

RECLAMATION

Managing Water in the West

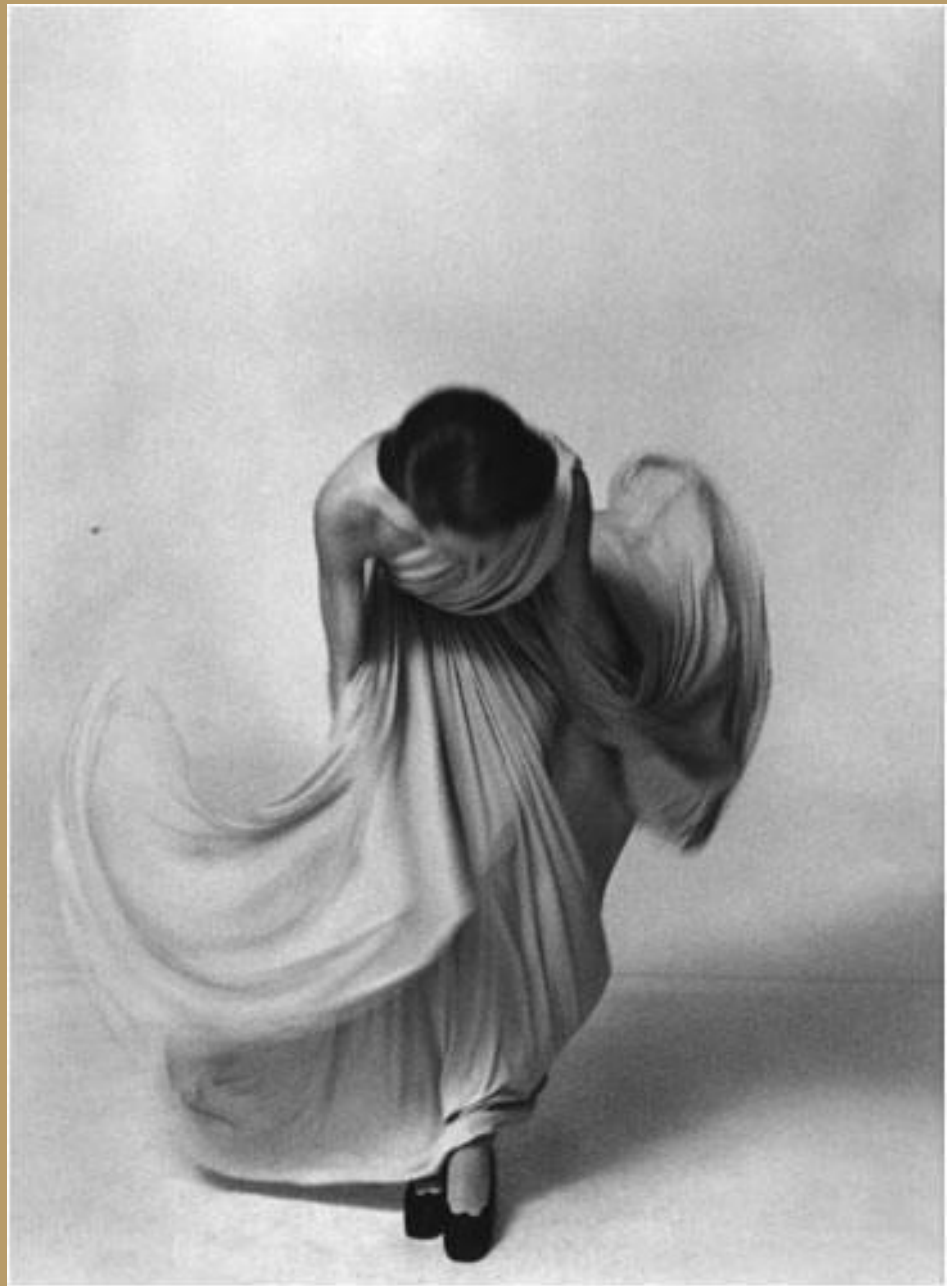
Planning Modeling for USBR Mid Pacific Region

