Rationale for considering adopting a maximum transportation program on the Snake River for the later half of May 2007.

- The main reason for considering a maximum transportation program for the balance of the spring season is that research data collected to date indicates that fish arriving late in the season at Lower Granite and Little Goose Dams have a much larger SAR when transported than if they migrate through the hydropower system. Poor late year migration conditions are exacerbated when flows are low. This year, poor in-river migration conditions are anticipated. The seasonal average flow forecast for this spring migration season (April 3 – June 20) is currently projected to be approximately 72 kcfs. The current average flow forecast for this May is an average flow 82 kcfs. Survival data from the year 2002 (Figures 1-3) , which had a seasonal average flow of 83 kcfs indicated that the SARs of both transported wild steelhead and wild spring Chinook were substantially higher than in-river migrants during the late May period.
- The NMFS 2005 Effects memo provided data indicating thresholds for both flow and temperature exist at which juvenile survival decreases at a rapid rate. For steelhead flows below 115 kcfs negatively affected steelhead, spring Chinook were negatively affected below flows of 72 kcfs. Both species showed a rapid decline in survival when temperature exceeded 12.5^0C (54.5F) at Lower Monumental Dam (Williams et al. 2005).
- The peak daily flow forecasted for the Snake River is currently forecasted to be in the range of 100 kcfs and will be short in duration. The current temperature at Lower Monumental Dam tailrace is 12.2^0C, (53.7F).
- Using 2002 as a comparable year (even though average volume was higher) the SAR of wild steelhead marked at Lower Granite Dam (LGR) and migrated in-river during the May 15 –June 1 period were <.4%, while transported fish had SARs in the 1.5 – 3% range; comparative SARs of steelhead migrating in-river vs transported from Little Goose Dam (LGS) were ~.5% vs 1 to 2.5%, respectively (Figure 3)(Marsh et al. 2005).
- Data for wild tagged spring Chinook showed a similar trend in terms of transport performance (Marsh et al. 2006). The SARs at LGR for in-river vs. transported fish for the late May period were ~.6% vs 1 – 2.5% respectively (Figure 1). The SARs from LGS in-river vs. transport were in the range of .5 – 1% vs .75 – 1.5% during the late May period (Figure 2).
- Muir (2006) concluded the poorer performance of late season [in-river] migrants is probably due to ocean entry beyond the optimum migration window and declining physiological condition. Thus, transporting a higher percentage of Chinook salmon smolts later in the season would optimize their ocean entry timing and should lead to improved survival.

Summary

It is anticipated that substantially fewer adults will return from fish left to migrate in-river versus those transported during the low flow and high temperatures anticipated to occur this year in the later part of May. Transitioning to a maximum transportation program is recommended by NMFS at this time.

