Klickitat Spring Chinook Salmon Population Status

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Anadromous Salmonids in Klickitat Subbasin

- Spring Chinook*
- Mid-Columbia Steelhead* (ESA threatened)
- Fall Chinook
- Coho

*Focal species from Klickitat Subbasin Plan

Spring Chinook in Klickitat subbasin

- Middle Columbia River ESU
  - Not ESA listed
- WDFW Salmonid Stock Inventory (SaSI)
  - Depressed

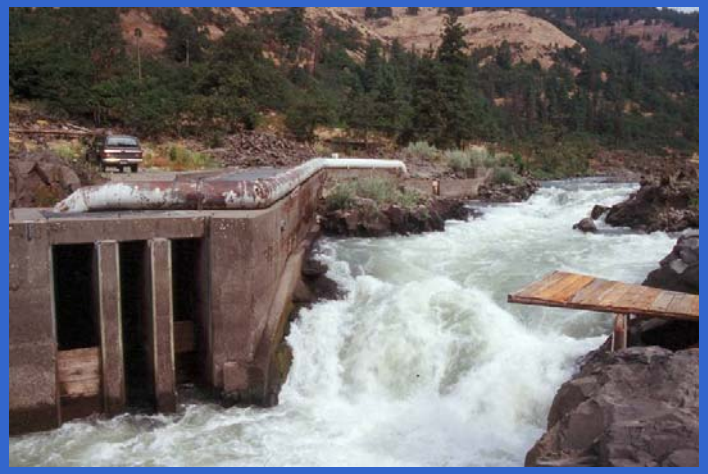
- Bryant 1949: "…originally a large run of spring chinook in the Klickitat River" with some declines already being reported.

Spawner Surveys (Redd counts)

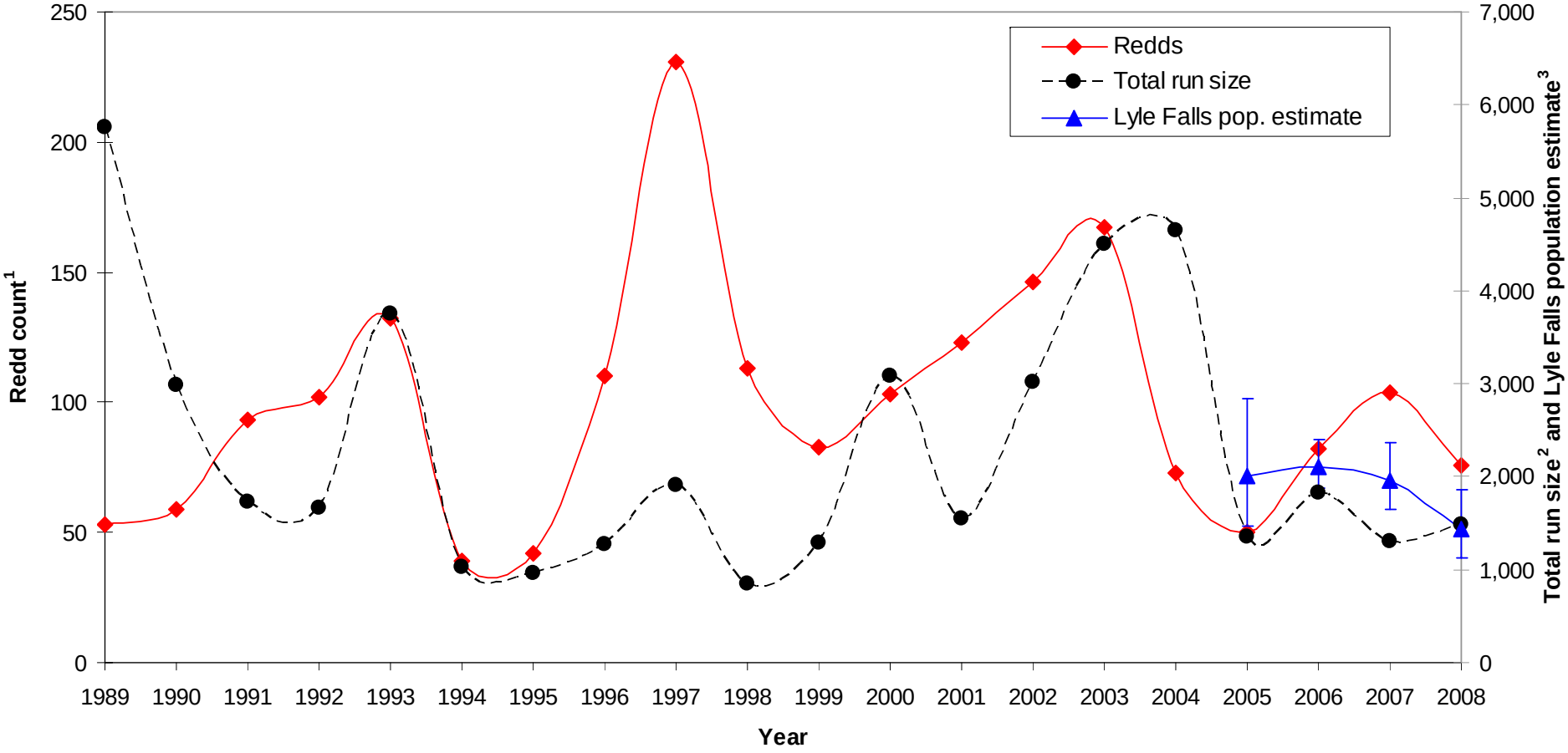
- Rafting and wading surveys
- Cover entire spawning range
  - ~62 mi. for Spring Chinook
- GPS locations recorded for redds
- Biological data collected from carcasses
  - Sex
  - Percent spawned
  - Scale samples
  - Marks/tags