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U.S. Department of the Interior
Bureau of Reclamation

**THANK
YOU !!!**



RECLAMATION

Credits

Walter Bourez

Levi Brekke

Richard Chen

Andy Draper

Dan Easton

Joel Fenolio

Ian Ferguson

Randi Field

Tom FitzHugh

Derek Hilts

Nazul Islam

Rich Juricich

Rob Leaf

Armin Munevar

Erik Reyes

Jeff Sandberg

Derya Sumer

Rob Tull

Hao Xie

Russ Yaworski

RECLAMATION

CALIDAD

- **Early 90's**
- **DSS/GUI Buzz**



- **Externally Supported**
- **Impractical Solution**
- **No MP Involvement**



RECLAMATION

PROSIM Users Manual



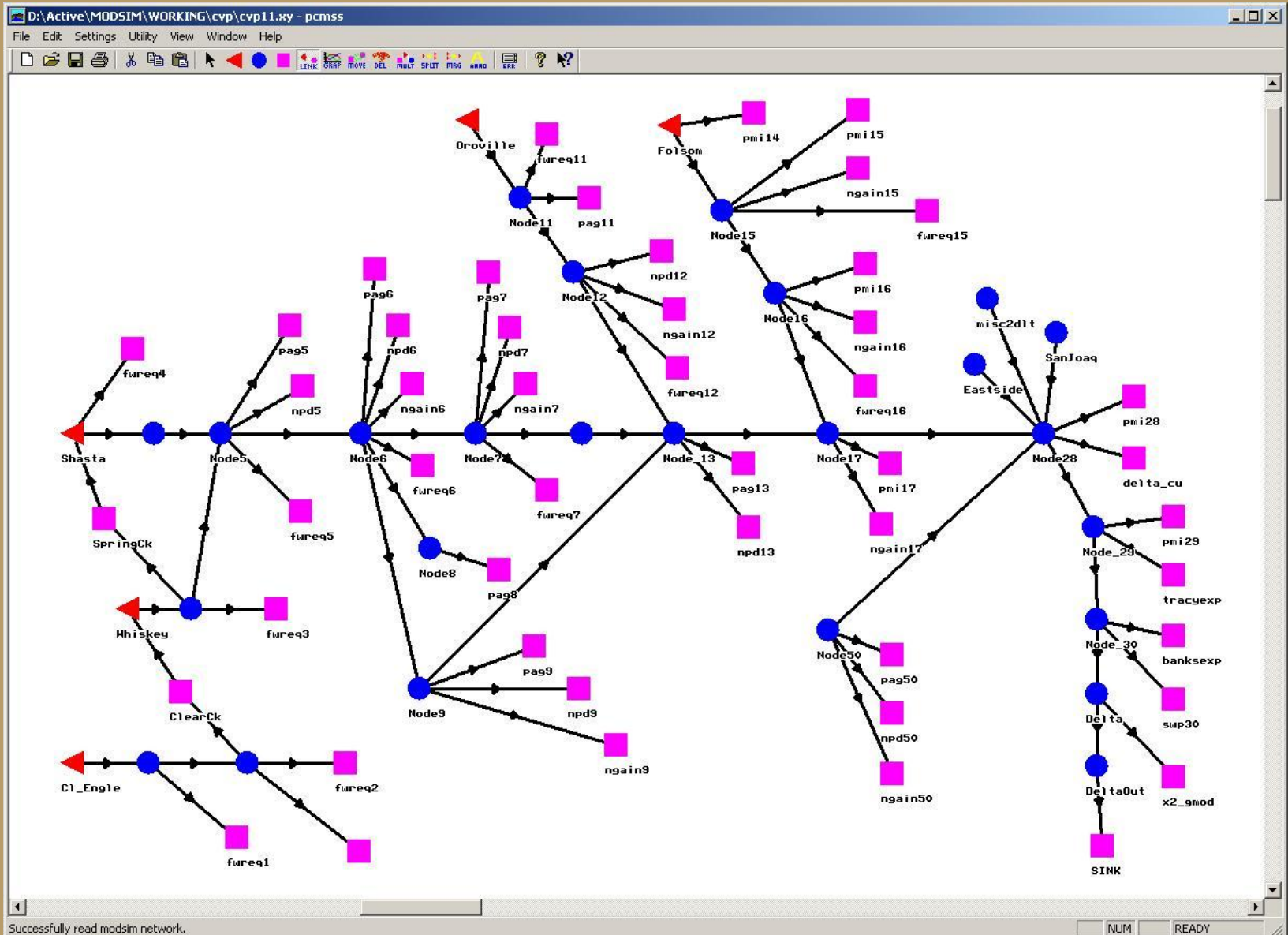
RECLAMATION

Looking for Flexibility

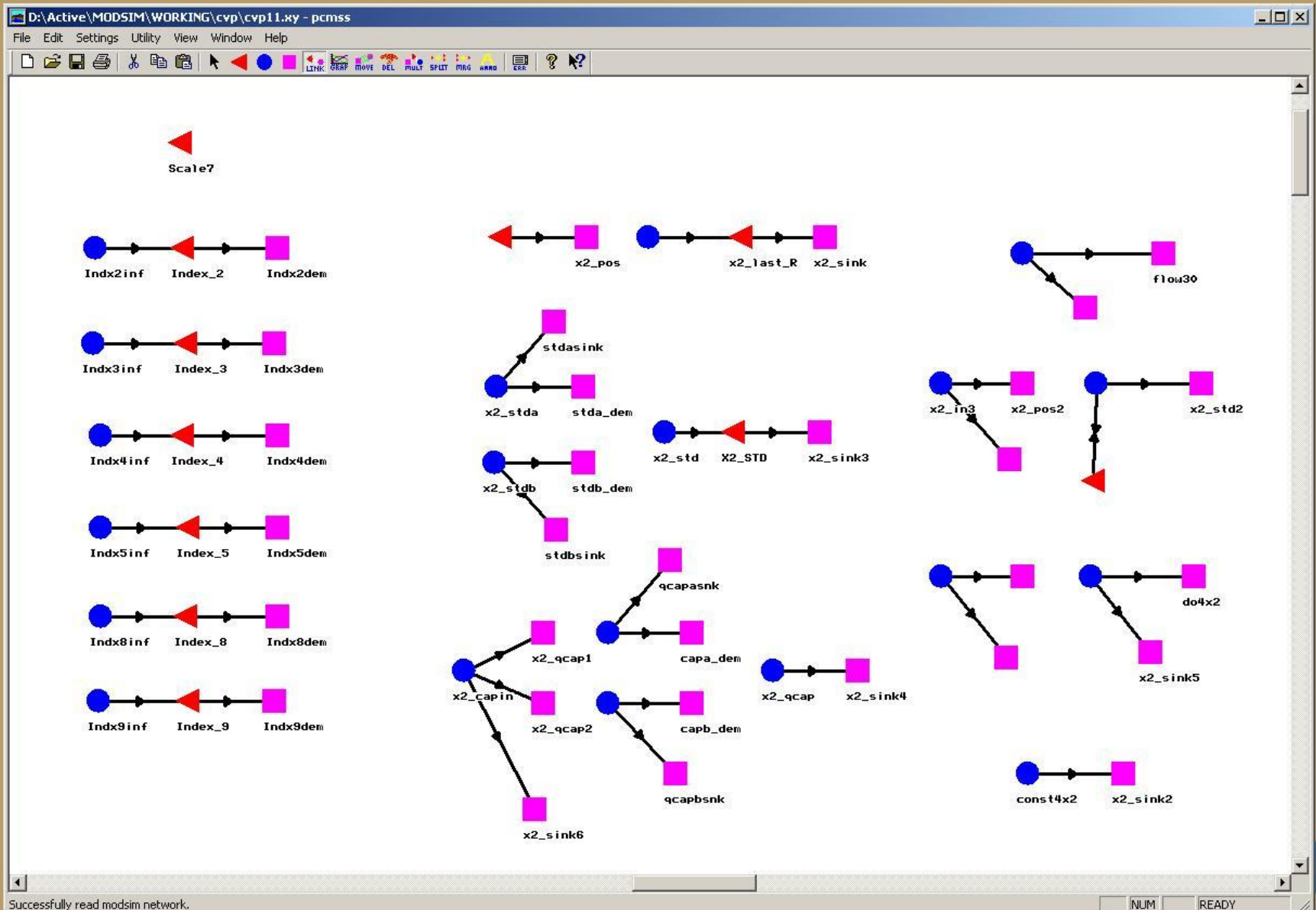
- **PROSIM was hard**
- **New problems**
- **Limited staff**

