

*Science, Service, Stewardship*



# Supplemental Recovery Plan Module for Hydropower and Water Storage Projects:

Presentation to the Snake River Recovery Plan  
Coordination Group

February 16, 2012

March 12, 2012

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## Overview

- Purpose and relationship to 2008 Recovery Planning Module
- Document Structure
- Juvenile Survival Rates
- Adult Survival Rates
- Smolt-to-Adult Return Estimates (in progress)



## Purpose and Relationship to 2008 Hydro Module

### 2008 Hydro Module

- Overview of Limiting Factors relating to Hydro (passage, inundation, water quality, quantity, and timing, etc.)
- Summarized current strategies to assist in recovery
- Provided survival rates (Current and Prospective) for 5 ESUs of Interior Basin species

### 2012 Supplemental Module

- Updates 2008 Hydro Module information for Snake River species (significant passage improvements and recent survival rates)
- Provides discussion of latent and delayed mortality



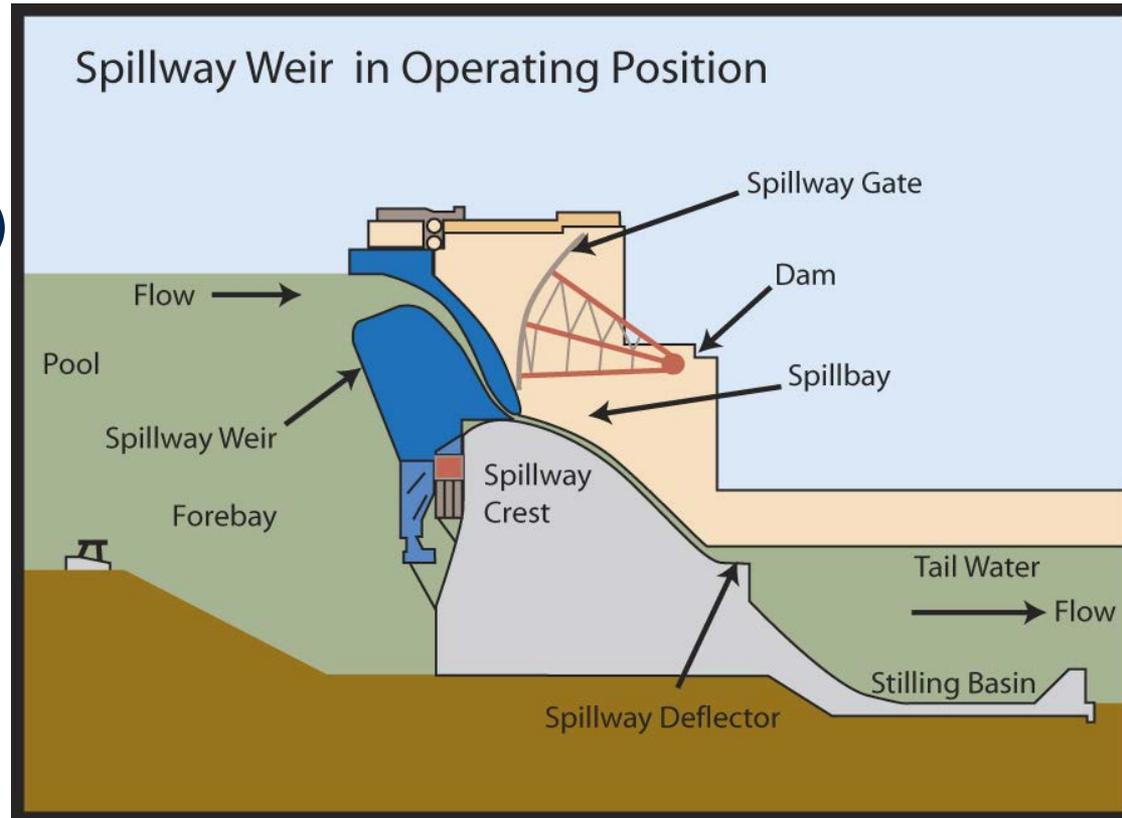
## Document Structure

- Introduction
- Hydropower System Overview
- Juvenile Passage and Survival
  - Spillways/Surface Passage Routes
  - Inriver Survival
    - (brief discussion of direct survival, latent mortality, and survival estimates)
  - Transportation
    - Brief discussion of differential delayed mortality, transport survival (system survival)
- Adult Passage and Survival



## Juvenile Survival: Recent Spillway / Passage Route Improvements

- 2008
  - LMN – spillway weir
  - JDA – spillway weirs (2)
- 2009
  - LGS – spillway weir
  - MCN summer spill at 50%





