Fish Committee Meeting
Willapa Bay Policy C-3622
May 13, 2022

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Fish Program

Washington Department of FISH and WILDLIFE

Meeting Outline

- Brief review of spawner-recruit based fall Chinook spawning escapement goals currently in use
- Initial staff efforts on the comparative analysis assignment of the 3 existing alternatives
- Development of Alternative 2 policy language

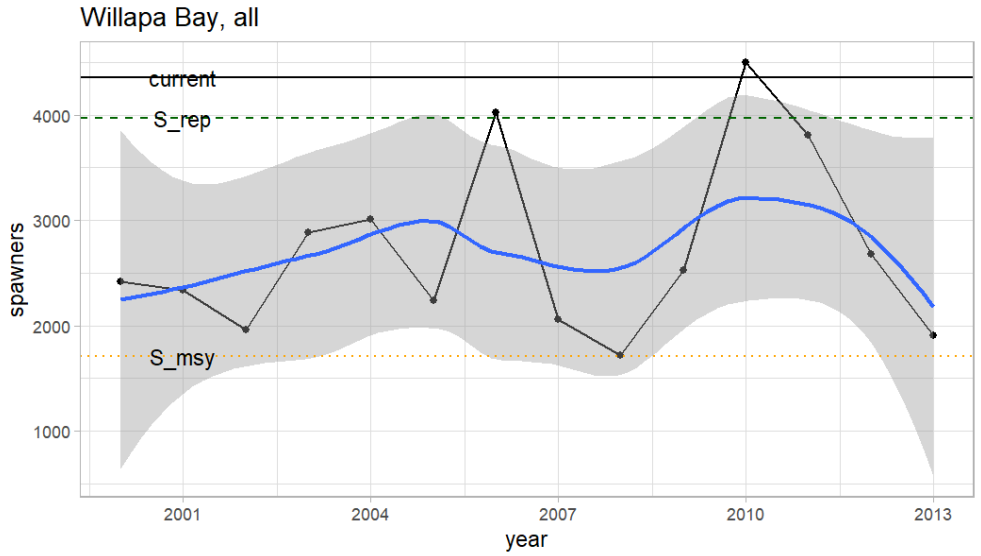
Review of spawner-recruit based fall Chinook spawning escapement goals currently in use

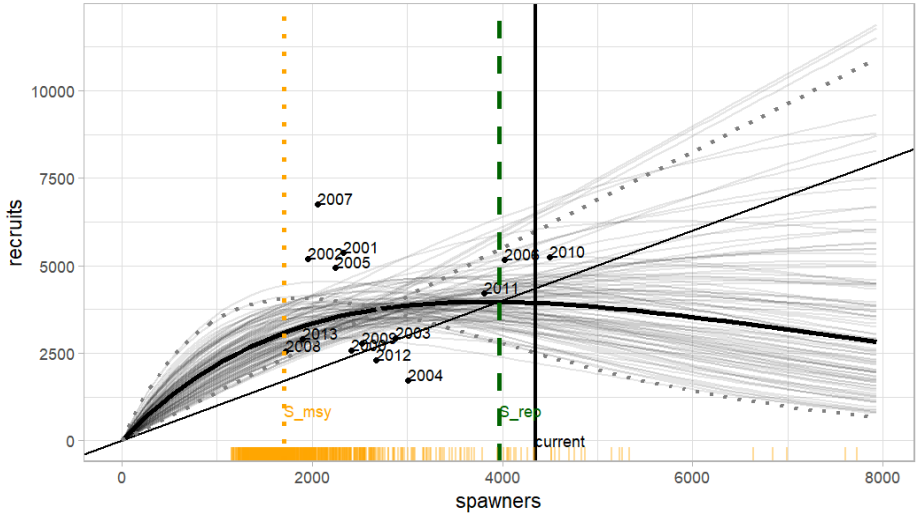
For most Washington State Chinook stocks, there are currently tiered management objectives that vary harvest over different levels of expected returns.

- Everywhere there are ESA listings, that overrides Magnuson-Stevens MSY management and fisheries must be permitted by NOAA.
  - In most cases, NOAA has adopted state or co-manager submitted fishery plans that utilize exploitation rates rather than escapement goals
- The Fish Program has begun to conduct management strategy evaluations for several stocks to evaluate alternative harvest control rules including, but not limited to, Smsy escapement goals.
  - That approach is being applied to Willapa Steelhead and Lower Columbia Steelhead and can be extended to Willapa Chinook

Willapa Bay Fall Chinook

An initial exploration of the Fall Chinook escapement goal was completed in 2020 with available data at that time





Stock	Natural spawner estimated capacity	Spawners at replacement
Willapa Bay aggregate	4,353	3,967
Willapa/North/Smith	2,172	2,126
Nemah/Palix	328	263
Naselle/Bear	1,853	1,551

Willapa Bay

Willapa Bay is currently under a rebuilding program to conserve and restore wild Chinook salmon

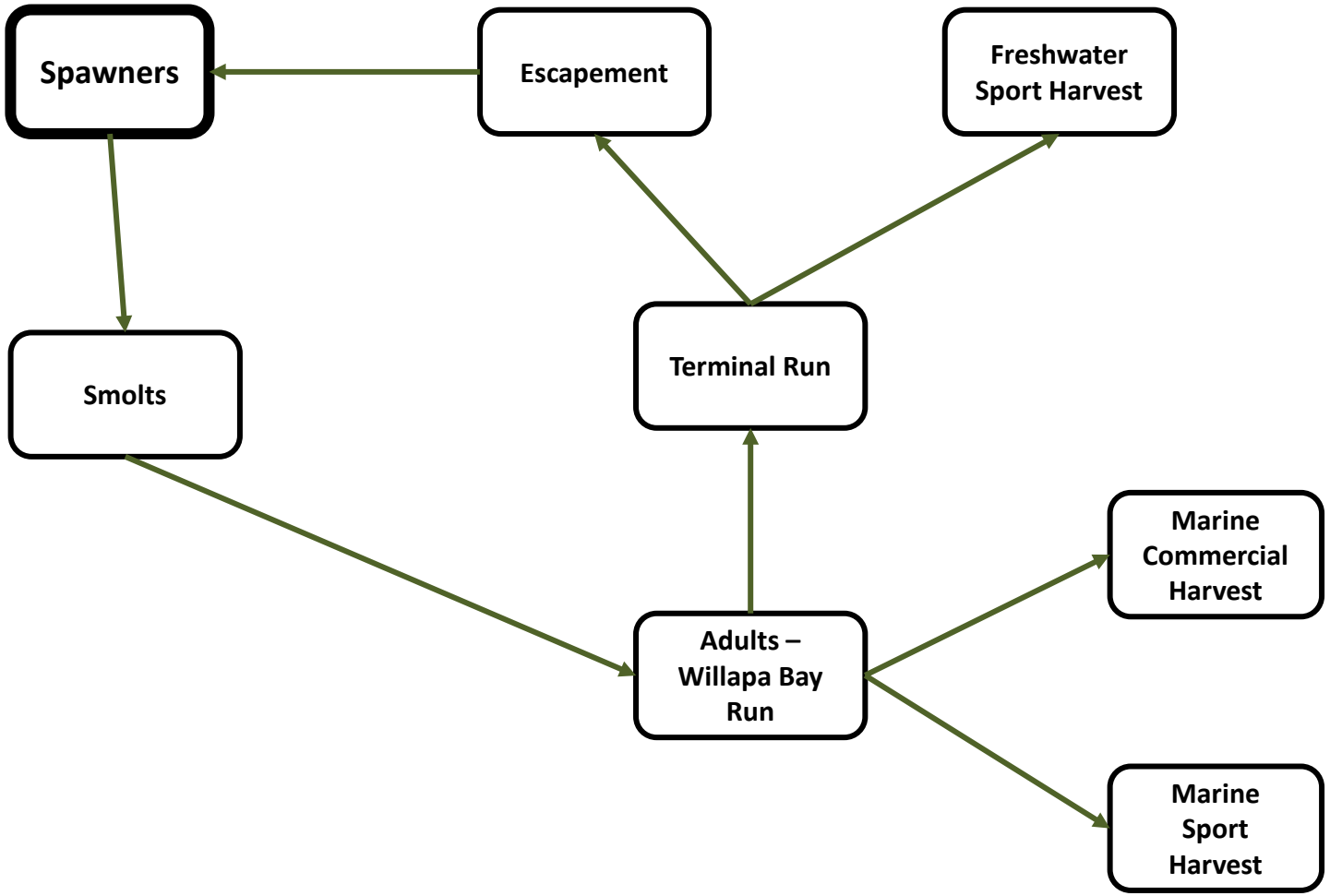
- Projected to achieve spawner goals by 2031-2036

- MSY not informative where habitat substantially degraded or where populations are depressed
  - MSY is appropriate where harvest is the primary objective

