

Water Budget Update

ESHMC Meeting
November 22-23, 2010
S. Taylor, B. Contor

STATUS OF DESIGN DOCUMENTS

Documents Completed and Posted:

– Canal leakage (*.cnl)

“Representation of Recharge from Canal Leakage for Calibration of Eastern Snake Plain Aquifer Model Version 2, As Built, Revision 1”

Link:

http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.0_Development/Current_Documentation/ESPAM2_Canal_Leakage_Design_Doc_ASBUILT_Rev1_20101104.pdf

– Perched river seepage (*.pch) – “Draft” needs to be removed

“Estimating Perched River Seepage in the Big Wood River, Little Wood River, Big Lost River, Little Lost River, Birch Creek, Medicine Lodge Creek, Beaver Creek, and Camas Creek for Calibration of the Eastern Snake Plain Aquifer Model Version 2”

Link:

http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.0_Development/Current_Documentation/Perched%20River%20Seepage%20design%20doc%20final.pdf

– River cells

“Representation of MODFLOW-2000 River Cells for the Snake River above Milner Dam and American Falls Reservoir for Calibration of the Eastern Snake Plain Aquifer Model Version 2; As Built”

Link:

http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.0_Development/Current_Documentation/Final%20River%20Stage%20ESPAM%202%20Design%20Doc%20AS%20BUILT.pdf

Documents Completed and Posted:

– Diversions and Returns (*.div)

“Irrigation Diversions and Returns for Calibration of the Eastern Snake Plain Aquifer Model Version 2, As Built”

Link:

http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.0_Development/Current_Documentation/ESPAM2_DIV_Design_Doc_ASBUILT_11_08_10.pdf

– Fixed Point and Offsite Pumping (*.off, *.fpt)

“Fixed-point and Offsite-point Recharge and Discharge for Calibration of Eastern Snake Plain Aquifer Model Version 2, As Built”

Link:

http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.0_Development/Current_Documentation/ESPAM2_FPT_OFF_Design_Doc_ASBUILT_20101104.pdf

– Soil Type (*.sol)

“Representation of Soil Type for Calibration of Eastern Snake Plain Aquifer Model Version 2, As Built Revision 1”

Link:

http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.0_Development/Current_Documentation/ESPAM2_SoilType_Design_Doc_ASBUILT_20101108.pdf

Documents Posted, but still a “draft”:

- Irrigation Sources – still says “DRAFT”

“Determination of Source of Irrigation Water for Calibration of Eastern Snake Plain Aquifer Model”

Link:

http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.0_Development/Current_Documentation/Wtr_Src_DesignDoc_ESPAM2_Draft2_20080416.pdf

- Sprinkler Fractions – still says “DRAFT”

“Irrigation Diversions and Returns for Calibration of the Eastern Snake Plain Aquifer Model Version 2, As Built”

Link:

http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.0_Development/Current_Documentation/ESPAM2_DesignDoc_Sprpct_10_25_10.pdf

- Precipitation – still says “DRAFT”

“Use of PRISM Data for Precipitation Estimates in ESPAM2 AS BUILT”

Link:

http://www.idwr.idaho.gov/Browse/WaterInfo/ESPAM/model_files/Version_2.0_Development/Current_Documentation/ESPAM2_Precipitation_DesignDoc_10_22_2010_DRAFT.pdf

Documents Completed (but not posted):

- Stress Periods

“Decisions on Stress Periods to be Used in Calibration of Eastern Snake Plain Aquifer Model Version 2”

Documents currently being reviewed by IDWR:

- Entity file/ET adjustment factors (*.ent)
- Irrigated lands (*.iar); also incorporates RED
- Tributary underflow (*.trb)

Design documents to be written by IDWR:

- Model grid/boundary (*.cel)
- MKMOD: irrigation efficiency parameters (*.eff), model specification file (*.mdl)
- Non-irrigated recharge (*.nir) ??

NEW DATA

New Data

This is where we left off last mtg.

- E100910A
 - First “non preliminary” water budget
- E101014A
 - New ibound (one cell different)
 - Remove out-of-bounds Fixed Points
 - Restore 1986 irrigated lands (correct problem above rim)
 - Add new 2002 irrigated lands data set