## Juvenile Survival: Recent Spillway / Passage Route Improvements

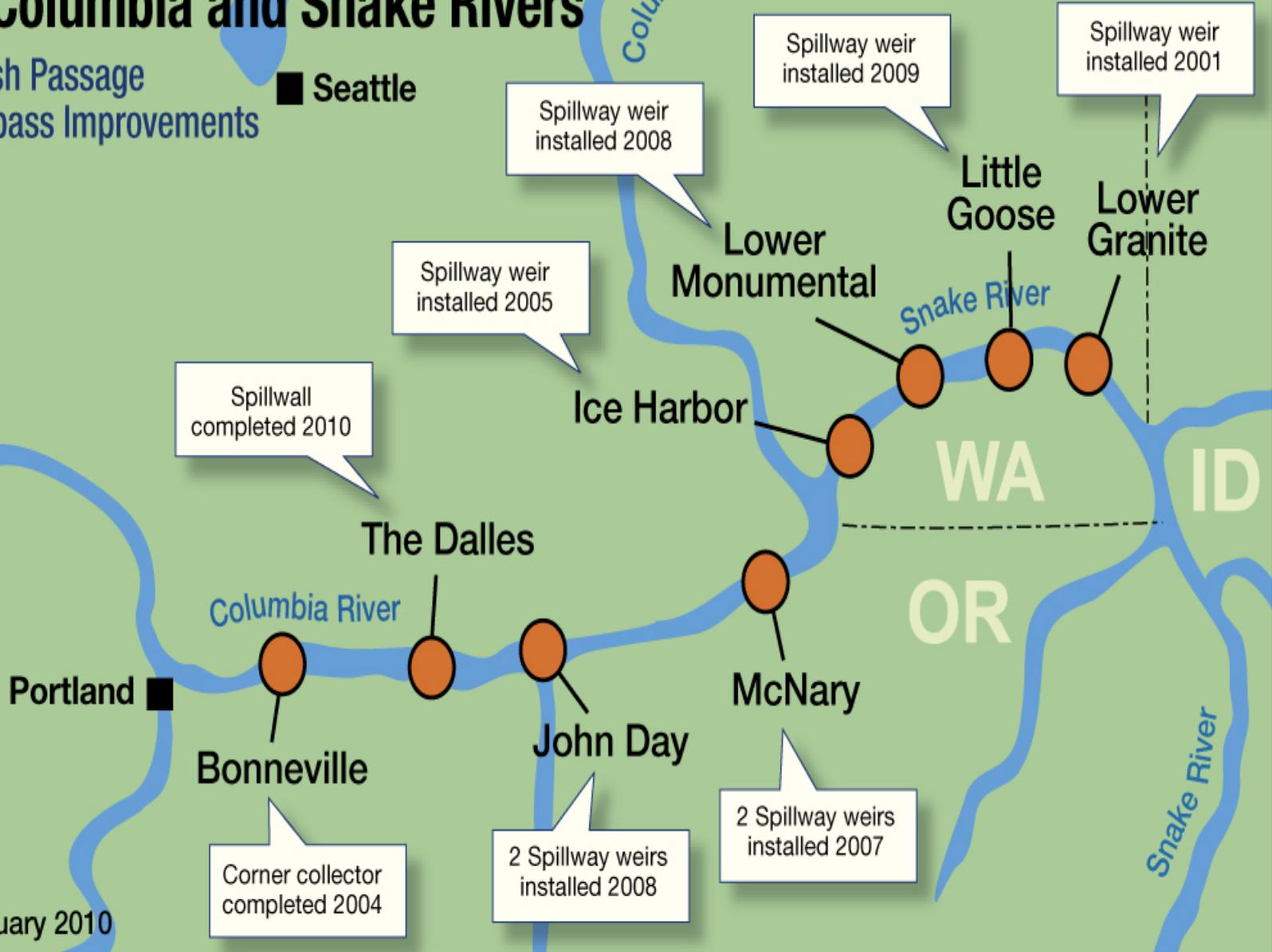
- 2010
  - TDA – spill wall and improved avian deterrents
  - JDA – improved avian deterrents
  - MCN - spillway weirs removed in summer
- 2012
  - LMN – new JBS outfall
  - MCN – new JBS outfall



