

A photograph of a branch with yellowing leaves against a blue sky. The leaves are in the foreground, slightly out of focus, and the sky is a clear, deep blue. The text is overlaid on the right side of the image.

Land Cover and ESPAM2

Presentation to ESHMC

6 May 2008

B. Contor

Recharge Tool Conceptual Model

- Irrigated Lands:

Recharge =

$$[(Pcp + Net Div) - (ET \times Adj)] * acres * [1-RED]$$

Recharge Tool Conceptual Model

- Irrigated Lands:

Recharge =

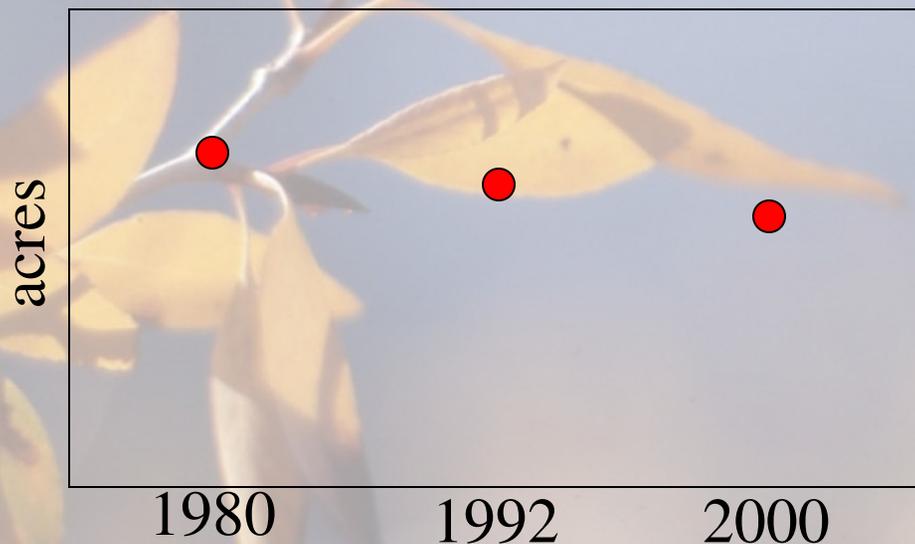
$$[(P_{cp} + \text{Net Div}) - (ET \times \text{Adj})] * \text{acres} * [1 - \text{RED}]$$



**ACRES come from GIS
analysis of irrigated-lands maps**

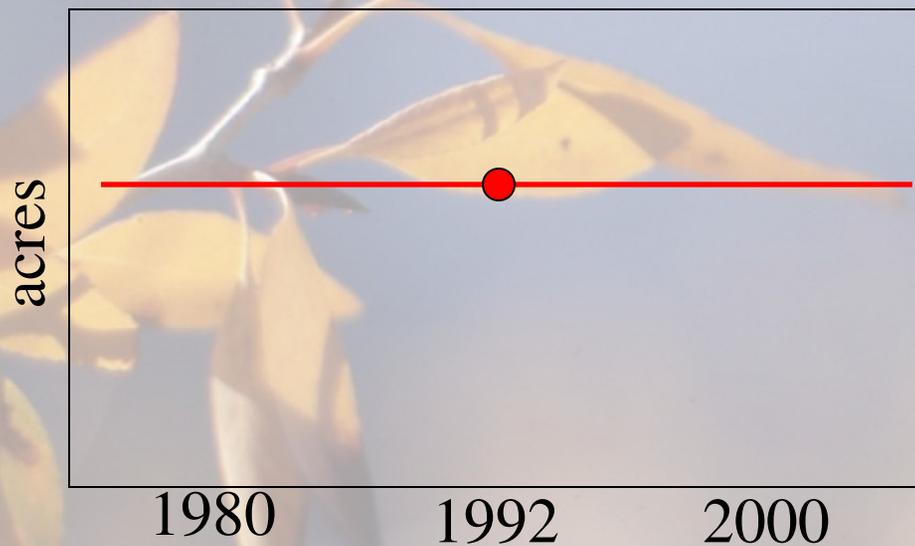
Irrigated Lands: ESPAM1.1

- 3 data sets were available
- Diverse methods & underlying data
- Acreage trend counter to expectations



Irrigated Lands: ESPAM1.1

- Decision (right or wrong):
use 1992 data set for entire period



A photograph of a plant branch with yellowish leaves against a blue sky background. The text "Irrigated Lands: ESPAM2" is overlaid on the image.

Irrigated Lands: ESPAM2

Irrigated Lands: Parameters

- Parcel size
- Parcel location
- Parcel geometry
- Parcel Status: Irrigated/Non-irrigated

Irrigated Lands: 2006 Data Set (IDWR)

- Parcel size
 - Parcel location
 - Parcel geometry
 - Parcel Status: Irrigated/Non-irrigated
(NDVI analysis of LANDSAT data)
 - Completed by fall 2008?
- USDA Farm Service Agency
CLU Polygons w/
refinement by IDWR

Proposal:

- Use IDWR 2006 Irrigated-lands map for later years in calibration (2004-end)

A photograph of a branch with yellowing leaves against a blue sky, with the text "What about 1980 - 2003?" overlaid.

What about 1980 - 2003?