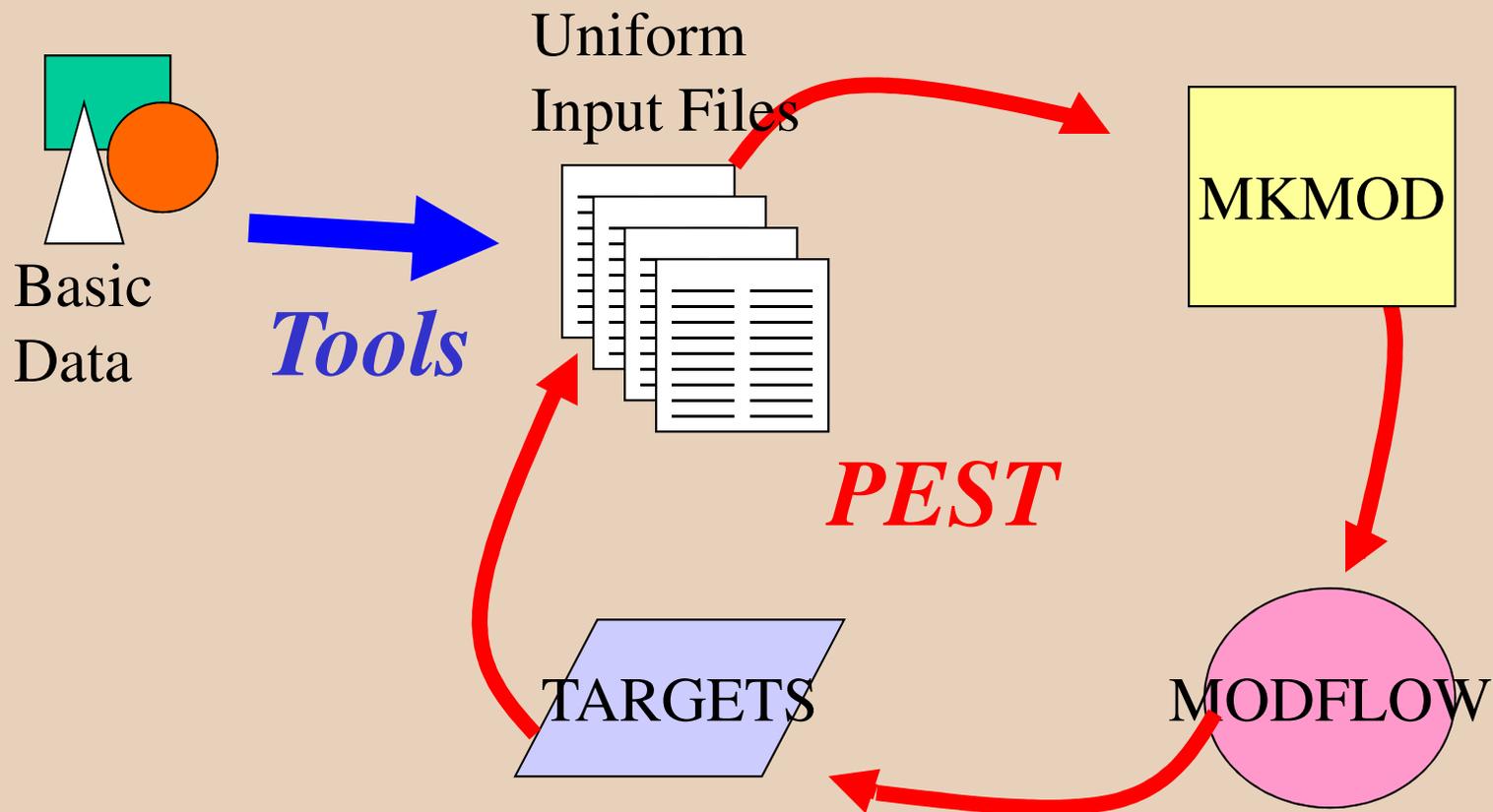
New Data (cont.)

- E101027A
 - New ET Adjustment Factors
- E101028A
 - Discarded
- E101028B
 - Formatting correction to *.cel file

Allan may be using a version of E101027A that he corrected himself; it would be identical in function and water budget content to E101028B