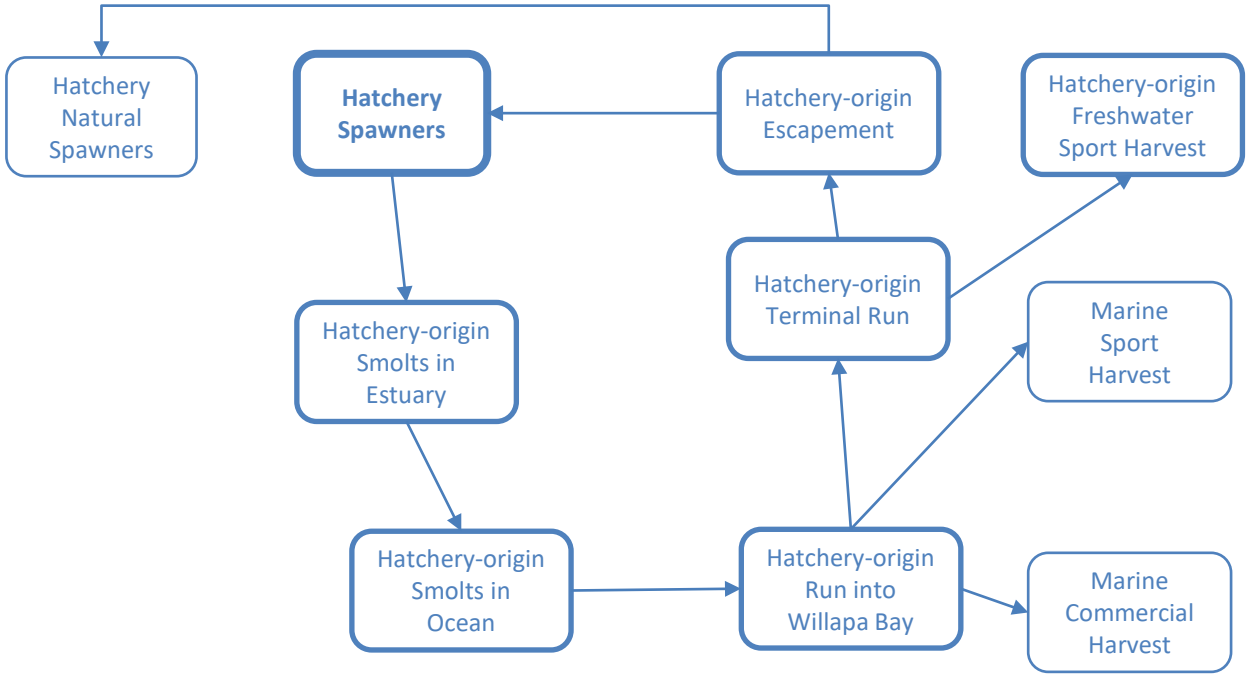
- Method should reflect the goals of WB populations

Preliminary look at the methods to compare the three alternatives

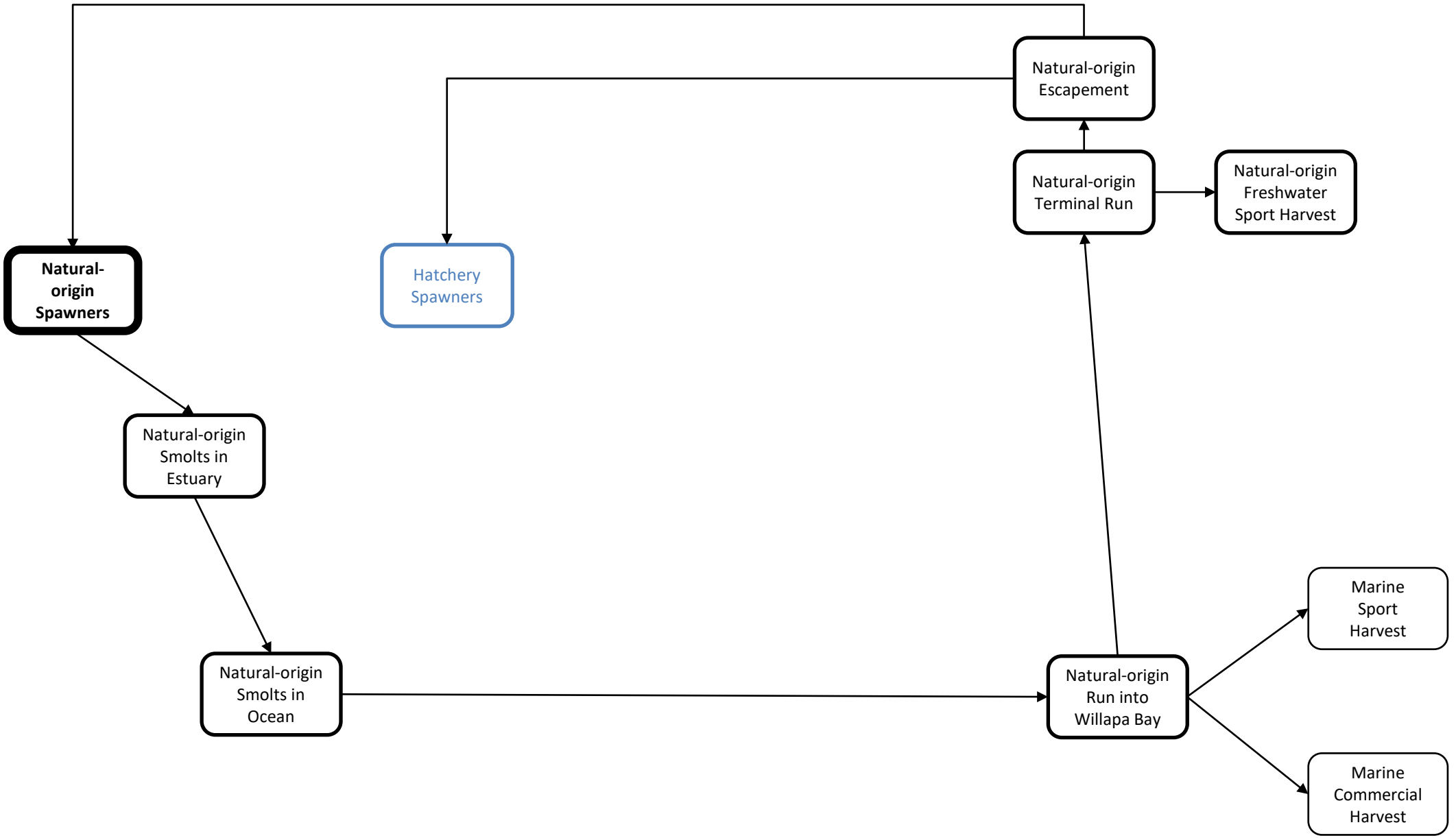
MULTI-STATE MODEL FOR WILLAPA BAY - Generalization