Irrigated Lands: Modeling Needs

- Parcel size ✓
- Parcel location ✓
- Parcel geometry ← not critical
- Parcel Status: Irrigated/Non-irrigated ✓
- **Year-to-year consistency in size** ✓



Assertion:

- Existing data sets can be relied upon for status and location
- Geometry is not critical for GW modeling
- Aerial photos w/ statistical sampling can be used to adjust **reduction for non-irrigated inclusions** to obtain **consistent, correct acres**

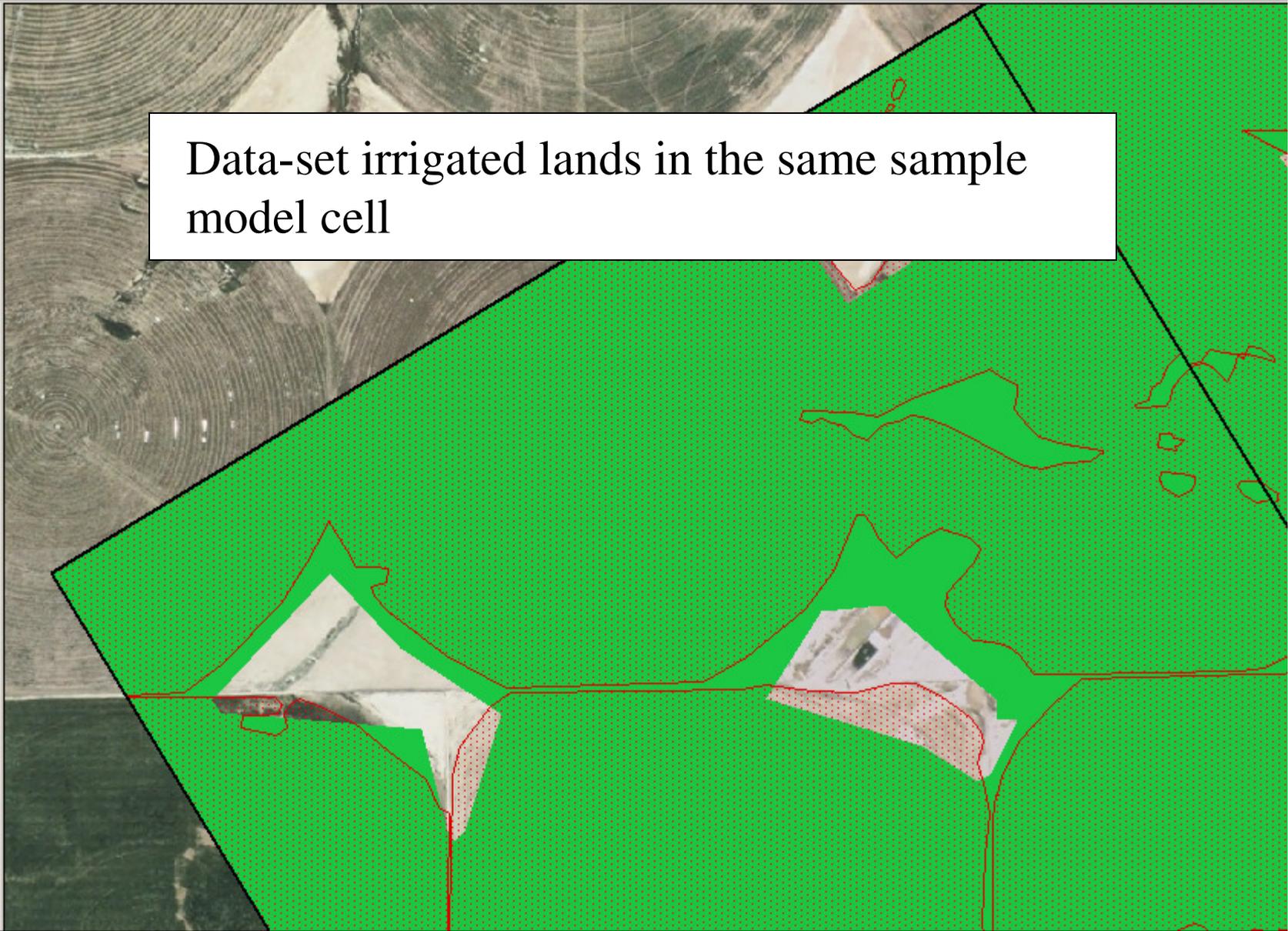


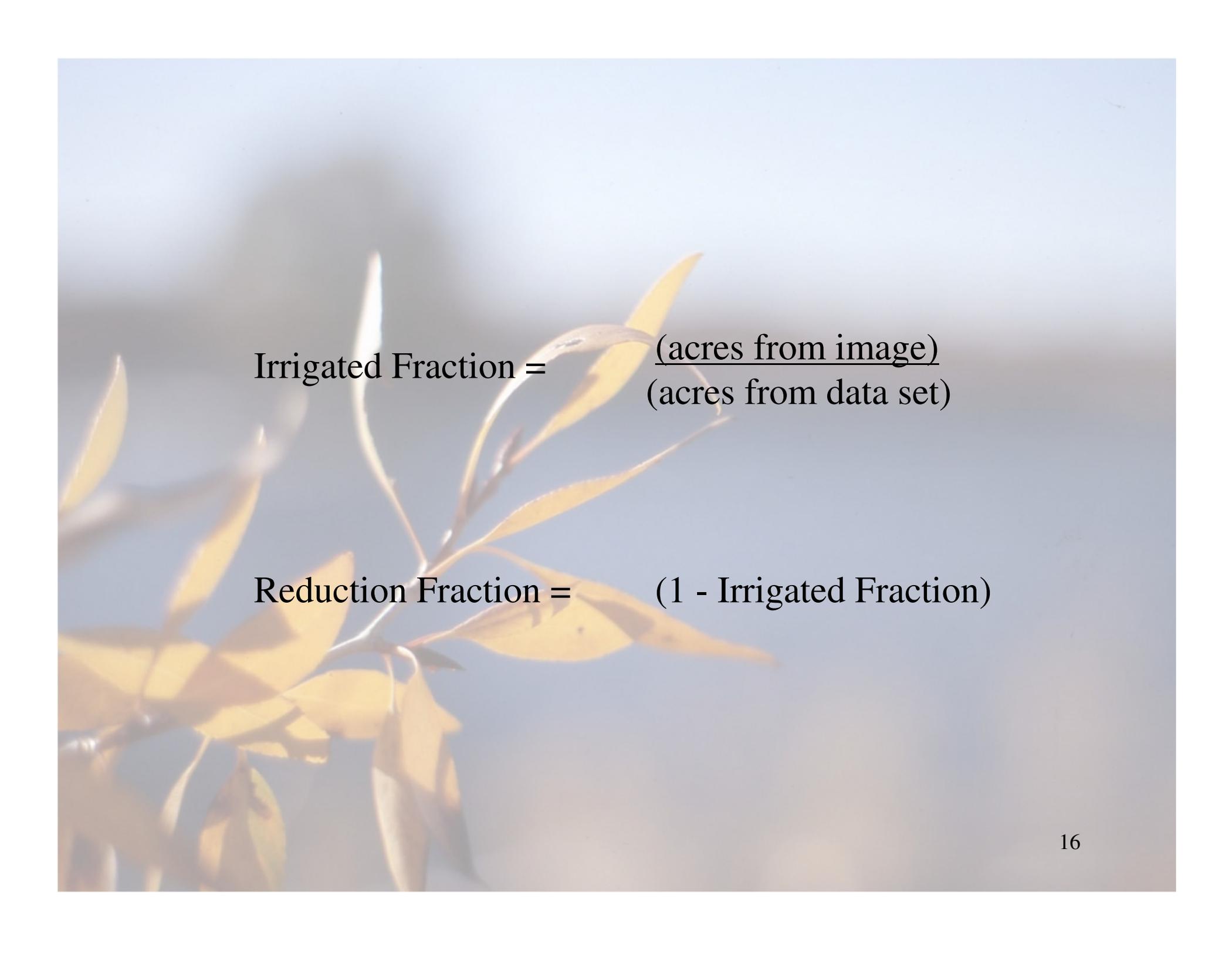
Proposal: Use reduction fractions to allow simultaneous use of all available data:

