

RESERVOIR PREDICTION: MANAGING CALIFORNIA'S WATER RESOURCES

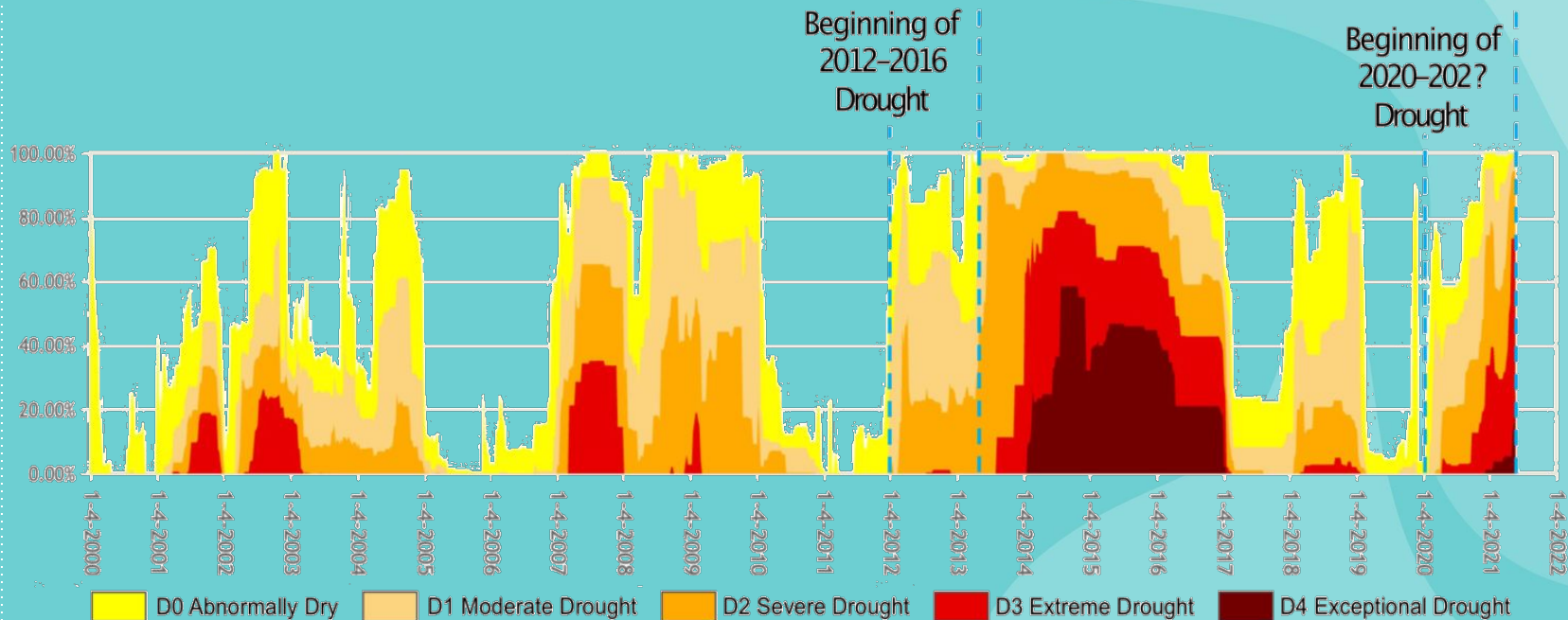


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CAN MACHINE LEARNING BE USED IN LONG-TERM WATER RESOURCE MANAGEMENT?



