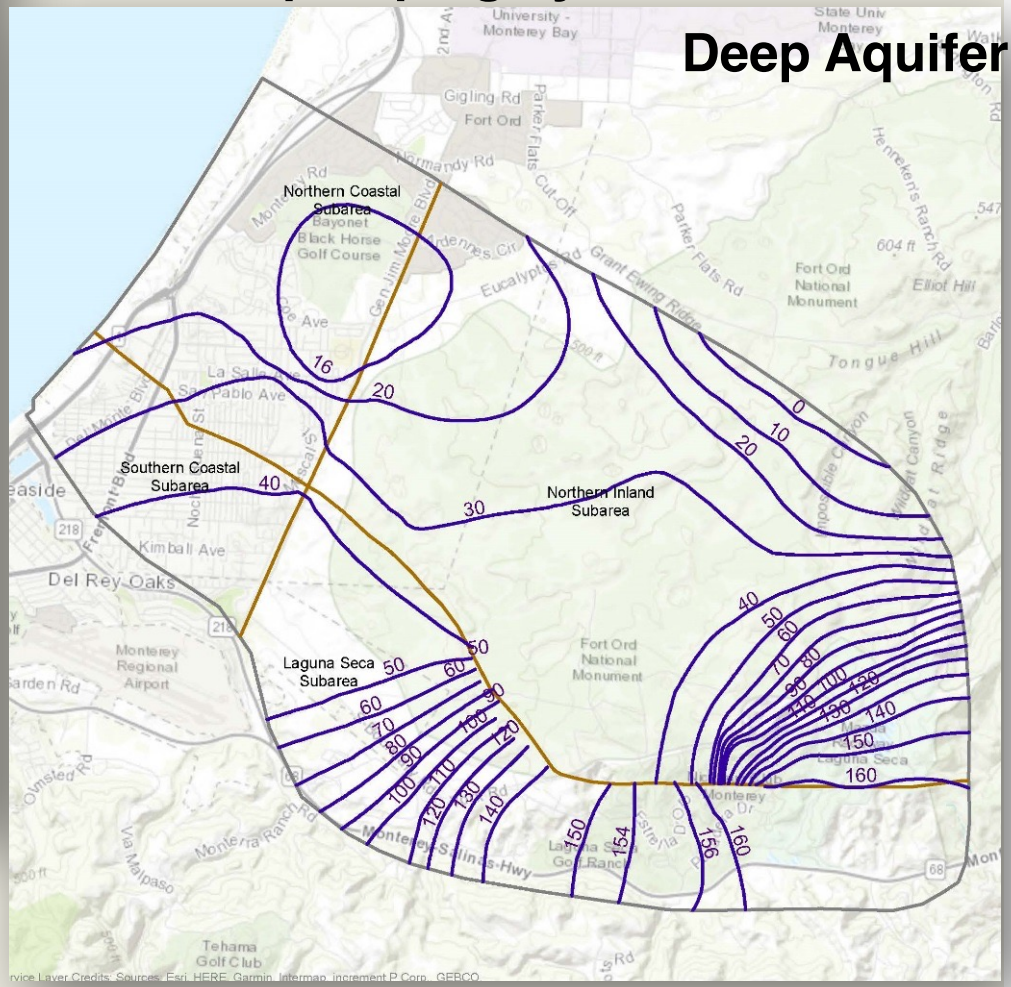
PROTECTIVE GROUNDWATER ELEVATIONS



Simulated assuming Pure Water Monterey and reducing Northern Coastal pumping by 1,800 AFY



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STORAGE EFFICIENCY

- The percentage of usable stored groundwater in the Basin that can be recovered at a later date
- Inefficiency happens when stored groundwater flows out of the Basin to adjacent basins, the ocean, or when groundwater is consumed by vegetation
- Depends on location and method of storage
  - ASR may cause groundwater to mound and flow north out of the Basin
  - Surface percolation may take a many years to reach the water table and may leave the Basin as outflow
- Recommended that the Watermaster evaluate the project specific storage efficiencies and include these in the producer's Storage and Recovery Agreement.

