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MEMORANDUM

TO: Ritchie Graves (NOAA)

FROM: Michele DeHart

DATE: March 29, 2016

SUBJECT: Preliminary 2015 juvenile survival estimates and environmental conditions

In response to your request, we have updated our juvenile survival web query (http://www.fpc.org/survival/smp_multiyearsurvival_query.html) to include the 2014 juvenile survival estimates that were provided in the 2014 FPC Annual Report (Appendix H). In addition, you inquired about estimates of 2015 subyearling Chinook survivals and how they compared to previous years. As part of the preparation of the 2015 FPC Annual Report (to be released in Draft form in June 2016), we are in the process of estimating juvenile reach survivals (LGR-MCN) for hatchery yearling Chinook, wild yearling Chinook, hatchery and wild steelhead, hatchery and wild sockeye, and hatchery and wild subyearling Chinook. In response to your inquiry, we have summarized our preliminary estimates of 2015 juvenile survivals (LGR-MCN) and associated environmental conditions and compared them to previous years. Below is a general overview of our findings followed by figures that demonstrate the particular examples highlighted in the points outlined below.

- In terms of Water Transit Time (WTT), the low flows that spring migrants encountered in 2015 were very similar to the low flow conditions in 2001 (Figures 1A, 2A, 3A, and 4A).
- Despite low flow conditions in 2001 and 2015, spill operations in these two years were very different. No voluntary spill was provided at Snake River projects in 2001, whereas voluntary spill was provided at all projects in 2015 (Figures 1B, 2B, 3B, and 4B).
- Even though WTT were similar in 2001 and 2015, Fish Travel Times (FTT) for all spring migrants were much faster in 2015 compared to 2001 (Figures 1C, 2C, 3C, and 4C).

These reductions in FTT ranged from 36% for hatchery and wild sockeye (Figure 4C) to 57% for hatchery and wild steelhead (Figure 3C).

- Average juvenile survivals (LGR-MCN) were also higher for spring migrants in 2015 compared to 2001 (Figure 1D, 2D, 3D, and 4D). Increases in juvenile survival ranged from 18% for hatchery yearling Chinook (Figure 1D) to approximately 420% for hatchery and wild steelhead (Figure 3D).
- These same basic patterns were evident for subyearling Chinook migrants as well. One difference was that WTT in 2015 were more similar to those from 2004 than 2001 (Figure 5A).
- However, spill operations in 2015, 2004, and 2001 differed substantially. Subyearling Chinook out-migrating in 2015 experienced voluntary spill at all projects. Subyearling Chinook out-migrating in 2004 experienced voluntary spill at only one project (IHR). Subyearling Chinook out-migrating in 2001 experienced no voluntary spill (Figure 5B).
- Fish Travel Times in 2015 were also faster for subyearling Chinook than either 2001 (65%) or 2004 (13%) (Figure 5C).
- As with spring migrants, average juvenile survival (LGR-MCN) for subyearling Chinook was also higher in 2015 than both 2001 (107% higher) and 2004 (18% higher) (Figure 5D).

