Presentation to the Idaho Water Resource Board

July 13, 2006

Jon Bowling
Engineering Leader
Idaho Power Company

Idaho Power Company

- Population of service area is estimated at 911,000 people
- 24,000 square miles
- 457,146 customers
- 2005 IPC Energy Generation
  - Hydro 46%
  - Thermal 54%
- Normal year hydro generation 60%+

IPC Integrated Resource Plan

- Plan produced every 2 years
- IPC must understand the relationship between ESPA Model results, IDWR Planning Model results and the actual observed data in order to develop an accurate, comprehensive Integrated Resource Plan (IRP)

IPC Integrated Resource Plan

- Utilize IDWR Planning Model to assess streamflow conditions for future resource needs, based on current level of development and Snake River base flows
- In 2004, IPC funded the update of IDWR Planning Model from a 1992 to a 2002 baseflow condition

IPC Integrated Resource Plan

- The updated IDWR Planning model shows a decline in baseflow (-200 cfs at Murphy from 1992 to 2002 level of development)
- Even without record customer growth, IPC would be required to build additional resources to account for reduction in river baseflows

ESPA Model

- IWRRI modelers are very capable and did a good job with the time and data that they had to work with
- However the ESPA Model can, and should be improved before it can be used with confidence as a planning tool

ESPA Model Predictions vs Observations

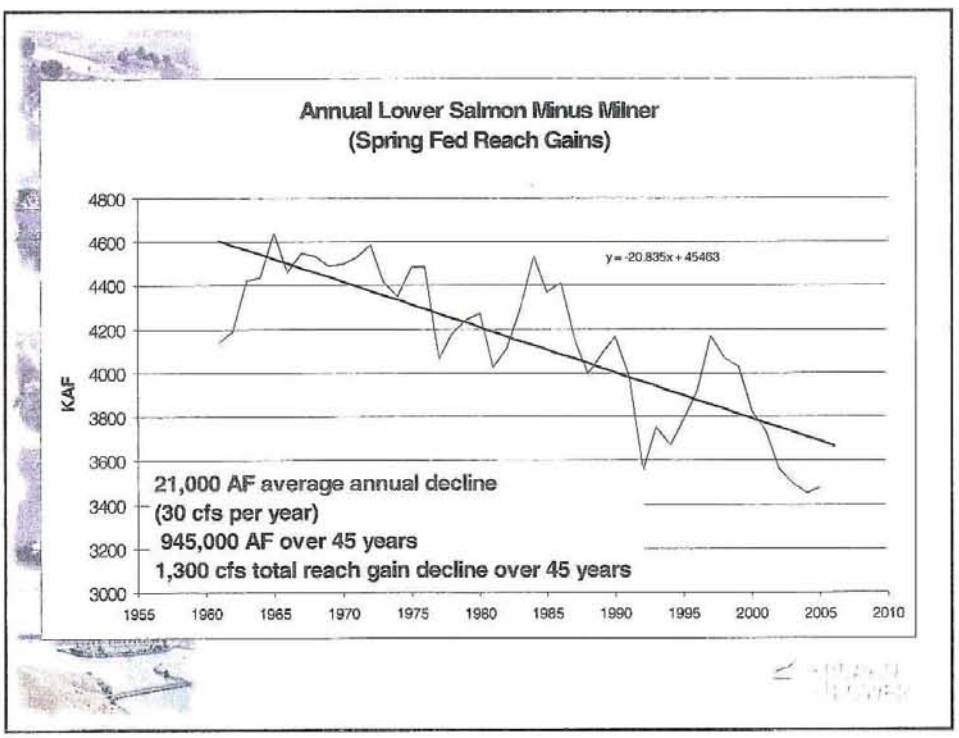
- Model predictions and scenarios do not necessarily reflect reality
- Curren Tunnel is good example
  - Historical Flows were upwards of 70 cfs and now dip down to 2 to 3 cfs
  - Model does not reflect higher historical flows or predict this magnitude of change in affected sub-reach

