

For RFAC Meeting April 7, 2011

Responses to the Queries of Elaine Reichart, President, Aquatic Conservation Unlimited

Peter Kolesar and James Serio

1. *Slide 16: Do you accept sacrificing the Lower Basin aquatic and water supply needs with your plan? Do you expect PA and NJ to accept the sacrifice of their aquatic systems for the one you favor?*

Response:

We have made several unsuccessful requests to Ms. Reichart for specificity regarding her implied accusation that our release proposal, called the Enhanced Joint Fisheries Program, 'sacrifices' lower basin aquatic systems and water supply. We are troubled by her use of the colorful word 'sacrifices' and all that it connotes. Nevertheless:

Our proposal is a modification of the Joint Fisheries White paper recommendation (scenario 6). As such, it calls for generally increased releases from the NYC Delaware reservoirs as compared to those made under Revision 1, under Revision 7, under the current FFMP, under the Joint Fisheries White Paper itself, and under what we currently understand of the NYC- DEP OST recommendations that are still under development.

Naturally, the impacts of these increased releases on river flows are strongest the closer one is to the reservoirs. (See Harvard and Bridgeville Flow Duration Curves in Appendix Figure 1 extracted from our March 8 RFAC presentation.) At the Montague gauge, roughly 100 miles downstream, the increased flows under our proposal are only modestly higher than those of the alternative policies. At the Trenton gage, roughly 200 miles downstream, the flow changes are essentially undetectable – but in any case somewhat higher. (Again see the Montague and Trenton flow duration curves in Appendix Figure 2, extracted from our March 8 RFAC presentation.)

With such modest augmentation of water flows in the reach of river from Montague to Trenton, it is highly unlikely that our release policies would have any negative impact on the aquatic ecology or on water supply for any stakeholders downstream of Montague, New Jersey.

Telephone inquiries made with experts at the New Jersey Bureau of Wildlife Management, the Pennsylvania Fish and Boat Commission, the US Fish and Wildlife Service, and the National Park Service did not reveal any potential for negative impact on aquatic fauna in the lower basin. Indeed, the general consensus was that the modest increases in flows that would result from our policy would be neutral or modestly beneficial.

Since our proposal calls for larger releases than the other candidate policies, it would appear that, from the water supply perspective, down basin stakeholders, including potential flood

victims, would only benefit from implementation of our proposal -- and most particularly as compared to Revision 1.

2. *Slide 16: Do you also accept spilling reservoirs as part of your plan?*

Response:

Yes, and we offer a brief explanation.

First, from the outset, one of our design principles, going back to the research that led to the FFMP, has been to reduce spilling, converting them into environmentally purposeful releases. This is substantially accomplished by our proposal: It reduces spilling as compared to other candidate policies under consideration -- some 51% as compared to Revision 1. Figure 3 in the Appendix compares annual spilling across the candidate release policies. The superiority of our proposal is evident

Second, another of our design principles has been to maintain a high probability that the Delaware reservoirs are at or near capacity on June 1 so as to maximize the amount of cold water available to maintain the trout fishery throughout the summer. In order to achieve full reservoirs on June 1, it is necessary to have a high probability of some spilling in the spring.

Third, it is generally accepted among fisheries experts that there is an ecological benefit to imitating natural water flow patterns in the River, and this typically includes some level of flooding. Flooding serves several natural functions, including a type of river and streambed 'cleansing'. Spilling is a mechanism by which an imitation of natural floods can be accomplished. Indeed, one of the questions directed to us for this RFAC session by the Wild Trout Flyrodders (Dr. Erikson) asks whether our release proposal does enough early spring spilling from the Pepacton dam. There are many literature references related to spilling and its beneficial impacts. We give two below.

Richter, B. D., and G. A. Thomas. 2007. Restoring environmental flows by modifying dam operations. *Ecology and Society* **12**(1): 12. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art12/>

WMO/GWP Associated Programme on Flood Management "[Environmental Aspects of Integrated Flood Management.](#)" WMO, 2007

3. Slide 16: Do you believe the Delaware Basin should subsidize NYC's desire for cheap water?

Response:

We fail to see how this question relates to our release proposal, or to slide 16 of our March 8 presentation to RFAC.

However, we too are troubled by the tendency of New York City to use water from the Delaware, rather than water from its Catskill and Croton resources for what appear to be economic reasons.

4. Slide 29: Please provide the calculations of 68% increase in spilling reservoirs;

Response:

We estimate via OASIS simulations conducted at a level of 550 MGD NYC diversions with a monthly varying diversion pattern over the period from 1928 to 2006 that under Revision 1 the average daily spill would be 401 MGD, while under the Joint Fisheries proposal the average daily spill would be 239 MGD. This change from 239 to 401 is a 67.8% increase. (See Appendix Figures 3 and 4.)