GROUNDWATER (1988 – 2017) BUDGET

Recharge Source	Northern Coastal Subarea	Northern Inland Subarea	Southern Coastal Subarea	Laguna Seca Subarea	Total
	Acre-feet per Year				
Basin Inflows					
Percolation from streams	0	0	0	0	0
Deep Percolation					
Rainfall	510	1,670	130	900	3,210
Irrigation & System Losses	150	20	100	10	280
Injection wells	260	0	0	0	260
Groundwater inflow					
From adjacent subareas	2,900	1,520	520	360	5,300
From adjacent basins	130	400	50	770	1,350
From offshore area	490	0	10	0	500
Total inflows	4,440	3,610	810	2,040	10,900
Basin Outflows					
Wells	3,660	70	170	680	4,580
Groundwater outflow					
To adjacent subareas of the Basin	290	2,710	550	1,750	5,300
To adjacent basins	280	1,310	70	490	2,150
To offshore area	260	0	60	0	320
Total outflows	4,490	4,090	850	2,920	12,350
Storage Change					
Based on Inflows-Outflows	-50	-480	-40	-880	-1,450

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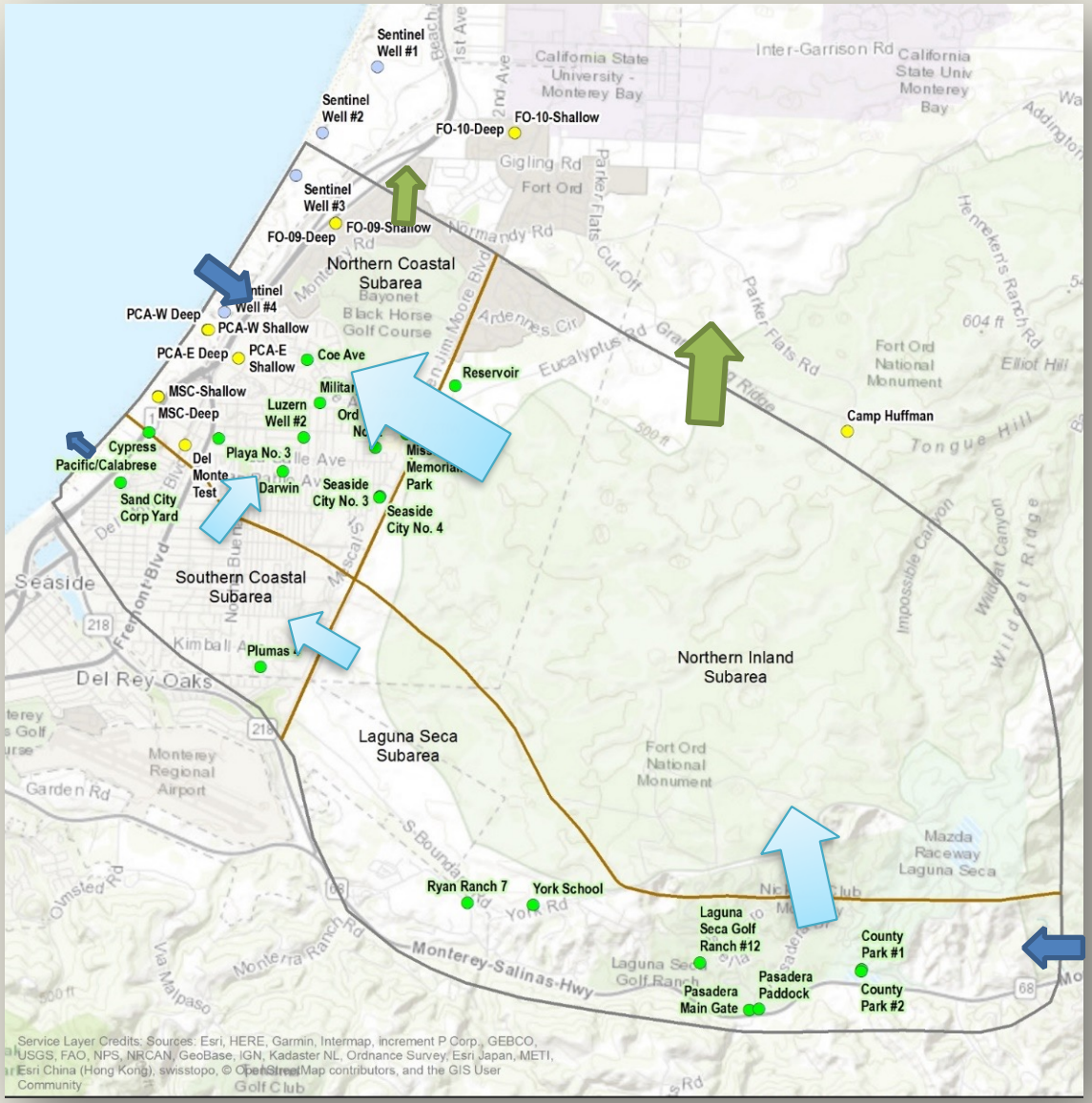
SUBSURFACE FLOWS BETWEEN SUBAREAS, OCEAN & OTHER BASINS