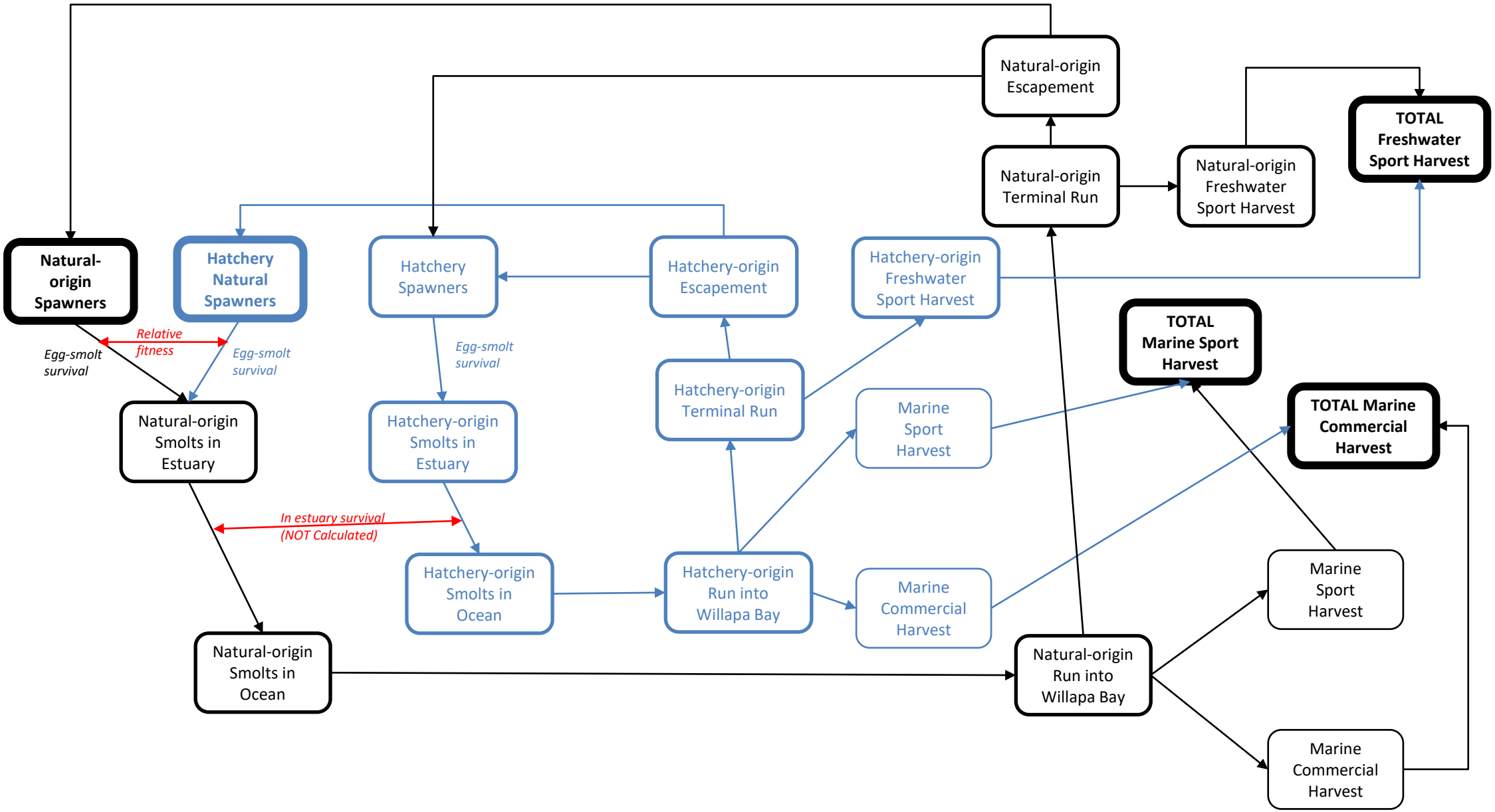


Hatchery portion of model

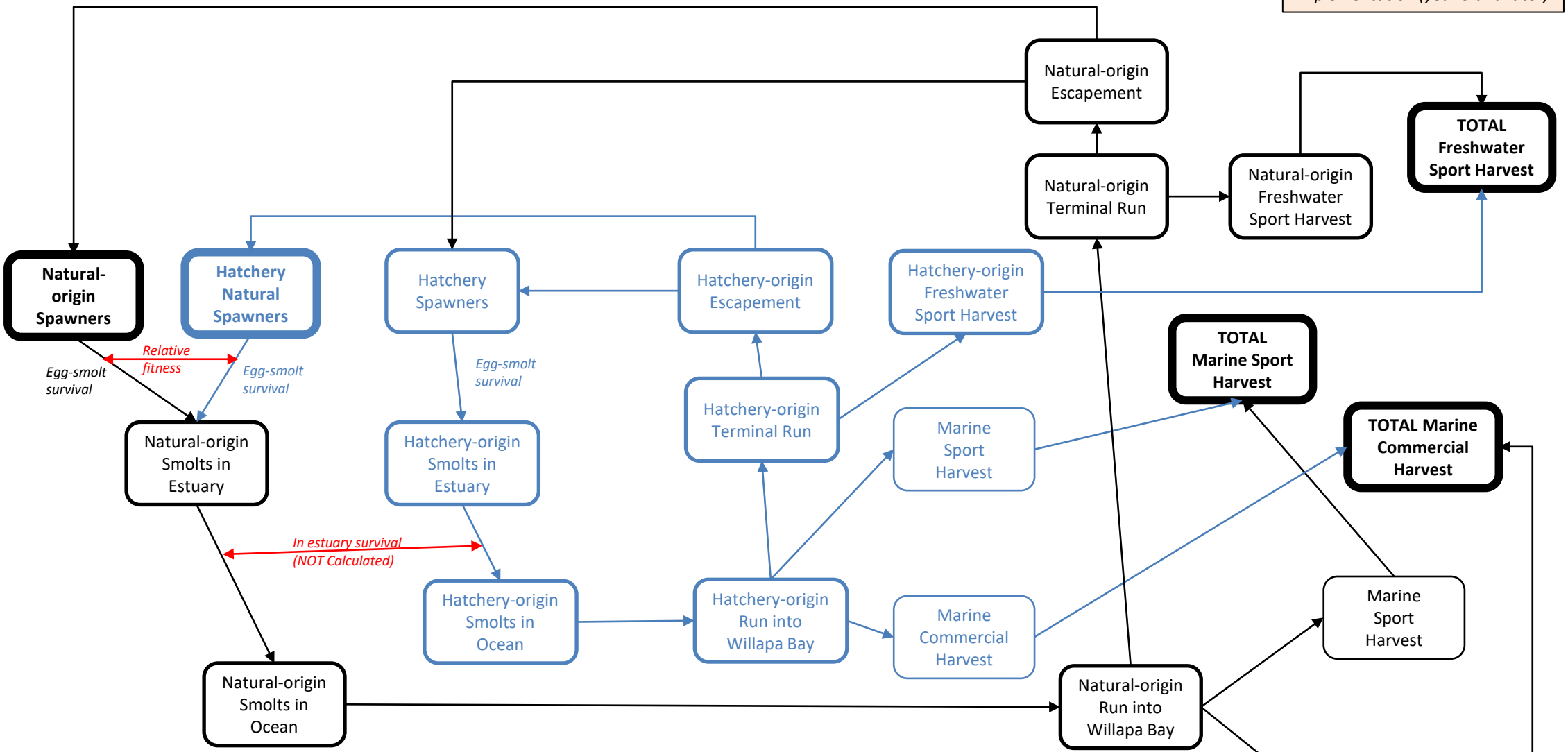


Natural-origin portion of model

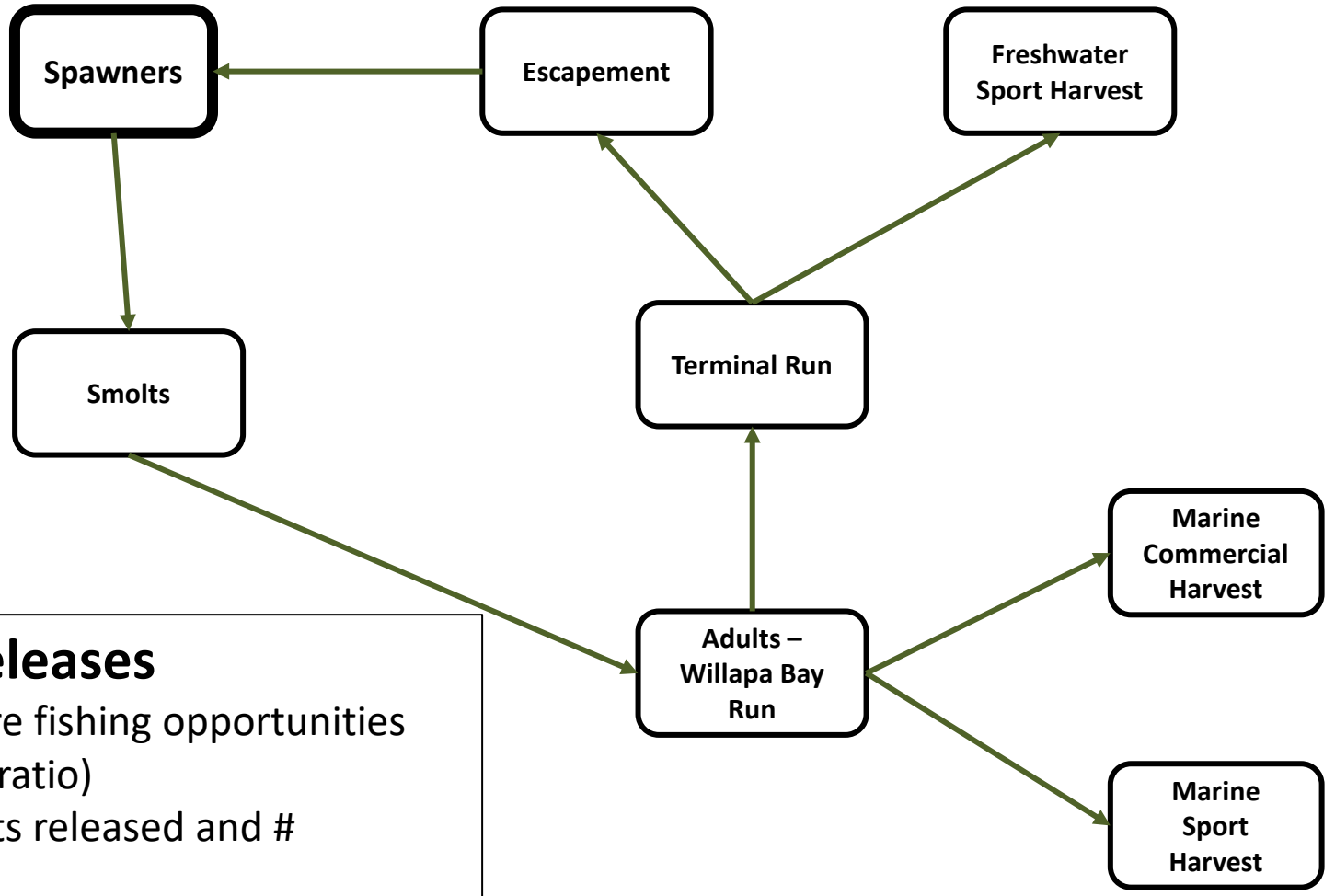



Natural-origin Escapement
TOTAL Freshwater Sport Harvest
Natural-origin Terminal Run
Natural-origin Freshwater Sport Harvest
Natural-origin Spawners
Hatchery Natural Spawners
Hatchery Spawners
Hatchery-origin Escapement
Hatchery-origin Freshwater Sport Harvest
Relative fitness
Egg-smolt survival
Egg-smolt survival
Egg-smolt survival
TOTAL Marine Sport Harvest
Hatchery-origin Terminal Run
Marine Sport Harvest
TOTAL Marine Commercial Harvest
Natural-origin Smolts in Estuary
Hatchery-origin Smolts in Estuary
In estuary survival (NOT Calculated)
Hatchery-origin Smolts in Ocean
Hatchery-origin Run into Willapa Bay
Marine Commercial Harvest
Marine Sport Harvest
Natural-origin Smolts in Ocean
Natural-origin Run into Willapa Bay
Marine Commercial Harvest

Average take in fisheries after implementation (year 5 and later)