# Lower Columbia and Snake Rivers

Juvenile Fish Passage  
Surface Bypass Improvements

■ Seattle



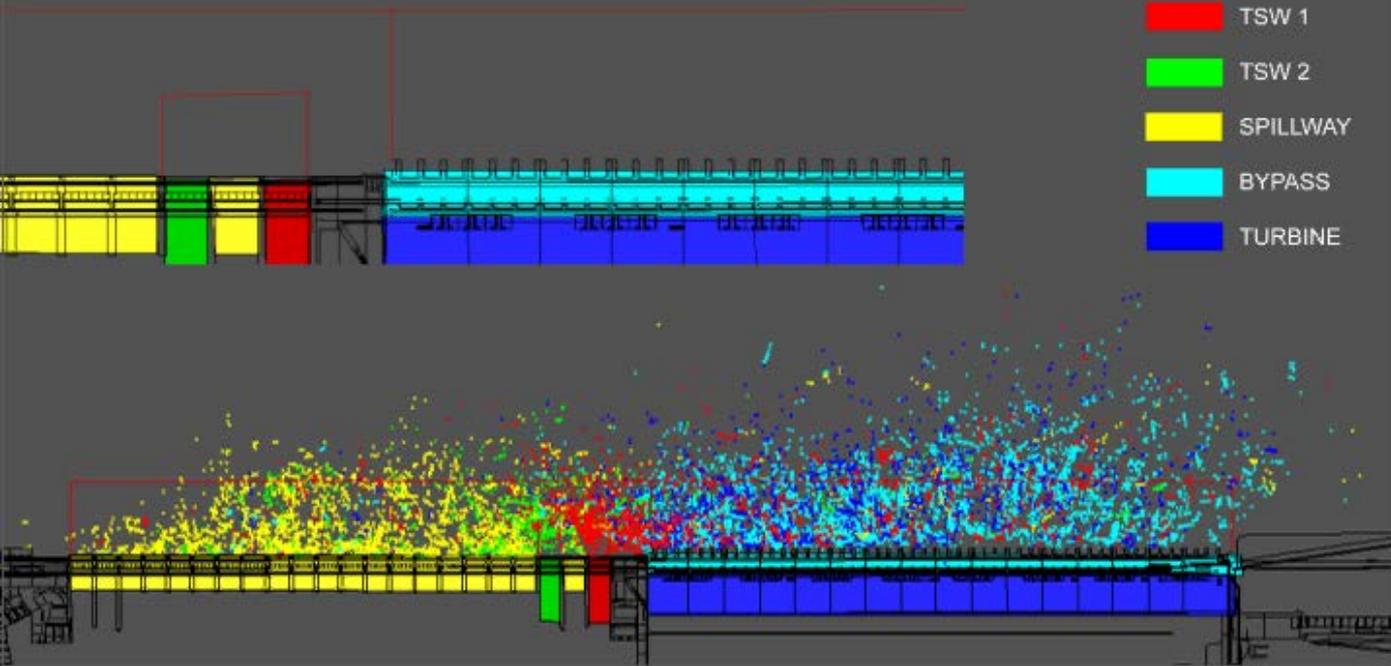
Updated February 2010



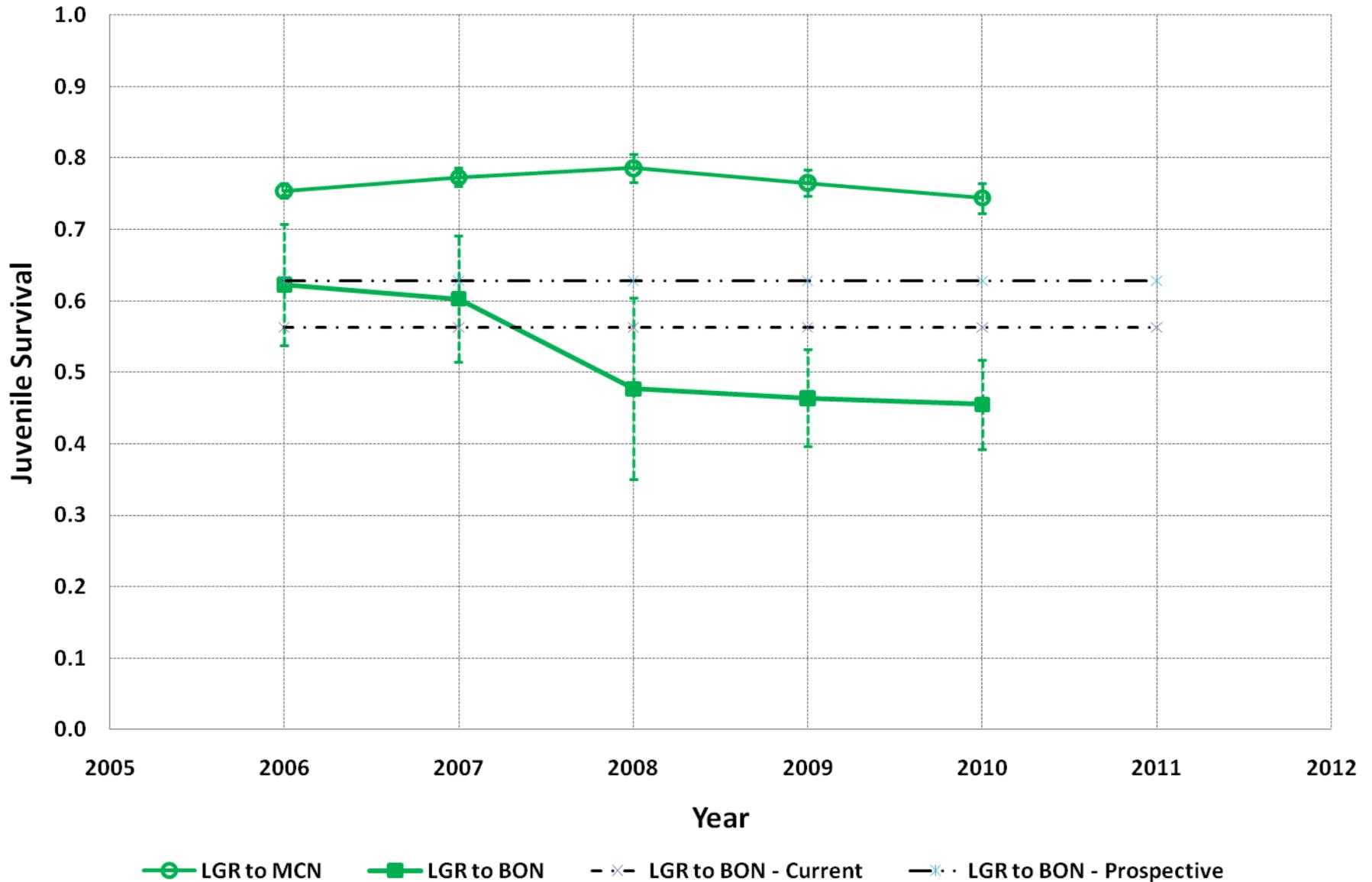