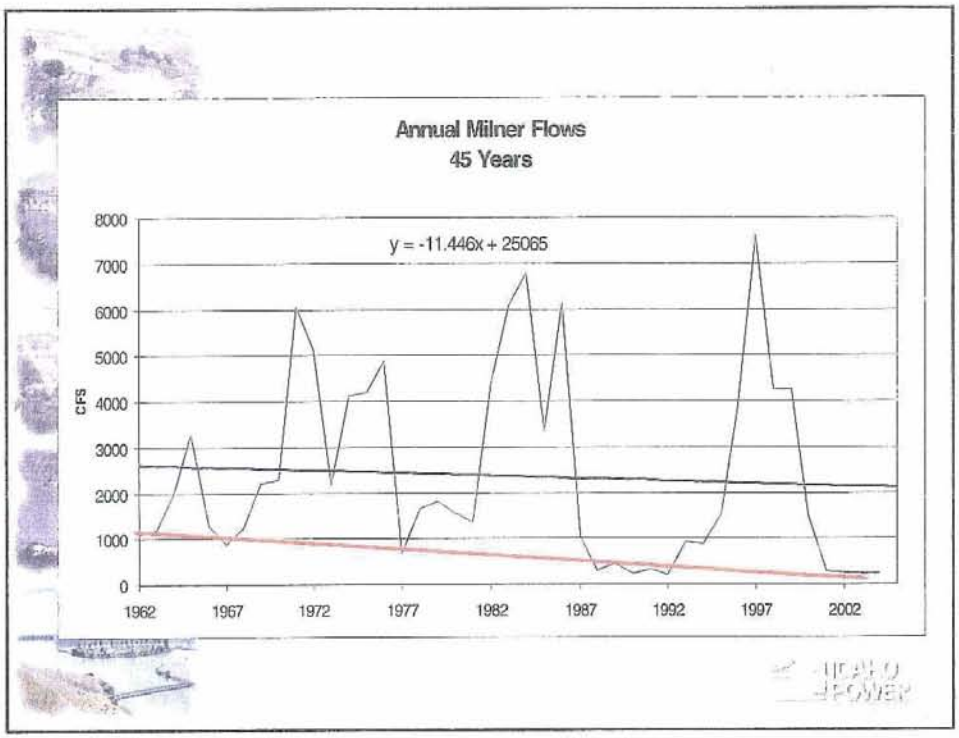
ESPA Model Predictions vs Observations

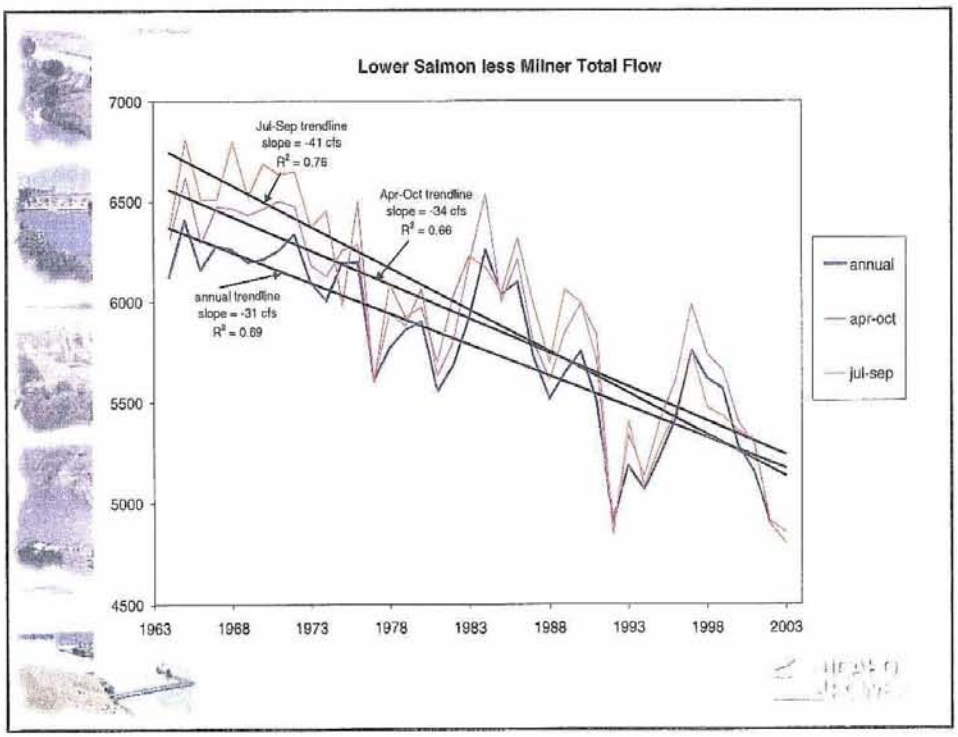
- Model Base Case Scenario, as setup, predicts system was close to equilibrium in 2002
- Recent historical data do not necessarily indicate that this is the case