MKMOD

TOOLS FOR MKMOD INPUT FILES

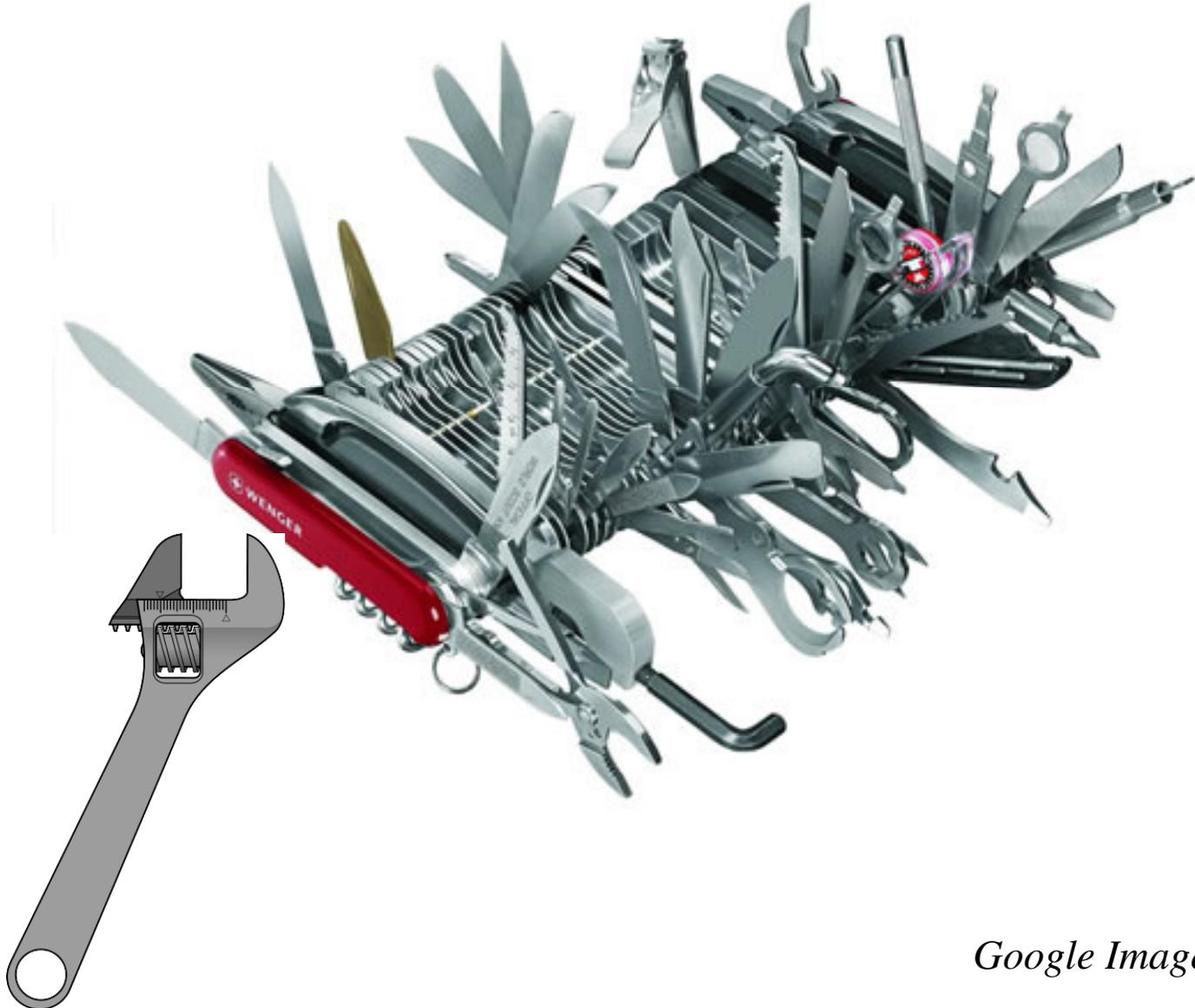


Generation I: ESPAM1.1

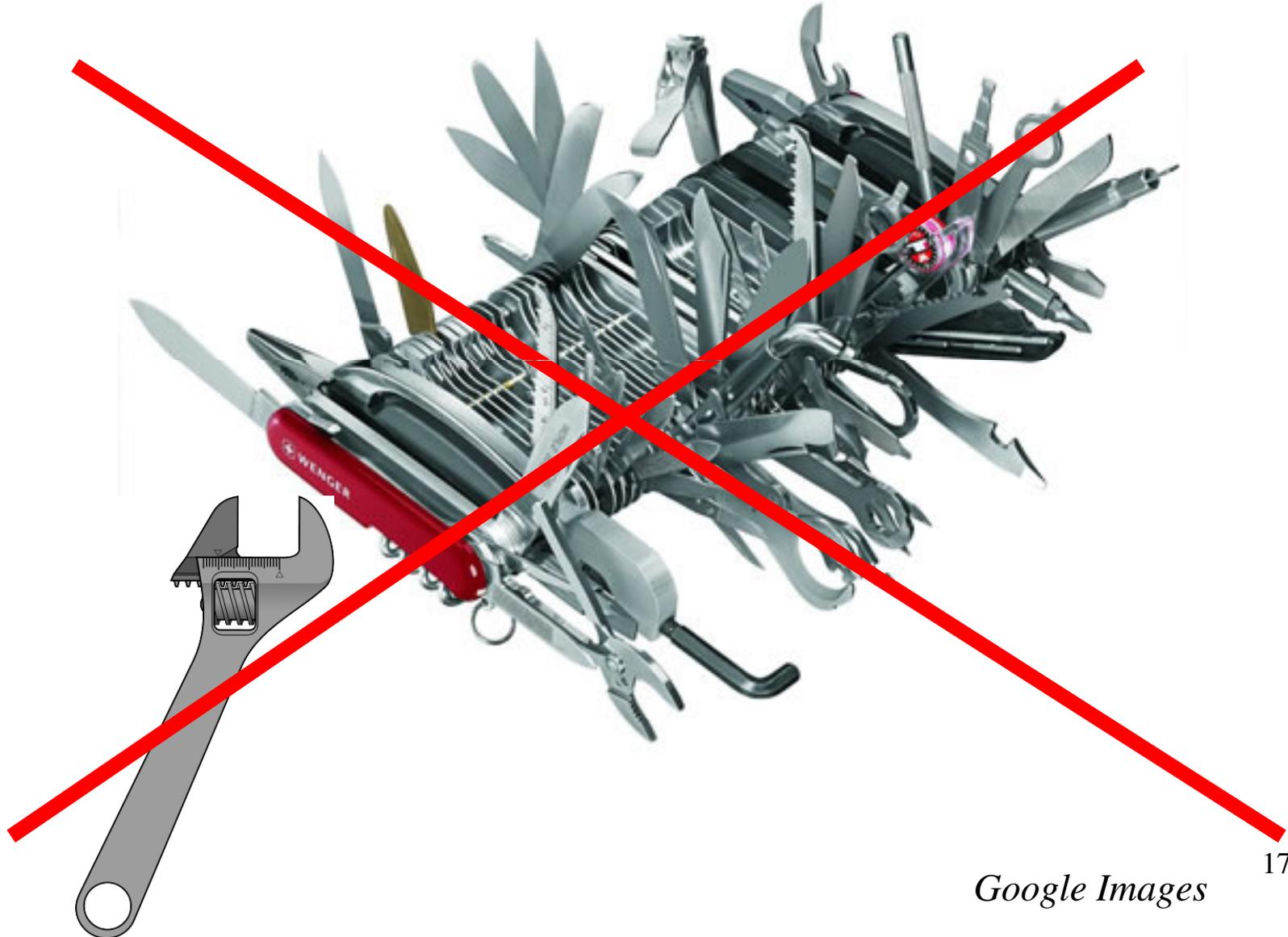


