APPENDIX

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APPENDIX D

Table D-1
Definitions of Parameters Used in the Release-recapture Survival Model Shown in Chapter 5

Parameter	Definition
S_{A1}	Probability of survival from release at Durham Ferry to Mossdale (SJO(s))
S_{A2}	Probability of survival from Mossdale (SJO(s)) to Lathrop (SJO(n)) or Old River East (OLD(e))
S_{A3}	Probability of survival from Lathrop (SJO(n)) to Stockton USGS Gauge (STP(s))
S_{A4}	Probability of survival from Stockton USGS Gauge (STP(s)) to Stockton Navy Bridge (STP(n))
S_{A5}	Probability of survival from Stockton Navy Bridge (STP(n)) to Shipping Channel Marker 18 (SJT(se)) or Turner Cut North East (TRN(ne))
S_{B1}	Probability of survival from Old River East (OLD(e)) to head of Middle River (OM(fs))
S_{B2}	Probability of survival from head of Middle River (OM(fs)) to Old River North upstream (OLD(nu)), Middle River North upstream (MID(nu)), Clifton Court Forebay Access Channel (CCG(e)), or Central Valley Project trash rack (CVP(ne), CVP(sw))
ψ_{A1}	Probability of remaining in the San Joaquin River at the Old River-San Joaquin River junction; $=1-\psi_{B1}$
ψ_{B1}	Probability of entering the Old River at the Old River-San Joaquin River junction; $=1-\psi_{A1}$
ψ_{A2}	Probability of remaining in the San Joaquin River at the Turner Cut-San Joaquin River junction; $=1-\psi_{F2}$
ψ_{F2}	Probability of entering Turner Cut at the Turner Cut-San Joaquin River junction; $=1-\psi_{A2}$
$\phi_{B2,B3}$	Joint probability of moving from OM(fs) toward OLD(nu), and surviving from OM(fs) to OLD(nu)
$\phi_{B2,C1}$	Joint probability of moving from OM(fs) toward MID(nu), and surviving from OM(fs) to MID(nu)
$\phi_{B2,D1}$	Joint probability of moving from OM(fs) toward CCG(e), and surviving from OM(fs) to CCG(e)
$\phi_{B2,E1}$	Joint probability of moving from OM(fs) toward CVP, and surviving from OM(fs) to CVP(ne) or CVP(sw)
P_{A2}	Conditional probability of detection at Mossdale (SJO(s))
P_{A3}	Conditional probability of detection at Lathrop (SJO(n))
P_{A4}	Conditional probability of detection at Stockton USGS Gauge (STP(s))
P_{A5}	Conditional probability of detection at Stockton Navy Bridge (STP(n))
P_{A6a}	Conditional probability of detection at Shipping Channel Marker 18 (SJT(se))
P_{B1}	Conditional probability of detection at Old River East (OLD(e))
P_{B2}	Conditional probability of detection at head of Middle River (OM(fs))
P_{B3a}	Conditional probability of detection at Old River North upstream (OLD(nu))
P_{C1a}	Conditional probability of detection at Middle River North upstream (MID(nu))
P_{E1a}	Conditional probability of detection at Central Valley Project trash rack (CVP(ne), CVP(sw))
P_{F1a}	Conditional probability of detection at Turner Cut North East (TRN(ne))
λ_{A6}	Joint probability of surviving from Shipping Channel Marker 18 (SJT(se)) to Shipping Channel Marker 16 (SJT(nw)), and being detected at SJT(nw)
λ_{B3}	Joint probability of surviving from Old River North upstream (OLD(nu)) to Old River North downstream (OLD(nd)), and being detected at OLD(nd)
λ_{C1}	Joint probability of surviving from Middle River North upstream (MID(nu)) to Middle River North downstream (OLD(nd)), and being detected at MID(nd)
λ_{E1}	Joint probability of surviving from the Central Valley Project trash rack (CVP(ne), CVP(sw)) to the Central Valley Project holding tank (CVP(tank)), and being detected at CVP(tank)
λ_{F1}	Joint probability of surviving from Turner Cut North East (TRN(ne)) to Turner Cut Resort (TRN(sw)), and being detected at TRN(sw)

Table D-2
Parameter Estimates (standard error in parentheses) with 95% Profile Likelihood Confidence Intervals (CI) for Tagged Juvenile Chinook Salmon Released at Durham Ferry in 2009, Omitting the Predator-type Detections. Parameters Without Standard Errors or Confidence Intervals Were Set to Fixed Values in the Model. Population-level Estimates are Weighted Averages of the Release Group Estimates. Some Parameters Were Not Estimable Because of Sparse Data.