Adult Salmonid Monitoring at Lyle Falls Fishway

- Began in 2004 under WDFW & YN joint project
- Adult trap located in fishway upstream end
- Biological data collected
  - Sex
  - Scale samples
  - Marks/tags
  - Genetic samples
- Floy tags implanted for mark-recapture population estimates



Klickitat Spring Chinook Redd Counts and Total Run Size, 1989-2008

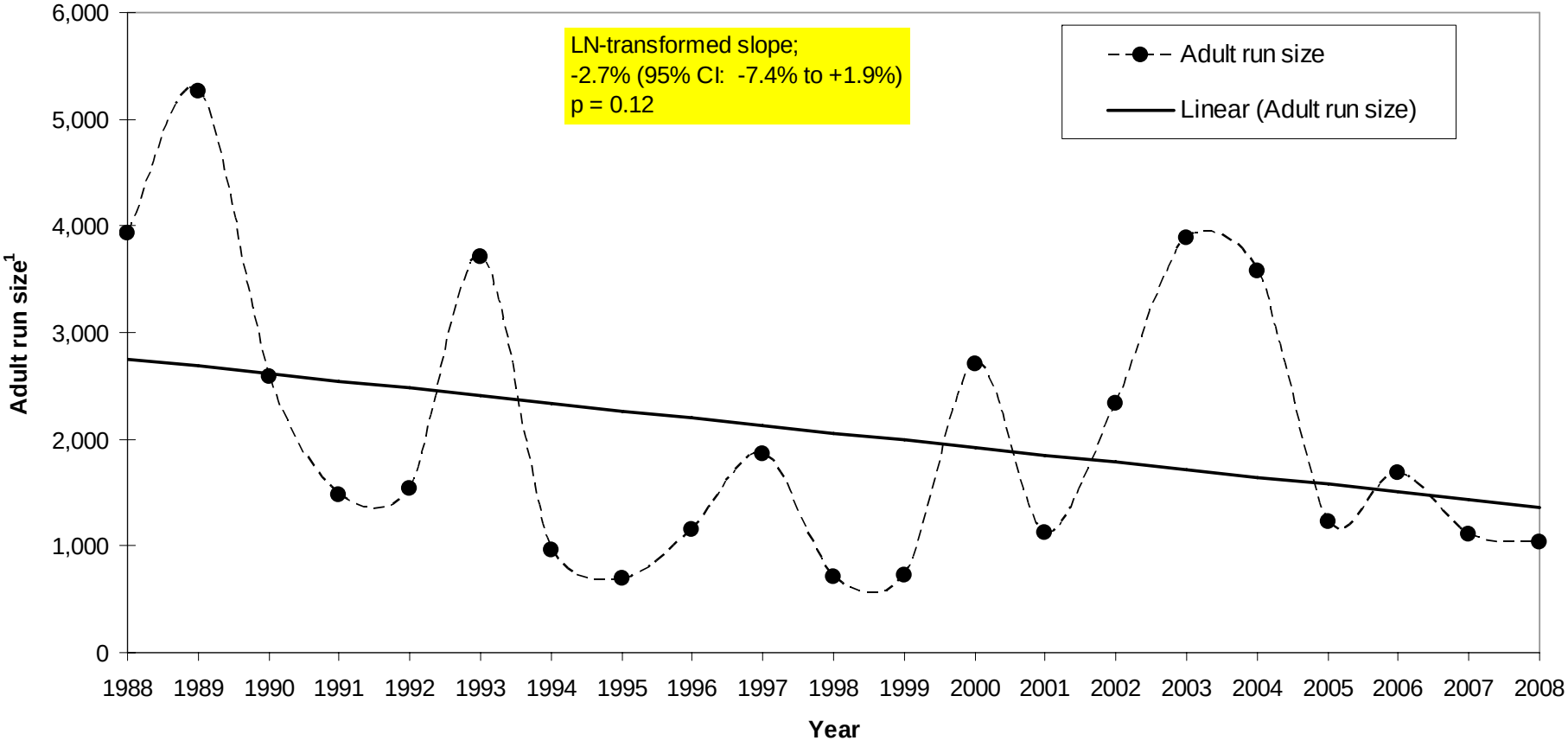


1 - Total redd counts minus hatchery adult releases above Castile

2 - Total run size of age-3 to age-6 fish estimated from natural spawner and hatchery escapement plus harvest (from YN and WDFW databases)

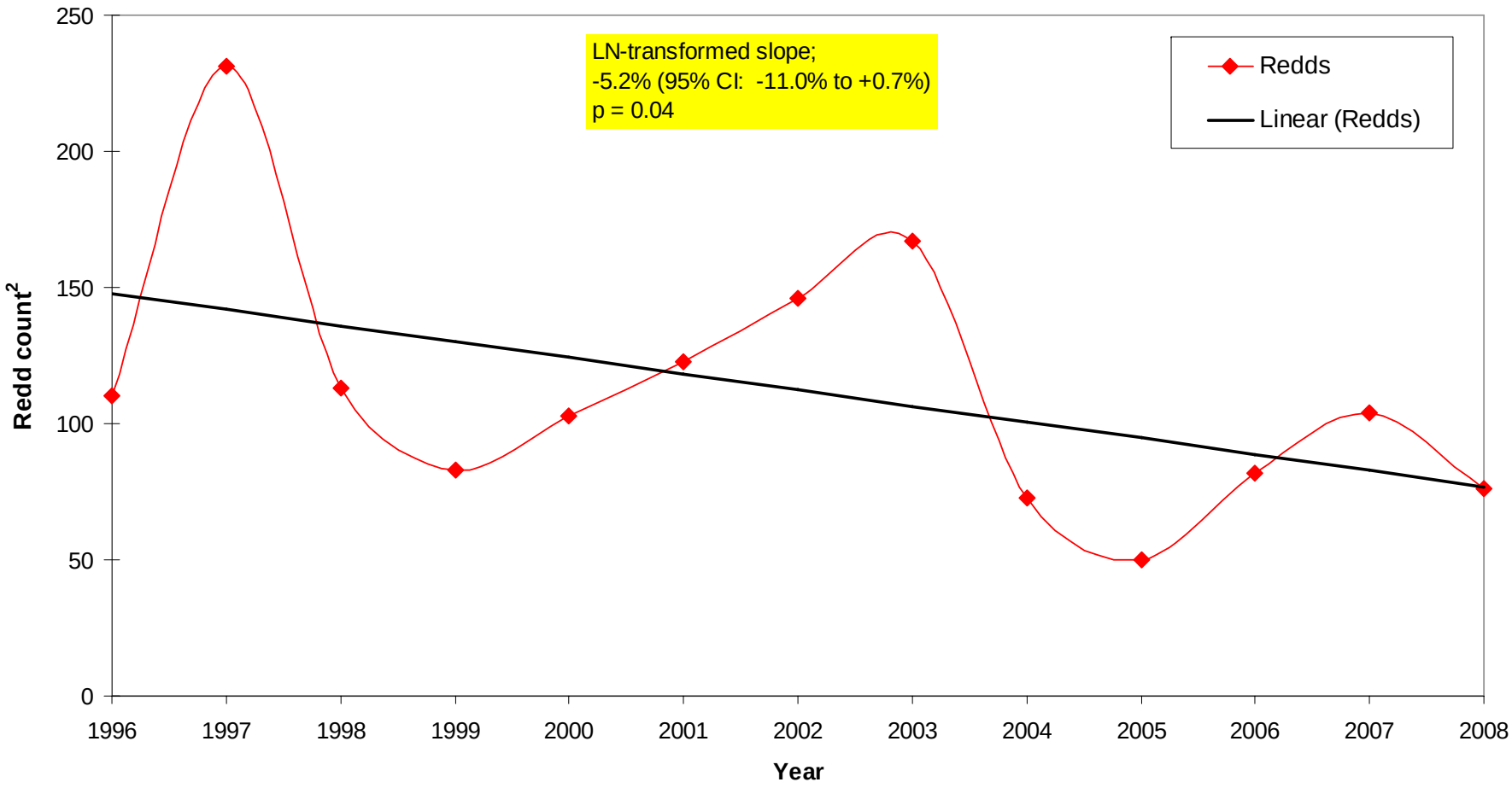
3 - Population estimate at Lyle Falls from mark-recapture methods