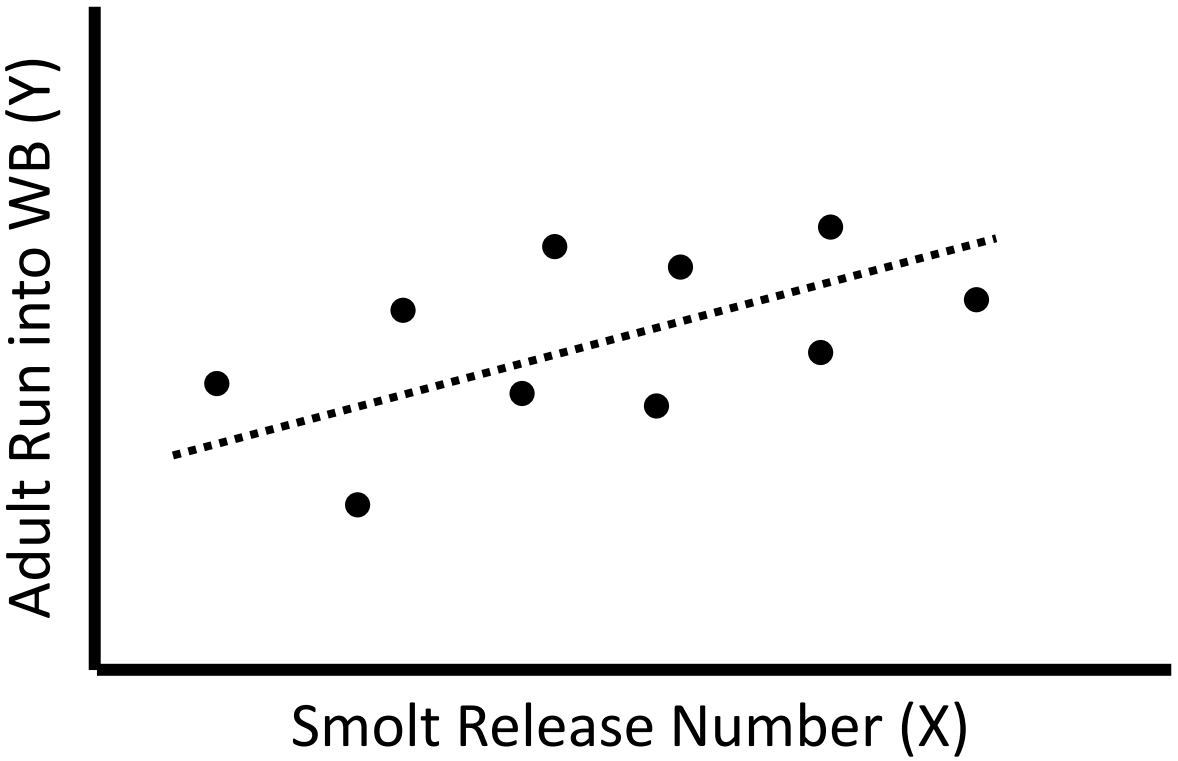


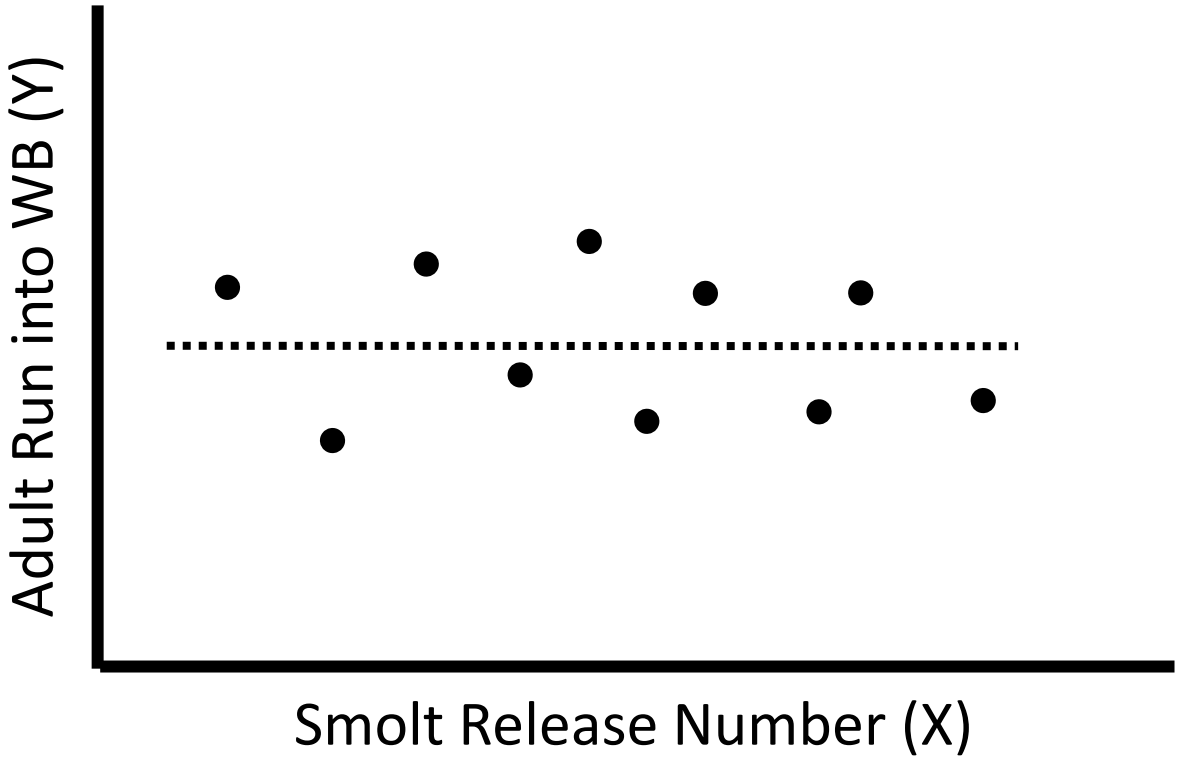
Status of wild fish populations at point of 2015 rebuilding plan target date (2033)

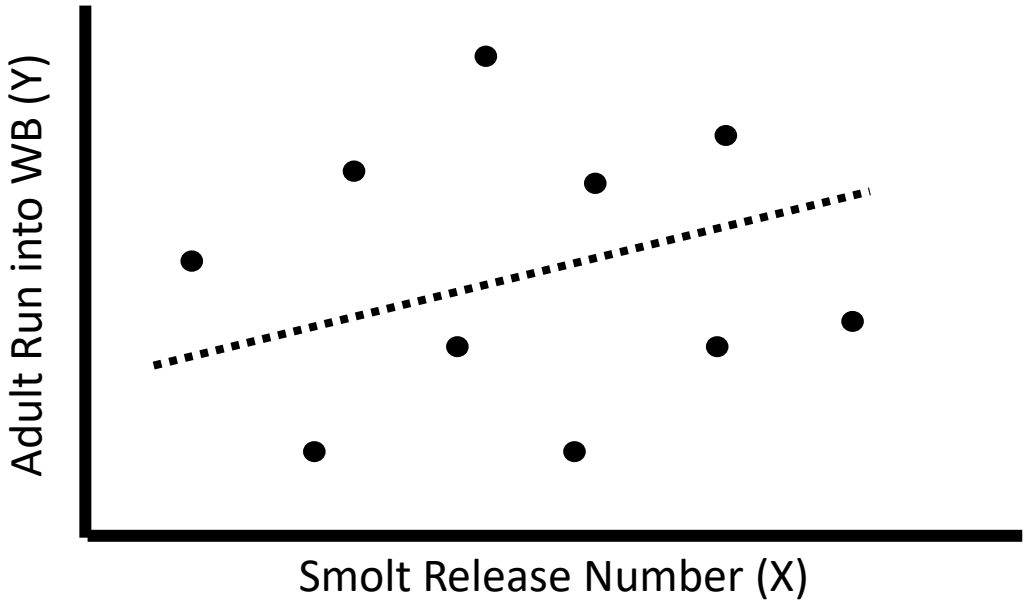


Estimate adult run from smolt releases

- Assumption: more smolts released = more fishing opportunities
- Constant – e.g., SAR = 0.4% (smolt-adult-ratio)
- What is the relationship between # smolts released and # returning adults?
  - Make estimate from adult run vs. smolt release regression
  - Uncertainty of the estimate:
    - Slope of the line
    - Variation


Adult Run into WB (Y)
Smolt Release Number (X)


