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VIA electronic mail

Co-Hearing Officer Tam Doduc  
Co-Hearing Officer Felicia Marcus  
State Water Resources Control Board  
1001 I Street  
Sacramento, CA 95814

Dear Hearing Officers

My proposed cross-examination questions for Mr. Randy Baxter, employee of the California Department of Fish and Wildlife, and the associated exhibits are attached to this letter.

Thank you,

A handwritten signature in black ink, appearing to read "D. Des Jardins", with a stylized flourish at the end.

Deirdre Des Jardins  
Principal, California Water Research

Cc: WaterFix Hearing Parties

## Proposed Questions for Cross-Examination of Randy Baxter

### 1. Expertise

Mr. Baxter, Exhibit DDJ-280 is a copy of the Statement of Qualifications you submitted for the 2010 Delta Flow criteria hearing.

Do you recognize this Statement of Qualifications?

Was it a correct statement of your qualifications in 2010?

Are you still a Senior Biologist Supervisor at the Department of Fish and Game?  
Are you still supervisor for the Young Fishes Unit for Region 3 (Bay-Delta)? If not, how long were you a supervisor?

(What is your current position?)

### 2. IEP POD management team

Your 2010 SOQ states you were a member of the Interagency Ecological Program Pelagic Organism Decline management team since 2005. Is this correct? Are you still a member?

Please pull up Exhibit DDJ-281.

Mr. Baxter, this is a copy of the web page for the Interagency Pelagic Organism Decline management team. Do you recognize this web page?

Can you describe what the Interagency Ecological Program is? And is it abbreviated as "IEP"?

What agencies are members of the Interagency Ecological Program? Is the State Water Resources Control Board a member?

Does the web page define the Pelagic Organism Decline as "unexpected decline" of delta smelt, longfin smelt, juvenile striped bass, and threadfin shad"?

Is this how you define "Pelagic Organism Decline?" Is the Pelagic Organism Decline abbreviated as "POD?"

The web page states that the IEP formed the POD management team in 2005. Is this correct? And you became a member when the team was formed?

### 3. Fall Midwater Trawl

I'd like to ask you some questions about the Fall Midwater Trawl.

## A. Defining Fall Midwater Trawl

What is the purpose of the Fall Midwater Trawl?

What months is it done? How is it done? How long has it been done?

Please pull up Exhibit DDJ-282.

Mr. Baxter, this Exhibit DDJ-282 is a copy of graphs of the Fall Midwater Trawl abundance indices from the DFG website. Do you recognize these graphs?

Can you explain what an “abundance index” is?

I'd like to ask you about the abundance indices.

## B. Delta Smelt

Let's look at page 1 of Exhibit DDJ-282.

Is the first graph on page 1 a graph of the DFG abundance indices of Delta Smelt from the Fall Midwater Trawl? Do you recognize these abundance indices?

Do you see an abrupt decline around 2002? Is there a decline to record lows around 2005?

Is 2011 an exception?

Is this decline in abundance of Delta Smelt part of the “Pelagic Organism Decline”?

Are there record lows in the drought years of 2014, 2015, and 2016?

Are you concerned that Delta Smelt populations might have declined so much that they can't recover?

## C. Longfin Smelt

Is the second graph on page 1 a graph of the DFG abundance indices of Longfin Smelt from the Fall Midwater Trawl? Do you recognize these abundance indices?

Do you see an abrupt decline around 2001? Do you see further decline in following years?

Is 2006 an exception?

Is this decline in abundance of Longfin Smelt part of the “Pelagic Organism Decline”?

Are there record lows in the drought years of 2014, 2015, and 2016?

Are you concerned that Longfin Smelt may go extinct if these trends continue?

#### D. Age 0 Striped Bass

Please go to page 2 of Exhibit DDJ-282

Is the first graph on page 2 a graph of the DFG abundance indices of Age 0 Striped Bass from the Fall Midwater Trawl? Do you recognize this set of abundance indices?

Do you see a decline around 1995? And a decline to record lows around 2001? Do you see further decline in following years?

Is 2006 an exception?

Are there record lows in the drought years of 2014, 2015, and 2016?

Is this decline in abundance of Age 0 Striped Bass part of the “Pelagic Organism Decline”?