# Juvenile Survival Estimates



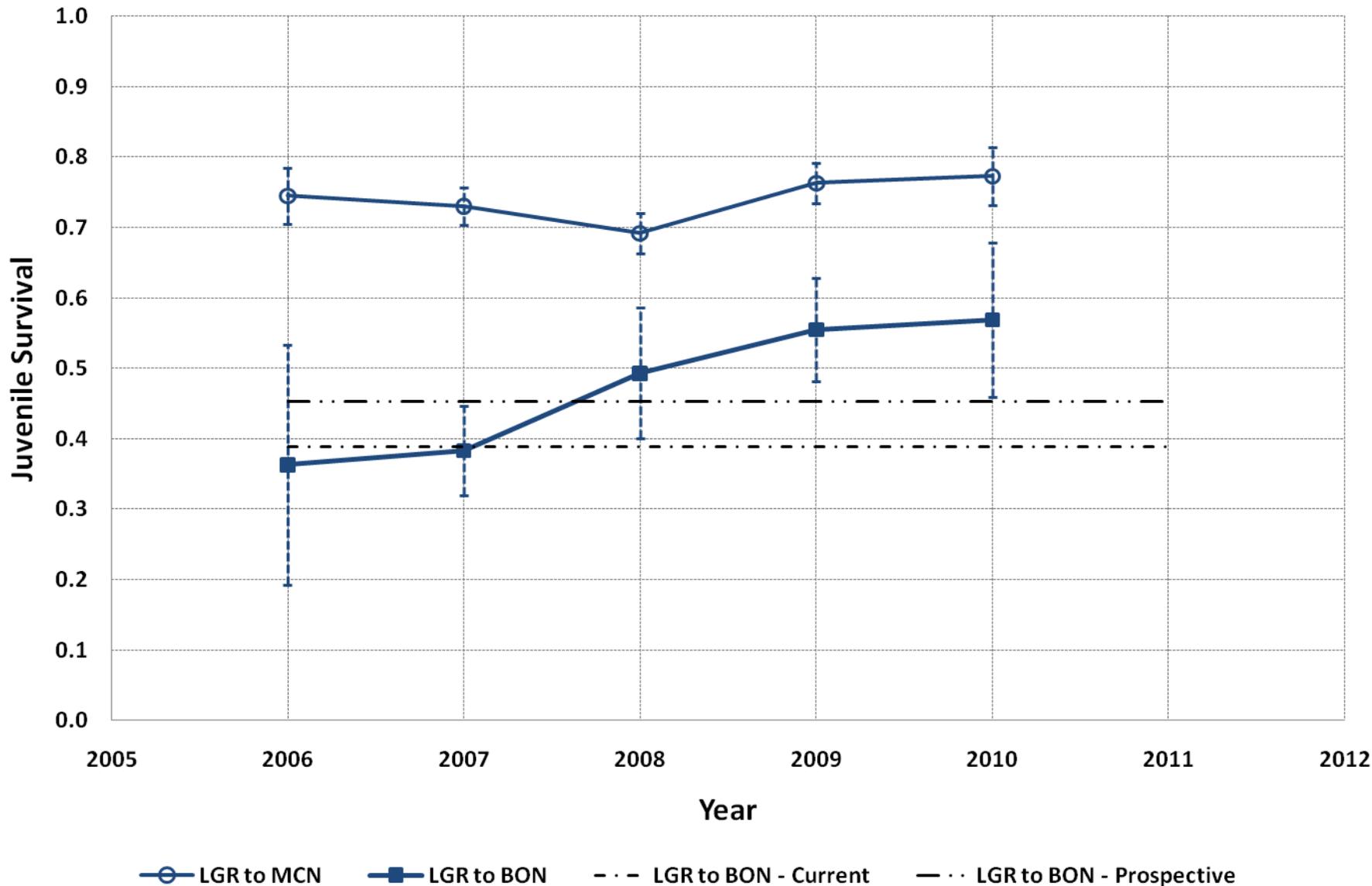
McNary Dam 2007  
Yearling Chinook



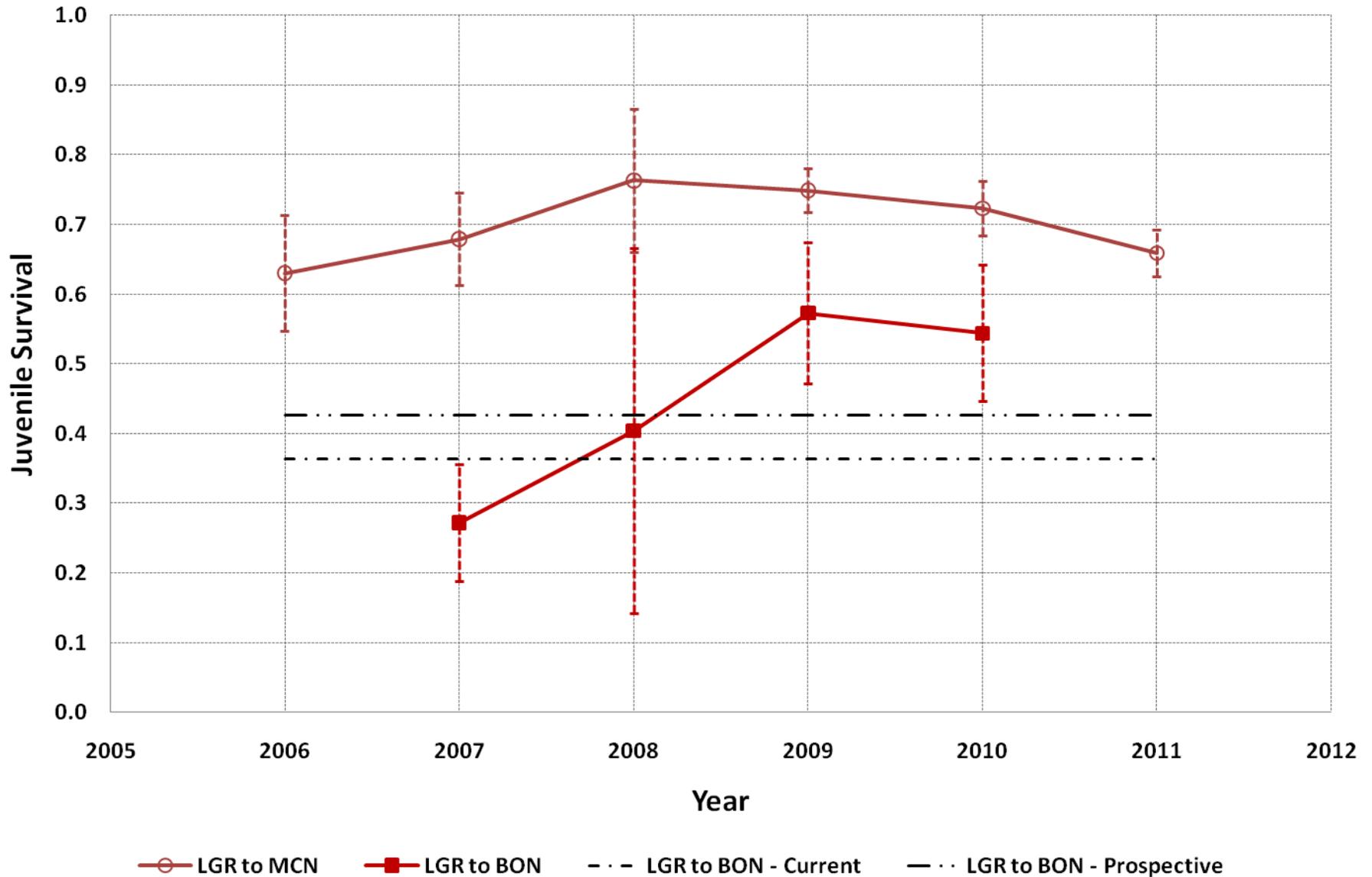
### Estimated Survival (Standard Errors) for PIT Tagged Wild Spr/Sum Chinook Smolts from Lower Granite