- Use IDWR 2006 Irrigated-lands map for later years in calibration (2004-2008?)
- Use existing maps (1980, 1992, 2000) for earlier years

- ew1
- Aj_east_for_rasa.st
- 4_cells.shp
- Irr2000_sample_ea
- Rasa80_sample_ea
 - Row Crops
 - Small Grain
 - Alfa fa
 - Pasture
 - Other Irr
- Irr92_eastsample.s
- Naip2006_compare
- Irr2000_compare.st
- Aj_image_compare
- 2cells_east_utm.sh
- 2cells_east.shp
- Iar_1992_sample.s
- Rasa_80_compare.
- 2004e_excerpt.jpg
- Bonneville_idwr.sid
- Bonn_2004.sid
- Basin35.sid

Data-set irrigated lands in the same sample model cell



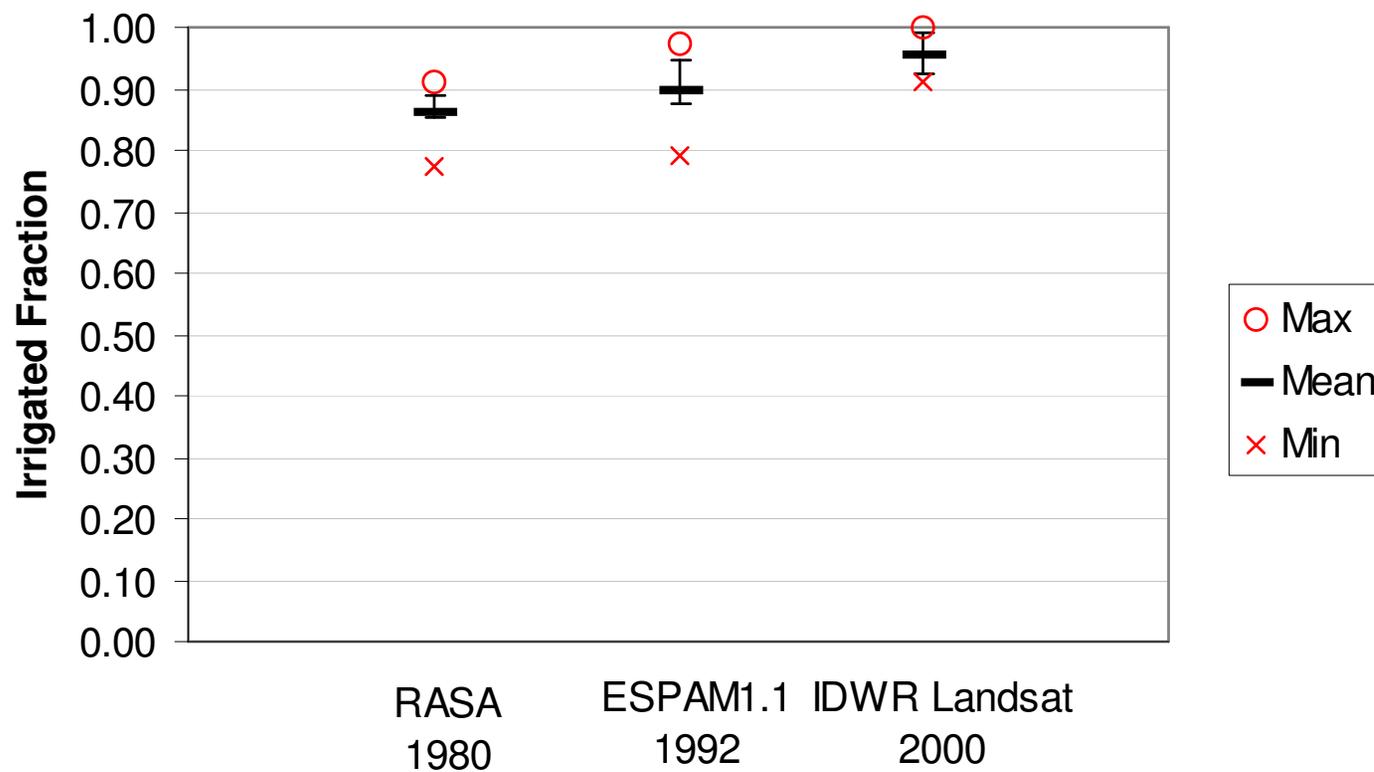


Irrigated Fraction = $\frac{\text{(acres from image)}}{\text{(acres from data set)}}$