#### E. Threadfin Shad

Is the second graph on page 2 of Exhibit DDJ-282 a graph of the DFG abundance indices of Threadfin Shad from the Fall Midwater Trawl? Do you recognize this set of abundance indices?

Do you see a steep decline around 2002? And a decline to record lows around 2008? Do you see further decline in following years?

Is 2006 an exception?

Are there record lows in the drought years of 2014, 2015, and 2016?

Is this decline in abundance of Threadfin Shad part of the “Pelagic Organism Decline”?

Do these fish all have different life histories? Was the combined decline across these four species of major concern?

#### 4. POD comprehensive study

Let's go back to Exhibit DDJ-281

Does the web page discuss “designing and managing a comprehensive study to evaluate the causes of the decline?”

Was doing a comprehensive study of the causes of the POD one of the reasons the POD management team was formed?

Was a comprehensive study done? Were you involved in the design and management of the comprehensive study?

Does the web page also state that one of the purposes was to “synthesize and report the results?”

A. Synthesis report

Please bring up FOR-60.

Exhibit FOR-60 is a copy of the Interagency Ecological Program 2010 Pelagic Organism Decline Work Plan and Synthesis of Results.

Do you recognize this report?

Are you listed as the first author of the report?

A. I'd like first to go to your conclusions on p. 90 (pdf p. 91.)

I'd like to ask you about the paragraph at line 3971, starting with “POD – a regime shift.”

POD – a regime shift

As depicted in figure 8, we propose that changes in a suite of mostly abiotic, environmental variables (drivers) led to changes in biological populations and communities in the system that recently became so profound that a regime shift might have taken place that affected not just the four POD fish species, but the entire system.

Does this paragraph describe a conclusion of the IEP POD management team? Were you an author of this conclusion?

Does the conclusion refer to “profound” changes in biological populations and communities in the estuary? Was this in part the changes shown in the Fall Midwater Trawl Data?

Does the conclusion that a regime shift might have taken place in the estuary? Does it also state that the shift was in response to environmental drivers?

I'd like to go to Figure 8 on p. 184.

B. Regime Shift

Do you recognize this graphic? Did you contribute to this conceptualization of the regime shift?

Does this graphic show an old regime and a new regime for the estuary?

What does this graphic state about the biological community in the Old Regime? (What fish dominate? What is the food web?)

What does this graphic state about the biological community in the New Regime (What fish dominate? What is the food web?)

Does this graphic show the environmental drivers that are proposed to contribute to the regime shift? Are they listed in order of importance?

(If necessary, What do the two sentences at 3991 state about the environmental drivers?

The environmental, slow drivers we propose for the POD regime shift are (1) outflow, (2) salinity, (3) landscape, (4) temperature, (5) turbidity, (6) nutrients, (7) contaminants, and (8) harvest. These drivers are listed in our hypothesized order of their importance to the resilience of the system and approximate rate of change.)

#### C. Outflow

Does Figure 8 show that the first driver is outflow? Does it state that under the old regime the outflow was high and variable? And low and variable under the new regime?

What effects does low outflow have on the Pelagic species? Why does the POD report identify outflow as the most important driver?

#### D. Salinity

Does Figure 8 show that the second driver is salinity gradient? Does it state that under the old regime the salinity gradient was to the west and variable? And under the new regime is to the east and constricted?

And what are the effects of salinity on pelagic fishes? Why does the POD report identify the salinity gradient as the second most important driver?

I'd like to ask you about a paper by Feyer, Nobriga, and Sommer in 2007, that is relied on for the conclusions about the effects of salinity?

Exhibit DDJ-283 is a copy of "Multidecadal trends for three declining fish species: habitat and mechanisms in the San Francisco Estuary, California, USA." Do you recognize this paper? And it is published in the Canadian Journal of Fisheries, a peer-reviewed journal?

Old Regime	Environmental Drivers	New Regime
<i>Variable, High</i>	Outflow	<i>Variable, Lower</i>
<i>To the west, Variable</i>	Salinity gradient	<i>To the east, Constricted</i>
<i>Complex, Variable</i>	Landscape	<i>Simplified, Rigid</i>
<i>Low, Variable</i>	Temperature	<i>High, Uniform</i>
<i>High, Variable</i>	Turbidity	<i>Low, Less variable</i>
<i>High P, low N</i>	Nutrients	<i>Low P, High N (NH<sub>4</sub><sup>+</sup>)</i>
<i>Few, Low</i>	Contaminants	<i>Many, High</i>
<i>Predation, Fishing</i>	"Harvest"	<i>Predation and Entrainment</i>

  

It is summarized on line 989 of the POD synthesis report on p. 25. Let's go to p. 989. Please read the summary.

