

NAVARRO RIVER

Notes for Viticulture

Anderson Valley Pinot Noir Festival
Zac Robinson
April 2009

Navarro Watershed

- 315 square miles of watershed
- average about 48" annual rain
- → 800,000 af of precip

- Average river flow = 1000 af / day
- Annual flow 350,000 af
- Highly seasonal

Flow is Very Seasonal

- Average river flow = 1000 af / day
- April = 1000 af/ day
- August = 21 af/day
- September = 18 af/day

2009 Navarro Flow, Drought?

- Jan '09= 5th percentile
- Feb '09= 50th percentile
- Today = 50th percentile

- Are we saved by late rain ???

Navarro Low Flow

- Everyone is focused on low flow
 - ◆ Regulators
 - ◆ Activists
 - ◆ Agriculture
 - ◆ Fish?
- Usually September
- 1977 = dry
- Can we predict 2009?

Low Flow Prediction

Statistical Regression 1952-2008 data

1. Rainfall → increases flow
2. Late Rains → increase flow
3. Previous Year Rainfall → increases flow
4. Summer Heat → decrease flow
5. Early fall (arrival cold nights) → inc. flow
6. Mystery factor → decrease flow

Low Flow Prediction (cont)

- If no more rain in 2009...
- If average weather in 2009...

2nd LOWEST RIVER FLOW SINCE
1952. (ONLY 1977 LOWER.)

Why Will the Navarro Go So Low?

- Climate trends
 - ◆ Changes in rainfall patterns
 - ◆ Some of these changes confirm AV viticultural lore
- Man-made changes
 - ◆ Development

Rainfall Shift

- LORE: “The chardonnay isn’t ripe until we have 2 inches in the rain gauge”
- DATA: Fall rains arrive 10-14 days later.

More Rainfall Shift

- LORE: “It doesn’t frost in AV like it used to.”
- DATA: Spring rains linger 10 days later

River Flows Are Shifting

- Last moderate flow (in Spring) has shifted by about 30 days
- First moderate flow (in Fall) has shifted by same amount.

River Losing Summer Flows

- The regression equation points to an unexplained loss of flow (the “mystery factor”) that increases every year (1952-2008).
- The loss of flow is about 1 cfs every eight years.
- Over last 55 years loss = 7 cfs

Surviving the drought 2009

- Water conservation
- Consider winter storage (ponds)
- Talk with neighbors
- Minimize pumping of rivers, streams, and groundwater
- Support local research