INCREASING DURATION AND SEVERITY OF DROUGHTS



KEY WATERSHEDS

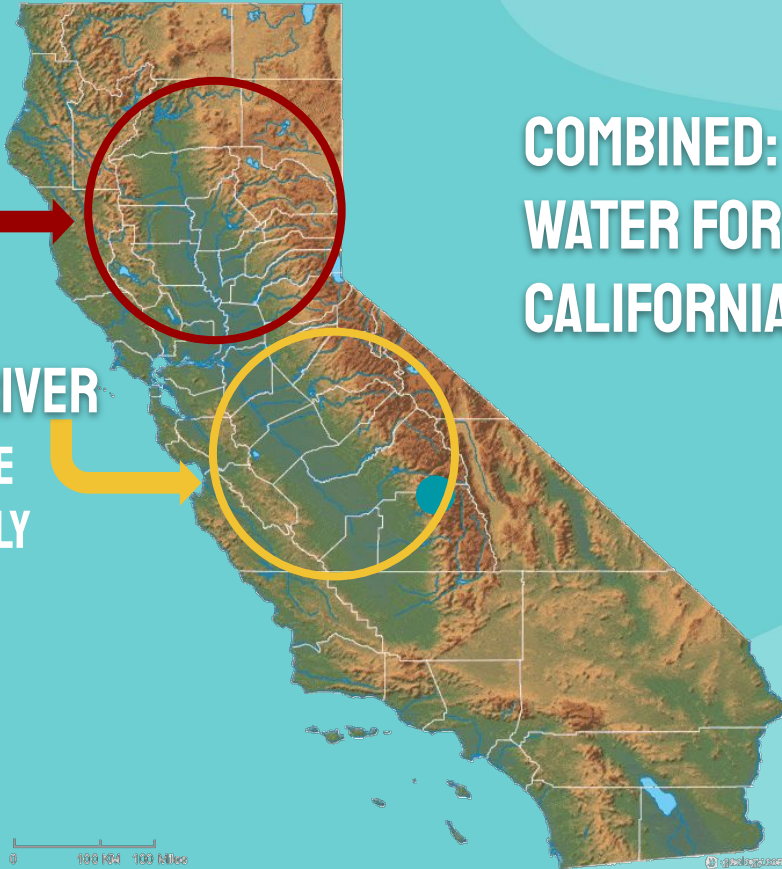
SACRAMENTO RIVER

- 35% OF STATE WATER SUPPLY

SAN JOAQUIN RIVER

- 16 % OF STATE WATER SUPPLY

COMBINED: PROVIDE
WATER FOR 27 MILLION
CALIFORNIANS

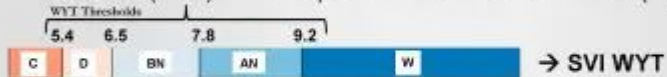


WATER YEAR INDEXING

SVI & SJI: WYT Construction

$$WY_{index} = X_{coeff} * X_{index} + Y_{coeff} * Y_{index} + Z_{coeff} * Z_{index-1}$$

$$SVI\text{-index (MAF)} = 0.4 * \text{Apr-Jul} + 0.3 * \text{Oct-Mar} + 0.3 * (\text{cap at 10 MAF})$$



$$SJI\text{-index (MAF)} = 0.6 * \text{Apr-Jul} + 0.2 * \text{Oct-Mar} + 0.2 * (\text{cap at 4.5 MAF})$$



CALIFORNIA DEPARTMENT OF
WATER RESOURCES

STRENGTH:

- ENSURED ACCURACY

WEAKNESS:

- ONLY PREDICTED HALFWAY THROUGH WATER YEAR
- BRUTE PERCENTAGES

OUR DATA



5 STATION SOUTH SIERRA INDEX

Daily precipitation for
the San Joaquin
Watershed



RESERVOIR TRACKING

Daily storage and
evaporation levels for
each reservoir.