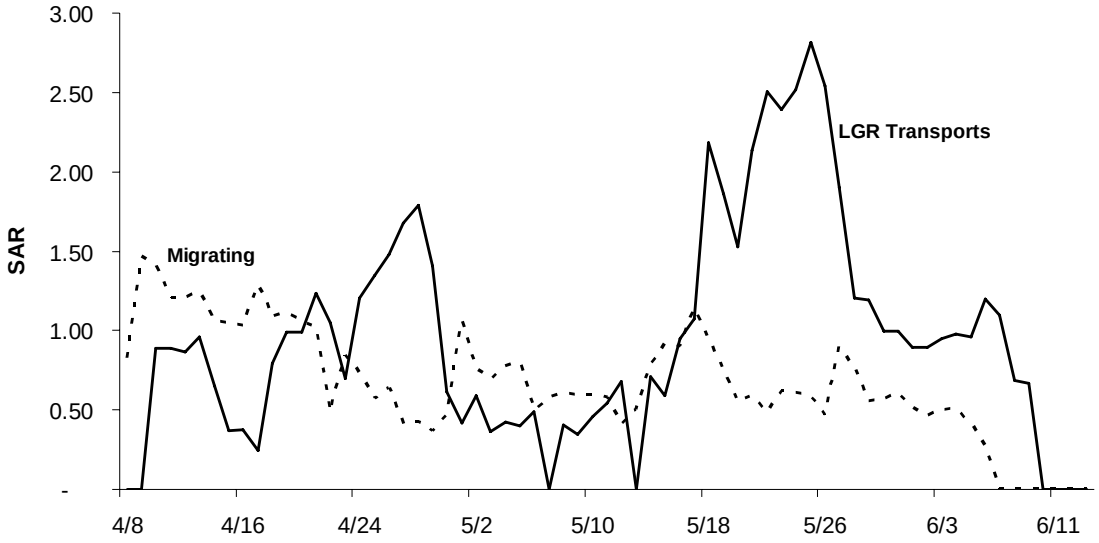

Figure 1. Smolt-to-adult return rates by release date for yearling Chinook smolts tagged in 2002 and either transported from Lower Granite Dam or released to migrate in the river. Data are 5-day running averages of daily juvenile releases, and numbers are adjusted proportional to daily collection numbers at LGR in 2002. The overall transport/inriver migrant ratio was 1.64.

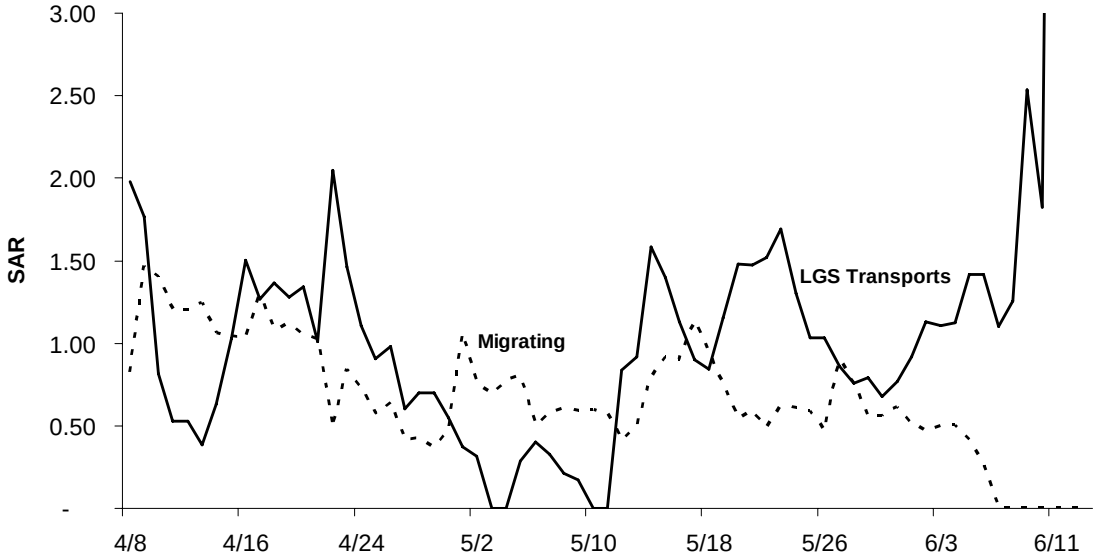

Figure 2. Smolt-to-adult return rates by release date for yearling Chinook smolts tagged in 2002 and either transported from Little Goose Dam or released to migrate in the river. Data are 5-day running averages of daily juvenile releases, and numbers are adjusted proportional to daily collection numbers at LGS in 2002. The overall transport/inriver migrant ratio was 1.34.