Limitation: 255 Stress Periods

Generation II: ESPAM2 “Fix”

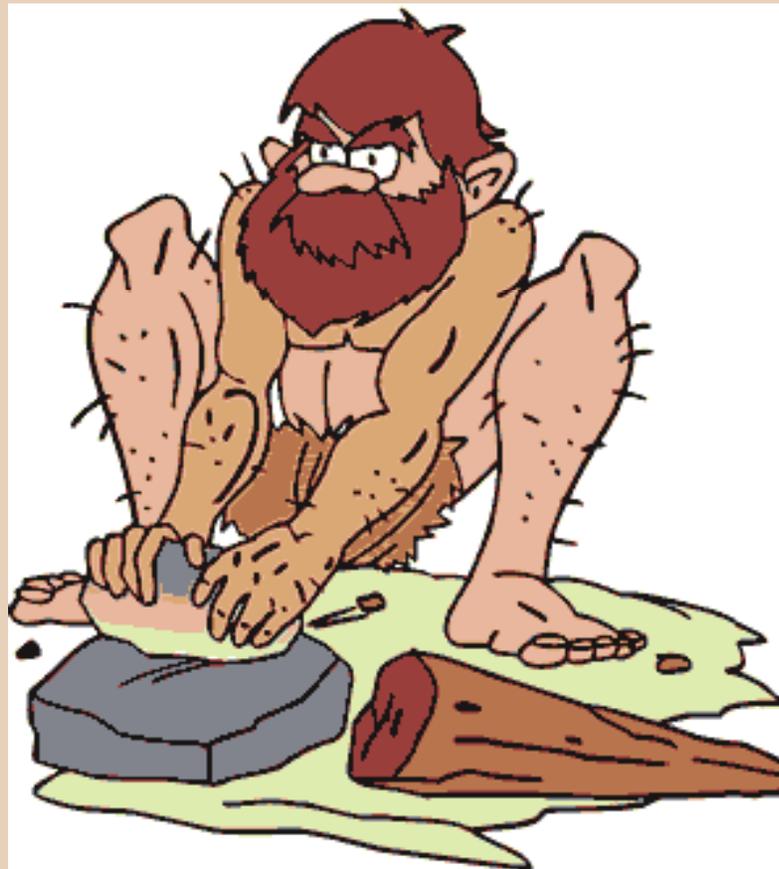


Generation II: ESPAM2 “Fix”

