
Testimony of Paul D. Horton
Principal Hydrogeologist, P.G., C.HG.
- R.G. in Oregon
- MS in Geology
-- 24 years experience
MORO
DITCH
SWISS CANYON
North Pasture
South Pasture
Pasture 1
Pasture 2
Pasture 3
Pasture 4
Pasture 5
Pasture 6
Pasture 7
WEATHER STATION
EL SUR RANCH
MOLERA STATE PARK
AMSP CAMP GROUND
AMSP PARKING LOT
OLD WELL
NEW WELL
NAVY WELL
ZONE 4
ZONE 3
ZONE 2
N
0
750
1500
HORIZONTAL SCALE IN FEET
LEGEND
Irrigation Valves
Piping Runs (Easements)
Map provided by: Aerial Photomapping Services (photo date Dec-03)
Surveying provided by: Rasmussen Land Surveying, Inc.
EL SUR RANCH
BIG SUR, CALIFORNIA
EL SUR RANCH
AERIAL VIEW
PROJECT NO.
DATE
DRAWN BY:
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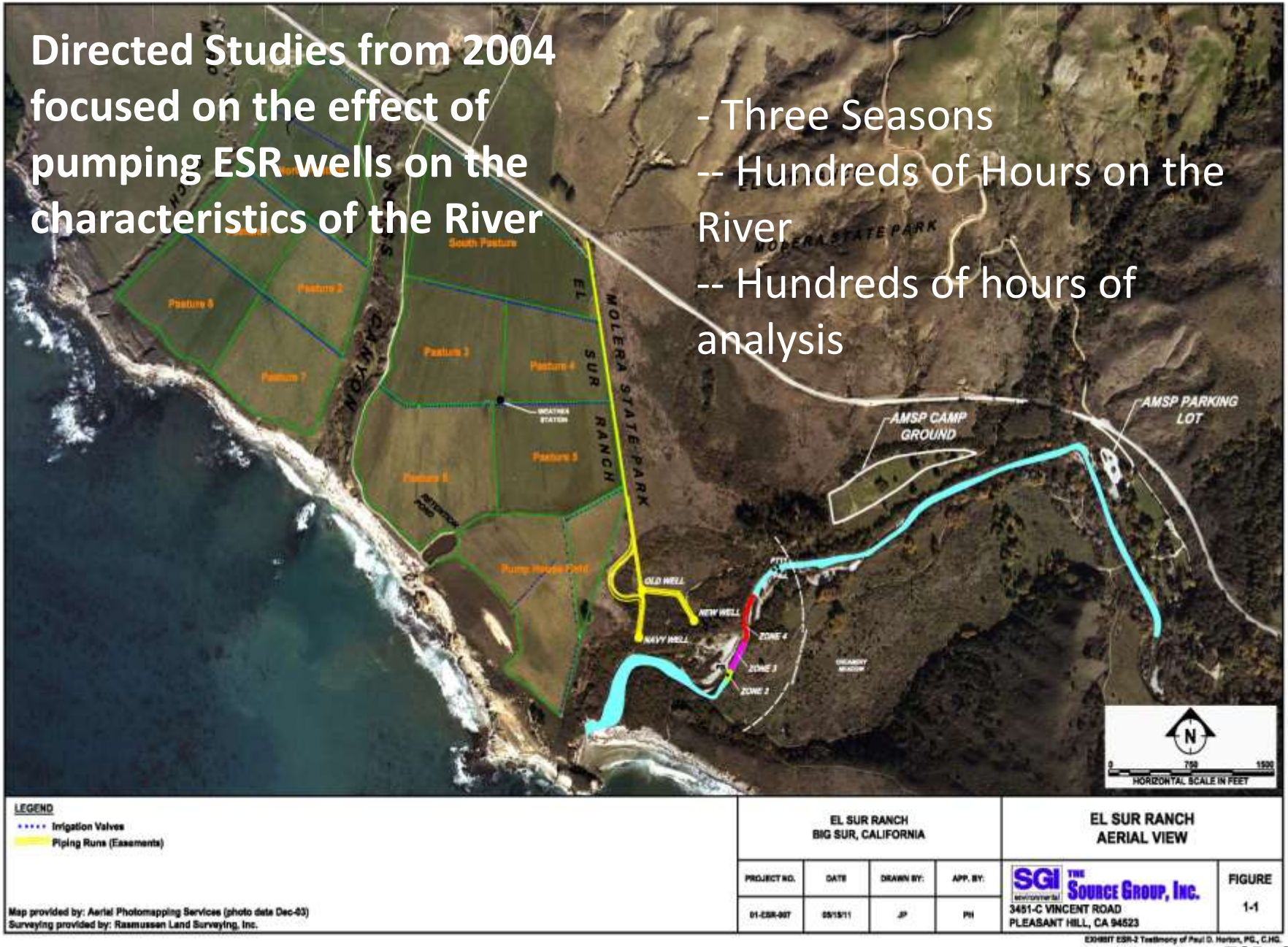
01-ESR-007
05/15/11
JP
PH
SGI
THE SOURCE GROUP, INC.
3451-C VINCENT ROAD
PLEASANT HILL, CA 94523
FIGURE
1-1
EXHIBIT ESR-2 Testimony of Paul D. Horton, PG., C.HG.