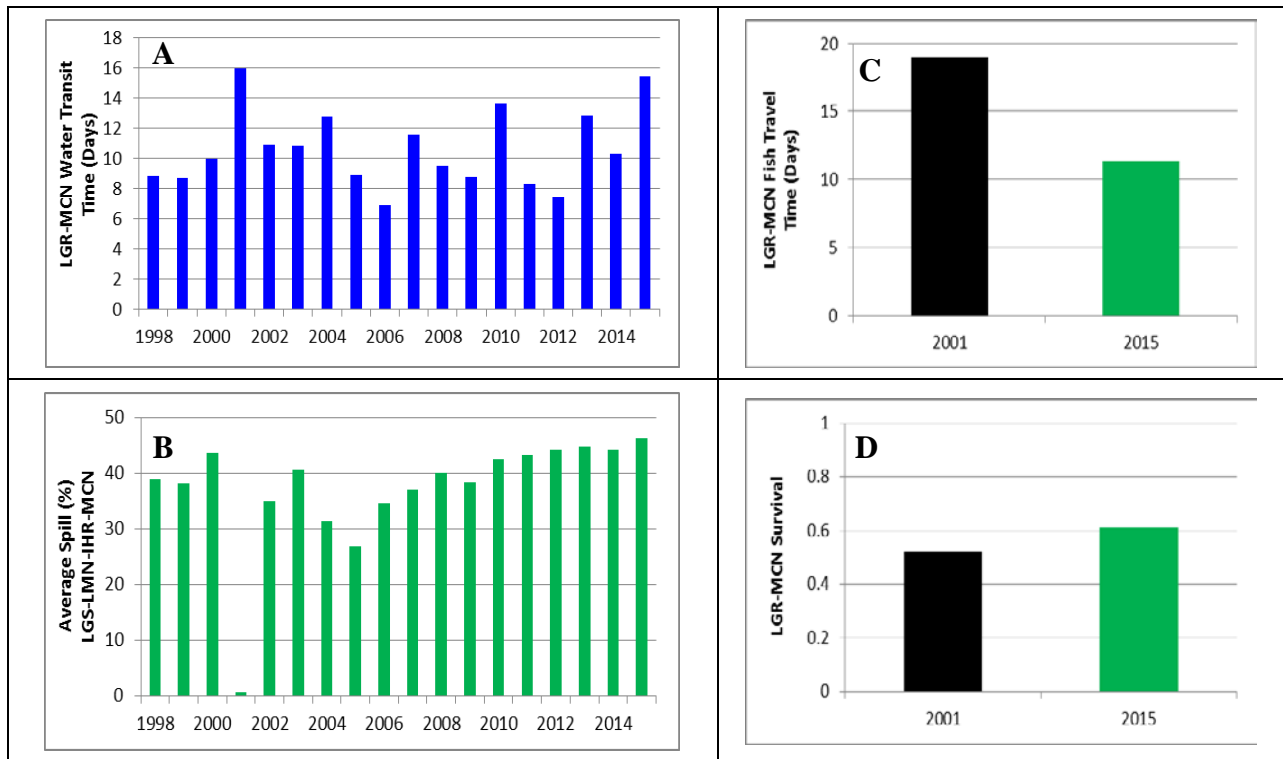


Figure 1. Hatchery yearling Chinook: (A) Average Water Transit Time (LGR-MCN, days) (1998–2015), (B) Average spill (%) (1998–2015), (C) Average Fish Travel Time (LGR-MCN, days) (2001 vs. 2015), and (D) Average Survival (LGR-MCN) (2001 vs. 2015).