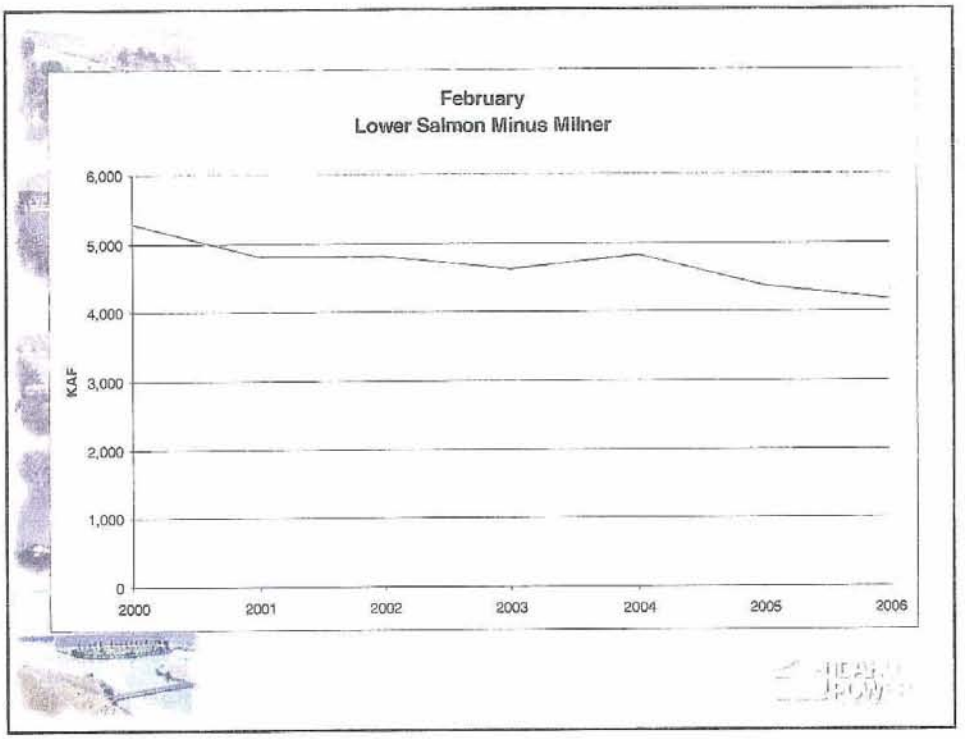
Historical Flows

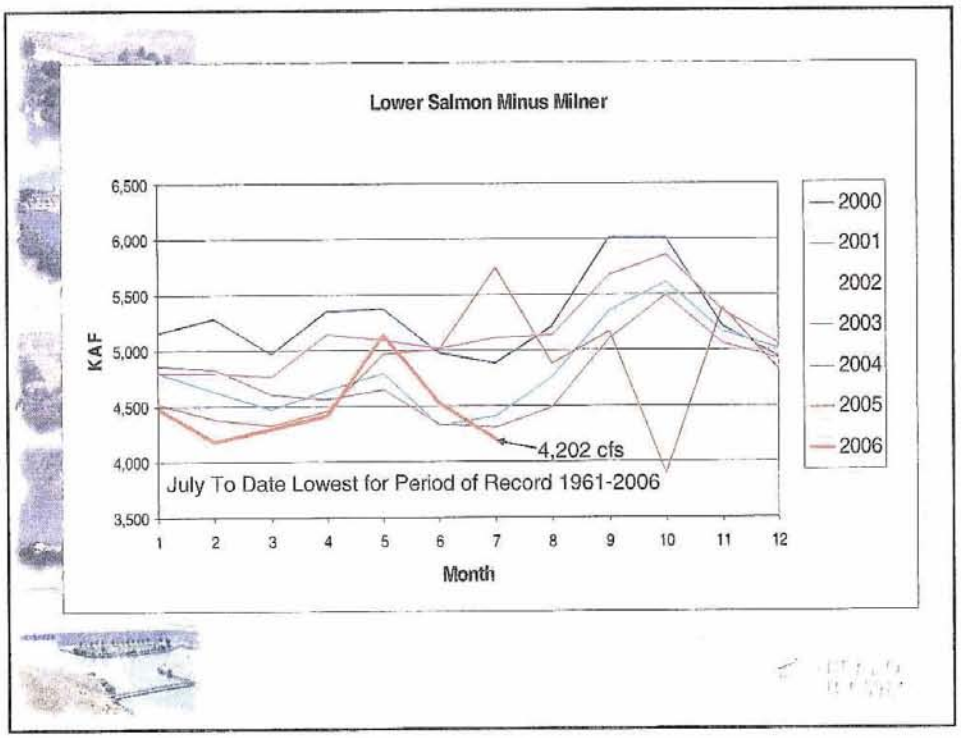
- Snake River Base flows below Milner continue to decline
- Swan Falls Minimum Flow of 3,900 cfs was breached in mid-July 2003
- With continued decline in aquifer level and spring flows, the Swan Falls minimum will be breached again in the future




Annual Milner Flows
45 Years
y = -11.446x + 25065
CFS
8000
7000
6000
5000
4000
3000
2000
1000
0
1962
1967
1972
1977
1982
1987
1992
1997
2002


Lower Salmon less Milner Total Flow
Jul-Sep trendline
slope = -41 cfs
R² = 0.76
Apr-Oct trendline
slope = -34 cfs
R² = 0.66
annual trendline
slope = -31 cfs
R² = 0.69
annual
apr-oct
jul-sep
7000
6500
6000
5500
5000
4500
1963
1968
1973
1978
1983
1988
1993
1998
2003


February
Lower Salmon Minus Milner
6,000
5,000
4,000
3,000
2,000
1,000
0
KAF
2000
2001
2002
2003
2004
2005
2006


Lower Salmon Minus Milner
6,500
6,000
5,500
5,000
4,500
4,000
3,500
KAF
4,202 cfs
July To Date Lowest for Period of Record 1961-2006
1
2
3
4
5
6
7
8
9
10
11
12
Month
2000
2001
2002
2003
2004
2005
2006

Idaho Power Participation

- IPC has been involved in Snake River water issues throughout its history
- IPC has served on ITCH Committee and ESPA Model Committee
- Latest ESPA Model enhancements
  - IPC committed $375,000 to start model enhancement efforts in 2000

Idaho Power Commitment

- IPC has recently committed an additional $200,000 and technical expertise and services for continued improvements to model and planning process

Idaho Power Commitment

- IPC will be an integral and willing participant in the ESPA comprehensive planning process
- All participants and stakeholders have a common goal; to maintain a healthy aquifer and river system
  - There are a lot of things at stake including water quality and endangered species

Willem A. Schreüder, B.Sc., Hons. B.Sc., M.Sc., Ph.D, MS, Ph.D

President, Principia Mathematica, Inc.
Lakewood Colorado

- Dr. Schreuder has more than 20 years of experience in data analysis and mathematical modeling. He holds PhDs in Applied Mathematics and Computer Science
- Dr. Schreüder specializes in numerical analysis, mathematical modeling, computational fluid dynamics and parallel systems.

Willem A. Schreüder, B.Sc., Hons. B.Sc., M.Sc., Ph.D, MS, Ph.D

President, Principia Mathematica, Inc.
Lakewood, Colorado

- He has developed and applied software for mathematical models, scientific visualization and geographic information systems.
- His modeling expertise include general computational fluid dynamics, ground and surface water hydrology and contaminant transport, heat and mass transport, turbulence modeling, dynamic systems and operations research.