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Review of Fisheries Program

TWG Summary - 2016 Protocol Evaluation Panel Findings

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Southwest Biological Science Center

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

Outline

- Why we do PEP panels
- Brief history of Protocol Evaluation Panels
- 2016 PEP panel - What was asked of the panel?
- Findings of 2016 panel

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Long-Term Fish Monitoring in Large Rivers:

Utility of "Benchmarking" across Basins

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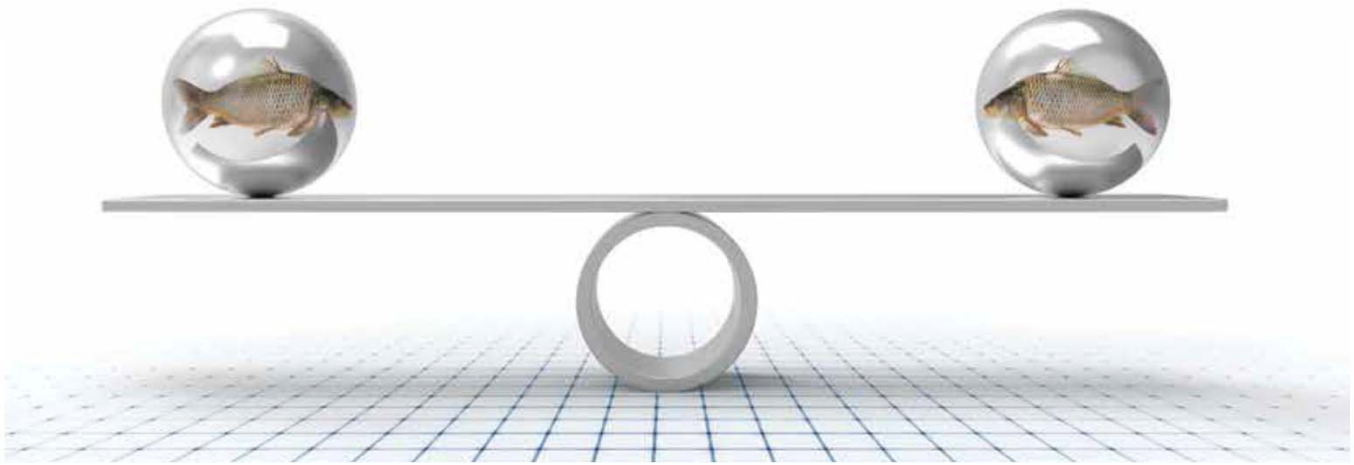

Fisheries, Feb 2017

Recent Timeline

- 2000 – Standardization of Long Term Fish Monitoring Programs

- Anders, P., M. Bradford, P. Higgins, K.H. Nislow, C. Rabeni, and C. Tate. **2001.** Grand Canyon Monitoring and Research Center protocols evaluation program: final report of the aquatic Protocol evaluation panel, Flagstaff, Arizona.

- Bradford, M., M. Bevelhimer, M. Hansen, G. Mueller, D. Osmundson, J. Rice and D. Winkelman. **2009.** Report of the 2009 Protocol Evaluation Panel for Fish Monitoring Programs of the Grand Canyon Monitoring and Research Center

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Participants – Aug 1-5, 2016

Jim Peterson - USGS, Oregon Cooperative Fish and Wildlife Research Unit
Keith Gido - Kansas State University
Don Jackson - University of Toronto, Department of Ecology and Evolutionary Biology
Frank Rahel - University of Wyoming, Department of Zoology and Physiology
Andy Casper - University of Illinois, Illinois River Biological Station

David Braun - Science Advisor (Sound-Science.org)