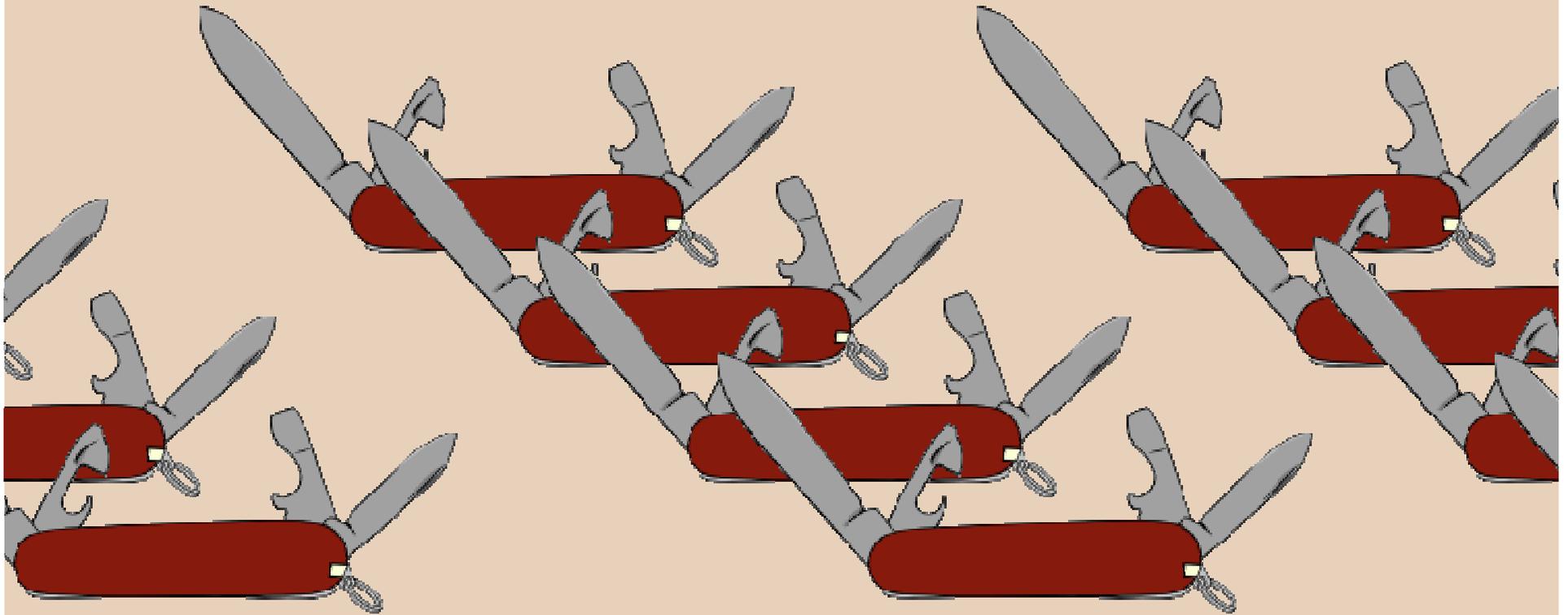


Generation III: ESPAM2

Ad Hoc/Pet Grade methods



Generation IV: IDWR Professional-Grade Stand Alone Tools



Status:

- Tools will preserve existing file formats.
- IDWR has a full set of test input data.
- IDWR has a full set of sample output data.
- IDWR is working on the first tool in the suite.

TRAINING

Goals

- Full transparency on Water Budget
- How to make Input Files
- How run MKMOD
- How to run MODFLOW
- How to extract results from MODFLOW
- How PEST does its Magic

Goals

- Full transparency on Water Budget ✓
- How to make Input Files ✓
- How run MKMOD ✓
- How to run MODFLOW ✓
- How to extract results from MODFLOW ✓
- ~~• How PEST does its Magic~~

Goals

*IWRRI
January
2011*

- Full transparency on Water Budget
- How to make Input Files
- How run MKMOD
- How to run MODFLOW
- How to extract results from MODFLOW
- ~~• How PEST does its Magic~~

Goals

- Full transparency on Water Budget
- How to make Input Files
- How run MKMOD
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- How to extract results from M
- ~~How PEST does its Magic~~