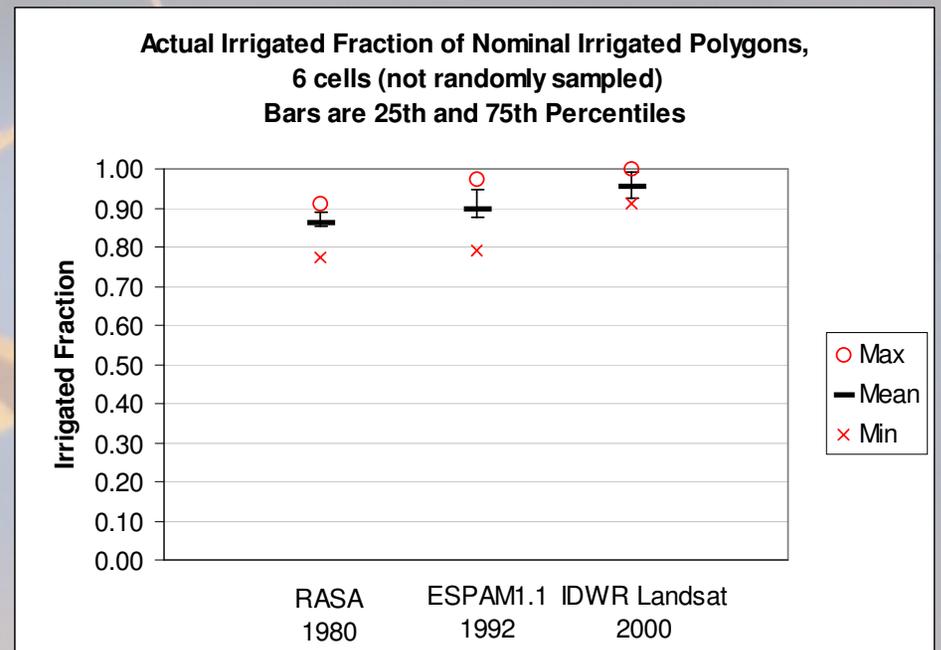
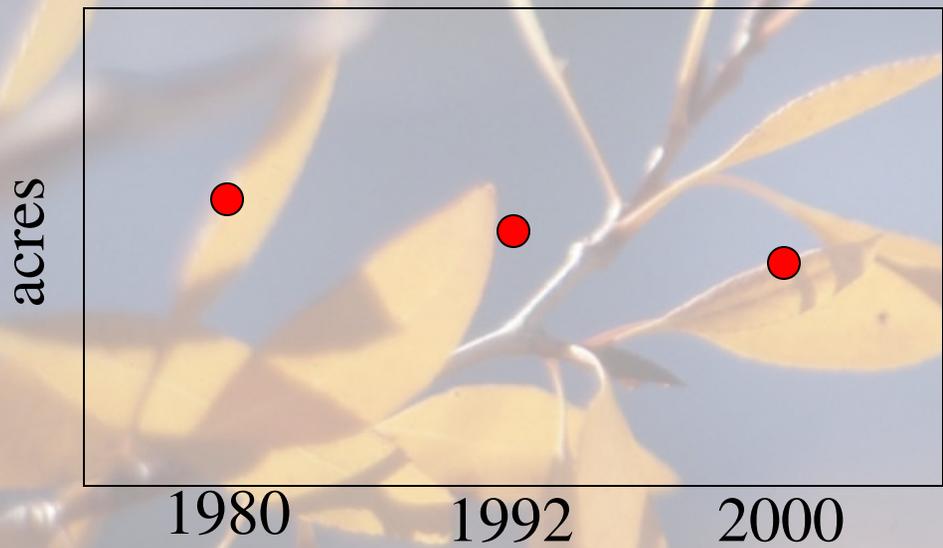
Reduction Fraction = $(1 - \text{Irrigated Fraction})$

Results of Test

**Actual Irrigated Fraction of Nominal Irrigated Polygons,
6 cells (not randomly sampled)
Bars are 25th and 75th Percentiles**