Formal Prospectus

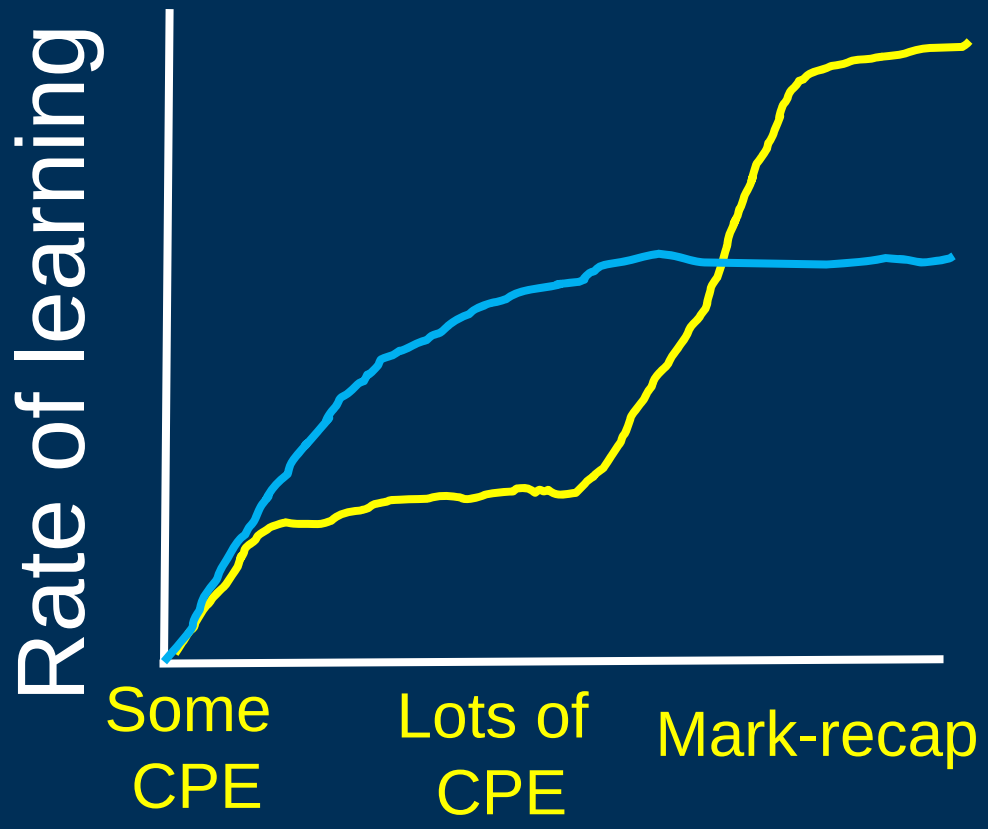
- **Asked 5 Key questions**

  How could the program better balance priorities and trade-offs focused on research and monitoring of –

1. **Rainbow trout** in Glen and Marble Canyons?
2. **Humpback chub** around the LCR confluence, and at other locations that may harbor secondary populations?
3. **Effectiveness of translocation efforts** for of humpback chub?
4. **Native and Nonnative** fish status and trends **outside of fixed study locations?**
5. **Better accommodating concerns for protecting the value of all life forms in culturally sensitive areas while** maintaining the quality science?

Also tasked with making recommendations regarding the scope/direction/ level of effort/study designs/ and relevance of program components

What is appropriate role for a bunch of scientists?



- Identify potential benefits of different levels of investment
- Identify most efficient use of a fixed level of investment
- ~~Tell managers / stakeholders how much to invest without clearly articulated goals.~~

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1a. Rainbow trout Monitoring

- “The quality of catch effort data…is likely reduced due to the inability to account for incomplete capture.”
- “To maintain a quality fishery it is necessary to understand the factors affecting vital rates, currently these estimates are only provided through the intensive research sampling efforts.”
- CPE monitoring is “providing a robust view of status and trends of exotic species” over large areas, and intensive methods have limited spatial extent.

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1a. Rainbow trout Monitoring

- Maintain the ***integrity of*** the Long –Term CPUE monitoring data
- Build on this long-term monitoring effort to estimate the annual response of RBT to conditions.

- Try fitting open models to RBT tagged during CPUE monitoring. **I'm not optimistic**

- Evaluate tradeoffs of different monitoring schemes via simulation.

FY18-20

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1b. Understanding drivers

- "Incorporate all levels of ecosystem (e.g., nutrients, benthic invertebrates, temperature, Lake Powell)" to better understand factors affecting RBT population dynamics. **FY18-20**

- Develop RBT conceptual model to facilitate communication within and outside the program.

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2. Humpback chub

- Quantify impacts of RBT on HBC.

LTEMP, In review

- Focus on drivers of vital rates more, abundance less.

Ongoing

- Improve efficiency of HBC monitoring and research through coordination and power analysis.

Ongoing, FY18-20 – JCM 4 -> 3, LCR -FALL

- Consider more research into a potential second population.

Ongoing, FY18-20

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3. Translocations

- **Need to clearly define goals ?**
  - Providing nursery areas for grow-out?
  - Establishing new populations?
  - Needs clear set of hypotheses.
  - Different stocking methods?

- **Need for quantitative analysis**

FY17-18

- **Genetic considerations**

Ongoing work

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4. Evaluating tradeoffs in monitoring efforts

- **Power analyses / simulations**
  - **Can some projects be downsized?**
  - **Should some projects be discontinued / redesigned?**
    - Some power analysis in draft FY18-20 TWP.
    - PA's have been done in the past – NO & JCM.
    - Changes to consider:
      1) RBT effort in Lees Ferry.
      2) One fall LCR trip?
      3) 4 to 3 JCM trips…2?
      4) 2 or 1 SWEF?
    - Need clear articulation of goal / management need to do a useful PA

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5. Monitoring Broad-Scale Fish Community Status and Trends

I think folks underestimate the importance of variation in capture probability. For example, each 1C change in temperature should increase capture probability by 35% for HBC (and likely similar for suckers) and temperature varies in space and time (7 degree change = 800% difference). Implications for aggregations and SWEF.

- Current sampling likely effective for trout, carp, walleye and smallmouth bass. Ineffective for catfish, striped bass.

- Stratified random design may be poor design for detecting invasions if likely entry points are not sampled yearly.