8 STATION NORTH SIERRA INDEX

Daily precipitation for the
Sacramento Watershed

FOLSOM LAKE



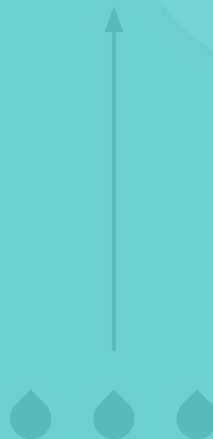
92%

Correlation- matching of
reservoir ebb and flow

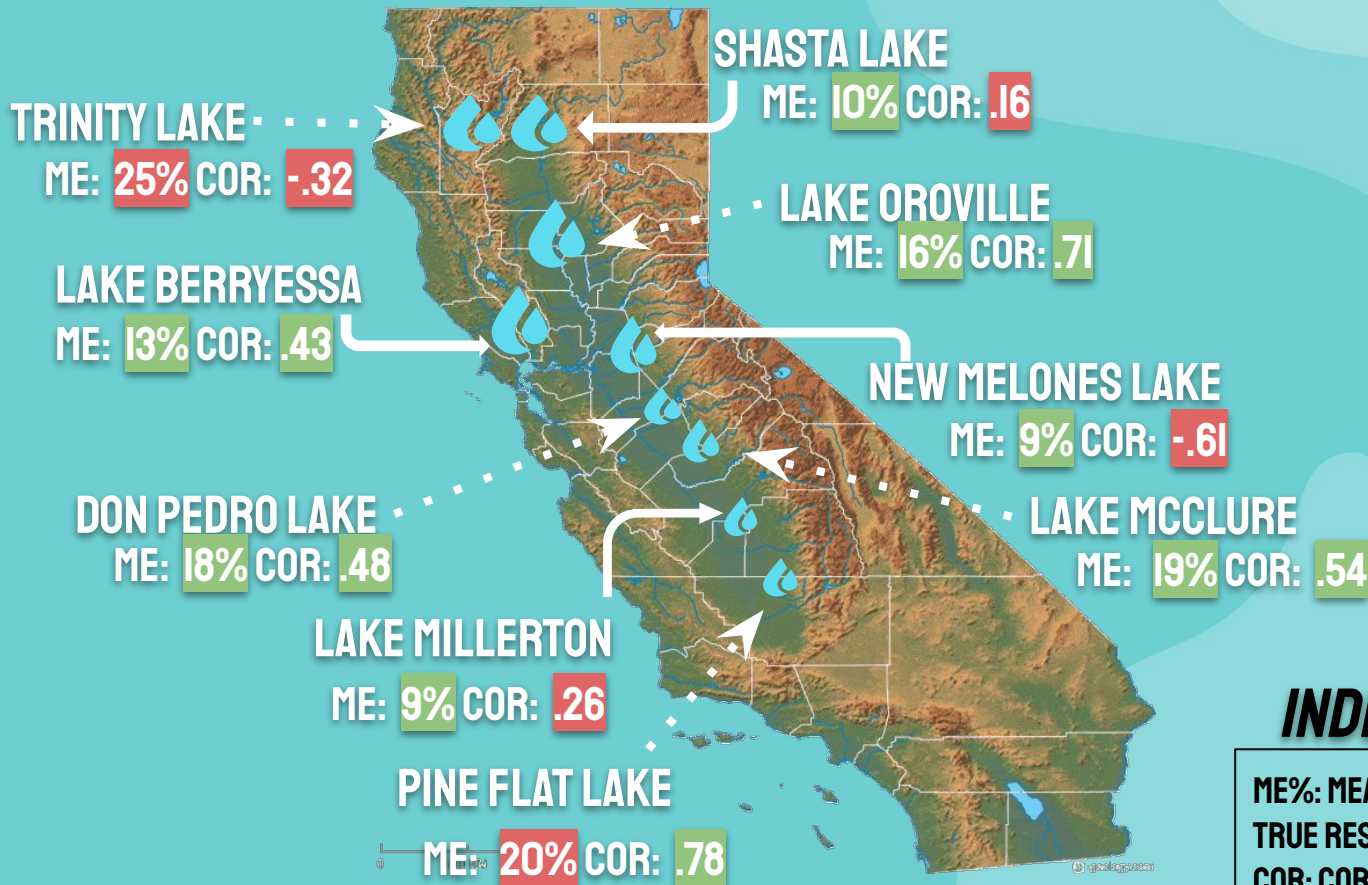


9.5%

Mean error from true
reservoir level



PERFORMANCE ON OTHER RESERVOIRS



INDEX

ME%: MEAN % ERROR FROM
TRUE RESERVOIR LEVEL
COR: CORRELATION TO TRUE
EBB & RISE (SLOPE)

FUTURE WORK

Model and predict
inflows from
environmental data

Individualize
variables for
reservoirs to account
for different outflow
needs

Incorporate long-term
weather forecasts
into models

QUESTIONS?



github.com/jadeadams517/California_Reservoir_Prediction



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