Flashback

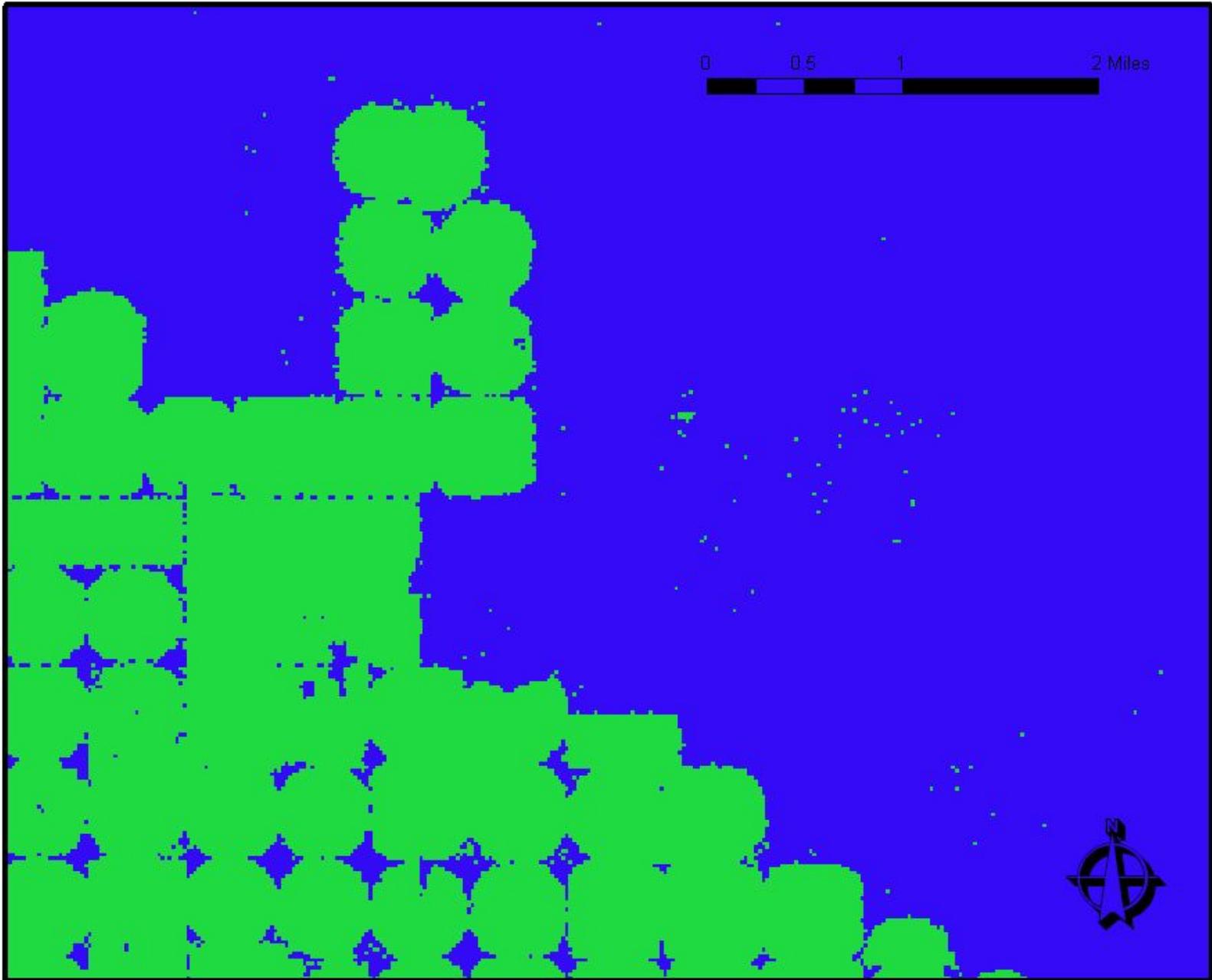


Proposal: Use reduction fractions to allow simultaneous use of all available data:

- Use IDWR 2006 Irrigated-lands map for later years in calibration (2004-2008?)
- Use existing maps (1980, 1992, 2000) for earlier years
- Use NDVI maps to “fill the gaps”
 - exact geometry is not critical
 - *for modeling purposes*, we can skip the time-consuming task of refining CLU polygons
 - NDVI is part of METRIC process - due to image costs, we need to pick "METRICable" years



Map courtesy Paul Pelot



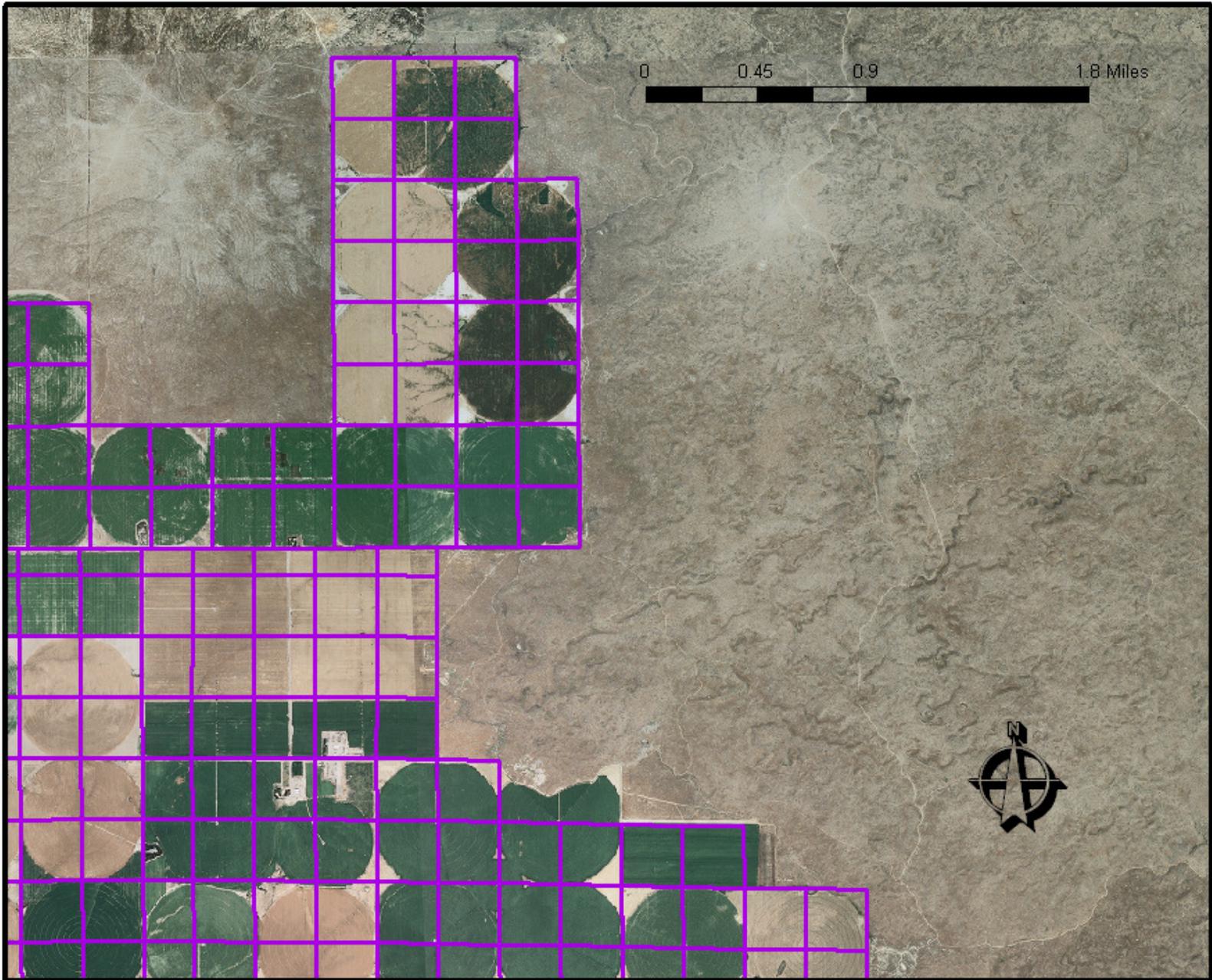
Map courtesy Paul Pelot



Map courtesy Paul Pelot



Map courtesy Paul Pelot



Map courtesy Paul Pelot

With unique reduction factors for each data set we can make all our data **consistent year-to-year**:

- 1980 RASA LANDSAT analysis
- Mid-1980s NDVI (not done yet)
- 1992 data used in ESPAM2
- Mid-1990s NDVI (not done yet)
- 2000 LANDAT data done by IDWR for ESPAM1.1
- 2002 NDVI (byproduct of METRIC) soon to be completed
- 2006 IDWR Maps (NDVI & CLU)

Decisions Today

- Is this the way we want to go?
- If so, select mid-80s and mid-90s year for NDVI analysis
 - Must be good years for METRIC
 - Best for modeling is "middle of the gap"
 - Are there other IDWR needs to consider?