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CHANGE IN GROUNDWATER IN STORAGE (1988 – 2017)

Basin Inflows
5,600 AFY

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Basin Outflows
7,050 AFY

= Change in Storage
Loss of 1,450 AFY

43,500 AF loss of groundwater in storage over 30 years

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NATURAL SAFE YIELD

- Decision established initial Natural Safe Yield = 3,000 AFY
- Using 1988 – 2017 model output, Natural Safe Yield estimated as
  - Coastal and Northern Inland Subareas = 2,500 AFY
  - Laguna Seca Subarea = -190 AFY
  - Basin total = 2,310 AFY
- Laguna Seca Subarea Natural Safe Yield has been studied in the past
  - Even if all wells stop pumping in the subarea, groundwater levels the very eastern portion of the subarea do not stabilize
  - Pumping in Corral de Tierra subbasin of the Monterey subbasin of the Salinas Valley Basin having an effect in the Seaside Basin

SUPPLEMENTAL SUPPLIES
BEING CONSIDERED

- Monterey Peninsula Water Supply Project (MPWSP)
  - 6.4 MGD Desalination Plant
  - Pure Water Monterey Project (3,500 AFY high quality purified water for recharge)
- Regional Urban Water Augmentation Project (RUWAP) - recycled water distribution from the M1W Advanced Wastewater Purification Facility
- DeepWater Desal
- Various projects in the planning stage to increase source water to the M1W Advanced Wastewater Purification Facility

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SUPPLEMENTAL SUPPLIES

- **Implemented since 2009 BMAP:**
  - Sand City Water Supply Project – desalination plant with beach wells
  - Pacific Grove Wastewater Reuse Project – recycled water irrigation at golf course and cemetery
  - Carmel River Water Aquifer Storage and Recovery Project – Phases 1 and 2
- **Various alternatives no longer being considered**

MANAGEMENT ACTIONS

Purpose of management actions

- Raise groundwater levels before supplemental supplies become available
- Optimize existing natural recharge and basin storage capacity
- Manage and reduce the near-term threat of seawater intrusion

1. Increase groundwater recharge

- Enhanced Storm Water Recharge within the City of Seaside
- Modeling shows injection as a recharge mechanism is more effective than in-lieu recharge for raising groundwater levels

MANAGEMENT ACTIONS

2. **Decrease groundwater demand**
   - Water conservation
   - Recycled water for Laguna Seca golf courses

3. **Operational management**
   - Redistribute pumping amongst existing wells
   - Install new Southern Coastal Subarea production wells to shift pumping from Northern Coastal Subarea – use model to optimize locations
   - Install new Northern Inland Subarea production wells to shift pumping from Northern Coastal Subarea – modeled to have limited benefit
   - Coordinate with neighboring Sustainability Management Planning agencies

RECOMMENDATIONS

1. **Encourage implementation of selected management actions**
   - Install new Southern Coastal Subarea production wells
   - Recycled water for Laguna Seca golf courses
   - Water conservation
   - Coordination with the Salinas Valley Basin Groundwater Sustainability Agency (Laguna Seca Subarea management)
   - Enhanced storm water recharge within the City of Seaside

2. **Groundwater modeling to determine a combination of management actions and supplemental supply projects that achieve protective groundwater elevations at the coast**

QUESTIONS?

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