What is the goal of SWEF?
Invasives? Native fish?
Should 2 trips have different goals?

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5. Monitoring Broad-Scale Fish Community Status and Trends

- **Suggest pit tagging and open models.**
  Optimistic for FMS, not for other species.
- **Also suggest incorporating PIT-tag antennae into design. Worth testing, some ongoing work.**

I think we are doing an good job in 3 of 4 locations identified by PEP already.

fixed sites where nonnative are known to exist or where introduction is most likely to occur."

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5. Monitoring Broad-Scale Fish Community Status and Trends

- **"Identify nonnative fish population or distribution indices or rules sets that would trigger nonnative fish control options to be employed"**

YES!!! I agree, but first step is identifying control options.

- **"Develop ways to routinely solicit information from fishing guides and anglers regarding composition of the recreational fishery."** **FY18-20**

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6. Minimizing negative effects of program activities on fish

- Clearly demonstrate need for particular levels of sampling We need to communicate better.
  Making efforts to decrease effort near LCR.
- Engage tribes in monitoring and Research programs

Ongoing, FY18-20

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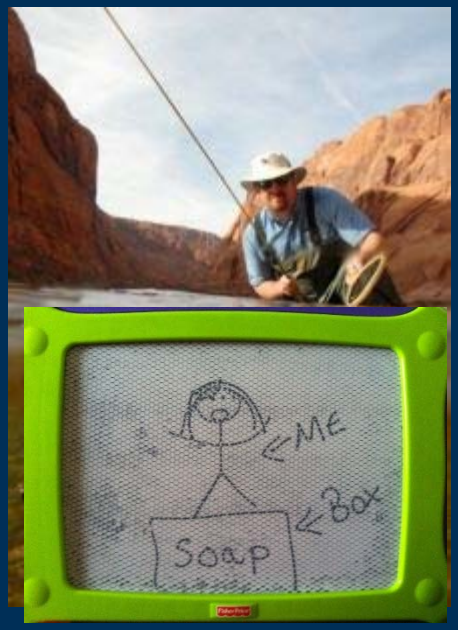
7. Program communication and Outreach

- Need to develop population metrics for characterizing RBT population in Lees Ferry that are understood by and acceptable to angler stakeholders.
- Develop an integrated conceptual model.
- Consider increased citizen science.



All seem reasonable to me.
Requires improved communication.

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8. Adaptive Management

- PEP recommended we focus on models throughout the adaptive management process (Information-theoretic approach).
  - Modify RBT and HBC models to incorporate alternative hypotheses of the factors affecting demography.
  - Integrate two population models.

Some of this has already been done, some is planned for FY18-20. I think this recommendation applies beyond the fishery program…

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8. Adaptive Management

- **Recommendations that the translocations be more hypothesis driven with hypotheses linked to specific management actions and criteria for success clearly defined.**

Makes sense to me. Planned analysis in FY17-18 for Chute Falls is a good first step, but more work needed.
Thoughts from NPS / FWS?

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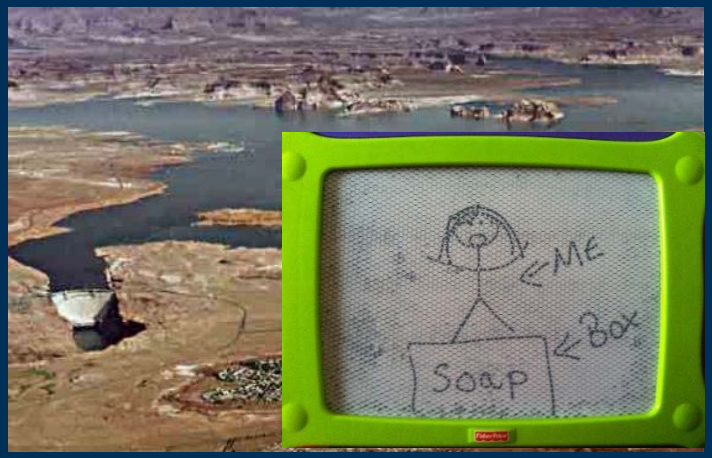
Emerging Issues

- Need to more formally integrate reservoir and downstream ecosystem monitoring.
  - Effects of warmer water and lower nutrients levels associated with lowered lake levels and potentially decreased inflows identified as key uncertainty.
  - Reconsider risk associated with Quagga effects in the reservoir on reservoir outflows (increased water temperature, altered nutrients).

See proposed temperature and nutrients project in FY18-20 workplan.



Emerging Issues

- Invasive species
  - "focus on prevention"

?

- Shifts in benthic macrophyte community –
  - consider research / modelling on nutrient assimilation and stoichiometry dynamics and differences in secondary production on different vegetation.

FY18-20 workplan

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Emerging Issues

- **Climate Change – need ecosystem and/or bioenergetics modelling.**
  - **Program should consider TCD as a management option for warming waters – what would effects be on nutrients / temperature and effects for rainbow trout and native species.**

See proposed temperature and nutrients project in FY18-20 workplan.

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Questions ?