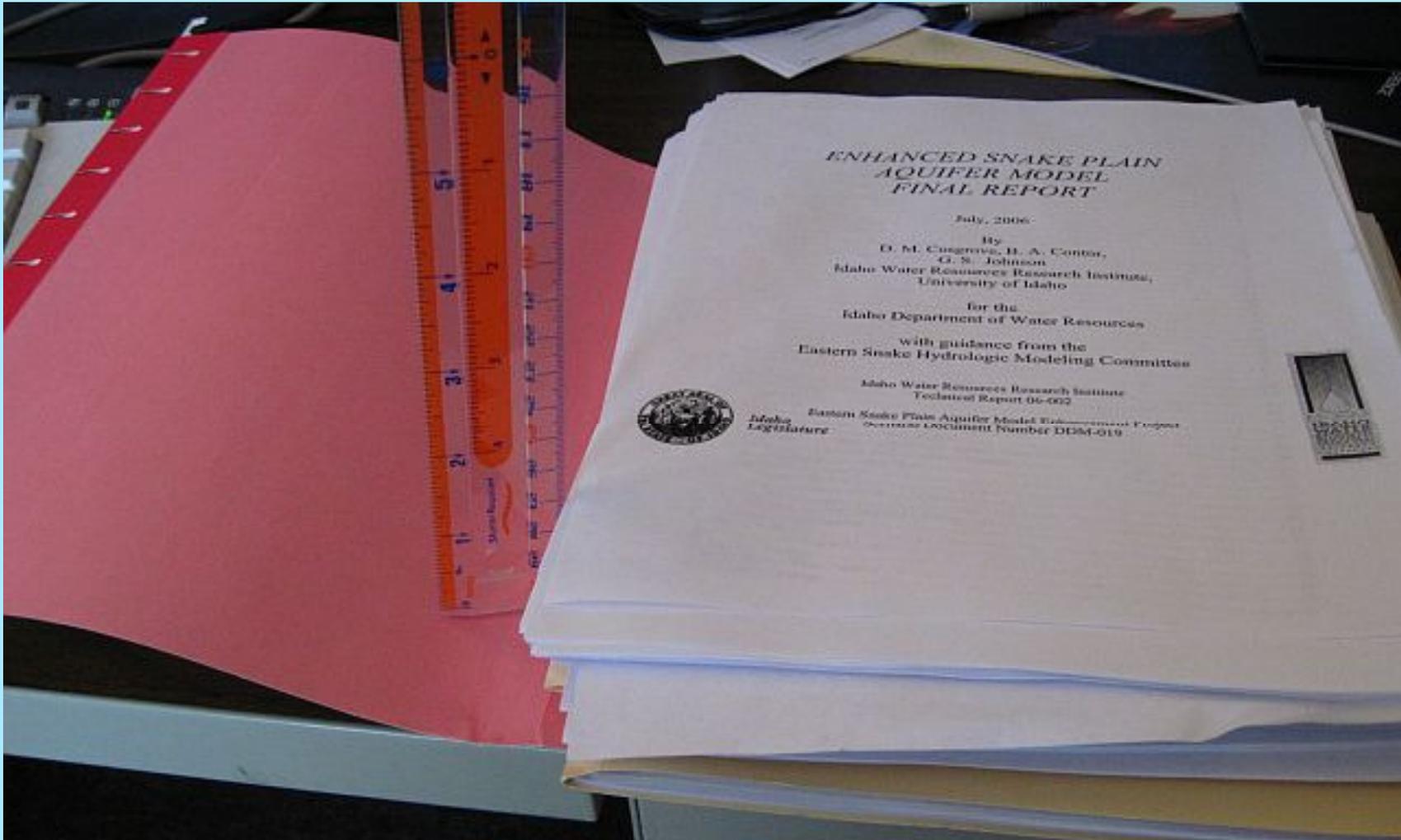
IWRRI

*Primarily
IDWR.
Awaiting
Tool
Completion*

Input Needed

- January 2011 training piggy-back onto ESHMC training?
- One day live, in person?
- GoToMeeting followup, if needed?

ESPAM2.0 FINAL REPORT



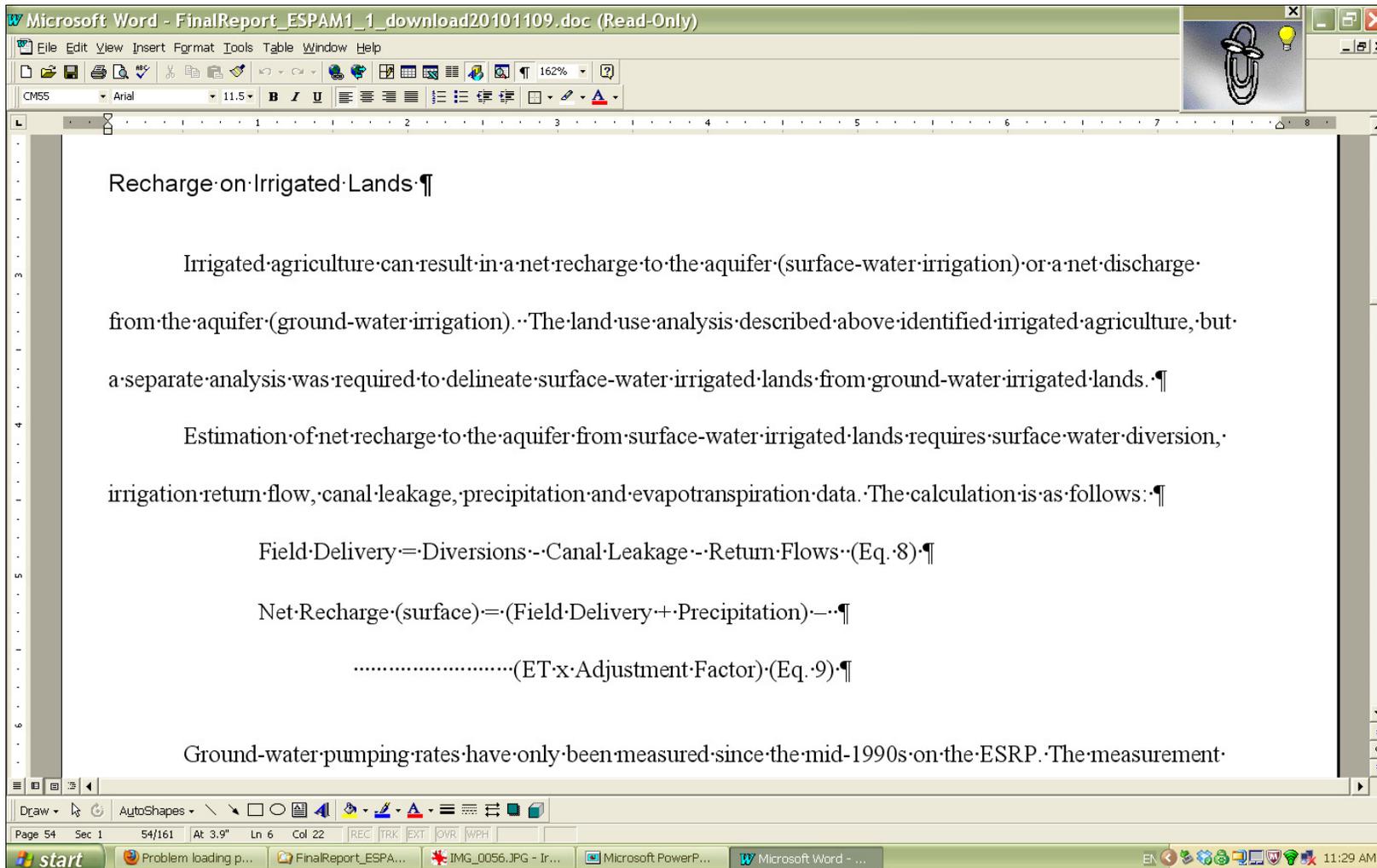
ESPAM1.1 Final Report: 1 5/8 inches, 3 1/2 pounds. 28

