Idaho Water Resources Board
Twin Falls
July 13, 2006

Presentation by
Charles M. Brendecke, PhD, PE

on behalf of
Idaho Ground Water Appropriators, Inc.
My Role in Model Development

- Review and comment, through modeling committee, on development work of IWRRI and IDWR

- Educate IGWA members about model development and capabilities

- Use model in evaluating Orders and Plans
Model Strengths

- Development used extensive field data
- Development employed ongoing peer review
- Calibration over a 21-year period
- Most detailed and comprehensive ESPA model in existence
Model Weaknesses

- Some key input data and assumptions, e.g., tributary underflows, are not well understood

- Observed river gains do not show degree of pumping impact predicted by model in some reaches, e.g. nr Blackfoot-Minidoka

- Tendency is to use model in more detailed applications than is justified by data

- Some ground water uses are not well understood
Near Blackfoot to Minidoka Reach Gains

The graph shows the observed and model-implied gains in KAF/yr from 1928 to 2004. The observed gains are represented by a solid blue line, while the model-implied gains are represented by a dashed pink line. The gains are most pronounced around the mid-1950s and vary significantly from year to year.
ESPA Model Grid

- Cities
- Observation Wells
- Snake River
- 1 x 1 mile grid
- Snake River Model Outline

King Hill
Bliss
Hagerman
Jerome
Buhl
Twin Falls
Murtaugh
Ground Water Use on Fort Hall Reservation
An ESPA Management Plan

- Integrate aquifer storage into system operation via managed recharge
- Improve certain canal systems to facilitate recharge
- Support conversions back to surface water use
- Allow temporary dry-ups without forfeiture
- Commit to permanent management of aquifer
Annual Natural Flow at Heise

Source: IDWR
Standard Deviation in Heise Annual Natural Flow (20-yr Moving Window)

Source: IDWR, 2005
Annual Blackfoot to Neeley Reach Gain and PDSI

Source: IDWR, 2005
Annual Spring Discharge Btw. Milner and King Hill and PDSI

Source: IDWR, 2004
Winter (Nov-Mar) Diversions, North Side Canal at Milner

\[ \Delta = 154,000 \text{ AF/year} \]
An ESPA Management Plan

- Integrate aquifer storage into system operation via managed recharge
- Improve certain canal systems to facilitate recharge
- Support conversions back to surface water use
- Allow temporary dry-ups without forfeiture
- Commit to permanent management of aquifer