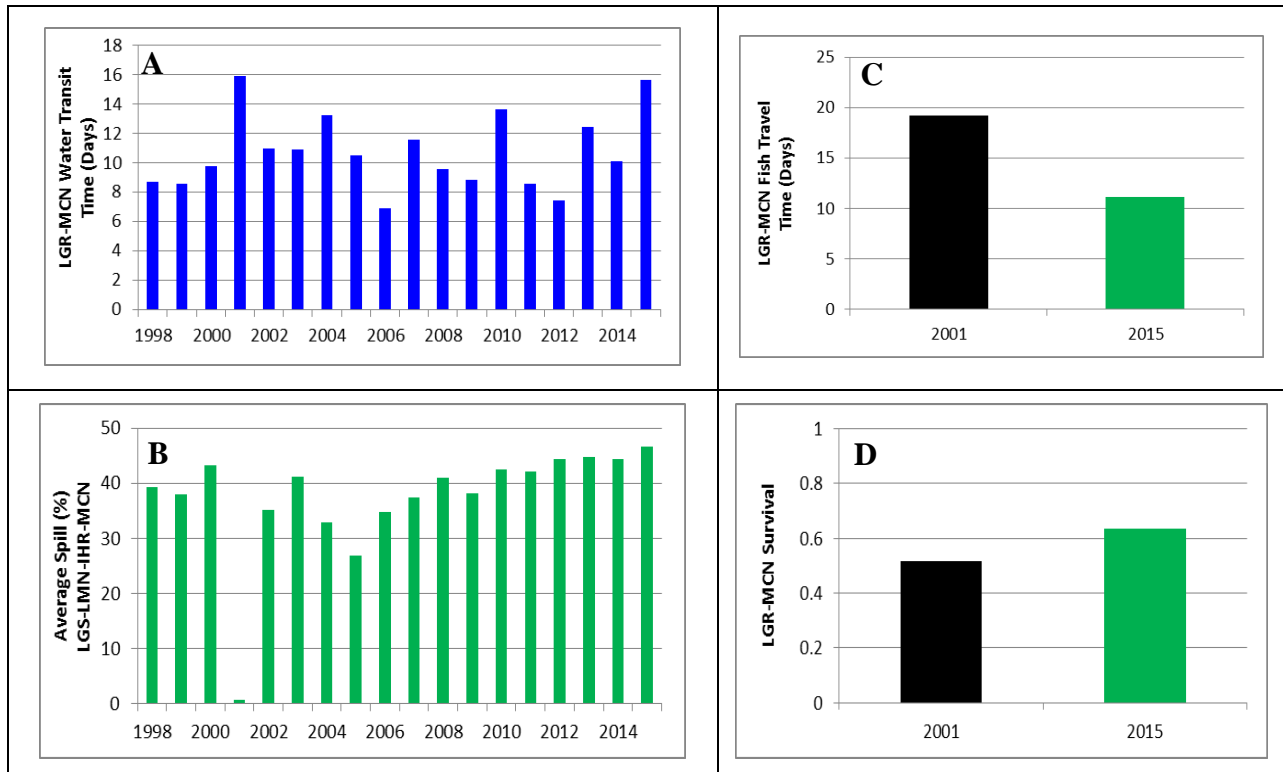


Figure 2. Wild yearling Chinook: (A) Average Water Transit Time (LGR-MCN, days) (1998–2015), (B) Average spill (%) (1998–2015), (C) Average Fish Travel Time (LGR-MCN, days) (2001 vs. 2015), and (D) Average Survival (LGR-MCN) (2001 vs. 2015).