Adult Run into WB (Y)
Smolt Release Number (X)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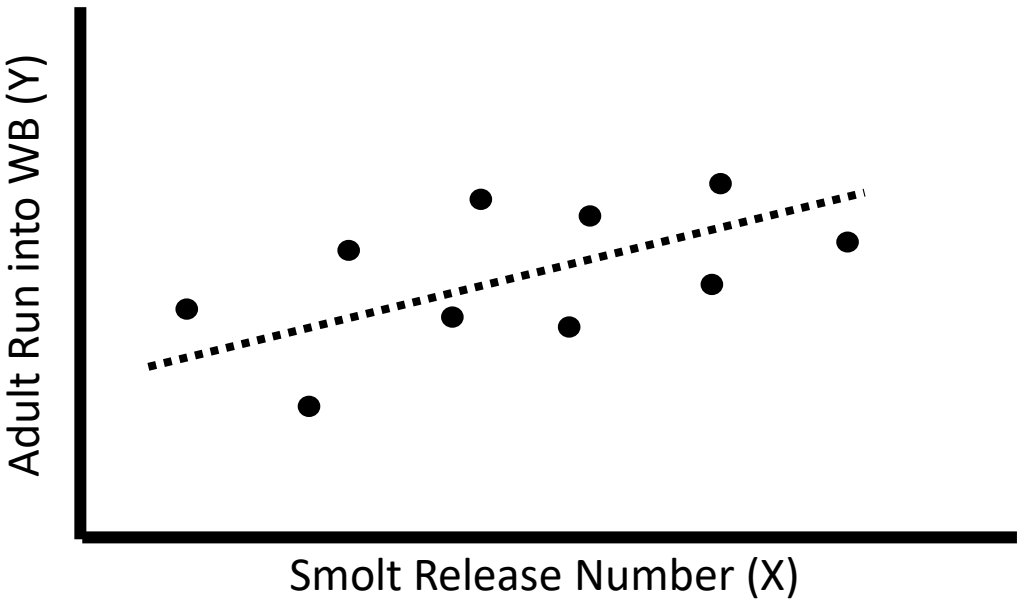
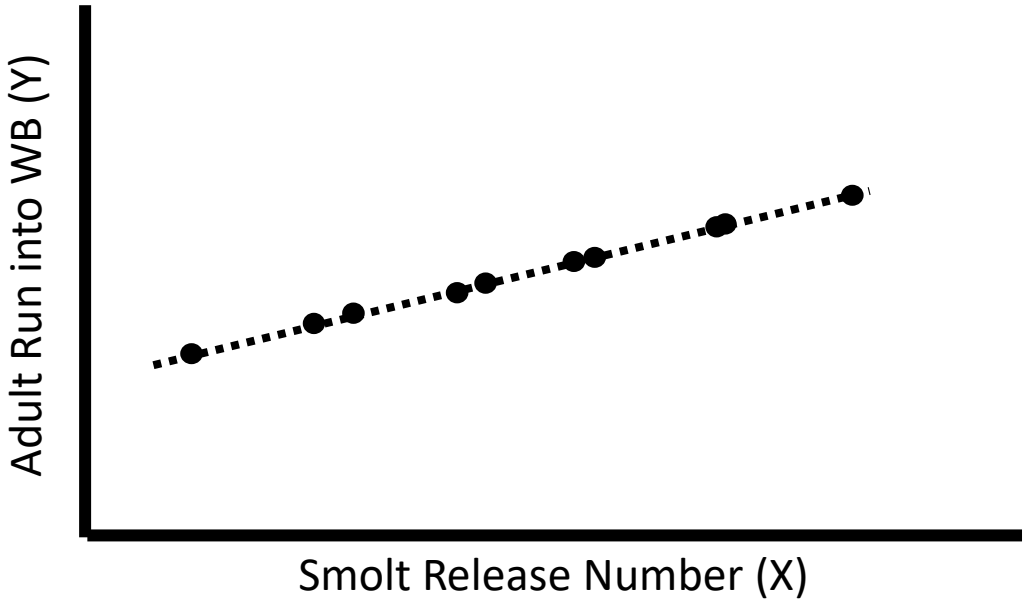
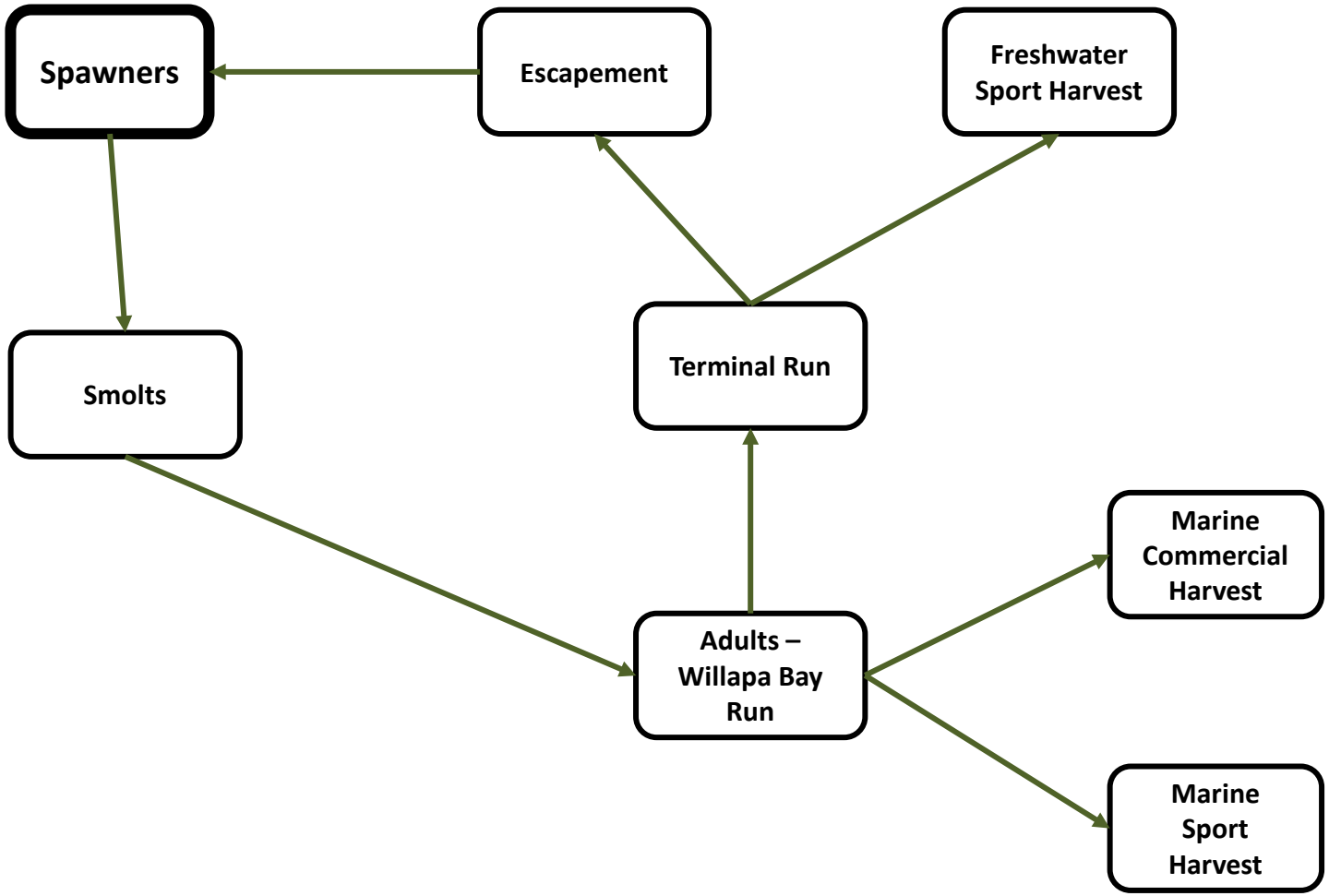
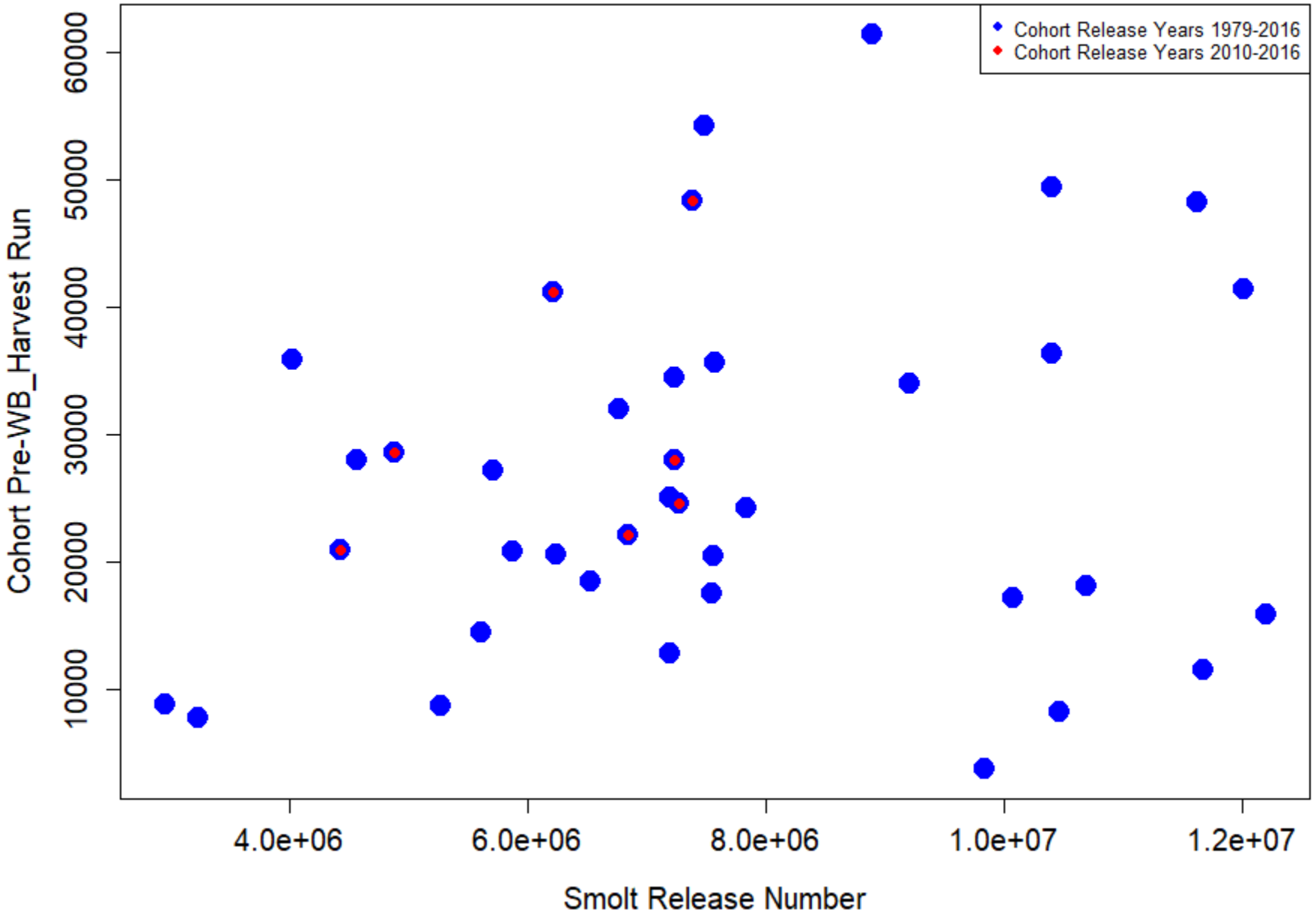
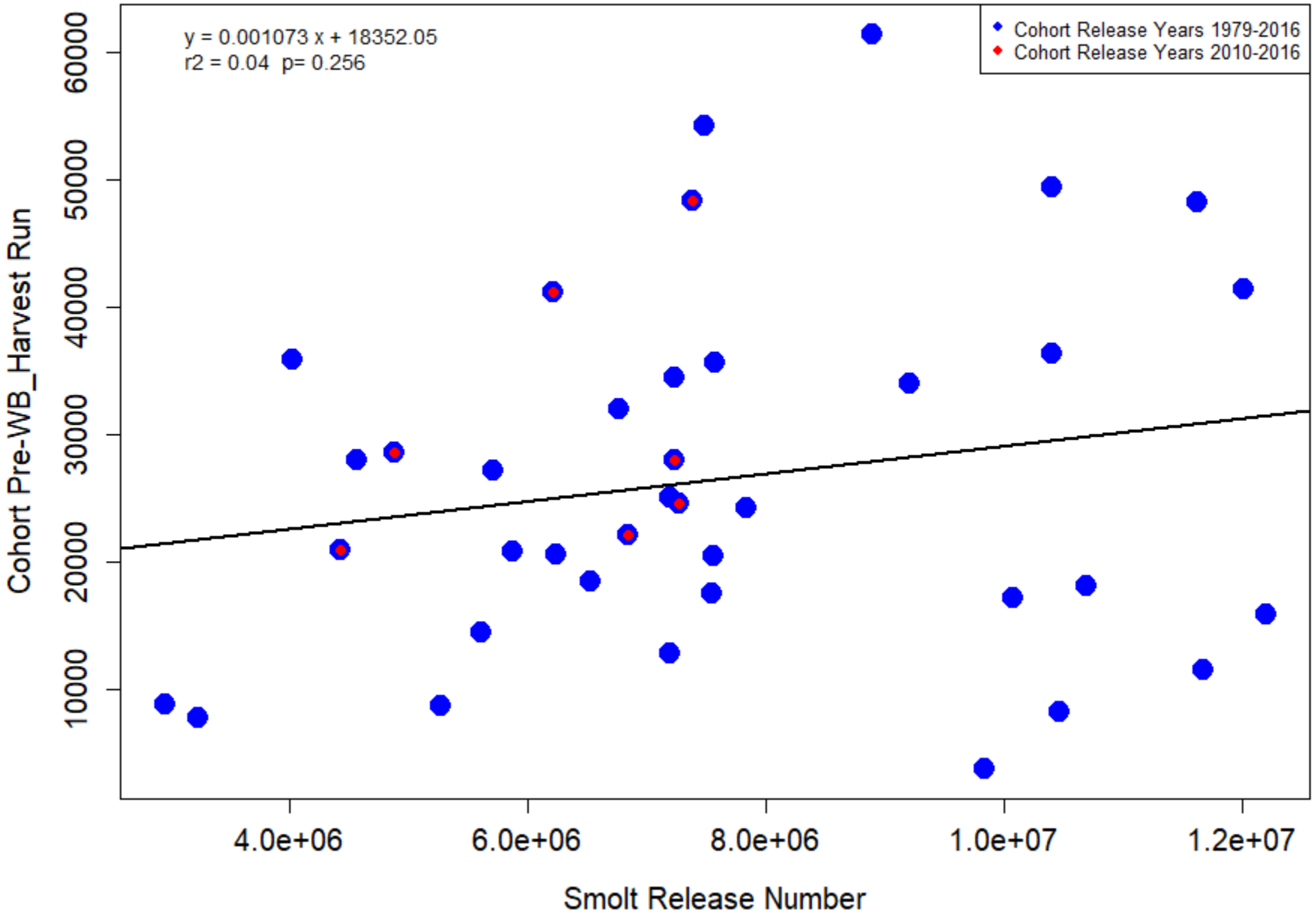
Smolt Release Number (X)

