CWEMF
IWFM v4.0 Workshop

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IWFM v4.0:
Introduction

Historical Background

- 1976: UCLA Ph.D. student, Young Yoon, develops a finite element groundwater model to study aquifer parameter estimation (inverse modeling)
- 1979 – 1983: Major revisions to the model and usage by Tetra Tech, Inc. and Boyle Engineering in basin-wide applications
- 1987 – 1990: Incorporation of stream routing and land surface processes, model named as Integrated Groundwater – Surface water Model (IGSM), application to California's Central Valley (CVGSM) as part of the Central Valley Project Improvement Act (CVPIA)
- 1990 – 2000: Additional features (water quality, reservoir operations, vadose zone, land subsidence, tile drains, crop water demand), updates to CVGSM, other applications around California

Historical Background

- 2000 – 2002: Transfer of proprietary software to DWR, major revisions to IGSM theories and code, non-proprietary (GNU licensed) IGSM2 v1.0 released, updates to and re-calibration of CVGSM by DWR begins (improved application renamed as C2VSim)
- 2005: IGSM2 is renamed as Integrated Water Flow Model (IWFM)
- 2005 – 2012: Enhancements (zone budgeting, modified PGMRES solver, time-tracking simulations), additional applications in California and Oregon
- 2012 – present: Release of IWFM v4.0 (May 2012) with improved simulation of root zone processes and water demand (IDC v4.0), explicit simulation of rice and refuge operations, and improved code modularity; applications around California

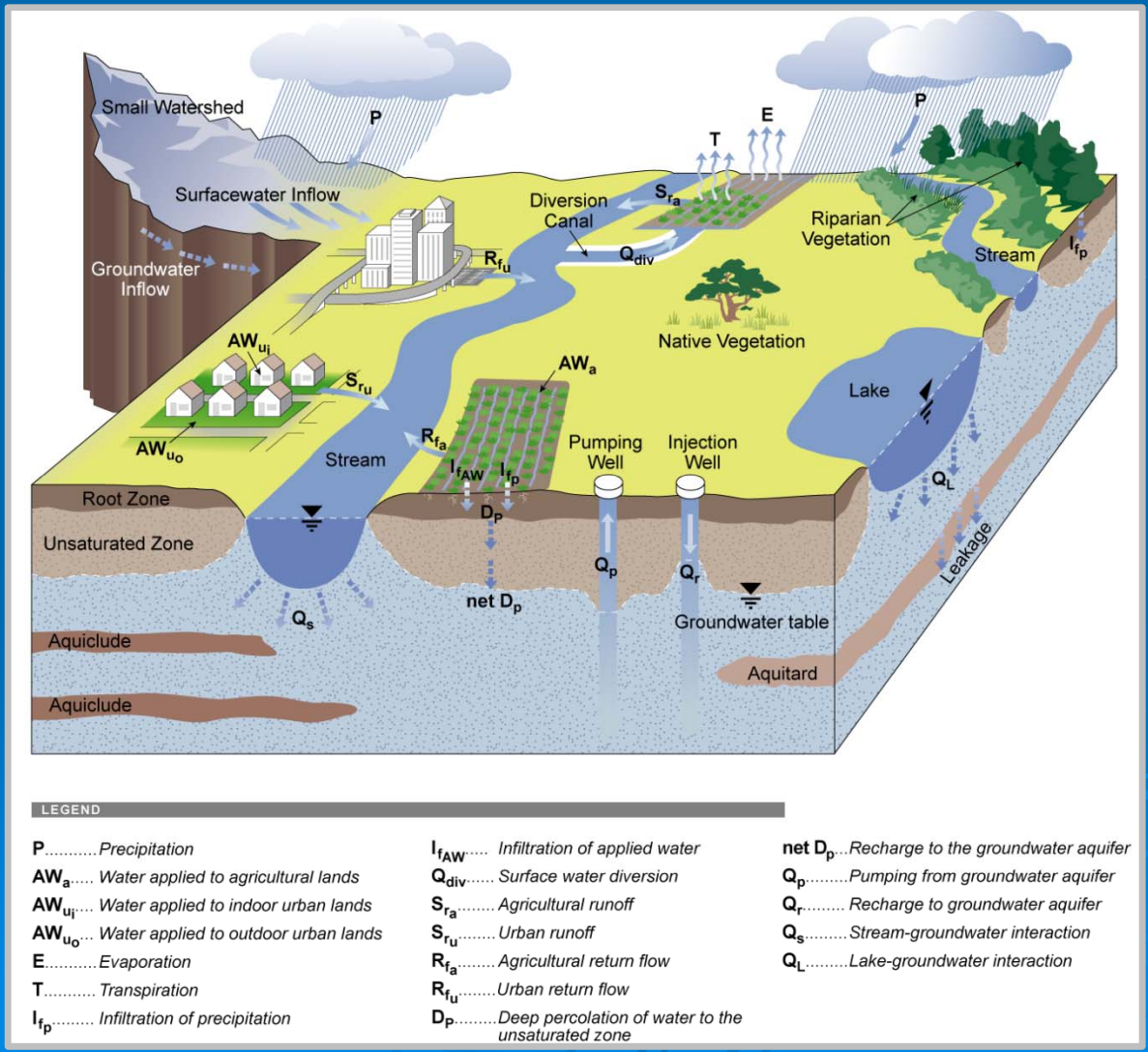
Why was IWFM Developed

- Better understand the historical evolution of water resources in a basin
- Improve accounting of ground water and the surface-ground water interaction in a linked simulation-systems analysis model (i.e. CalSim-C2VSim linkage)
- Study the impacts of climate change on long term groundwater conditions and of meeting future water demands with constrained supplies
- Address the complexities of planning for and implementing Integrated Regional Water Management Plans and conjunctive use projects
- Facilitate easy linking of all or some components of an integrated hydrologic model to other types of models such as agro-economic (e.g. SWAP) and systems analysis (e.g. CalSim) models

IWFM: Overview

- An open-source, regional-scale integrated hydrologic model that simulates groundwater flow, surface flows, and surface-groundwater interactions
- A tool that allows the user to represent agricultural and urban water management practices, and their effects on the water system
- A planning and analysis tool as it computes agricultural and urban water demands based on climatic, soil, land-use and agronomic parameters, and tries to meet these demands with pumping and stream diversions

IWFM: Overview



IWFM: Overview

- Sound theoretical basis
- Extensively tested
- Well documented
- Available for free to the public (posted on website)
- Technical support
- Numerous applications at regional scales
- Peer reviewed
- Linked to systems analysis (reservoir allocation) model CalSim 3.0 and agro-economics model CVPM