1980	1984 - too sparse
1981	1985 - too sparse - could be used for NDVI assessment of irrig. areas
1982	1986 - candidate for METRIC for both paths
1983	1987 - not as populated as 1986, but possible for METRIC
1984	1988 - no April-May for METRIC on path 40
1985	1989 - no Sept-Oct for METRIC on path 40, poor on path 39
1986	1990 - possible METRIC on 40, not on 39
1987	1991 - no
1988	1992 - possible METRIC for 40 and 39
1989	1993 - possible for METRIC, no April-May on 39
1990	1994 - no May-June for METRIC path 40
1991	1995 - no
1992	1996 - yes for METRIC on both paths
1993	1997 - yes, iffy METRIC for June-July on 39
1994	1998 - no May for METRIC on 40 and 39
1995	1999 - no for METRIC in spring
1996	2000 - yes (METRIC DONE)
1997	2001 - yes for METRIC on both paths
1998	2002 - yes (METRIC in Progress)
1999	2003 - iffy on for METRIC both paths (DONE for path 40 through August (no
2000	2004 - yes for METRIC on both paths
2001	2005 - iffy for METRIC
2002	2006 - yes (METRIC in Progress)
2003	2007 - iffy for METRIC on path 40
2004	
2005	
2006	
2007	

Homework for ESHMC

- Respond to memo about nitty-gritty of calculating RED factors & the implications for ET adjustment factors (available today)
- Look for memo about geometry for NDVI-based maps (coming soon to a Website near you)



Courtesy Greg Sullivan

(Backup Slides)

Proposal

- Use statistical sampling & aerial photos to get RED factors
- Use listed data sets with RED factors:
$$\text{Acres} = (\text{nominal acres}) * (1 - \text{RED})$$
- For years with METRIC ET, set ET adjustment factor to 1.0
- Use (METRIC/Traditional) from METRIC years to set ET adjustment factor for other periods.

Proposed

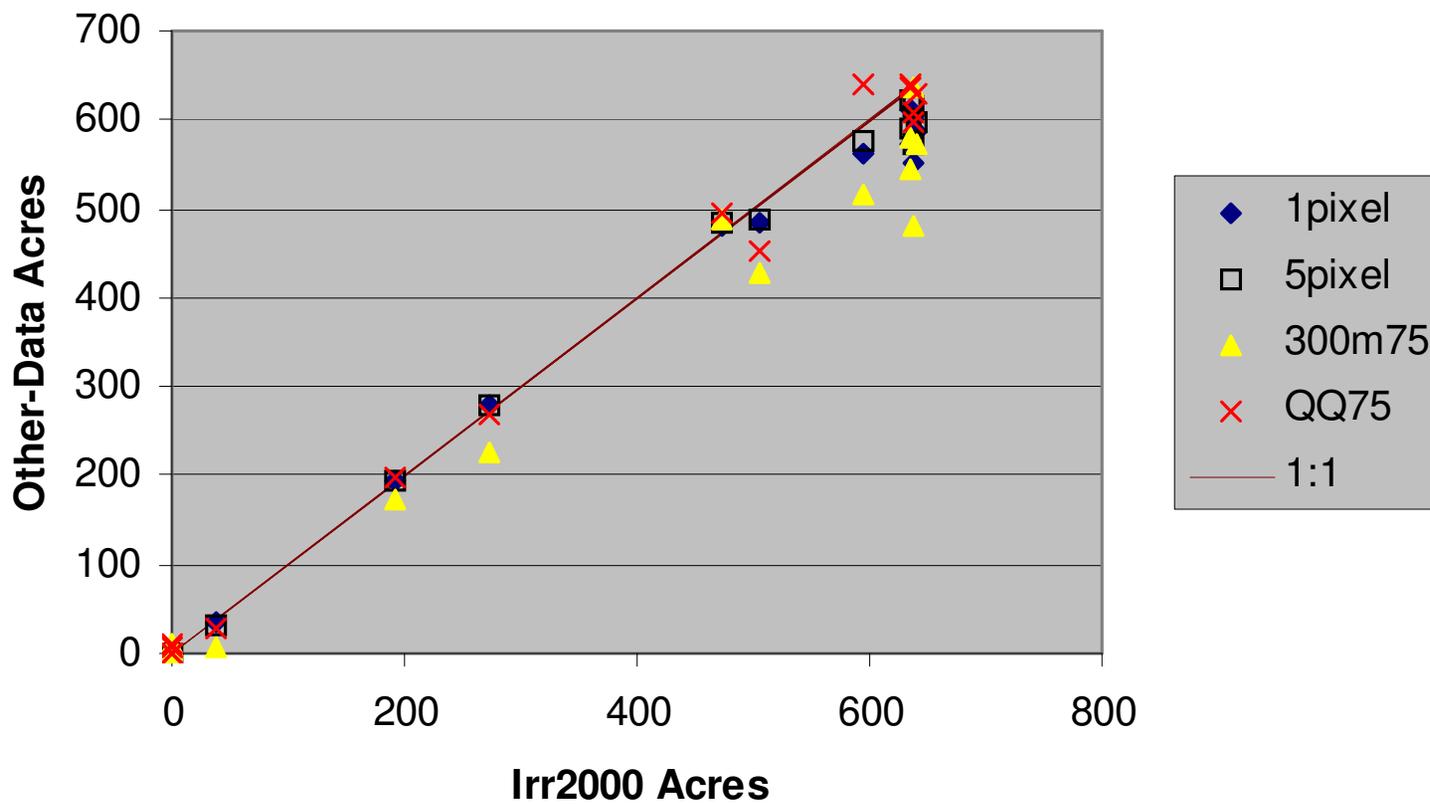
- Use statistical sampling to get RED factors
- Use listed data sets with