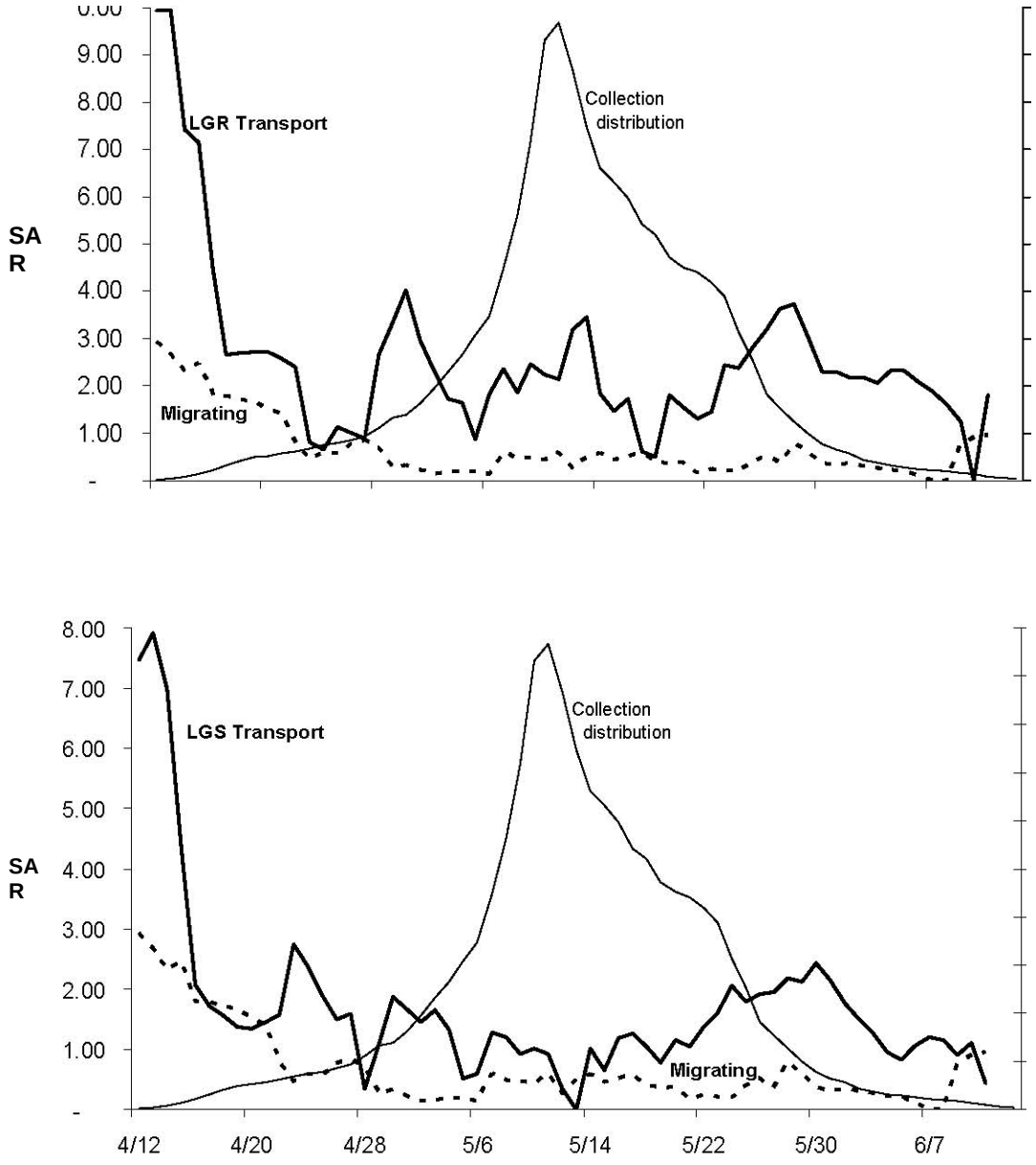

Figure 3. Smolt-to-adult return rates by juvenile tagging date for steelhead smolts transported from Lower Granite (LGR transport, above) and Little Goose Dam (LGS transport, below) compared with SARs of their inriver migrant cohorts in 2002. Also shown is the distribution of juvenile fish collected at these dams in 2002.