Directed Studies from 2004 focused on the effect of pumping ESR wells on the characteristics of the River
- Three Seasons
-- Hundreds of Hours on the River
-- Hundreds of hours of analysis
MOLERA STATE PARK
EL SUR RANCH
MOLERA STATE PARK
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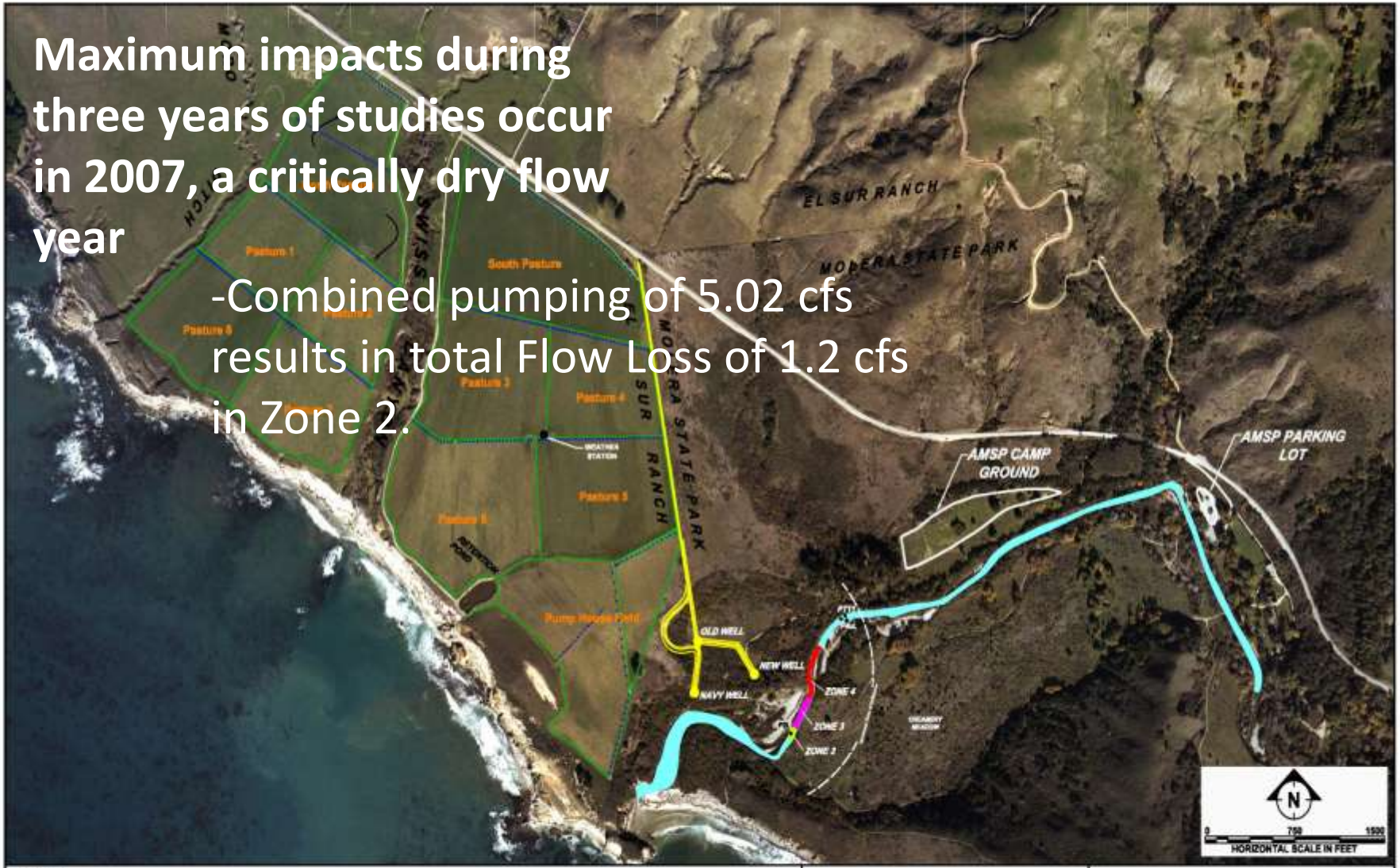
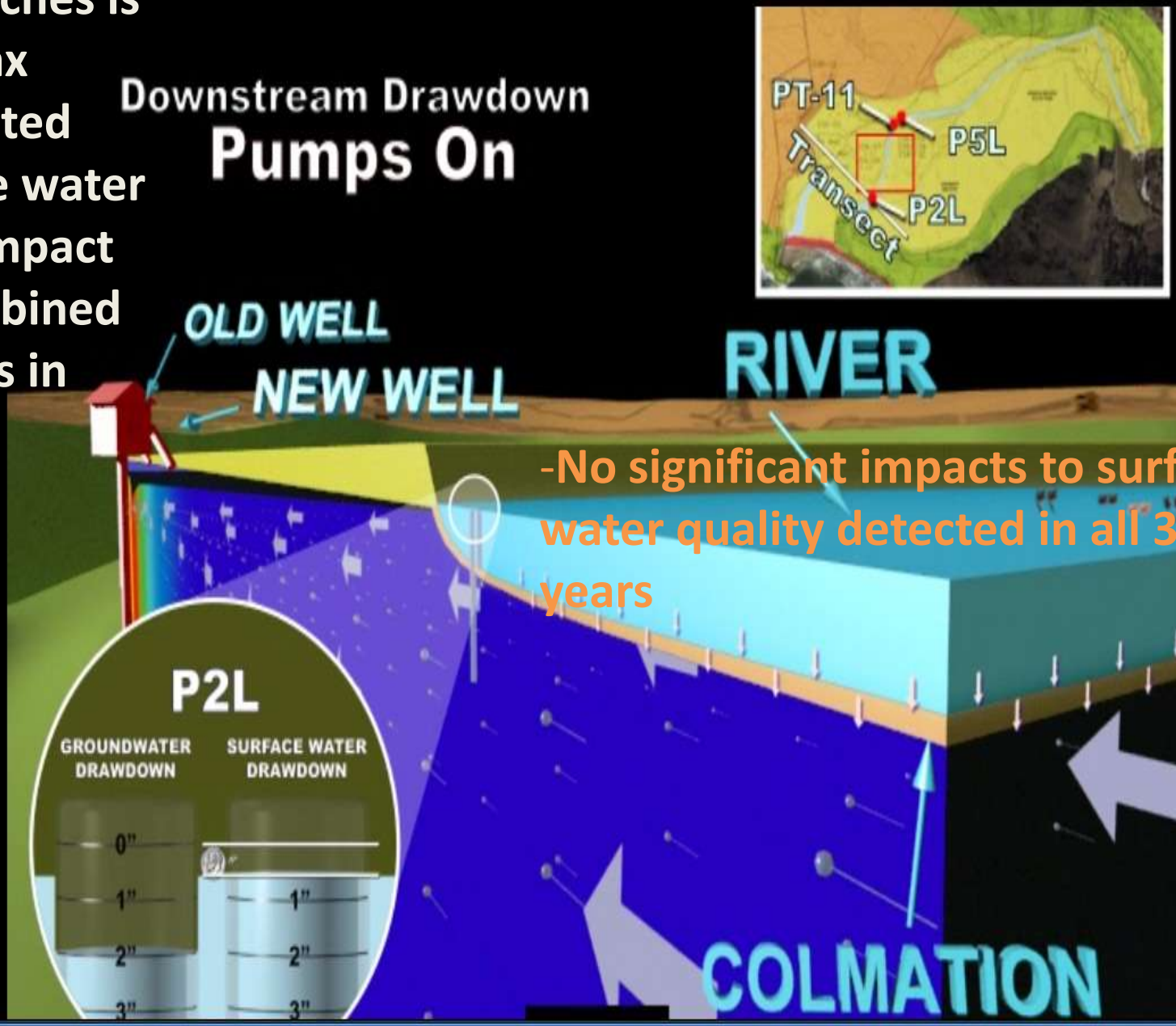
Maximum impacts during three years of studies occur in 2007, a critically dry flow year

-Combined pumping of 5.02 cfs results in total Flow Loss of 1.2 cfs in Zone 2.



- 0.5 inches is the max calculated surface water level impact at combined 5.02 cfs in 2007.