- **Seeking established environment**
- **User community & support mechanisms**
- **Decided to explore using MODSIM**

PROSIM in MODSIM



X2 Standard in MODSIM



CALSIM / WRIMS

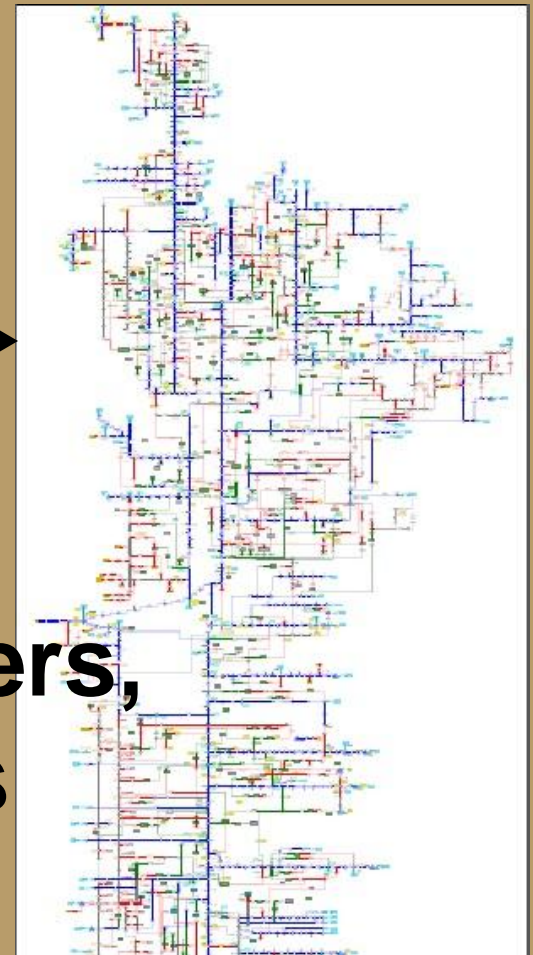
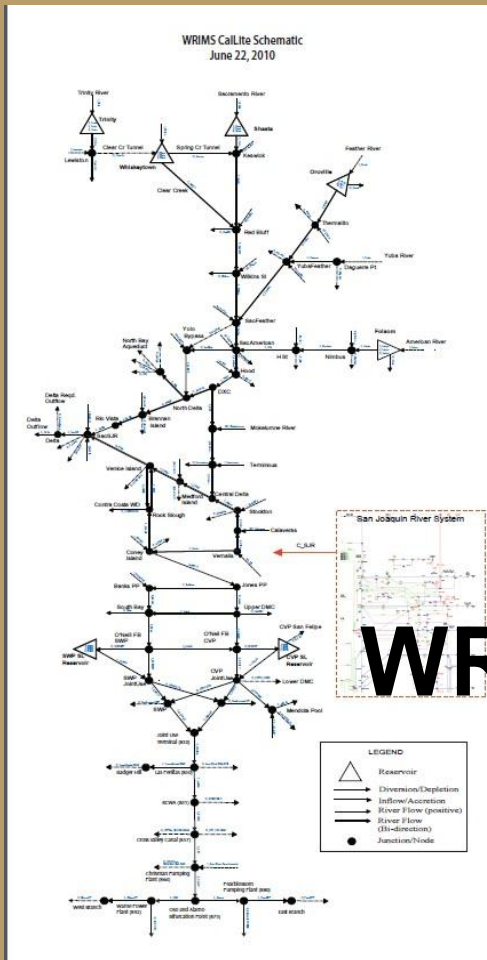
- define
- goal
- what, not how
- reads like a story
- no software “overhead”
- Insurmountable Opportunity

```
TextPad - [C:\MP2012\GeneralModeling\Baselines\CalSim_Existing_012012\common\Delta\Mrdo\X2\X2days_WQCP.wres]
File Edit Search View Tools Macros Configure Window Help
! X2 setup for WQCP requirements
! set minimum flow
define flowmin_DecA4 {value 0.}
! set the flow cap for each station (cfs). this is max flow to meet X2 at each station
define flowcap_roe {value 29200.} ! cfs for Roe Island/Port Chicago
define flowcap_chs {value 11400.} ! cfs for Chipps Island
define flowcap_cnf {value 7100.} ! cfs for Confluence (Sac & SJR)
! set the trigger value which activates the operation of Roe X2 standard
define trigger_x2roe {value 66.3} ! km to just beyond Roe Island
! set the minimum flow for the circumstances in which there is no requirement at the confluence
! ie. May_SRI < 8.1 maf, then no X2 standard
define flowmin_specX2 {value 4000.} ! cfs for months (feb-june) in which no confluence req
! *****
! Get the days required for X2 at each location (Roe, Chipps, Confluence)
define daysX2_roe {
  case FebtoJun {
    condition month >= FEB .and. month <= JUN
    select roe_days
    from x2days