Klickitat Spring Chinook Adult Run Size 1988-2008



1 - Run size of age-4 to age-6 fish estimated from natural spawner and hatchery escapement plus harvest (from YN and WDFW databases)

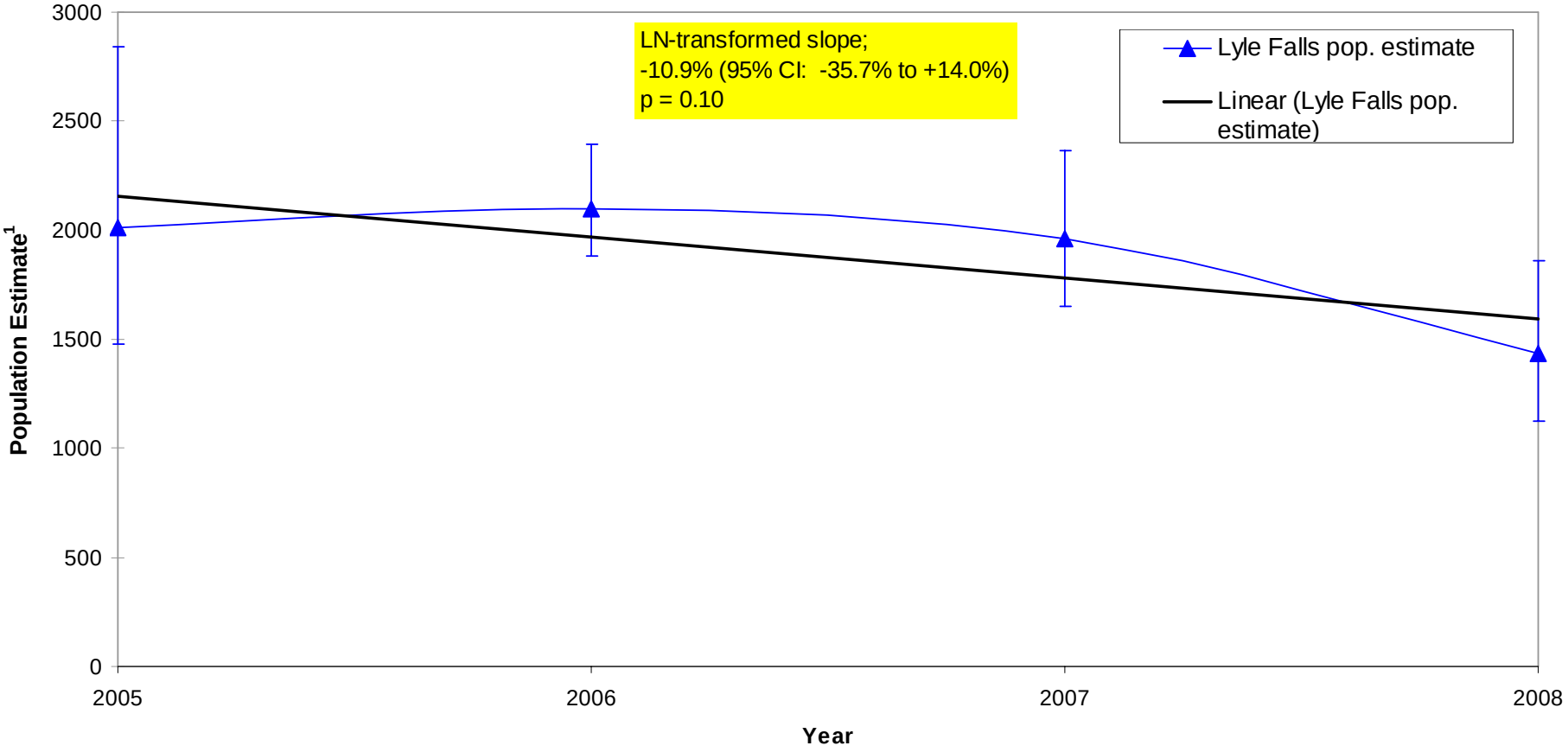
Klickitat Spring Chinook Redd Counts 1996-2008[1]



1 - 1996-2008 time period selected for consistency in geographic area coverage during redd surveys