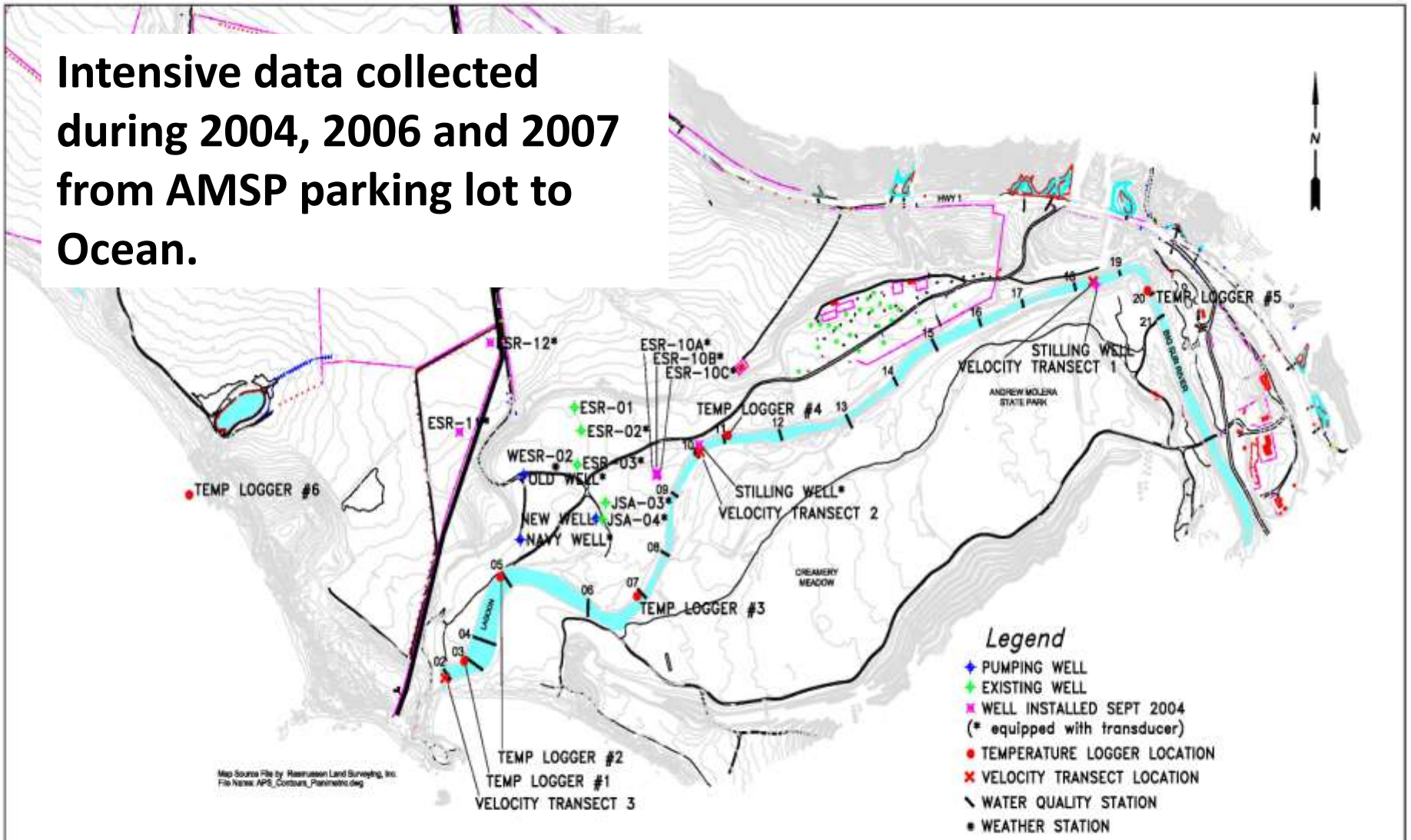


-No significant impacts to surface water quality detected in all 3 years

08:04

Volume

Intensive data collected during 2004, 2006 and 2007 from AMSP parking lot to Ocean.



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SCALE
0 500 1000
SCALE IN FEET

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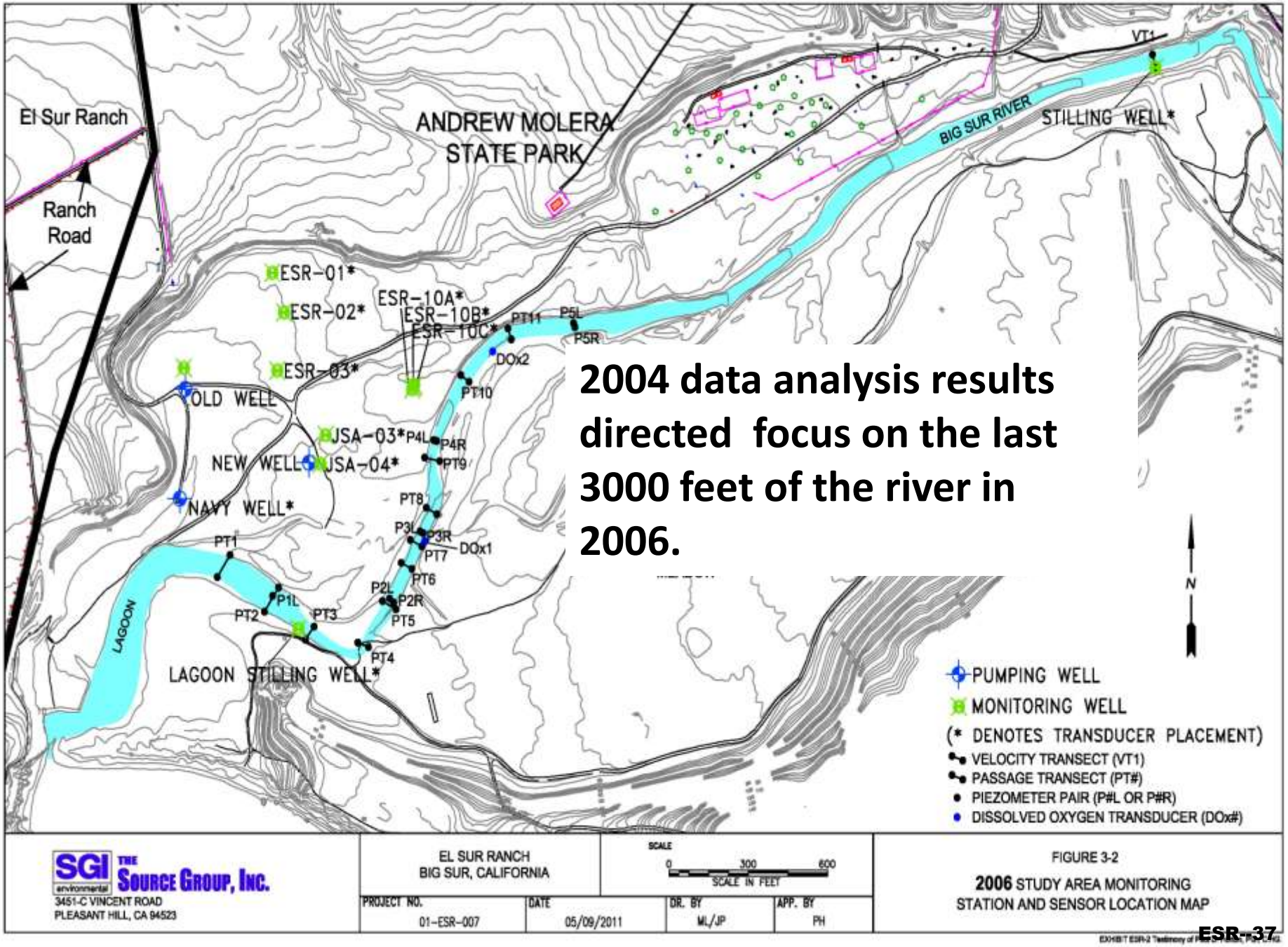
FIGURE 3-1

2004 MONITORING STATION MAP



2004 data analysis results directed focus on the last 3000 feet of the river in 2006.

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0 300 600
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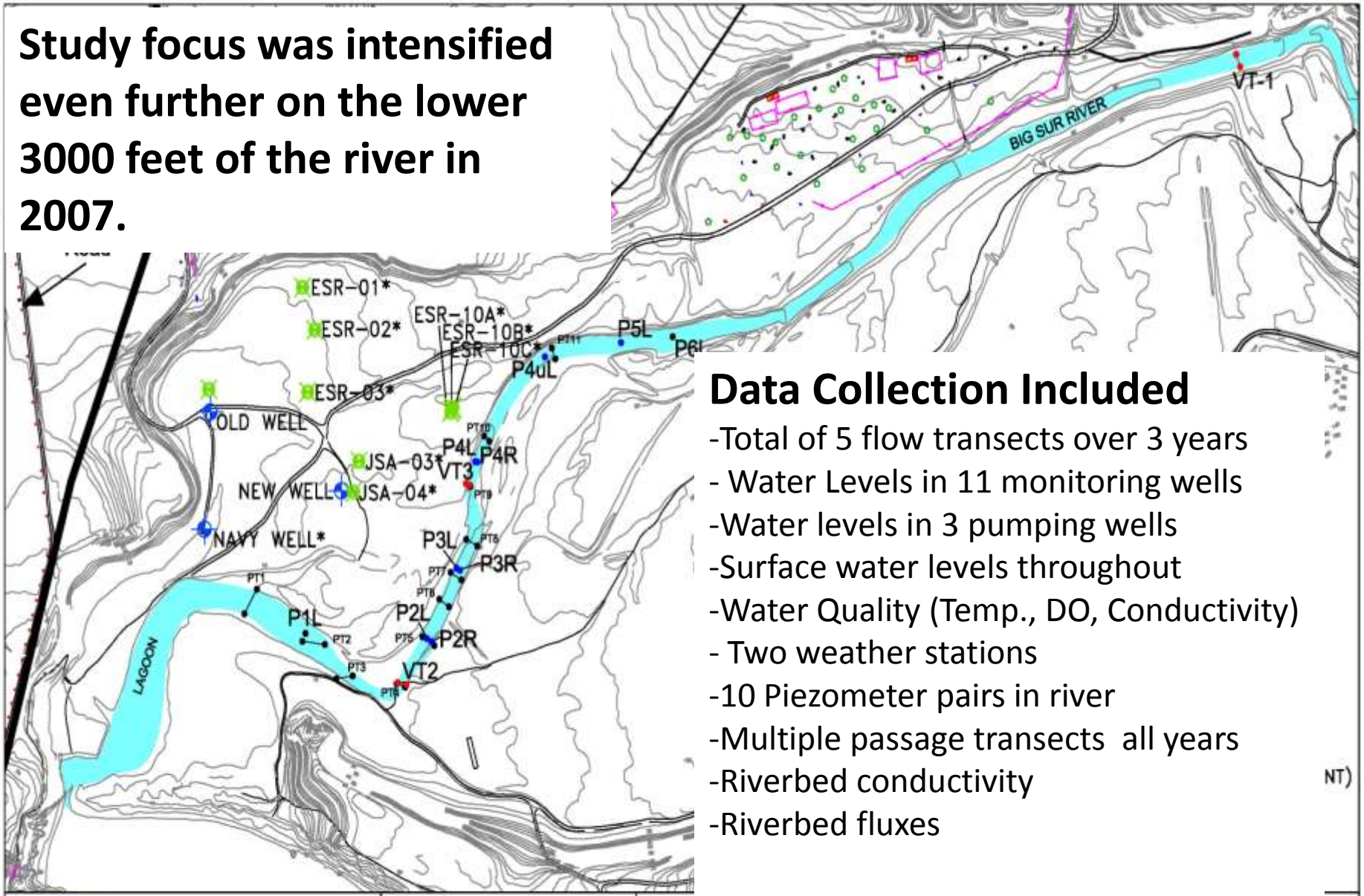
FIGURE 3-2
2006 STUDY AREA MONITORING STATION AND SENSOR LOCATION MAP