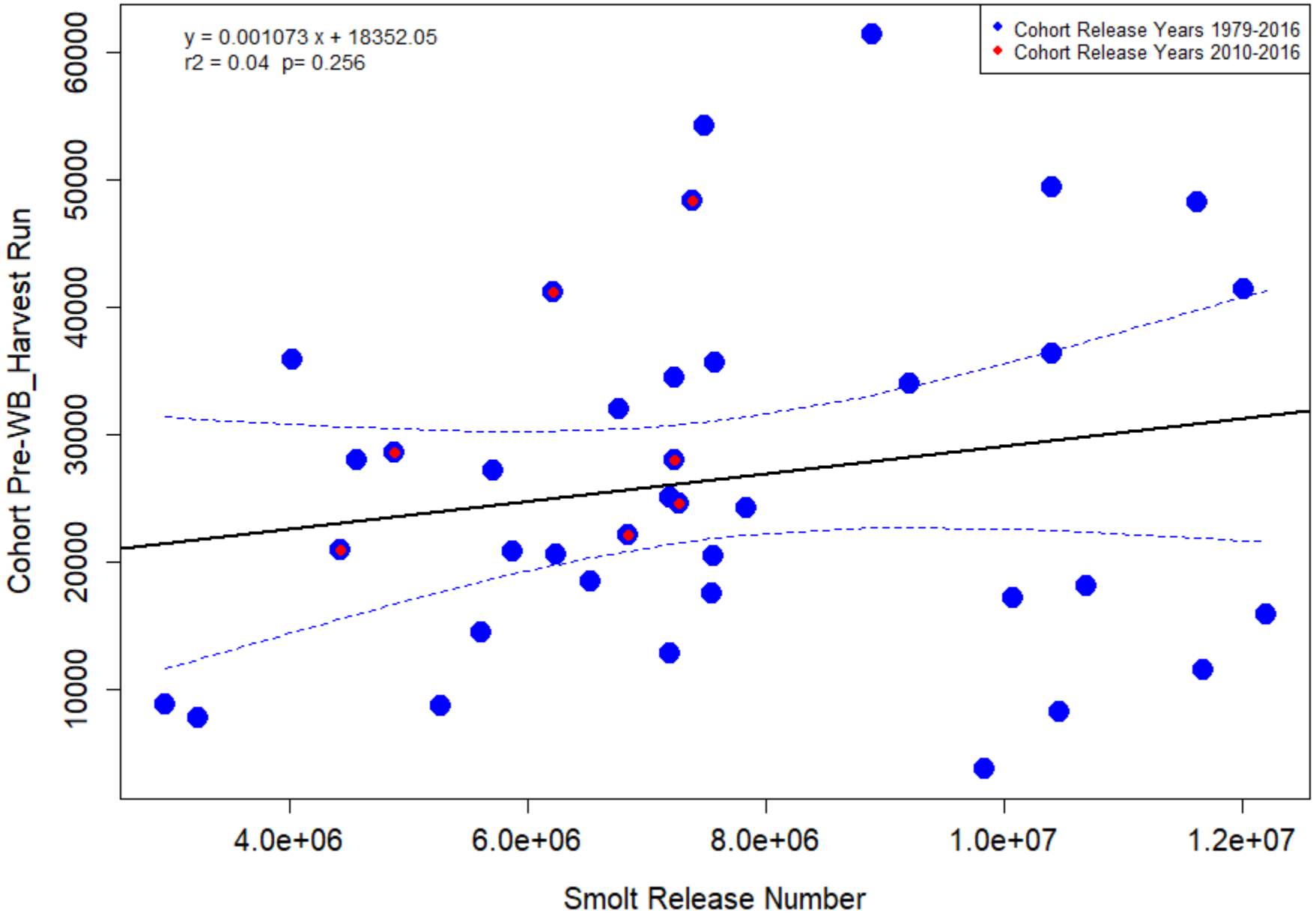

Adult Run into WB (Y)
Smolt Release Number (X)