This will require a small modification to the Recharge Tools

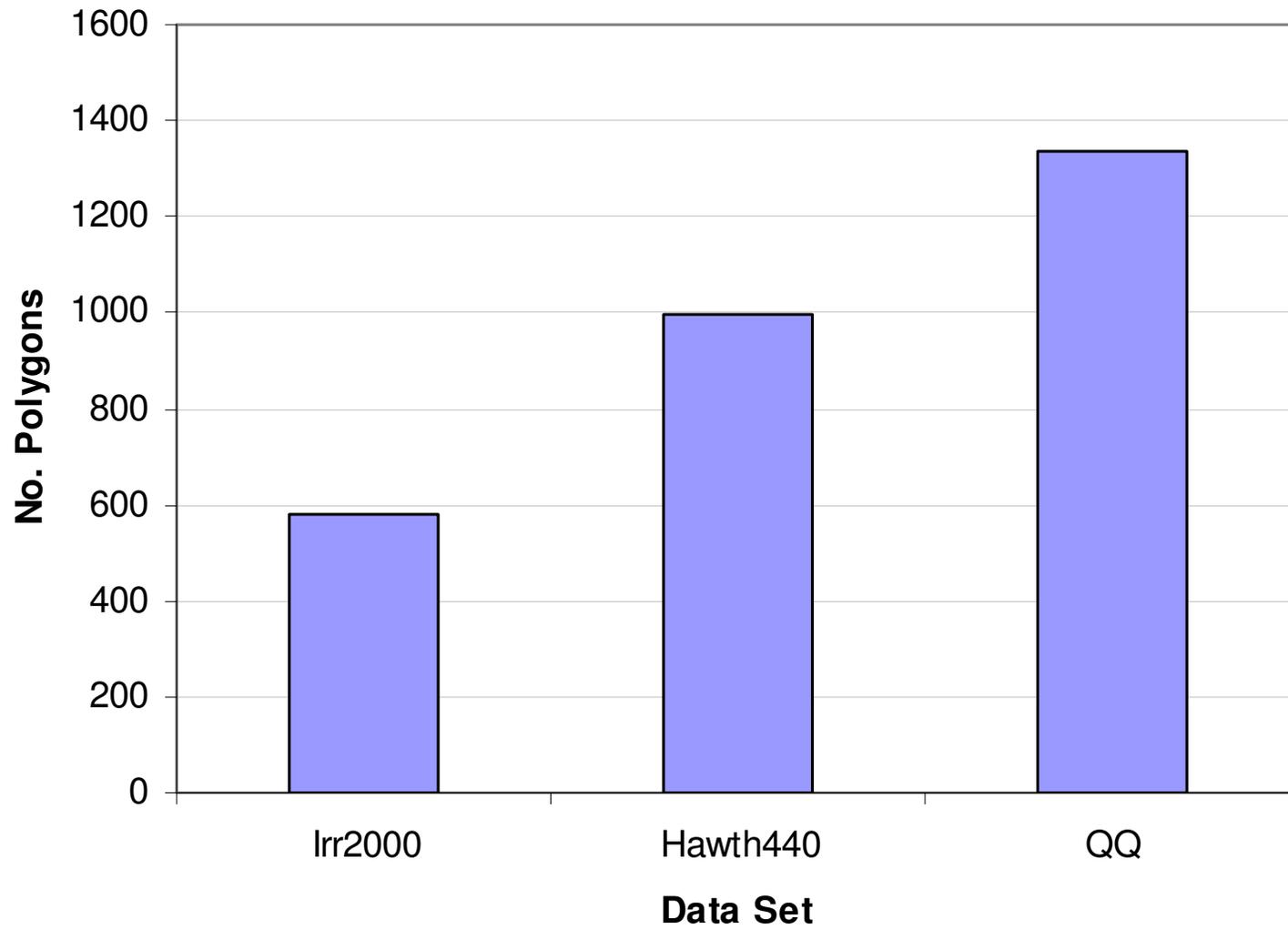
$$\text{Acres} = (\text{nominal acres}) \cdot (1 - \text{RED})$$

- *For years with METRIC ET, set ET adjustment factor to 1.0*
- *Use (METRIC/Traditional) from METRIC years to set ET adjustment factor for other periods.*