Study focus was intensified even further on the lower 3000 feet of the river in 2007.



Data Collection Included

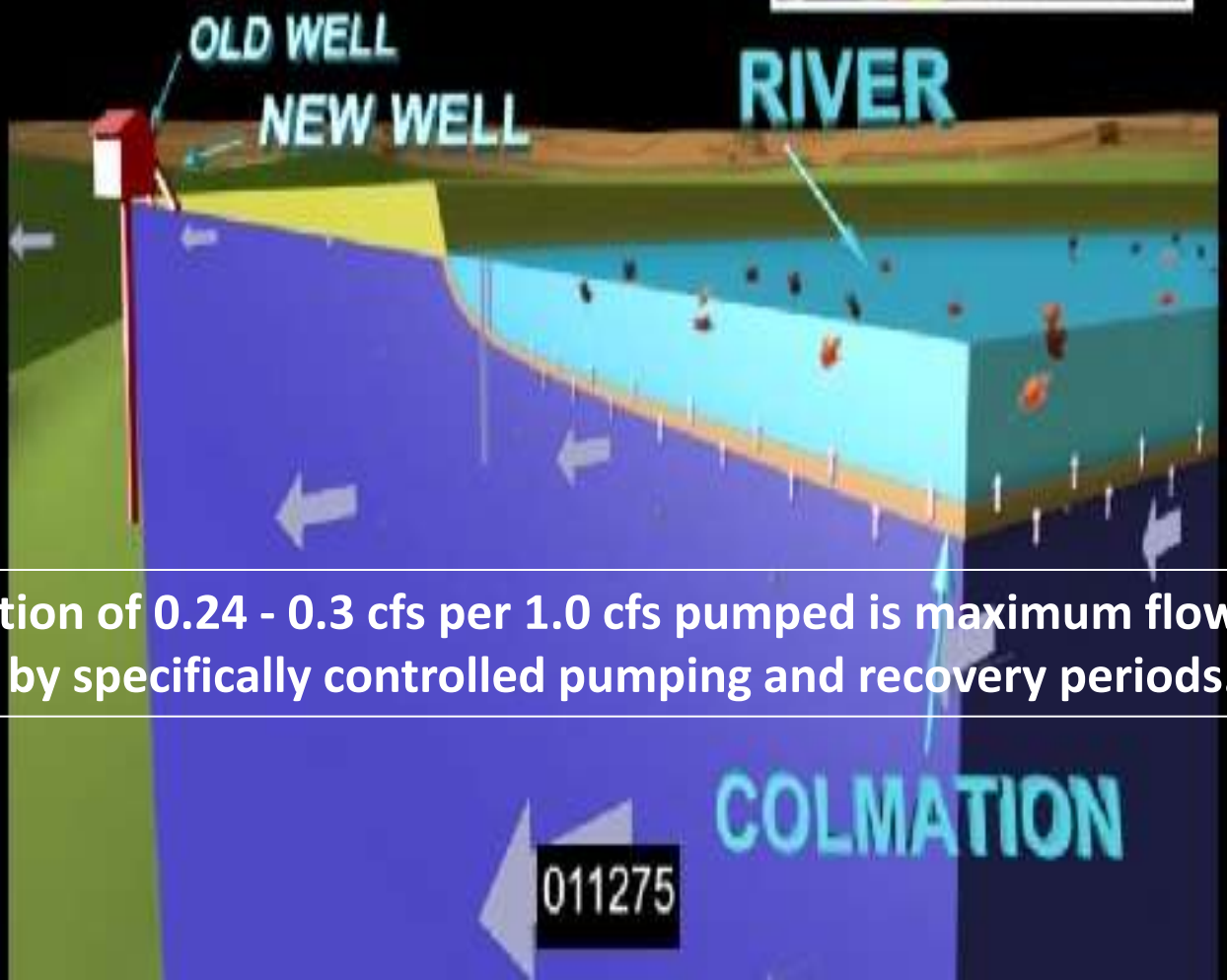
-Total of 5 flow transects over 3 years
- Water Levels in 11 monitoring wells
-Water levels in 3 pumping wells
-Surface water levels throughout
-Water Quality (Temp., DO, Conductivity)
- Two weather stations
-10 Piezometer pairs in river
-Multiple passage transects all years
-Riverbed conductivity
-Riverbed fluxes

Animation

Five Key Conclusions From Studies

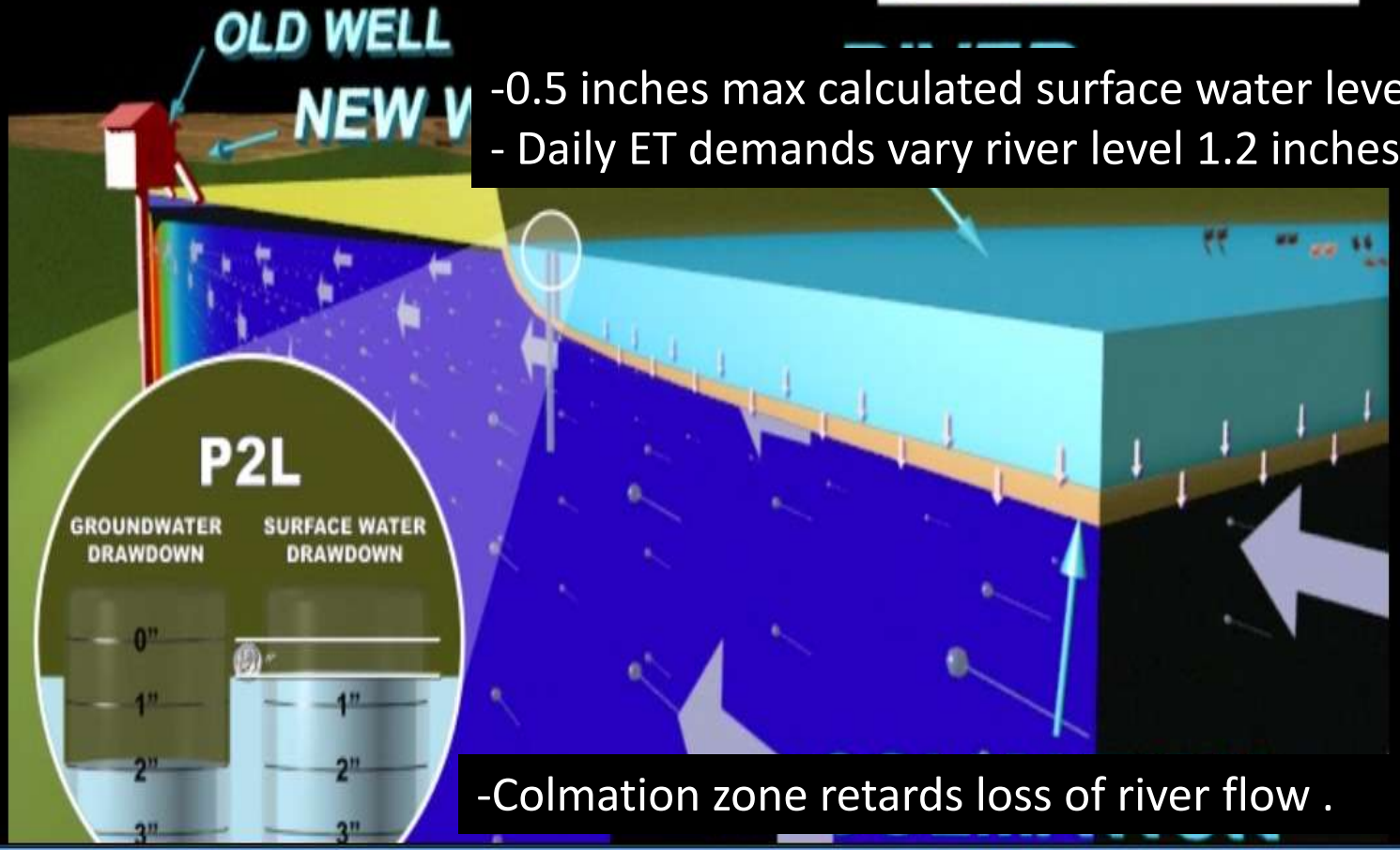
1st) El Sur Ranch irrigation pumping primary effect is to reduce the benefit of natural groundwater inflows when river flow is at critically dry levels