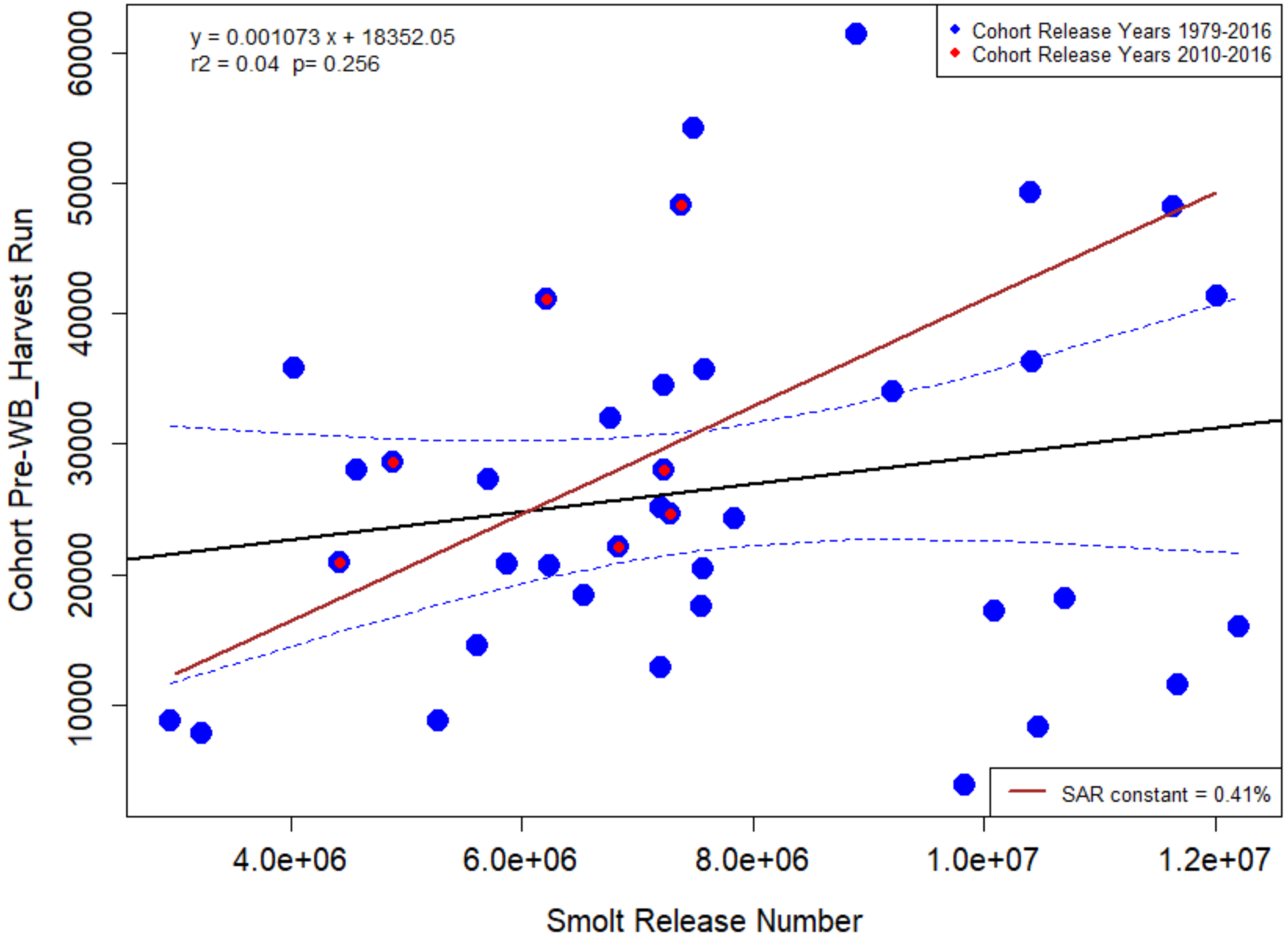

Adult Run into WB (Y)
Smolt Release Number (X)

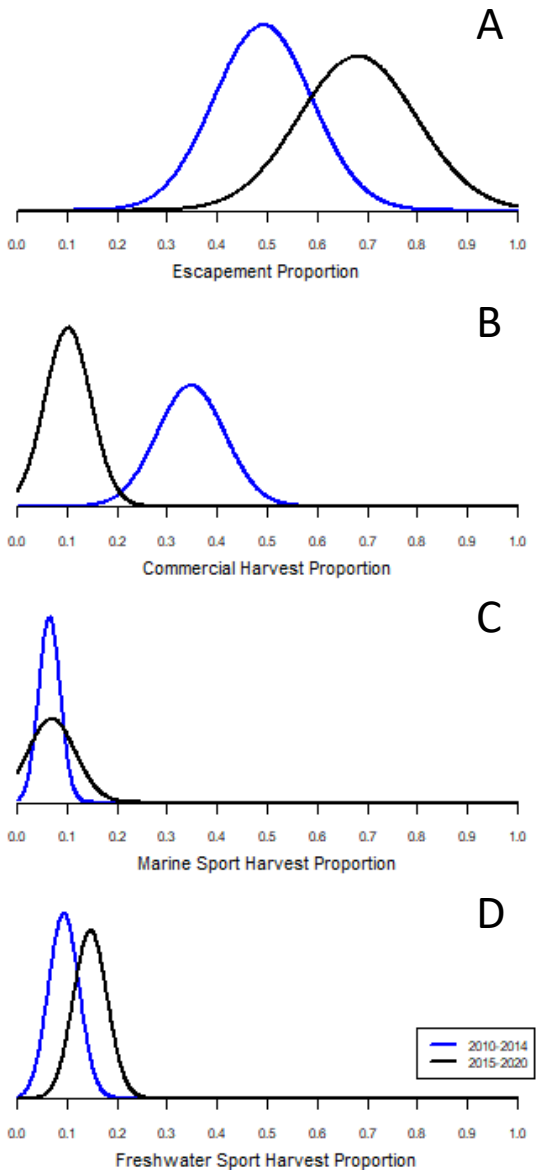

Spawners
Escapement
Freshwater Sport Harvest
Smolts
Terminal Run
Marine Commercial Harvest
Adults – Willapa Bay Run
Marine Sport Harvest

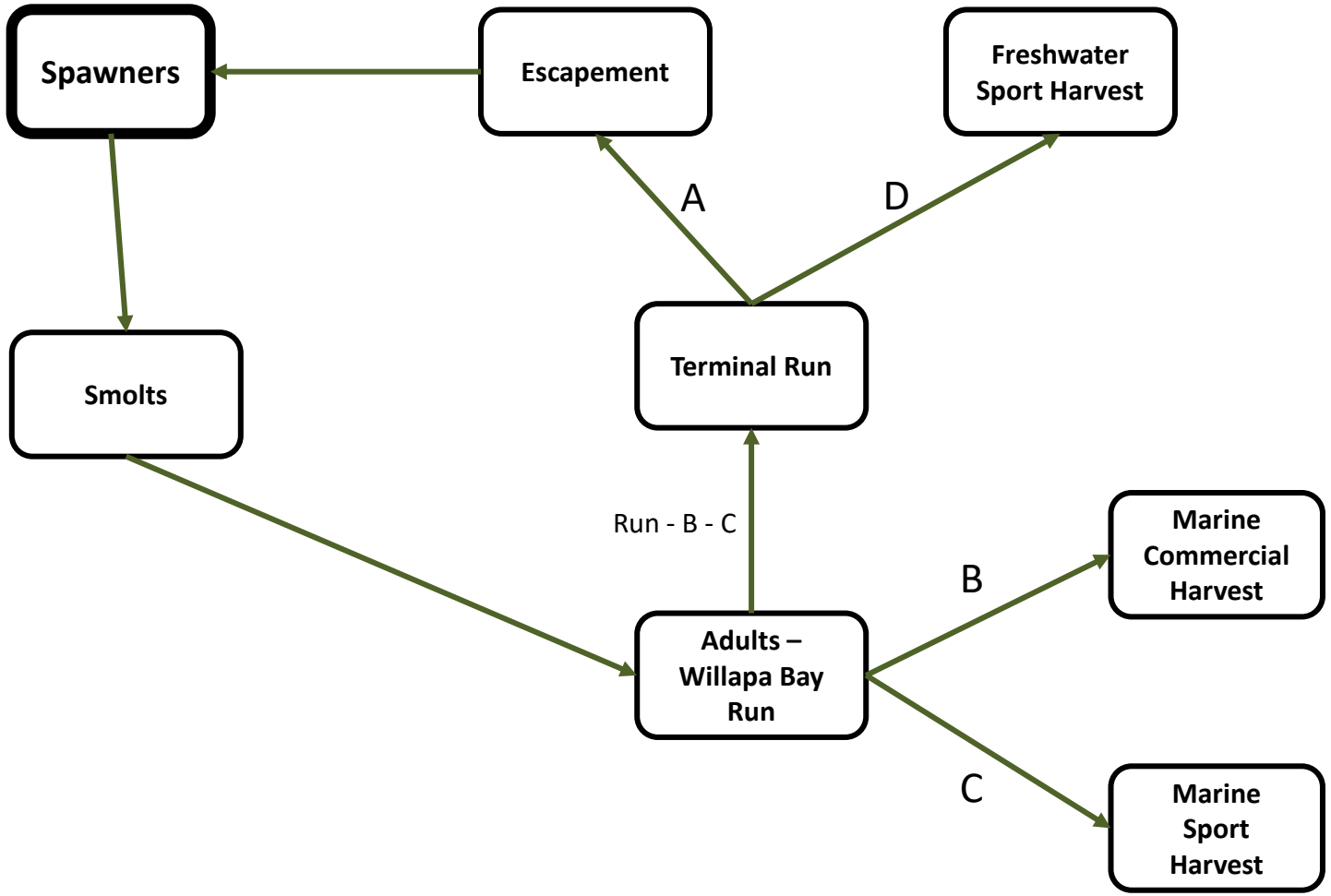

Cohort Release Years 1979-2016
Cohort Release Years 2010-2016
Cohort Pre-WB_Harvest Run
10000
20000
30000
40000
50000
60000
4.0e+06
6.0e+06
8.0e+06
1.0e+07
1.2e+07
Smolt Release Number


y = 0.001073 x + 18352.05
r2 = 0.04 p= 0.256
Cohort Release Years 1979-2016
Cohort Release Years 2010-2016
Cohort Pre-WB_Harvest Run
10000
20000
30000
40000
50000
60000
4.0e+06
6.0e+06
8.0e+06
1.0e+07
1.2e+07
Smolt Release Number


y = 0.001073 x + 18352.05
r2 = 0.04 p= 0.256
Cohort Release Years 1979-2016
Cohort Release Years 2010-2016
Cohort Pre-WB_Harvest Run
10000
20000
30000
40000
50000
60000
4.0e+06
6.0e+06
8.0e+06
1.0e+07
1.2e+07
Smolt Release Number


y = 0.001073 x + 18352.05
r2 = 0.04 p= 0.256
Cohort Release Years 1979-2016
Cohort Release Years 2010-2016
SAR constant = 0.41%
Cohort Pre-WB_Harvest Run
10000
20000
30000
40000
50000
60000
4.0e+06
6.0e+06
8.0e+06
1.0e+07
1.2e+07
Smolt Release Number