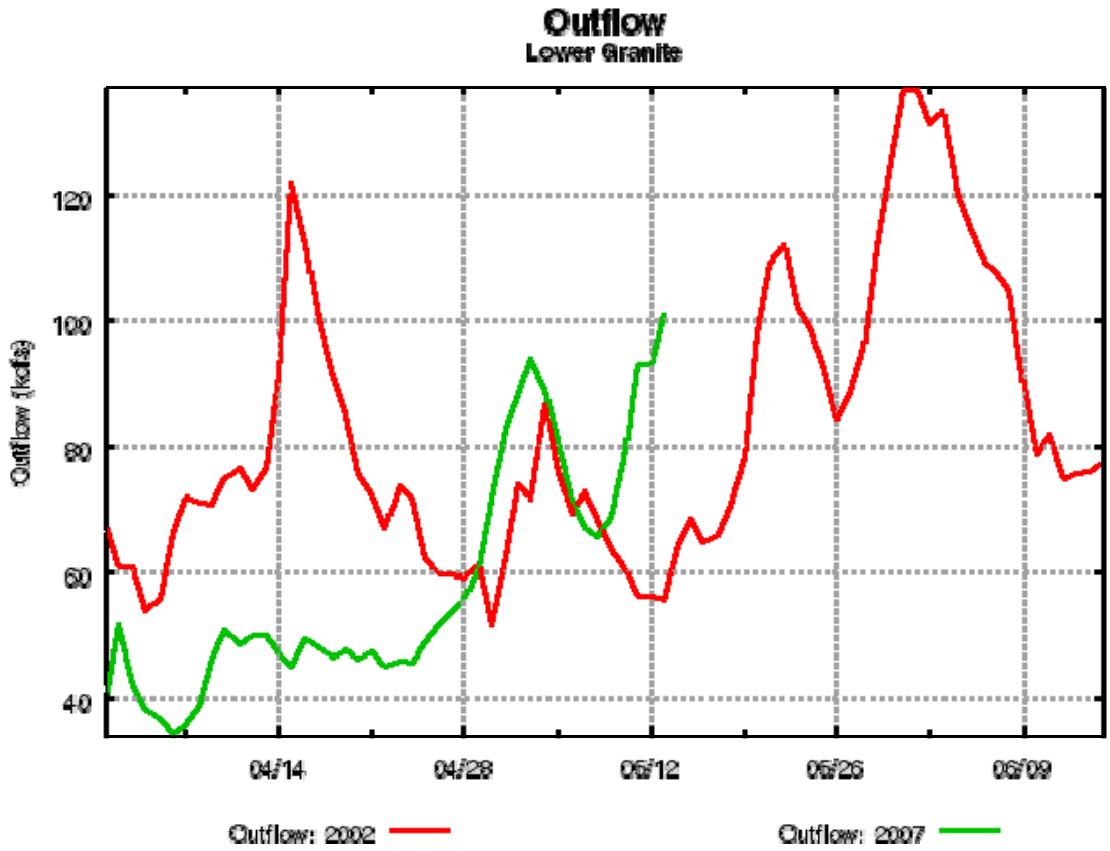

Figure 4. Flow during the spring migration period at Lower Granite for the years 2002 and 2007. The magnitude of flow in 2007 is projected to be less than that observed in 2002 due to a substantially lower runoff volume in 2007. The April to July runoff volume in 2002 was 19.2 Maf vs 14.2 Maf for 2007.

References Cited:

Marsh, D. M., and coauthors. 2006. Research related to transportation of juvenile salmonids on the Snake River 2005: Final report for 2002 spring/summer Chinook salmon juvenile migration. Report of Research by Fish Ecology Division, Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration to the U.S. Army Corps of Engineers, Walla Walla District, 43 p. .

Marsh, D. M., and coauthors. 2005. Transportation of juvenile salmonids on the Columbia and Snake Rivers, 2004: Final report for 2002 steelhead juveniles with updates on other transport studies. Report of Research by Fish Ecology Division, Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration to the U.S. Army Corps of Engineers, Walla Walla District, 46 p. .

Muir, W.D., D.M. March, B. P. Sandford, S. G. Smith, and J. G. Williams. 2006. Post-Hydropower System Delayed Mortality of Transported Snake River Stream-Type

Chinook Salmon: Unraveling the Mystery. Transactions of the American Fisheries Society 135:1523–1534.

Williams, J. G., and coauthors. 2005. Effects of the Federal Columbia River Power System on salmon populations. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-63, 150 p. (Available online at http://www.nwfsc.noaa.gov/publications).