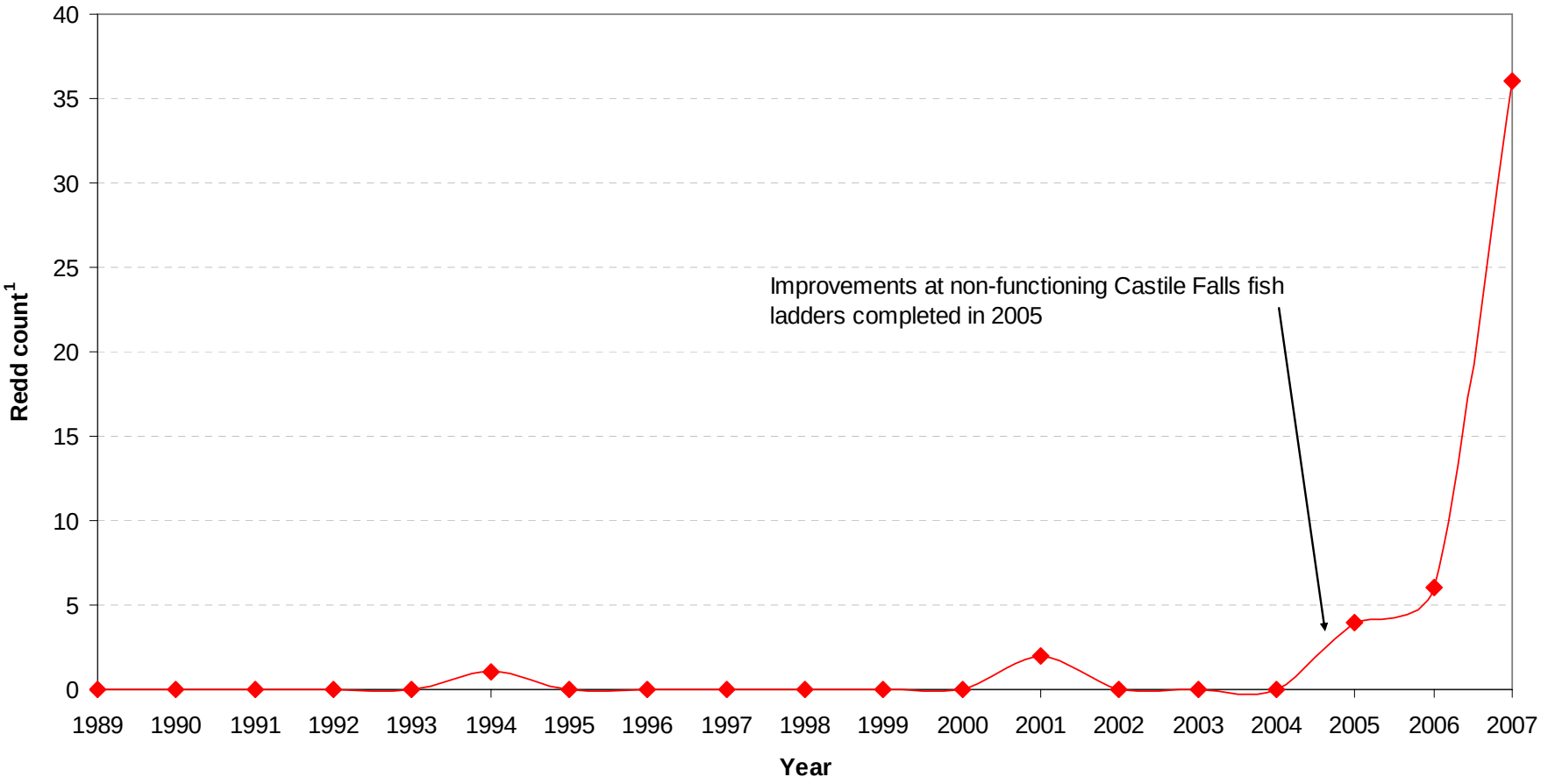
2 - Total redd counts minus hatchery adult releases above Castile