Plan for ESPAM2.0 Final Report

- Use ESPAM1.1 report as a foundation
- Update and change only what needs to be changed
- IWRRRI will do the first draft
- Review protocol to be determined by IDWR
- Final publication as IDWR product

Presentation Format

- Product 1: “Track Changes” version
- Product 2: “Changes Accepted” version



Recharge on Irrigated Lands¶

Irrigated agriculture can result in a net recharge to the aquifer (surface-water irrigation) or a net discharge from the aquifer (ground-water irrigation). The land-use analysis described above identified irrigated agriculture, but a separate analysis was required to delineate surface-water irrigated lands from ground-water irrigated lands.¶

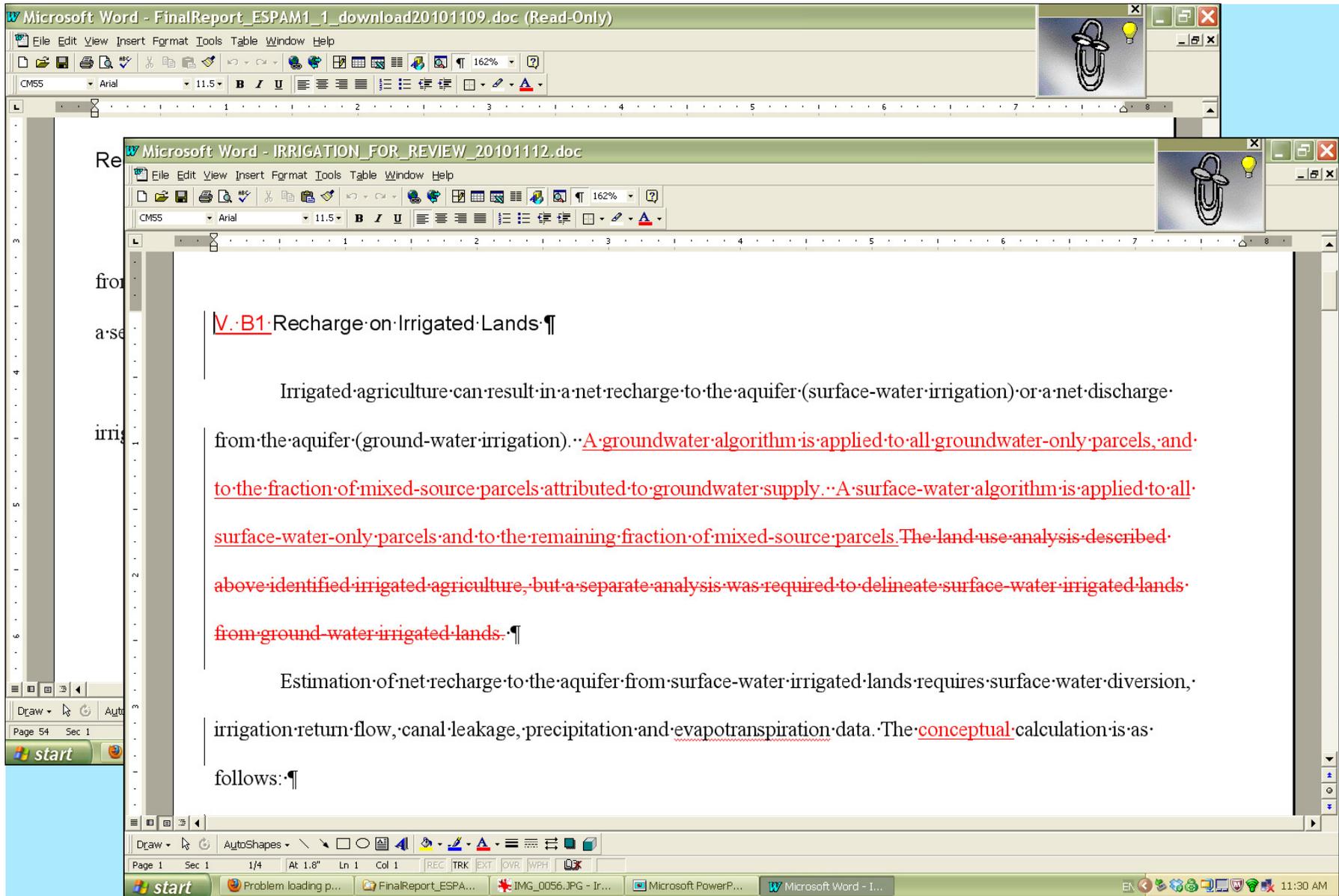
Estimation of net recharge to the aquifer from surface-water irrigated lands requires surface-water diversion, irrigation return flow, canal leakage, precipitation and evapotranspiration data. The calculation is as follows:¶