5. Slide 29: Please provide your support data for your assertion that NJ diversions would be 1% lower, and that Trenton median flows would decrease by 6%

Response:

We estimate via OASIS simulations conducted at a level of 550 MGD NYC diversions with a monthly varying diversion pattern over the period from 1928 to 2006 under Revision 1 that the average daily New Jersey Diversion would be 97.0 MGD, while under the Joint Fisheries proposal the average daily New Jersey Diversion would be 98.4 MGD. This change from 98.4 to 97.0 is a 1.4% decrease. (See Appendix Figures 3 and 4.)

We estimate via OASIS simulations conducted at a level of 550 MGD NYC diversions with a monthly varying diversion pattern over the period from 1928 to 2006 under Revision 1 that the median daily summer Trenton flow would be 4,931 CFS, while under the Joint Fisheries proposal the flow would be 5,238 CFS. This change from 5,238 to 4,931 is a 5.9 % decrease. (See Appendix Figures 4 and 5.)

6. Please show your methodology and assumption sets.

Response:

A full response to this question invites a several hour presentation.

However in brief , and much as described in our March 8 RFAC presentation, our methodology is to model candidate response policies using the official DRBC OASIS simulation model of the Delaware River -- driven by the OASIS January 1, 1928 to September 30, 2006 database of reservoir and tributary inflows. We simulate New York City diversions at a constant annual level, but we impose a monthly varying diversion pattern that was estimated from the most recent decade of actual NYC –DEP diversion data. We have simulated candidate release policies at a number of different average diversion levels including, but not limited to, 450, 550 and 650 MGD. From each OASIS run we capture time series of reservoir storage levels, reservoir releases, reservoir spills and river flows at key gage stations. Selected time series are graphed, summarized statistically and compared across policies. Output from OASIS runs provide time series river flow inputs to the USGS DSS habitat model of the Delaware from which we estimate habitat by fish species, by season, by river segment. OASIS and DSS results are typically summarized statistically.

In addition to using the OASIS and DSS models, we rely on historical and current data gathered from several USGS gages on the Delaware, data from the website of the Office of the Delaware River Master, and data on historical NYC reservoir operations provide by NYC-DEP.

Our approach is based on the assumption that understanding how candidate release policies would have differed in performance with respect to such characteristics as reservoir storage, drought days, river flows , spills and fish habitat from one to another over the past 78 years, as estimated by these River models, is relevant to selecting policies for future use.

7. General Question: Your presentation shows increased releases that may help the Trout under certain conditions. Where is the support for the Basin's other ecosystems further down river?

Response:

As mentioned in our response to your question 1 above, despite numerous inquiries with fisheries experts, we have been unable to identify any evidence of deleterious impacts of our release proposals on down basin ecosystems. Indeed, to the contrary, all responses from fisheries experts have been to the effect that our release policies would be neutral or modestly beneficial down basin. To a significant extent trout are the 'canary in the coal mine.' When the trout are healthy, the river tends to be healthy.

There are two important unresolved aquatic ecology issues of concern on the Delaware, the dwarf wedge mussel and the oysters of Delaware Bay. Based upon the best information currently available, both the Joint Fishery proposal and our enhanced policy would do no harm and may provide modest improvement for Dwarf Wedge Mussels. On both issues, we await, along with RFAC, additional scientific knowledge on the relationship between River flows and the health of these two important populations. We hope that such will be forthcoming soon.

Your repeated inquiry on this theme suggests that, in contrast, you believe the opposite to what we have just stated. If you have evidence to the contrary, we would appreciate your sharing that evidence with us, with the fishing environmental community, with SEF and with RFAC.

Peter Kolesar

James Serio

April 2, 2011

APPENDIX:

Slides extracted from our March 8 Presentation to RFAC that were alluded to in the questions