Klickitat Spring Chinook Mark-Recapture Population Estimates 2005-2008



1 - Population estimate at Lyle Falls from mark-recapture methods

Klickitat Spring Chinook Redd Counts above Castile Falls, 1989-2007



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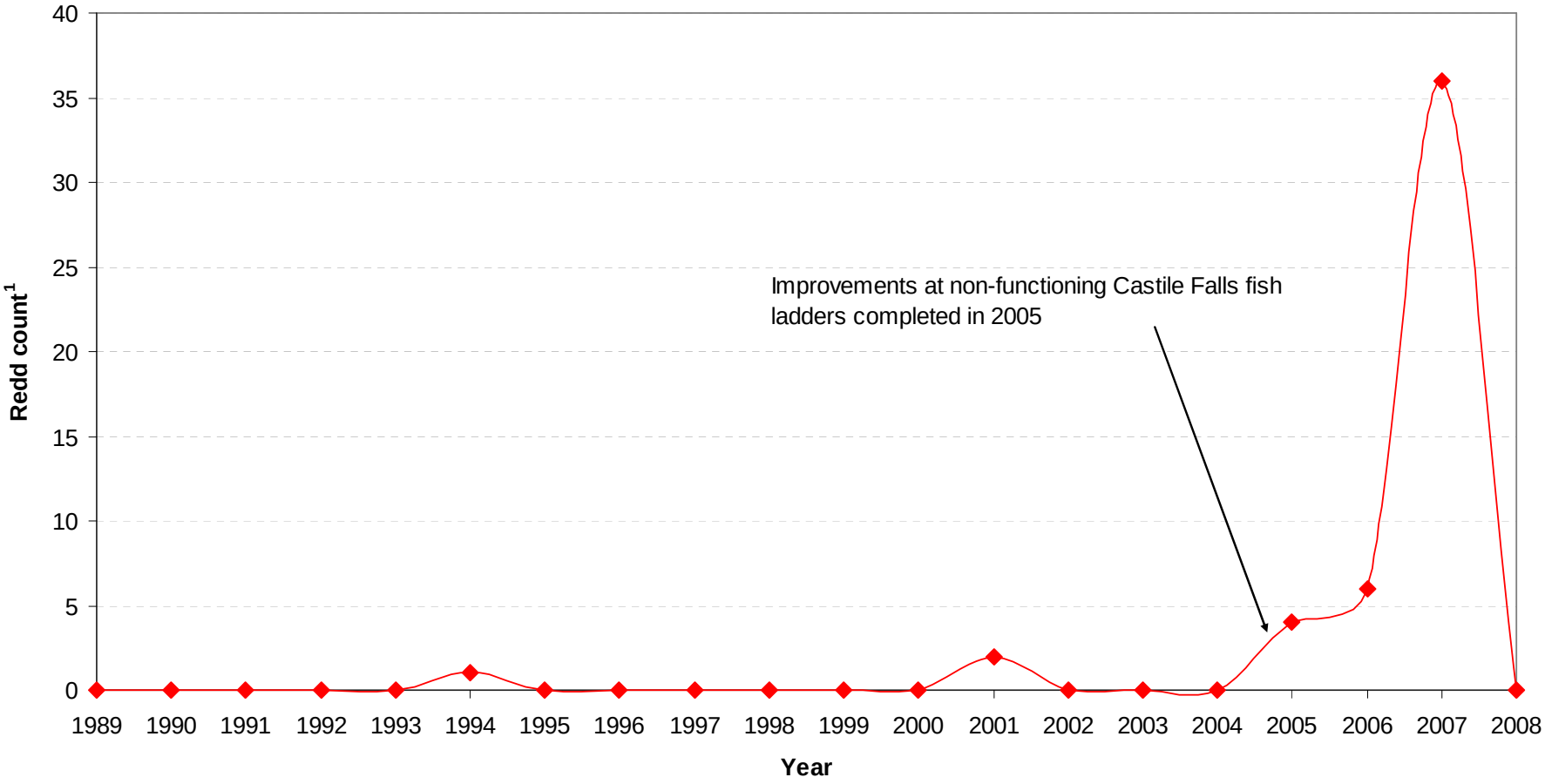
Klickitat Spring Chinook Redd Counts above Castile Falls, 1989-2008

