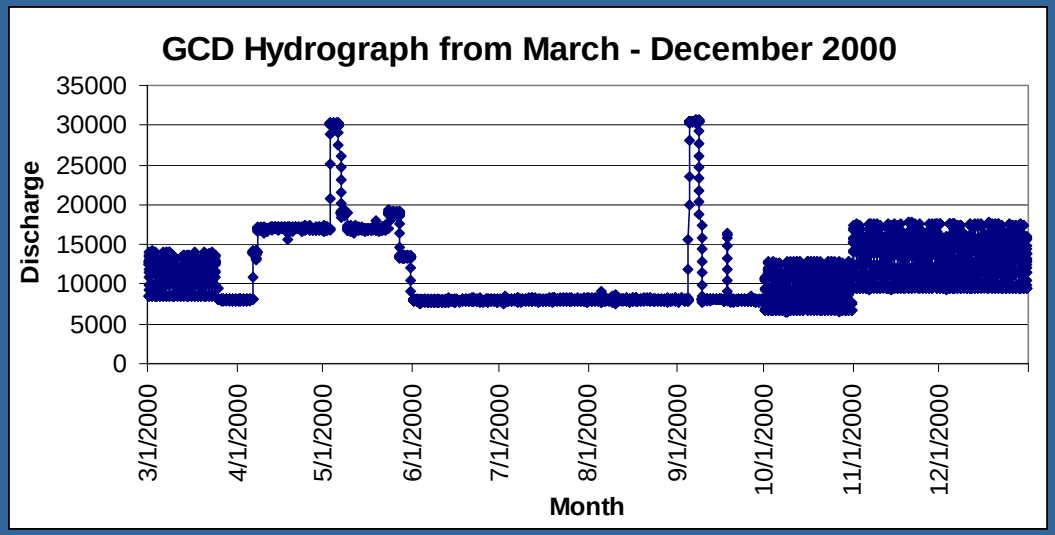
USGS
science for a changing world

Low Steady Summer Flows 2000 Synthesis Project



B. E. Ralston, M.E. Andersen
SBSC/GCMRC
Report to TWG Oct. 15, 2008

U.S. Department of the Interior
U.S. Geological Survey

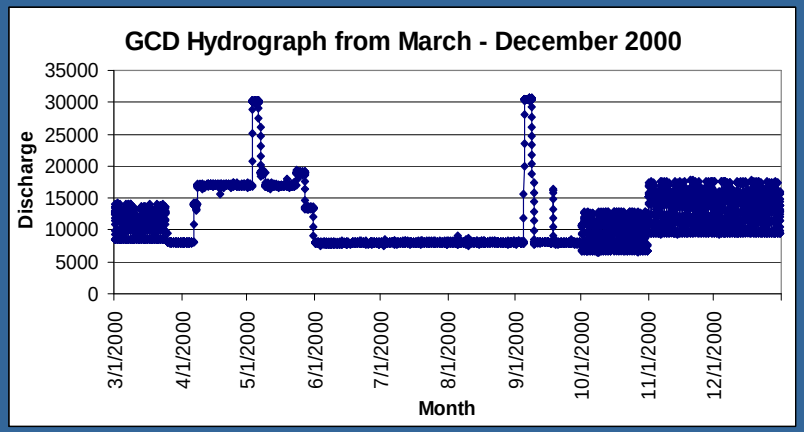
Introduction & Background

- February 2000: Completion of Plan of Experimental Flows for Endangered Fish (SWCA 2000)
- April - September 2000: Implementation of experimental hydrograph
- 25 Studies initiated to evaluate flows on physical, biological and cultural resources
- August 2007: AMWG requested synthesis of information

USGS

Hypotheses by Season and Hydrograph

- Hydrograph designed around life history of native fishes
- Spawning in Spring
- Summer larval development
- Early fall exotic fish disturbance



USGS

Three Phase Approach
(Accelerated Schedule)

- **Synopsis:**
  - **Phase I. Summary of individual studies, Completed Summer 2008.**
  - **Phase II. Workshop for secondary analysis**
    - **Aug. & Oct. 2008.**
- **Synthesis:**
  - **Phase II (cont'd). Synopsis and synthesis. USGS Publication FY 09.**
  - **Phase III. Incorporate results of synthesis into fall steady flows science plan July 09.**

USGS

Current Status 2008

March – Initiated synopsis and data consolidation through cooperative agreement with Northern Arizona University

July – Draft summary completed

August – Workshop conducted: Physical and Biological resources

October – Workshop Held Oct 8th: Social Sciences

USGS

General Conclusions Workshop I & II

- Water temperatures in near shore appear most warmed by low volumes and direct sunlight; fluctuations of limited influence
- Maximum young of year native fish habitat at mouth of LCR observed at 13 kcfs; ponding at higher flows did not occur
- Flows greater than 8 kcfs appear to be the threshold for exporting more sand

USGS

Preliminary results, subject to review and revision

General Conclusions Workshop I & II

- New Zealand mudsnail numbers increased during 2000, but impacts to other species not observed
- Warm water appears to support algae and diatom growth, but fluctuations can negate growth gains
- *Chlodophora* recovers quickly following disruption

USGS

Preliminary results, subject to review and revision

General Conclusions Workshop I & II

- **Primary productivity and invertebrates in Lees Ferry largely unaffected by test flows**
- **Lees Ferry rainbow trout appear to have had successful reproduction in 2000; year class appears to have persisted for five years**
- **Tamarisk expanded initially in 2000, but have persisted in only limited areas**

USGS

Preliminary results, subject to review and revision

General Conclusions Workshop I & II

- Native sucker species and nonnative fathead minnows appear to have reproduced in summer 2000
- Humpback chub may have benefitted from 2000 flows, but ageing is imperfect
- More campable areas available with stable flows
- Less time spent at off river attraction sites due to longer travel time
- Financial costs complicated by drought and California spot market prices in Summer 2000

USGS

Preliminary results, subject to review and revision

Aug. ’08 Workshop Outcome

- New USGS publication to be developed in FY09 (draft March 2009) – accelerated schedule
  - Executive Summary
  - Experiment Overview/Introduction
  - Synopsis (July ’08 - completed)
  - Synthesizing results – augmenting knowledge assessment document and following Knowledge Assessment format
  - Recommendations for future studies

USGS

LSSF Workshop I and II Recommendations for Further Description/Detailed Explanation and Analysis

- **New Synthesis Topics:**
  - Quantify areal extent of warm near shore habitats associated with Thermal Infrared Data
  - Quantify ponding at mouth of LCR
  - Reanalyze fish capture data to clarify effects of fall 31k spike
  - Synthesize fish and water temperature data (incorporate more recent monitoring data)
  - Vegetation effects on the ecosystem
  - Use Bishop model to estimate willingness to pay & provide explanation of limitations of analysis.
  - Look at AGFD creel survey to look at angler response past 2000.
  - Incorporate safety and ability to learn over time into discussion.

USGS

Budget Summary

- FY 08: 100k
- FY 09: 80k
  - 40k carry over
  - 40k new
  - Sufficient for project

USGS