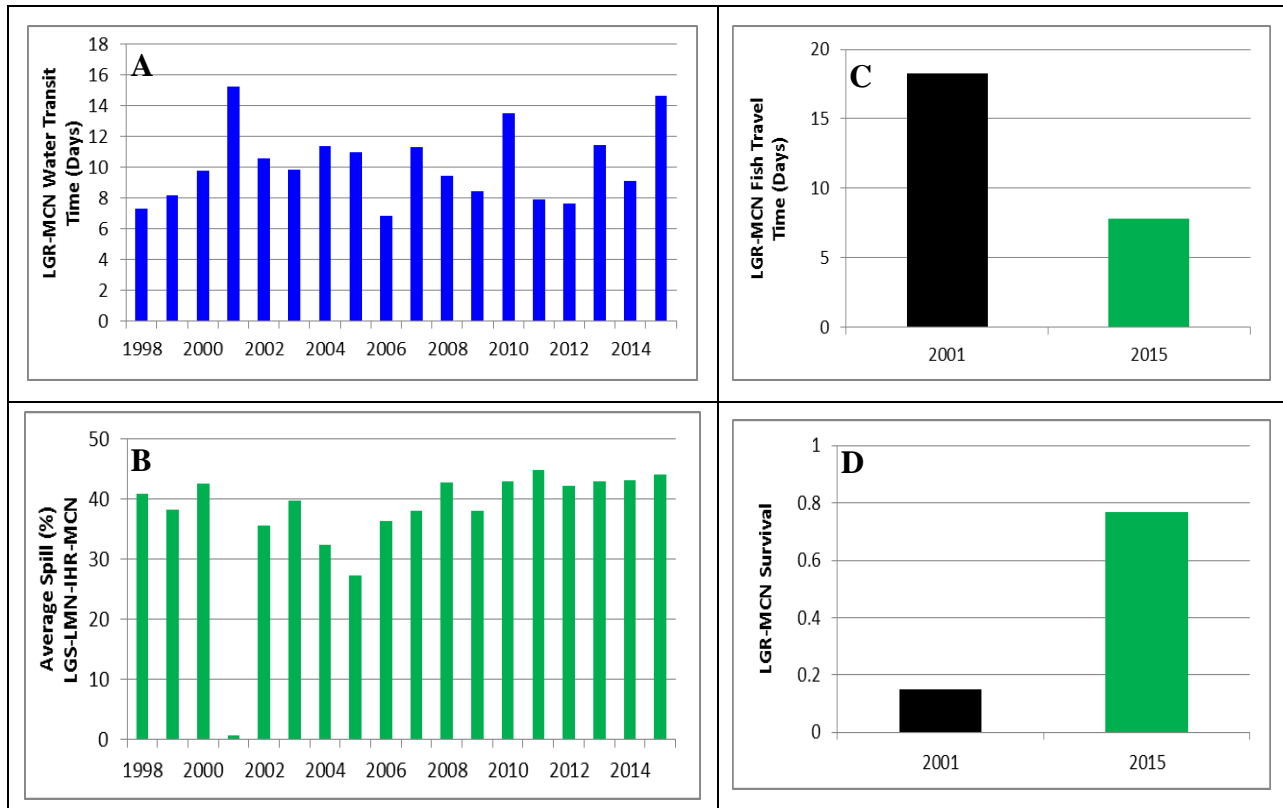


Figure 3. Hatchery and wild steelhead: (A) Average Water Transit Time (LGR-MCN, days) (1998–2015), (B) Average spill (%) (1998–2015), (C) Average Fish Travel Time (LGR-MCN, days) (2001 vs. 2015), and (D) Average Survival (LGR-MCN) (2001 vs. 2015).