to McNary and Bonneville Dams (2006-2011).



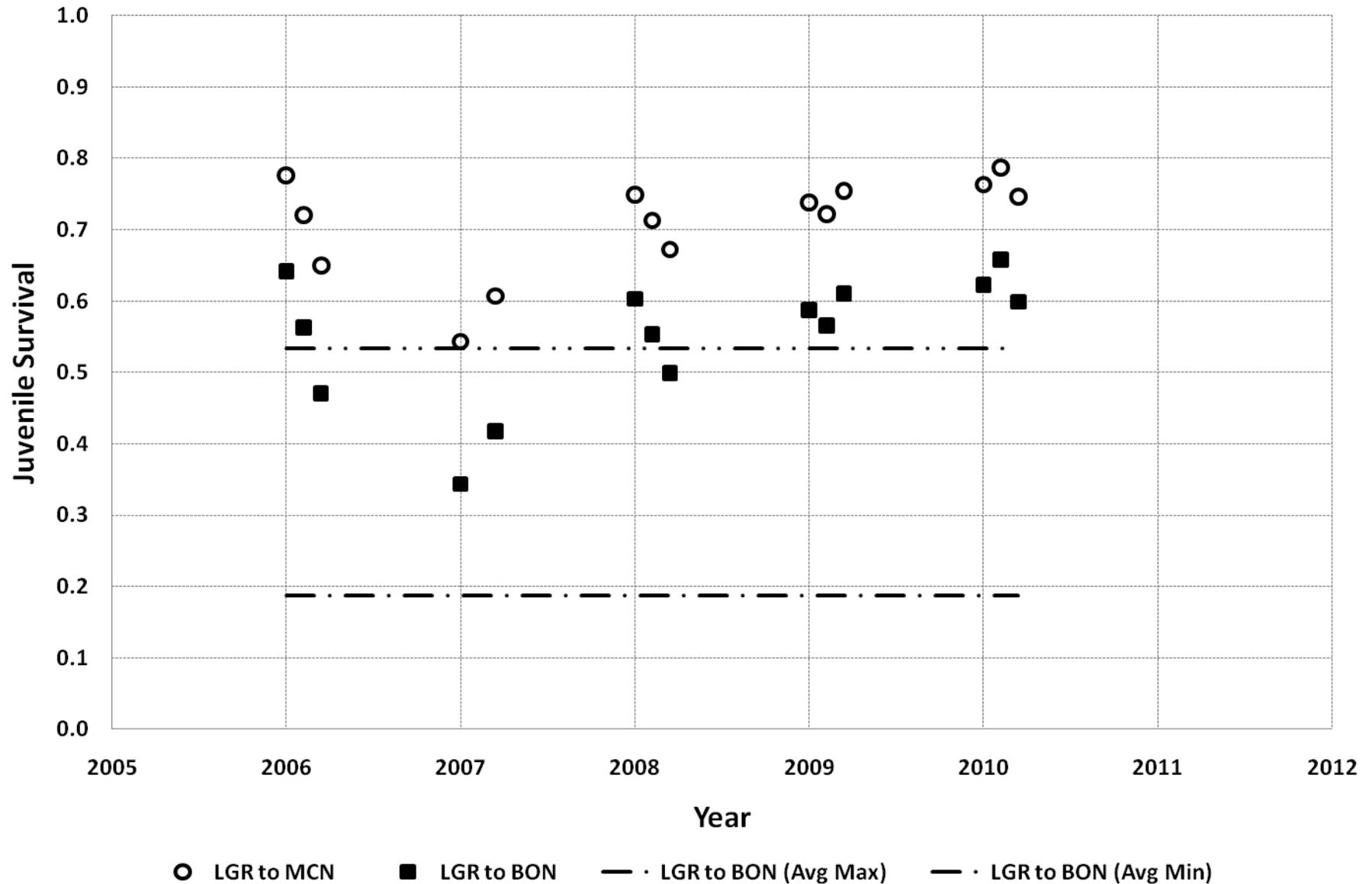
### Estimated Survival (Standard Errors) for PIT Tagged Wild Steelhead Smolts from Lower Granite to McNary and Bonneville Dams (2006-2011).