Based on a 36-year record of concurrent midwater trawl and water quality sampling, there has been a long-term decline in fall habitat suitability for delta smelt and striped bass, but not for threadfin shad (Feyrer et al.

2007). The long-term habitat suitability declines for delta smelt and striped bass are defined by a lowered probability of occurrence in samples based on changes in specific conductance (a surrogate for salinity) and Secchi depth (a measure of water clarity or, conversely, turbidity).

Is specific conductance a surrogate for salinity? And secchi depth is a surrogate for turbidity? )

Does this discuss a decline in fall habitat suitability? Does it link it to specific conductance, a surrogate for salinity? And secchi depth, a surrogate for turbidity?

#### E. Temperature

Does Figure 8 show that the fourth driver is temperature?

And under the new regime they are high and uniform? What effects do high and uniform temperatures have on the Pelagic species? Why does the POD report identify temperatures as the fourth most important driver?

I'd like to ask you about a specific description of the effects of temperature on Delta smelt. Please go to line 2412 on p. 56

Nobriga et al. (2008) found that the catch of delta smelt began decreasing at temperatures above 20° C and became almost zero at 25°C suggesting avoidance of stressful conditions or high mortality. Temperatures near 25°C are likely to be near the lethal end of delta smelt tolerance (Swanson et al. 2000) and would certainly affect growth rates and metabolic activities after 2415 prolonged exposure.

Are temperatures near 25 degrees centigrade lethal for Delta smelt? And the catch begins decreasing at temperatures above 20 degrees centigrade?

Are other fish adversely affected by high temperatures?

#### F. Turbidity

Does Figure 8 show that the fifth driver is turbidity? Does it state that under the old regime turbidity was high and variable? And under the new regime it is low and less variable?

Why is turbidity ranked lower in importance than outflow, salinity gradient, and temperature?

### 5. 2010 Delta Flow Recommendations

Exhibit DDJ-284 is a copy of Effects of Delta Inflow and Outflow on Several Native, Recreational, and Commercial Species by the Department of Fish and Game.



Do you recall this report?

Please read the note at the bottom of p. 1. Can you confirm that the report was produced for the State Water Resources Control Board's 2010 Delta Flow Criteria Informational Hearing?

Did this report assess of the effects of Delta inflow and outflow on several species of fish in the Delta?

Did you help present this report to the State Water Resources Control Board?

A. Chinook Salmon

I'd like to ask about the assessment for Chinook salmon in section 2.1 on p. 1 of the report. It refers to a 1987 USFWS study that found that juvenile Chinook salmon was positively correlated with flow and negatively correlated with temperature.

Do you agree with those conclusions?

Are you familiar with the conclusion cited here that smolt survival increases are associated with increasing flows at Rio Vista? Do you agree with that conclusion?

Are you familiar with the conclusion that maximum survival was observed with flows at Rio Vista of 20,000-30,000 cfs?

B. Delta Smelt

I'd like to ask you about the assessment for Delta smelt in section 2.6 of the report on p. 14.

It states that flows that locate  $X_2$  in Suisun Bay are noted to result in high survival rates, and cites a 2002 paper by Peter Moyle.

Are you familiar with Peter Moyle's paper? Is it Peer Reviewed? Do you agree with this conclusion?

It also states that flows that locate X in Suisun Bay are noted to result in high abundance of delta smelt, and cites a 1995 paper by Jassby et. al.

Are you familiar with Jassby's 1995 paper. Is it peer reviewed?

Do you agree with Jassby's conclusion?

6. Delta flow criteria recommendations

I'd also like to ask you about Exhibit SWRCB-25, the Delta Flow Criteria report.

Table 13 on p. 96 lists the recommendations for Starry Flounder. Are you familiar with these recommendations?

It shows very high outflows (>50,000 cfs) being required in wet years for Starry Flounder. Do you know why this is required?