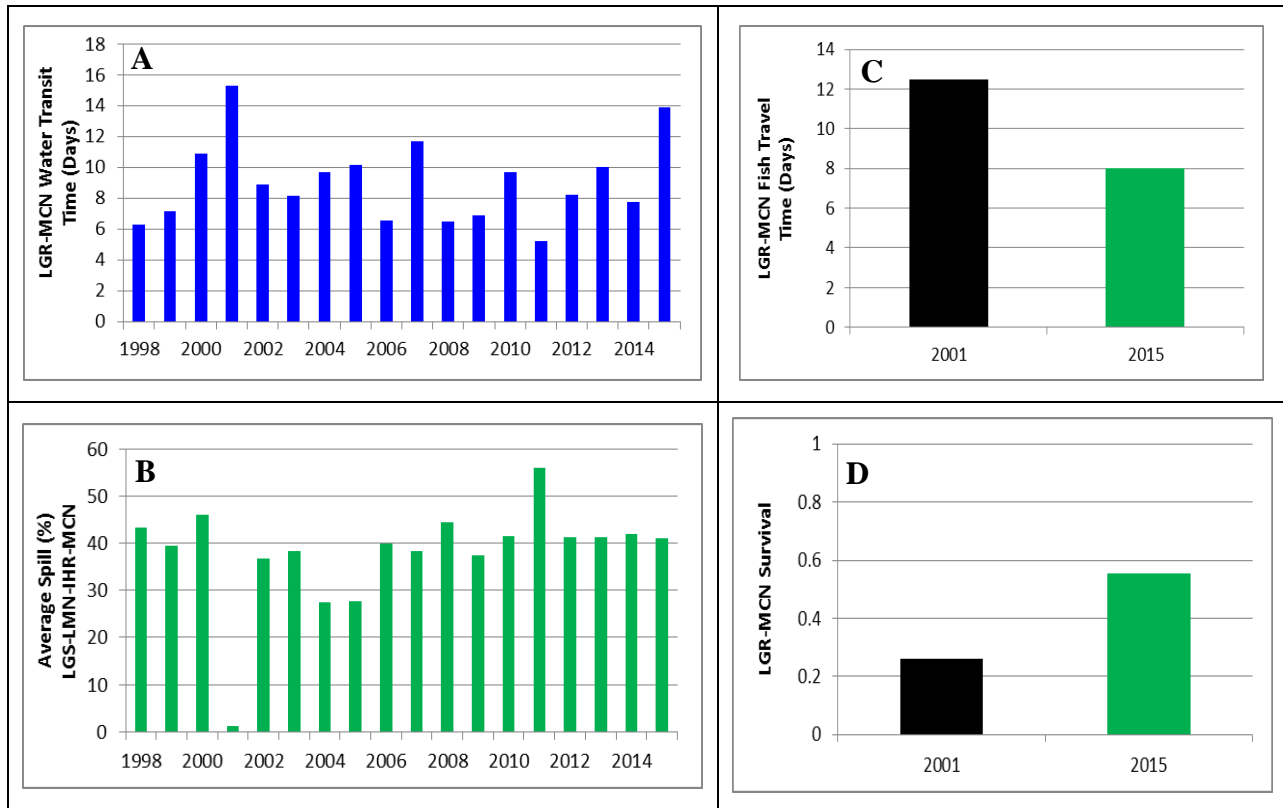


Figure 4. Hatchery and wild sockeye: (A) Average Water Transit Time (LGR-MCN, days) (1998–2015), (B) Average spill (%) (1998–2015), (C) Average Fish Travel Time (LGR-MCN, days) (2001 vs. 2015), and (D) Average Survival (LGR-MCN) (2001 vs. 2015).

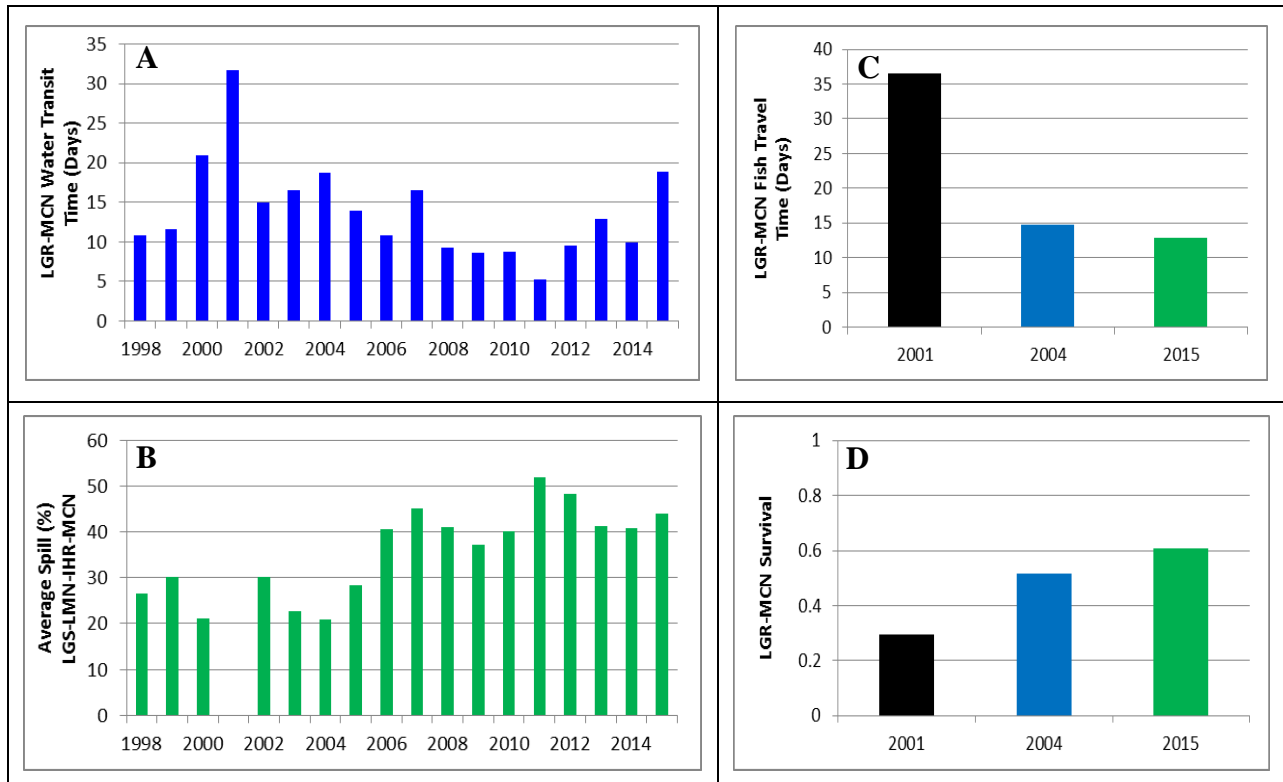


Figure 5. Hatchery and wild subyearling Chinook: (A) Average Water Transit Time (LGR-MCN, days) (1998–2015), (B) Average spill (%) (1998–2015), (C) Average Fish Travel Time (LGR-MCN, days) (2001, 2004, and 2015), and (D) Average Survival (LGR-MCN) (2001, 2004, and 2015).