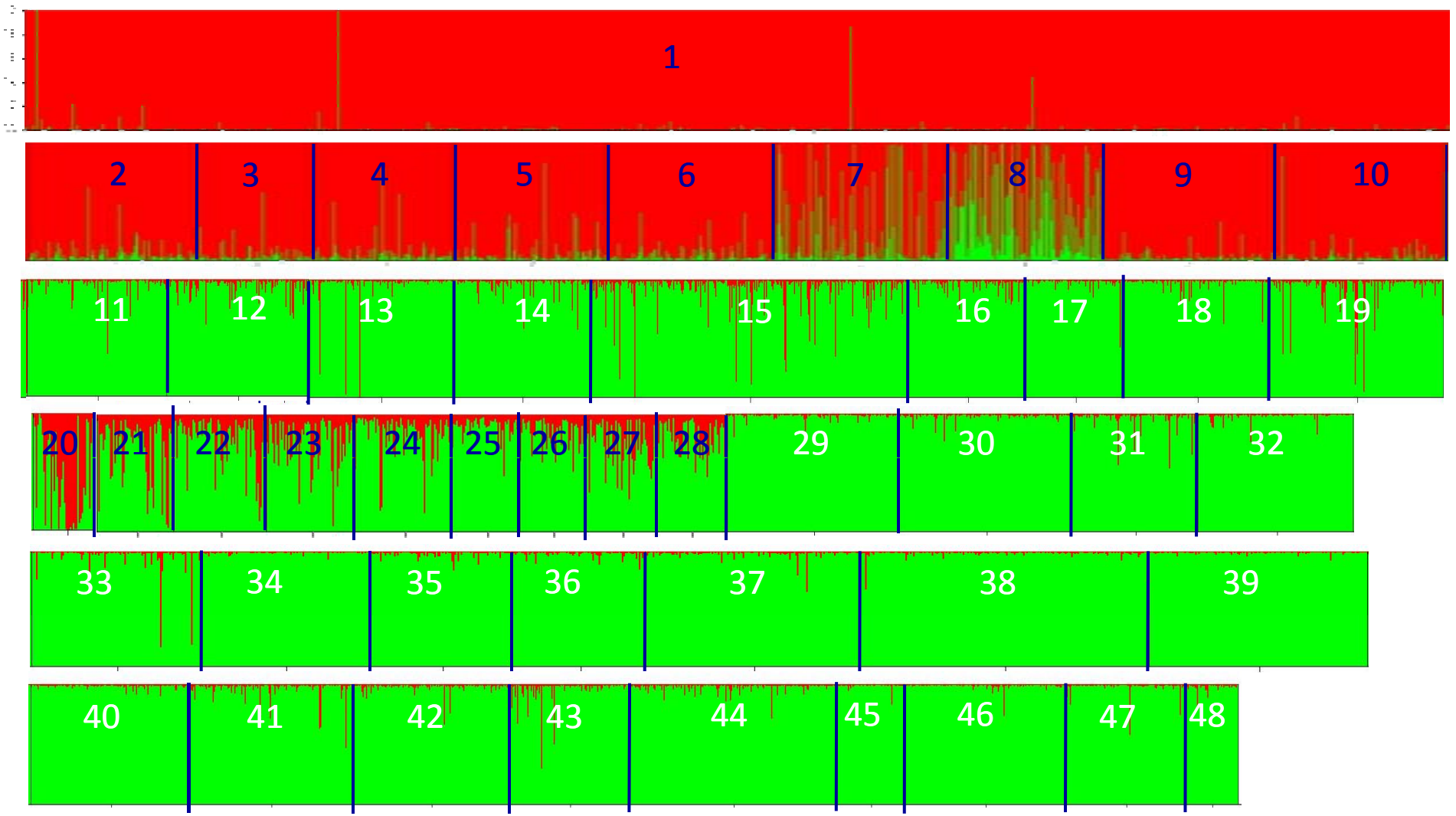


1 - Total redd counts minus hatchery adult releases above Castile

Genetic Analysis

- Indicates a mixing of stream-type (spring) Chinook and ocean-type (summer or fall) Chinook
  - Unusual genotype as compared to other Columbia basin populations
  - Hatchery broodstock mixing?
  - Hatchery/wild mixing, spring/summer mixing on spawning grounds?
  - Natural genotype?

- Effects on fitness or survival?
  - Smolt-to-Adult Return estimates:
    - 0.2-0.4% for Hatchery stock (CWT and preliminary PIT returns)
    - 5.3% for Natural-origin fish (EDT model estimate)