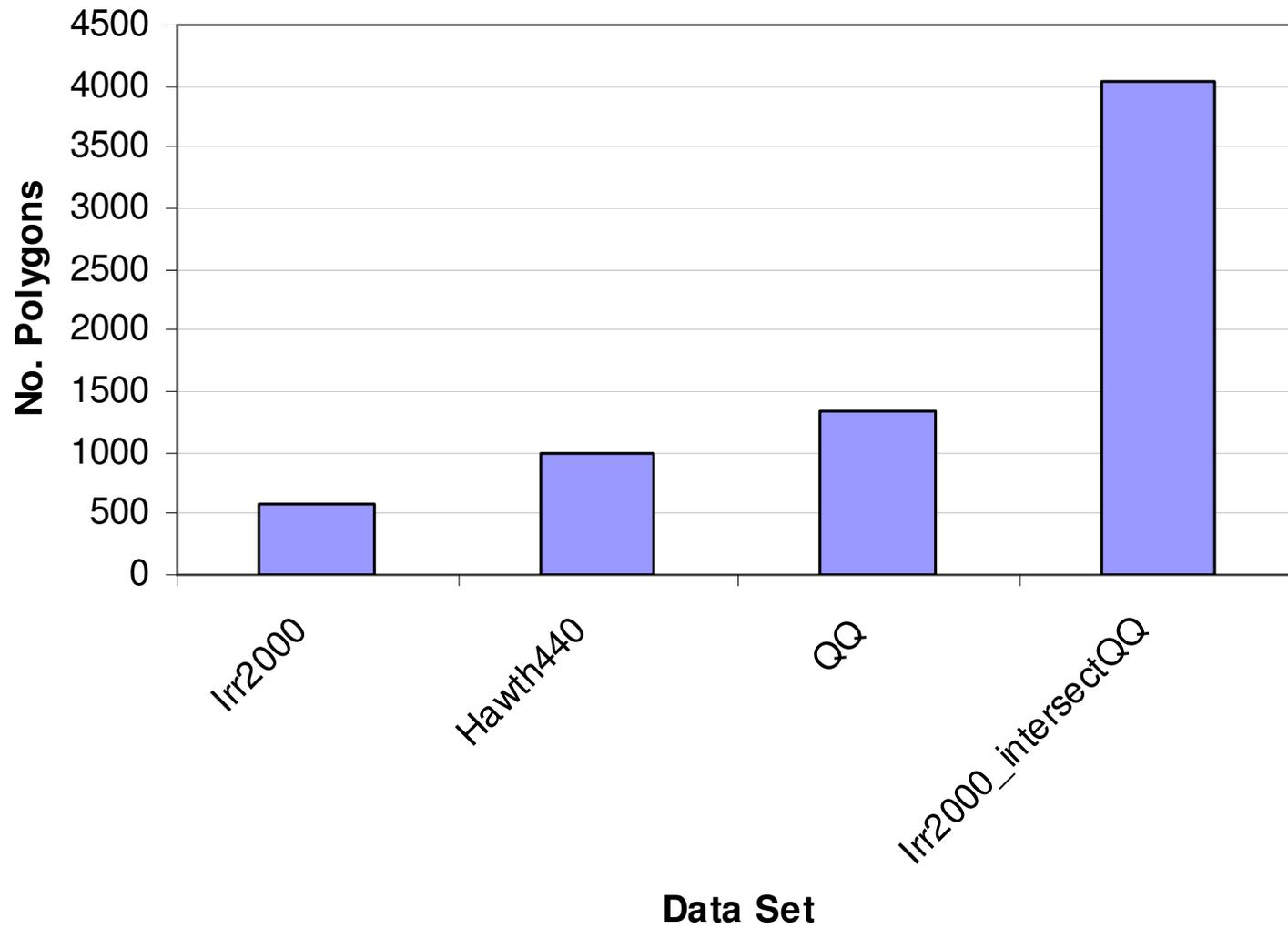
Acres by Model Cell (no-change cells)



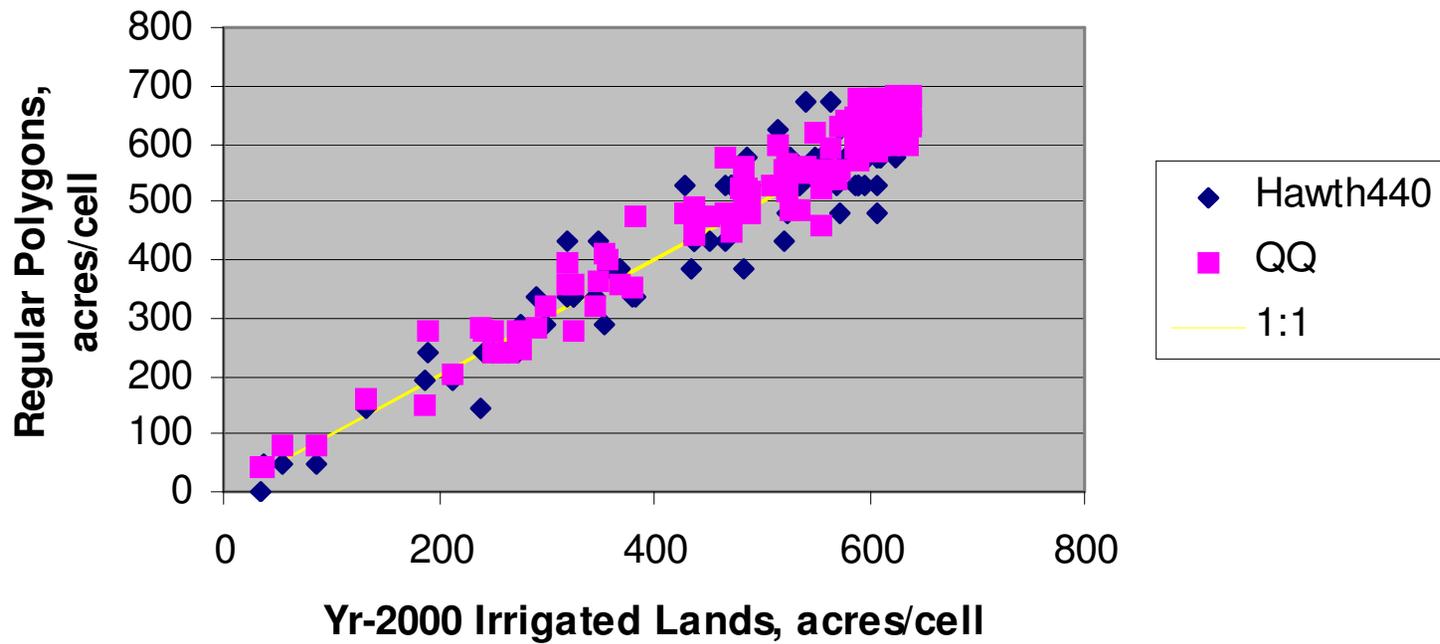
Test of Regular Polygons: 100 Model Cells



Test of Regular Polygons: 100 Model Cells



Test of Regular Polygons: Selected by "Center in Irrigated Lands"



Test of Regular Polygons: Selected by "Center in Irrigated Lands"