The primary effect of pumping on the River is to reduce the benefit of natural inflows from groundwater.



-Inflow reduction of 0.24 - 0.3 cfs per 1.0 cfs pumped is maximum flow impact
- Determined by specifically controlled pumping and recovery periods.

Pumping at combined 5.02 cfs in 2007 yielded 1.2 cfs loss at P2L area of Zone 2.



-0.5 inches max calculated surface water level impact
- Daily ET demands vary river level 1.2 inches

-Colmation zone retards loss of river flow .

08:04
Volume

2nd) El Sur Ranch Irrigation Pumping has a theoretical maximum zone of influence in groundwater of 1000 feet. Measured impacts do not extend this far.

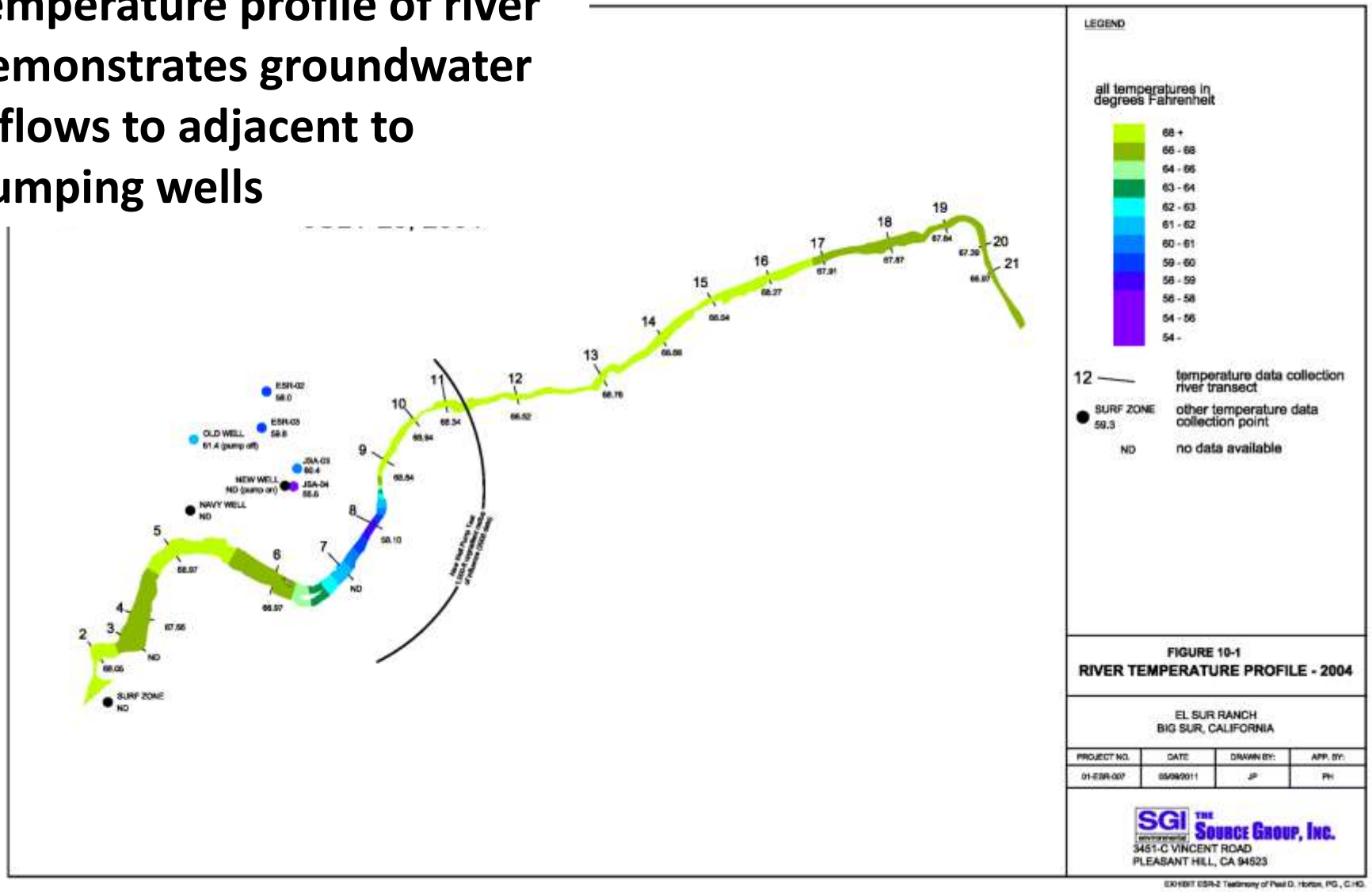
Maximum theoretical zone of influence (ZOI) is calculated at 1000 feet from New Well

-No drawdown in groundwater or surface water was measured at locations P4UL and P5L that straddle the PT 11 location and the calculated ZOI

03:33
Seek

3rd) El Sur Ranch Irrigation Pumping is not significantly impacting River water quality

Temperature profile of river demonstrates groundwater inflows to adjacent to pumping wells