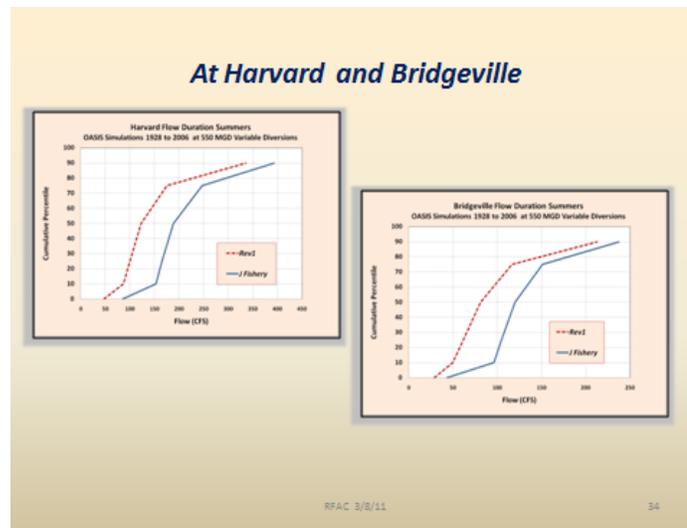


Figure 1. Summer Flows at Two Locations Upriver

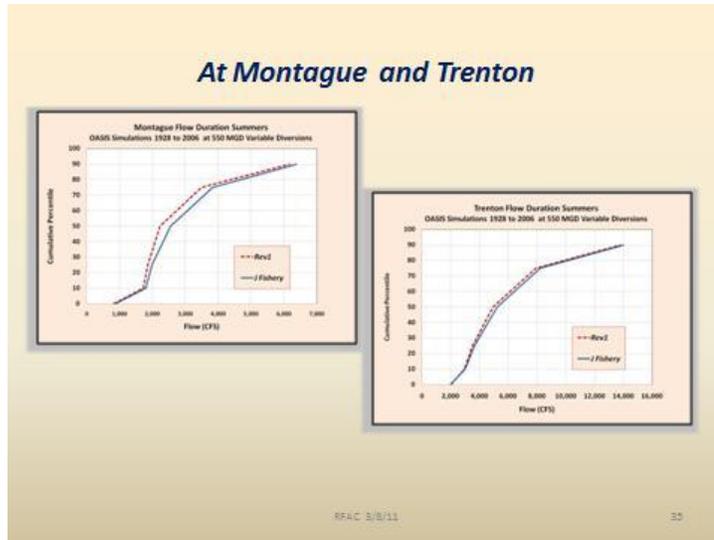


Figure 2. Summer Flows at Two Locations Downriver

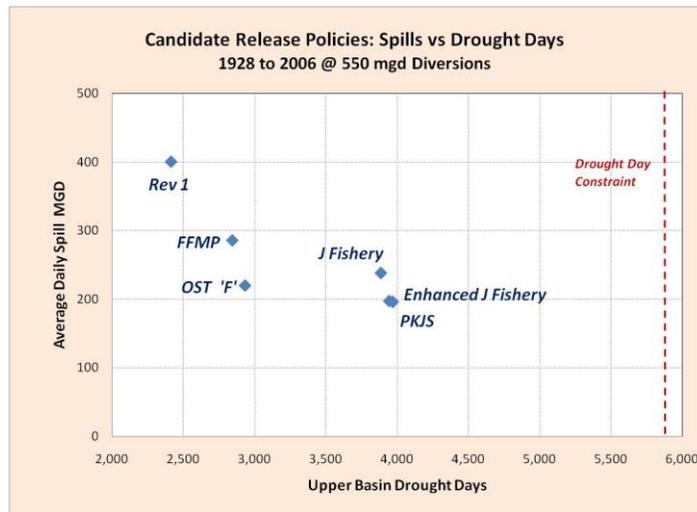


Figure 3 Spills vs. Drought Days Candidate Polices

An Overview Long-run Average Performance (1928 to 2006)

	Rev 1	FFMP	J Fishery
Storage Jun 1	261,554	259,173	255,871
Storage Sep 1	208,815	217,477	208,398
Spills Mean	401	286	239
Upper Drought Watch	458	692	952
Upper Drought Warning	568	672	1,175
Upper Drought Emergency	1,389	1,480	1,757
Upper Drought Total	2,415	2,844	3,884
Lower Drought Total	1,364	1,216	1,156
Reservoir Refill Years	64	61	55
95% Reservoir Refill Years	70	66	66
Summer Adult Trout Habitat (m sq)			
West Branch	53,482	64,586	88,795
East Branch	75,721	89,261	85,468
Neversink	39,899	50,252	50,661
Main Stem	28,267	26,249	70,447
Total Habitat	197,409	230,348	295,371

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Figure 4. Slide 30 March 8 RFAC Presentation

Some Implications of Reverting to Rev 1 as Compared to the Joint Fishery Recommendation

- **A Fishery Perspective**
 - Adult trout summer habitat would decrease by 33% overall and 60% in the main stem.
- **A Flooding Perspective**
 - Spilling would increase by 68% and September 1 reservoir voids would go down by 1%.
- **A New Jersey Pennsylvania Perspective**
 - New Jersey diversions would be 1% lower. Trenton median flows would decrease by 6% and 10th percentile flows would decrease by 2%.
- **A New York City Perspective**
 - Average reservoir levels would be 7% higher, June 1 reservoir levels would be 2% higher and reservoirs would refill 16% more often.

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Figure 5. Slide 31 March 8 RFAC Presentation