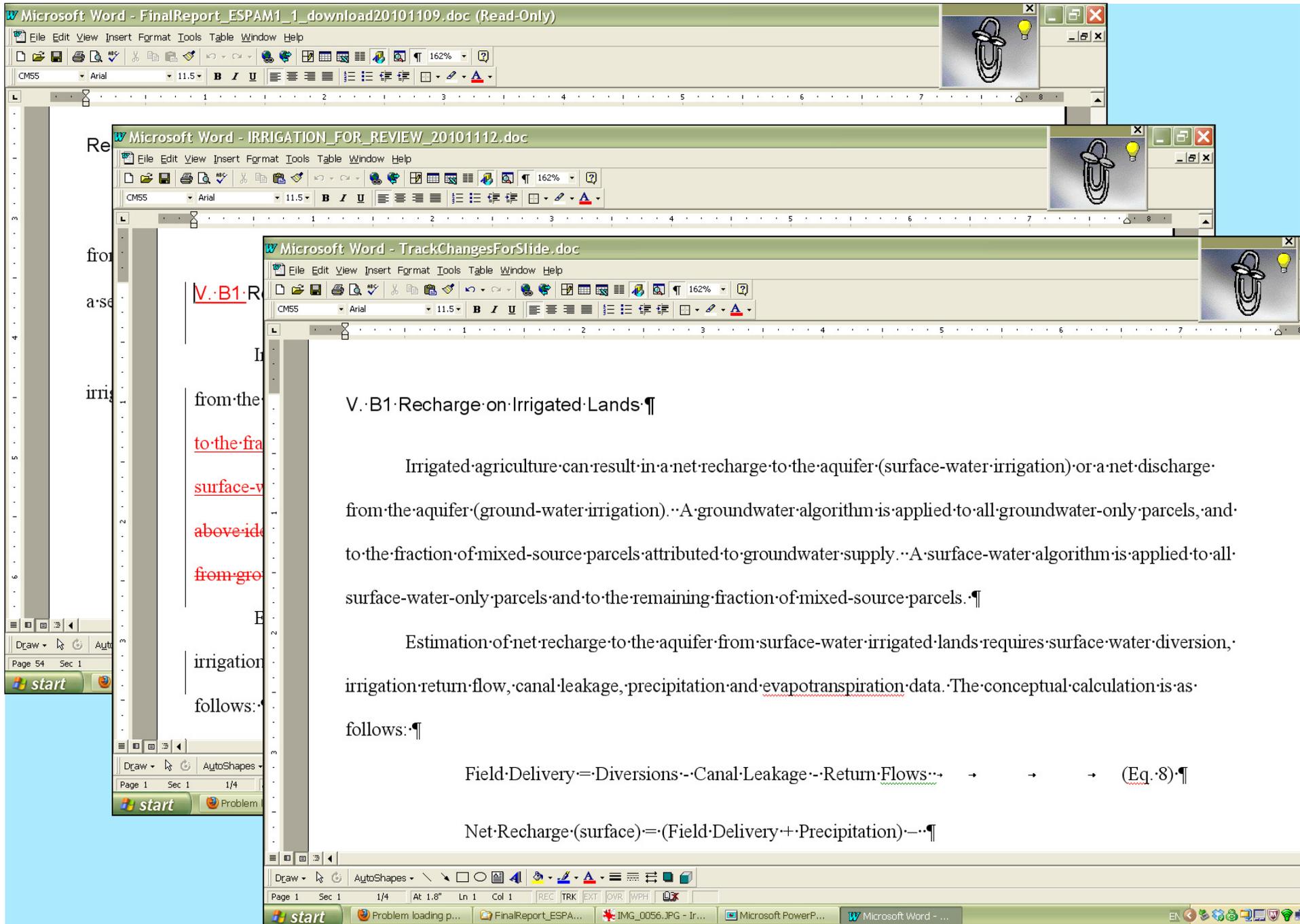
$$\text{Field Delivery} = \text{Diversions} - \text{Canal Leakage} - \text{Return Flows} \quad (\text{Eq. 8}) \quad ¶$$

$$\text{Net Recharge (surface)} = (\text{Field Delivery} + \text{Precipitation}) - ¶$$

$$\dots\dots\dots (\text{ET} \times \text{Adjustment Factor}) \quad (\text{Eq. 9}) \quad ¶$$

Ground-water pumping rates have only been measured since the mid-1990s on the ESRP. The measurement





Status

- About halfway through first draft of main body
 - Selected invitations for input/review of particular sections
 - Anyone who wants to wade through it all is welcome
- Not started on Tables
- Not started on Figures
- Not started on Appendices

DISCUSSION