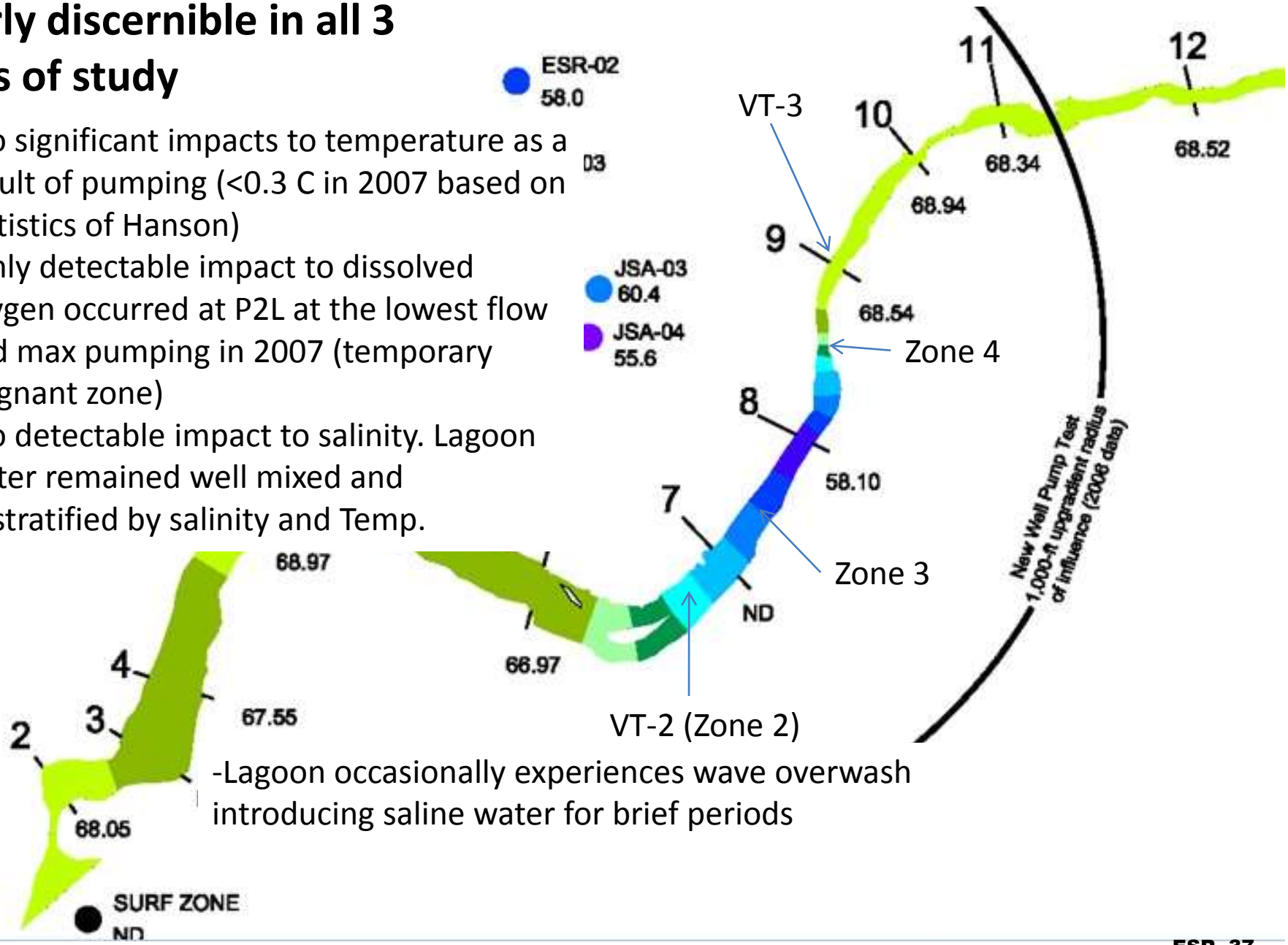


The cooling effect of inflow is clearly discernible in all 3 years of study

-No significant impacts to temperature as a result of pumping (<0.3 C in 2007 based on statistics of Hanson)

-Only detectable impact to dissolved oxygen occurred at P2L at the lowest flow and max pumping in 2007 (temporary stagnant zone)

-No detectable impact to salinity. Lagoon water remained well mixed and unstratified by salinity and Temp.



-Lagoon occasionally experiences wave overwash introducing saline water for brief periods

4th) El Sur Ranch Irrigation Pumping is minimal compared to total watershed discharge moving past the wells.