### Estimated Survival (Standard Errors) for PIT Tagged Hatchery and Wild Sockeye Smolts from Lower Granite to McNary and Bonneville Dams (2006-2011).



### Estimated Survival for PIT Tagged Hatchery Fall Chinook Smolts (Bi-weekly release groups) from Lower Granite to McNary and Bonneville Dams.





## Description of Key Concepts

- Direct Survival
- Latent or Indirect Mortality
- Differential Delayed Mortality “D”



## Transport Estimates (2008-2011)

- SR Spring/Summer Chinook
  - Wild = 35 to 55% (BiOp Avg was 64% for >65 kcfs years)
  - Hatchery = 23 to 45%
- SR Steelhead
  - Wild = 36 to 51% (BiOp Avg was 74% for >65 kcfs years)
  - Hatchery = 35 to 47%
- Will add Sockeye Estimates if Available

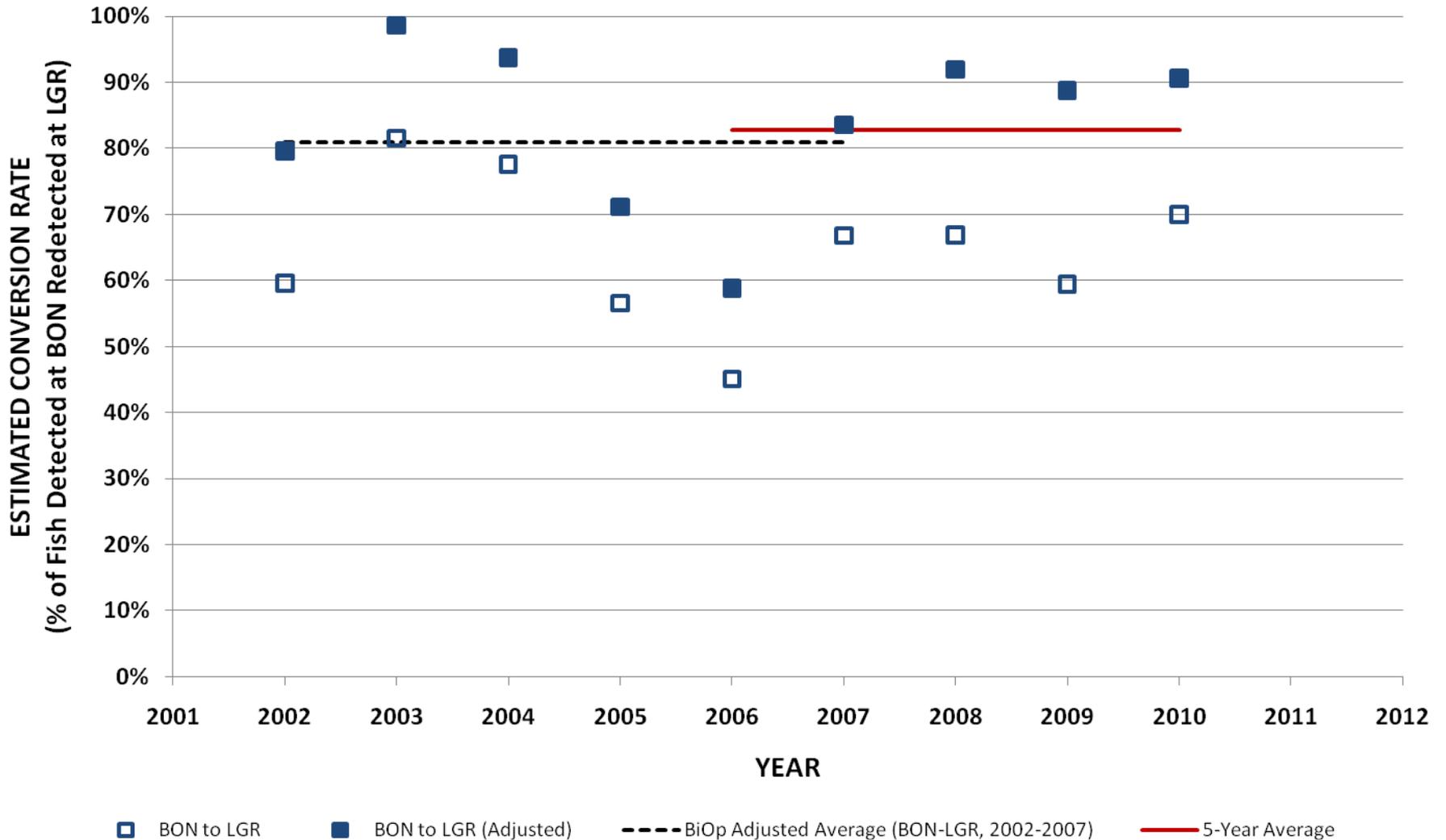


## Adult Survival Estimates



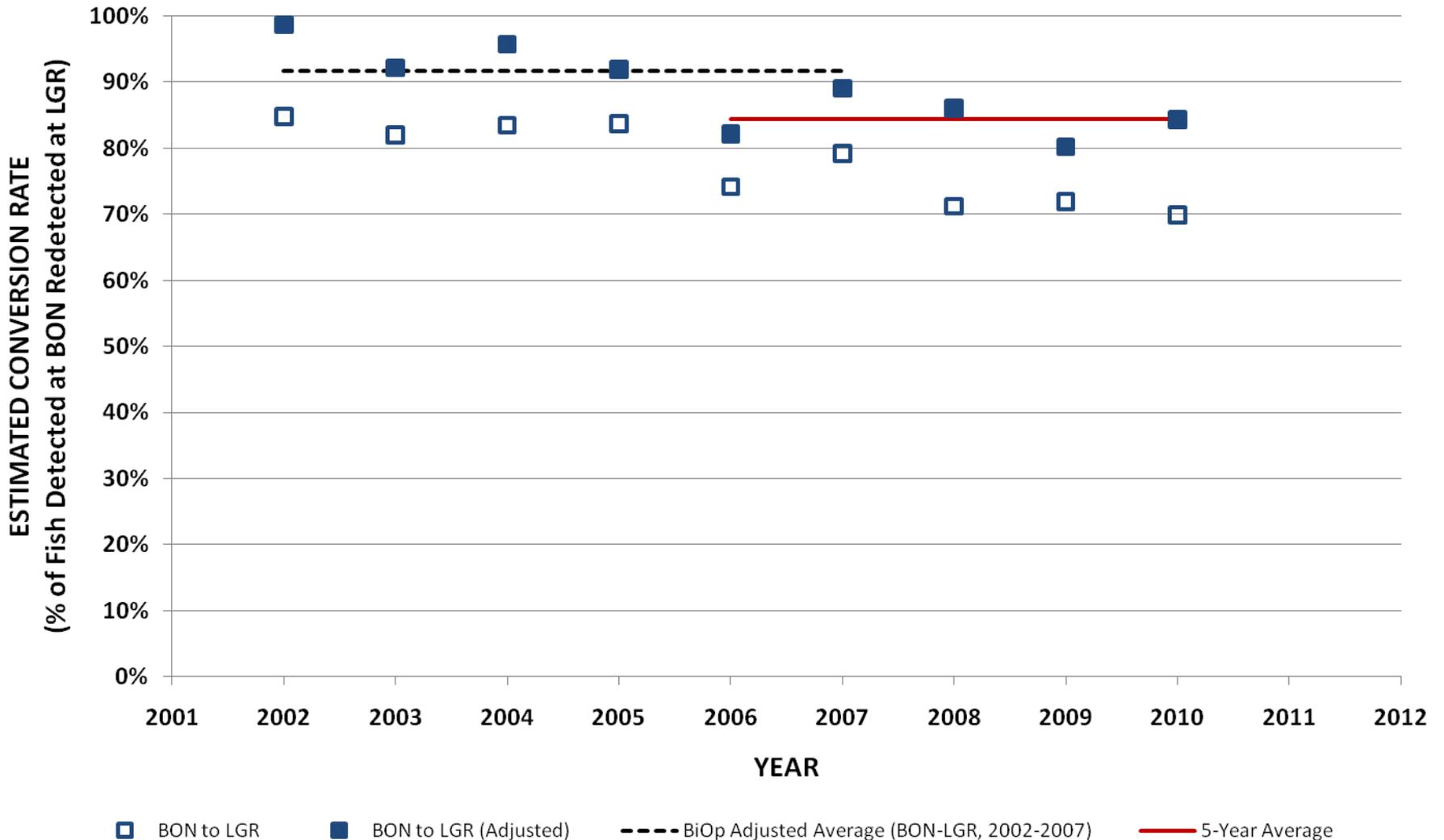
# Estimated Conversion Rates From Bonneville Dam to Lower Granite Dam of Known Origin, PIT Tagged Fish That Migrated Inriver As Juveniles