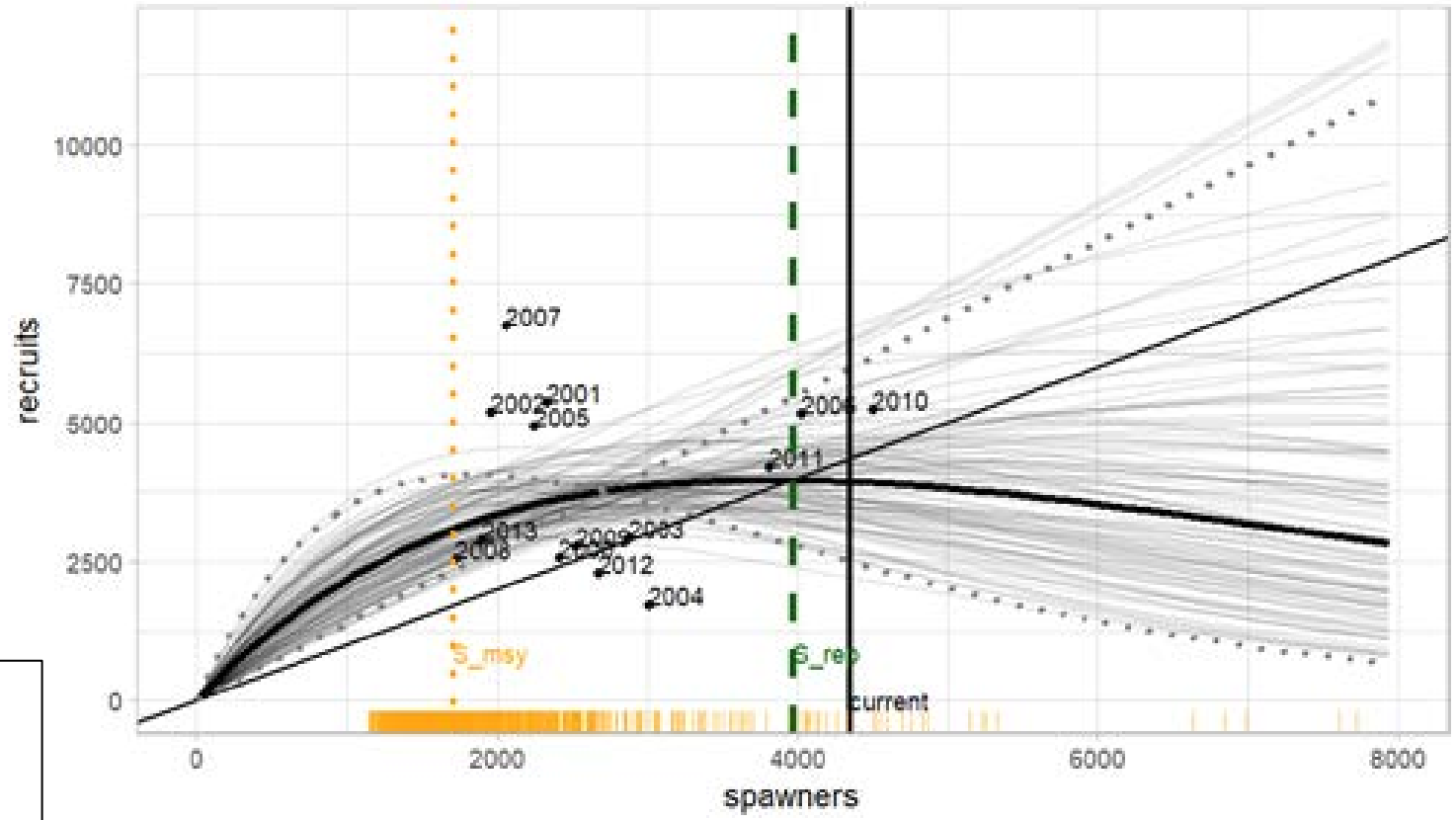


$$Commercial = Run - Escapement - MarineSport - FWSport$$

Willapa Bay Fall Chinook Natural-Origin Spawner-Recruit Population Dynamics, Brood Years 2000 -2013

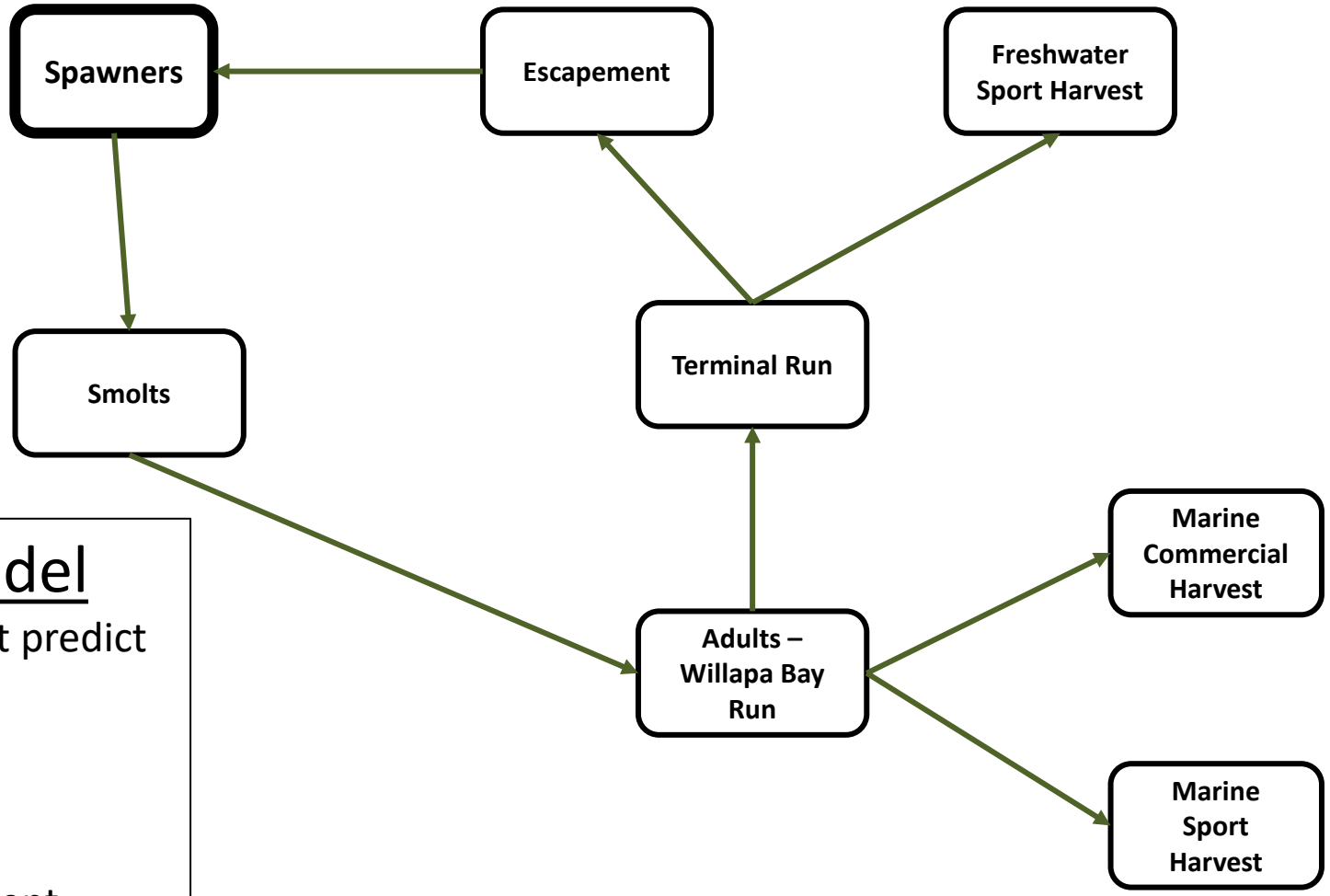
(Excerpt from Comprehensive Review of Willapa Bay Salmon Policy, page 105)

From Alternative 2, April 15, 2022 draft



Parameters

- # Spawners
- Carrying capacity
- Intrinsic rate of growth



Final Comments on Model

- Heuristic model - teaches doesn't predict
- One integrated population
- *One species (?)*
- One year of return
- Harvest is instantaneous
- No timing or geographic component
- Main difference between alternatives
  - spawner escapement goal

Alternative 2 policy language

See documents

1. Staff_Questions_Alt2_WillapaBayPolicy_FishCommittee_May13_2022.docx
2. ALT 2 Draft Ap 15 22v2_LineNumbered.doc

Questions and Discussion