    where wateryear=wateryear,month=month }
  case StandardOff {
    condition always
    value 0. }
}
define daysX2_chs {
  case FebtoJun {
    condition month >= FEB .and. month <= JUN
    select chs_days
    from x2days
    where wateryear=wateryear,month=month }
  case StandardOff {
    condition always
    value 0. }
}
define daysX2_cnf {
  case FebtoJun {
    condition month >= FEB .and. month <= JUN
    select cnf_days
    from x2days
    where wateryear=wateryear,month=month }
  case StandardOff {
    condition always
    value 0. }
}
! *****
! Modify the days at each location depending on whether the trigger for Roe has been tripped
! If X2last > trigger then,
!   roe_days=0, chs_days=orig, cnf_days=daysinperiod - chs_days
! If X2last < trigger then,
!   roe_days=orig, chs_days=orig-roe_days, cnf_days=daysin period-chs_days-roe_days
! NOTE: THE DAY MODIFICATION ASSUMES THAT CHS_DAYS >= ROE_DAYS. IE. WHEN YOU MEET ROE YOU
! AUTOMATICALLY MEET CHIPPS. BE SURE TABLE 'X2DAYS' IS SET PROPERLY.
define daysX2_roe_mod {
  case RoeOff {
    condition x2_last > trigger_x2roe
    value 0. }
}
```

CalLite

CalSim2

CalSim3



**WRIMS2, New Solvers,
Results Displays**

Our Jobs as Modelers

- **Provide Credible Technical Analysis**
- **Credibility = Transparency**
- **Transparency = $f(\# \text{ people, communication})$**



RECLAMATION

**All Models are Wrong;
Some are Useful**

**Problems are Hard;
Models Shouldn't Make Them Harder**

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