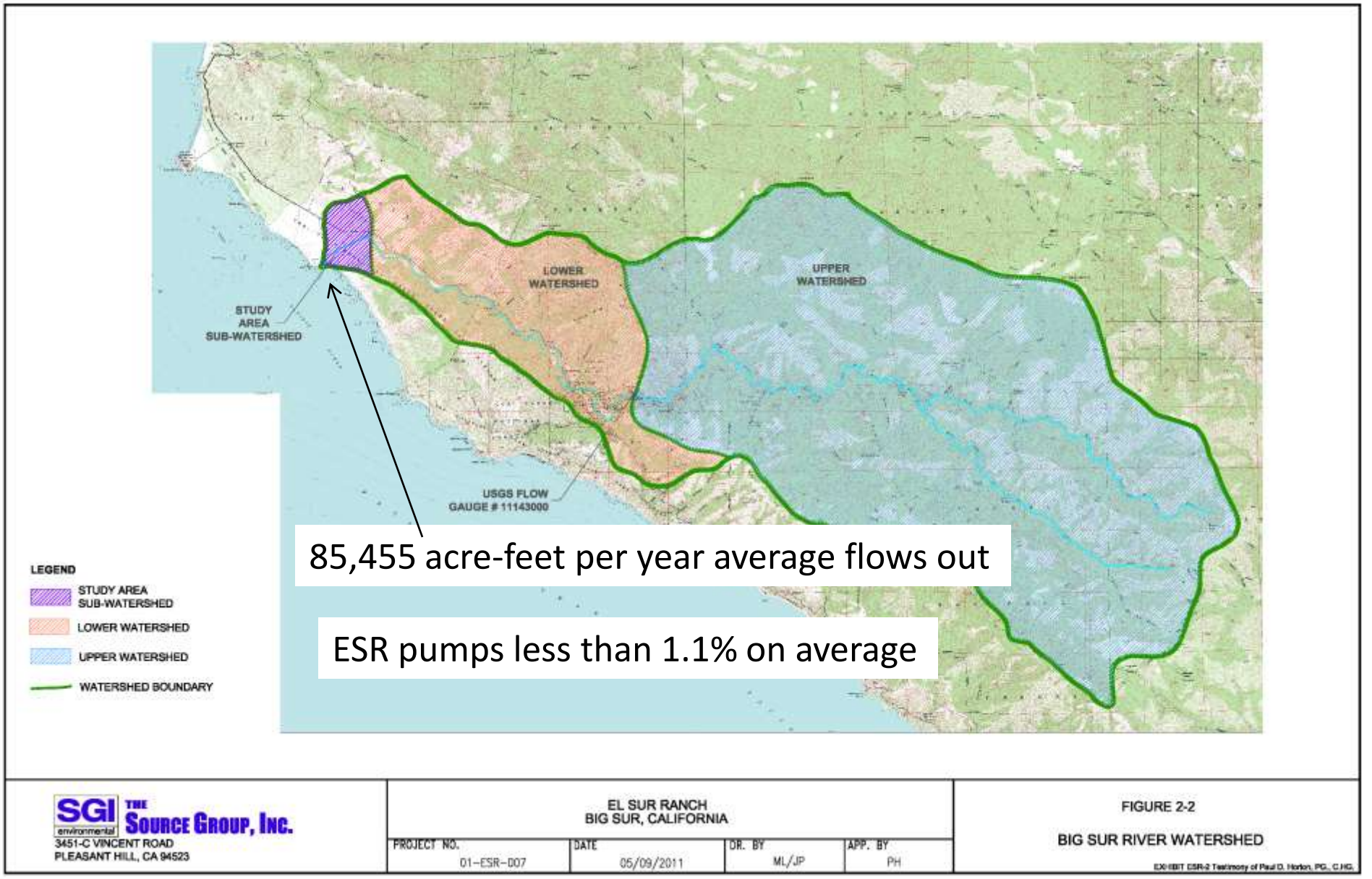


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FIGURE 2-2

BIG SUR RIVER WATERSHED

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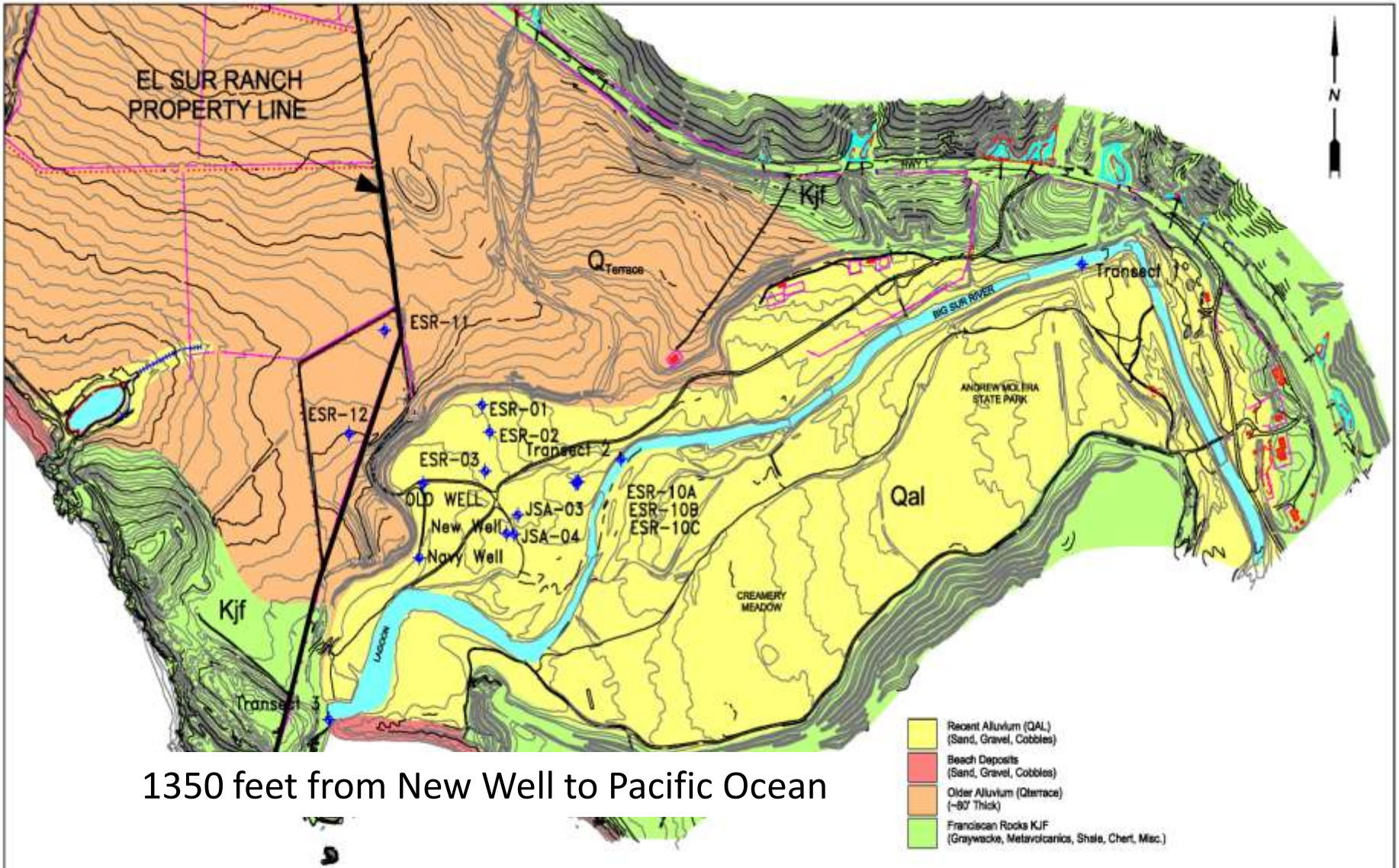

1350 feet from New Well to Pacific Ocean

Map Source File by Rasmussen Land Surveying, Inc.
File Name: APS_Contours_Planimetric.dwg

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0 500 1000
SCALE IN FEET

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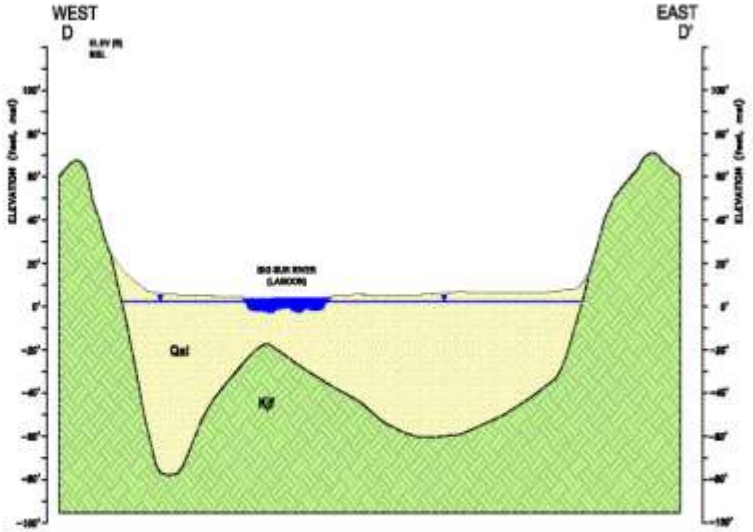
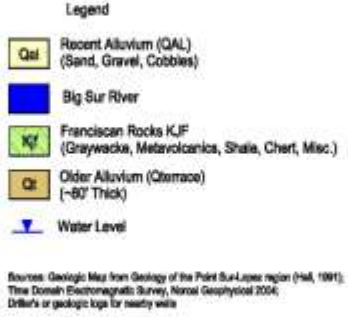
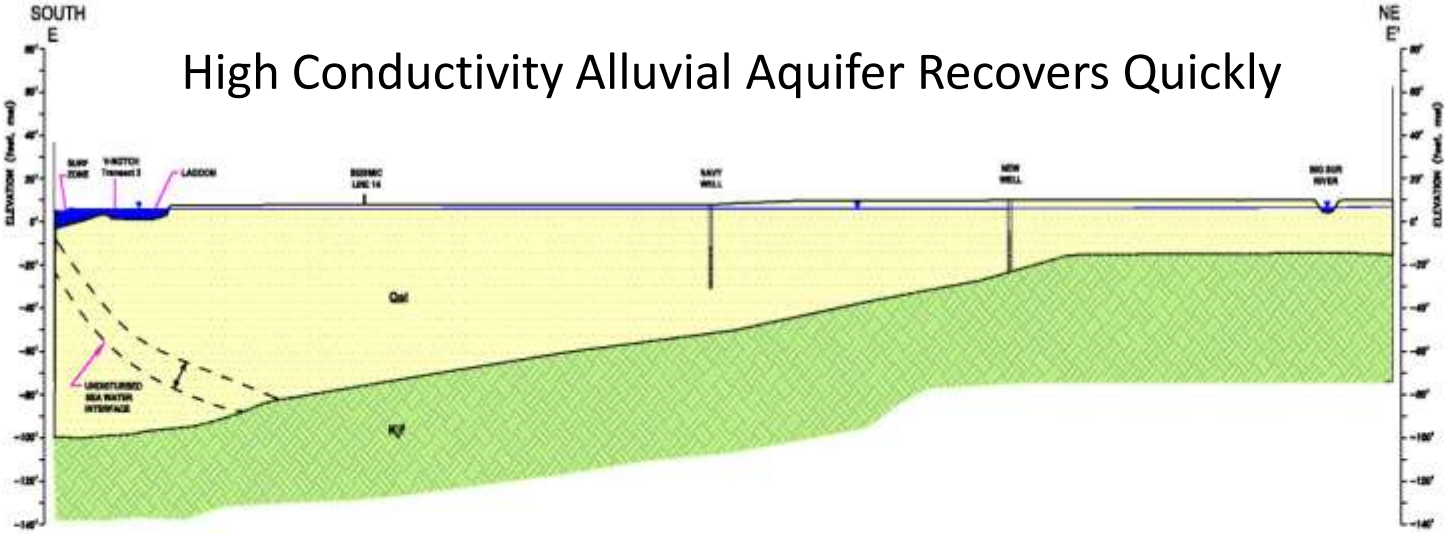
FIGURE 4-2

STUDY AREA GEOLOGIC MAP

5th) El Sur Ranch Irrigation Pumping impacts to the aquifer water levels are temporary and local. Aquifer overdraft is not occurring and, based on water use history and requirements by El Sur Ranch, not an issue for the future