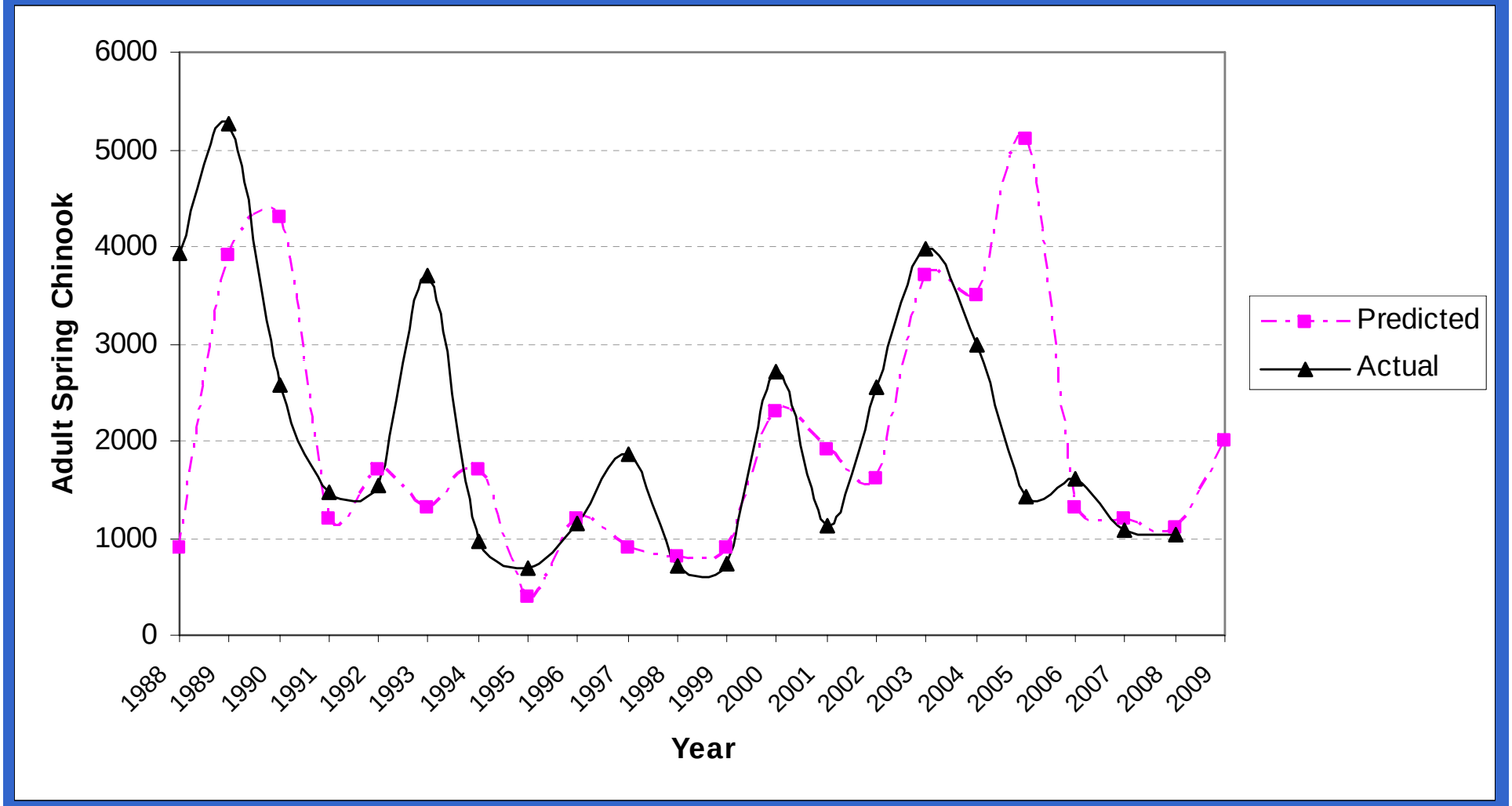


Analysis of inferred 'population' of origin using "STRUCTURE"

1. Interior fall type set as "prior", or known based on genetic similarity (NJ tree)

Deschutes (summer)
Deschutes (fall)
Klickitat (summer) 2005
Klickitat (fall) 2005
Hanford Reach (fall)
Priest Rapids (fall)
Wells (fall)
Methow (summer)
LyonsFerry (fall)
Clearwater (fall)
NPTH (fall)

2. Cowlitz (fall)
3. Lewis (fall)
4. Sandy (fall)
5. Spring Cr. (fall)
6. Cowlitz (spring)
7. Kalama (spring)
8. Lewis (spring)
9. Mckenzie (spring)
10. Santiam (spring)
11. Carson stock (spring)
12. WarmSprings (spring)
13. Shitike (spring)
14. John Day (spring)
15. Yakima (spring)
16. Wenatchee (spring)
17. Methow (spring)
18. Entiat (spring)
19. Tucannon (spring)
20. Klickitat (spring) 2005
21. " (spring) NOR 2006
22. " (spring) NOR 2007
23. " (spring) NOR 2008
24. " (spring) HAT 06-07
25. " (spring) brood 2002
26. " (spring) brood 2006
27. " (spring) brood 2007
28. " (spring) brood 2008
29. Imnaha (spring)
30. Minam (spring)
31. Catherine (spring)
32. Lolo (spring)
33. Newsome (spring)
34. Dworshak (spring)
35. Clearwater Cr. (spring)
36. Lochsa (spring)
37. S.F. Clearwater (spring)
38. Rapid (spring)
39. Big Creek
40. Big Creek (spring)
41. Johnson (spring)
42. Secesh (spring)
43. Johnson Supp. (spring)
44. Sawtooth (spring)
45. W. F. Yankee (spring)
46. E.F. Salmon (spring)
47. Pahsimeroi (spring)
48. March (spring)


Adult Spring Chinook
6000
5000
4000
3000
2000
1000
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Year
Predicted
Actual

Conclusions

- Various methods in general agreement
  - Suggest a possible decline, but high annual variability and uncertainty in estimates
- Chronically low returns and potential genetic issues

  ~300 wild fish not consistent with “large run”

Needs

- Continued monitoring
  - Mark recapture estimates (more precision)
  - Other methods?
  - Survival estimation
  - Further genetic analysis
- Management alternatives