## Adult Snake River Fall Chinook Salmon



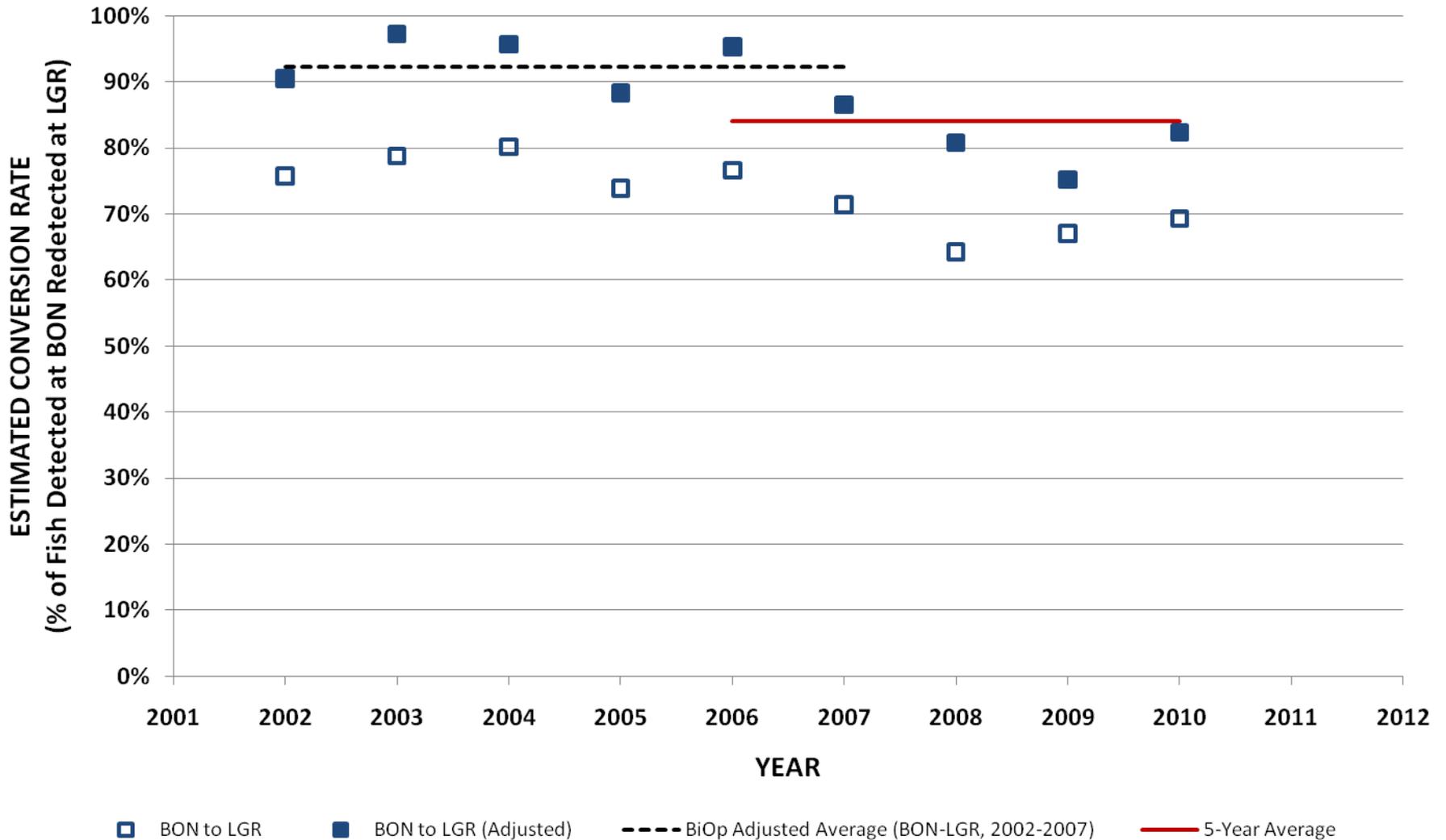
# Estimated Conversion Rates From Bonneville Dam to Lower Granite Dam of Known Origin, PIT Tagged Fish That Migrated Inriver As Juveniles

## Adult Snake River Spring-Summer Chinook Salmon



# Estimated Conversion Rates From Bonneville Dam to Lower Granite Dam of Known Origin, PIT Tagged Fish That Migrated Inriver As Juveniles

## Adult Snake River Steelhead





## Sockeye Salmon

BiOp estimated 81.1% survival from BON to LGR

- Estimate was extrapolated from BON to MCN data – primarily of UCR sockeye – from 2006 and 2007

2008 Survival = 74.9%

2009 Survival = 74.9%

2010 Survival = 82.8% (n=40 Snake River sockeye only)



## Things To Do

- Add average annual Juvenile System Survival Estimates (with / without “D”)
- Add Examples of seasonal Transport:Migrant estimates and “D” patterns.
- Add 2011 Adult Survival Estimates
- Add Smolt-to-Adult Returns?
  - CSS Estimates
  - NWFSC Estimates
- Add Lower Granite Abundance Estimates?



## Questions

[Ritchie.Graves@noaa.gov](mailto:Ritchie.Graves@noaa.gov) 503-231-6891