High Conductivity Alluvial Aquifer Recovers Quickly

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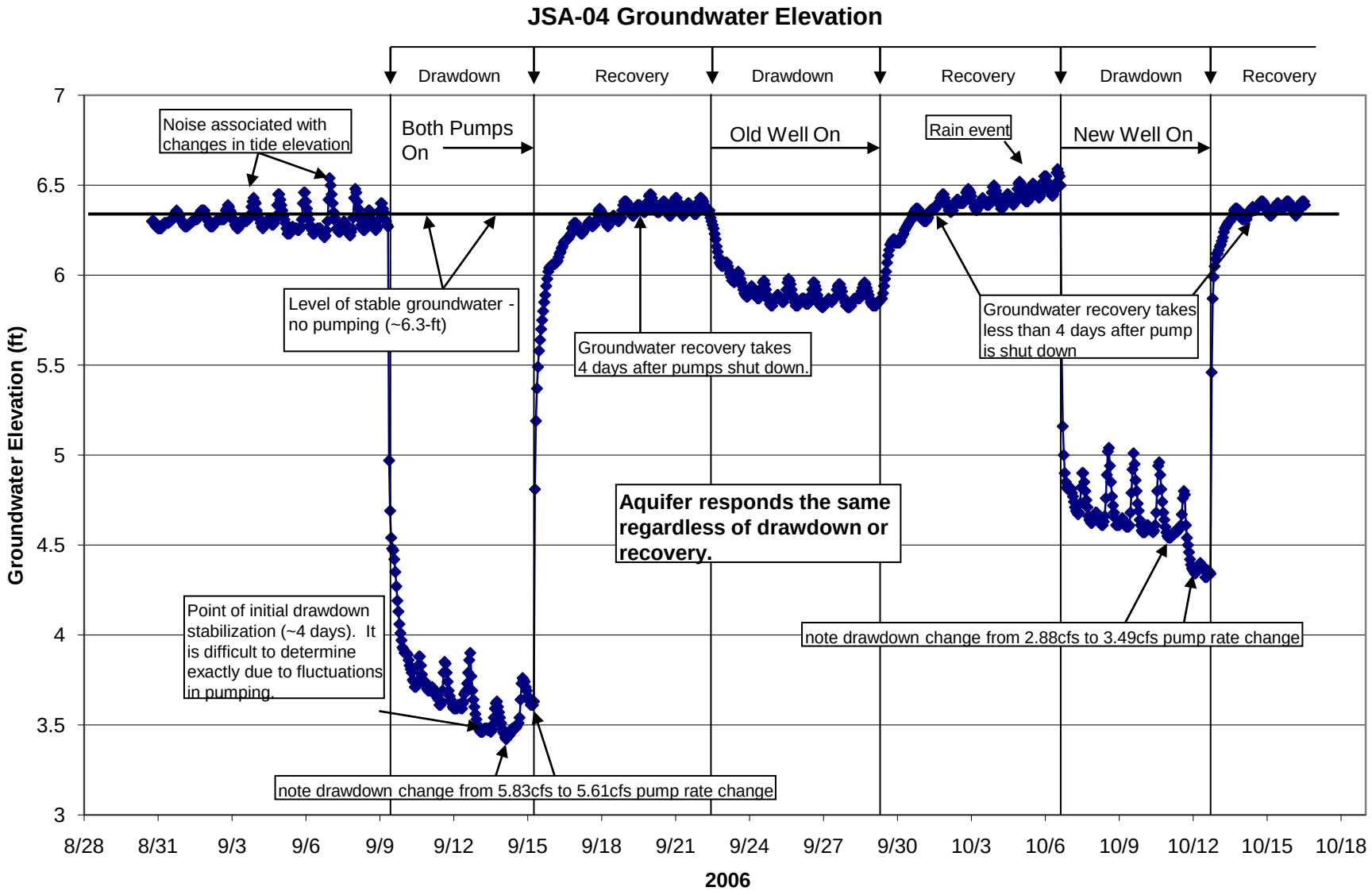
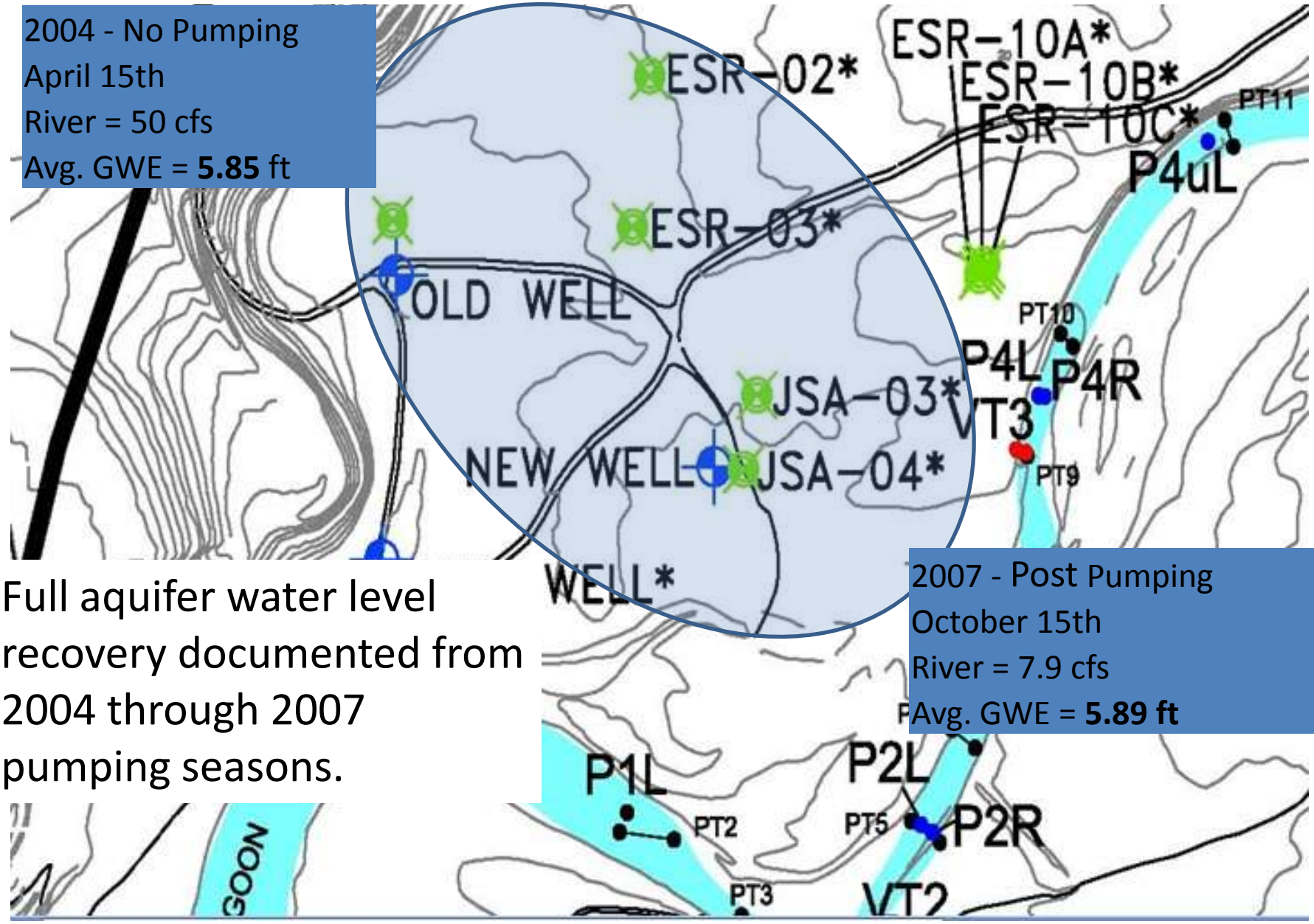
Water level drawdown stabilizes and recovers in 4 days in response to standard El Sur Ranch pumping rates.



Aquifer Water Levels Across the Seasons



Full aquifer water level recovery documented from 2004 through 2007 pumping seasons.