Parameter	Release Groups 1 – 2		Release Groups 3 – 6		Release Group 7		Population	
	Estimate (SE)	95% CI	Estimate (SE)	95% CI	Estimate (SE)	95% CI	Estimate (SE)	95% CI
S_{A1}			0.46 (0.02)	0.42, 0.51	0.47 (0.04)	0.39, 0.56	0.47 (0.02)	0.43, 0.50
S_{A2}			0.83 (0.03)	0.77, 0.87			0.83 (0.03)	0.77, 0.87
S_{A3}	0.50 (0.07)	0.37, 0.63	0.63 (0.05)	0.53, 0.72			0.59 (0.04)	0.51, 0.66
S_{A4}	0.81 (0.08)	0.63, 0.93	0.77 (0.05)	0.66, 0.86	0.70 (0.14)	0.39, 0.92	0.78 (0.04)	0.68, 0.85
S_{A5}	0.04 (0.04)	0.00, 0.18	0.13 (0.05)	0.06, 0.24	0.00		0.09 (0.03)	0.04, 0.16
S_{B1}	0.70 (0.05)	0.61, 0.78	0.78 (0.04)	0.69, 0.86			0.75 (0.03)	0.69, 0.81
S_{B2}	0.26 (0.05)	0.16, 0.37	0.12 (0.04)	0.06, 0.20	0.16 (0.08)	0.04, 0.36	0.16 (0.03)	0.11, 0.23
ψ_{A1}	0.36 (0.04)	0.29, 0.44	0.52 (0.04)	0.45, 0.59			0.47 (0.03)	0.42, 0.52
ψ_{B1}	0.64 (0.04)	0.56, 0.71	0.48 (0.04)	0.41, 0.55			0.53 (0.03)	0.48, 0.58
ψ_{A2}	1.00		1.00				1.00	
ψ_{F2}	0.00		0.00				0.00	
$\phi_{B2,B3}$	0.00		0.01 (0.01)	0.00, 0.06	0.00		0.01 (0.01)	0.00, 0.03
$\phi_{B2,C1}$	0.00		0.00		0.00		0.00	
$\phi_{B2,D1}$	0.21 (0.05)	0.13, 0.32	0.11 (0.04)	0.05, 0.19	0.00		0.12 (0.02)	0.08, 0.18
$\phi_{B2,E1}$	0.04 (0.02)	0.01, 0.11	0.00		0.16 (0.08)	0.04, 0.36	0.03 (0.01)	0.01, 0.07
P_{A2}			0.99 (0.01)	0.97, 1.00	1.00		0.99 (0.01)	0.98, 1.00
P_{A3}	1.00		0.96 (0.03)	0.89, 1.22			0.97 (0.02)	0.93, 1.03
P_{A4}	0.91 (0.06)	0.75, 0.98	0.98 (0.02)	0.92, 1.00	0.88 (0.12)	0.55, 0.99	0.95 (0.03)	0.88, 0.96
P_{A5}	1.00		1.00		1.00		1.00	
P_{A6a}	1.00		1.00				1.00	
P_{B1}	1.00		0.93 (0.03)	0.86, 0.98			0.96 (0.02)	0.91, 0.98
P_{B2}	1.00		1.00		1.00		1.00	
P_{B3a}			1.00				1.00	
P_{C1a}								
P_{E1a}	1.00				1.00		1.00	
P_{F1a}								
λ_{A6}	1.00		1.00				1.00	
λ_{B3}			0.00				0.00	
λ_{C1}								
λ_{E1}	0.00				0.33 (0.27)	0.02, 0.84	0.11 (0.09)	0.01, 0.28
λ_{F1}								

Table D-3
Parameter Estimates (standard error in parentheses) with 95% Profile Likelihood Confidence Intervals (CI) for Tagged Juvenile Chinook Salmon Released at Durham Ferry in 2009, Including the Predator-type Detections. Parameters Without Standard Errors or Confidence Intervals Were Set to Fixed Values in the Model. Population-level Estimates are Weighted Averages of the Release Group Estimates. Some Parameters Were Not Estimable Because of Sparse Data.

Parameter	Release Groups 1 – 2		Release Groups 3 – 6		Release Group 7		Population	
	Estimate (SE)	95% CI	Estimate (SE)	95% CI	Estimate (SE)	Parameter	Estimate (SE)	95% CI
S_{A1}			0.69 (0.02)	0.65, 0.73	0.77 (0.04)	0.70, 0.84	0.71 (0.02)	0.65, 0.74
S_{A2}			0.86 (0.02)	0.82, 0.90			0.86 (0.02)	0.82, 0.90
S_{A3}	0.59 (0.07)	0.45, 0.72	0.74 (0.04)	0.66, 0.80			0.69 (0.03)	0.62, 0.75
S_{A4}	0.88 (0.06)	0.73, 0.97	0.93 (0.02)	0.88, 0.97	0.83 (0.08)	0.65, 0.95	0.91 (0.03)	0.86, 0.94
S_{A5}	0.08 (0.05)	0.01, 0.22	0.16 (0.04)	0.10, 0.25	0.00		0.12 (0.03)	0.07, 0.18
S_{B1}	0.89 (0.03)	0.82, 0.94	0.90 (0.02)	0.84, 0.94			0.89 (0.02)	0.85, 0.93
S_{B2}	0.62 (0.05)	0.52, 0.71	0.75 (0.07)	0.65, 1.46	0.66 (0.08)	0.50, 0.79	0.70 (0.04)	0.63, 1.10
ψ_{A1}	0.30 (0.04)	0.23, 0.37	0.46 (0.03)	0.41, 0.52			0.41 (0.02)	0.36, 0.45
ψ_{B1}	0.70 (0.04)	0.63, 0.77	0.54 (0.03)	0.48, 0.59			0.59 (0.02)	0.55, 0.64
ψ_{A2}	1.00		0.94 (0.06)	0.76, 0.99	1.00		0.96 (0.04)	0.84, 1.00
ψ_{F2}	0.00		0.06 (0.06)	0.00, 0.24	0.00		0.04 (0.04)	0.00, 0.16
$\phi_{B2,B3}$	0.06 (0.02)	0.02, 0.11	0.06 (0.05)	0.02, 0.77	0.03 (0.03)	0.00, 0.11	0.06 (0.03)	0.03, 0.46
$\phi_{B2,C1}$	0.00		0.00		0.00		0.00	
$\phi_{B2,D1}$	0.23 (0.04)	0.16, 0.32	0.32 (0.04)	0.25, 0.40	0.13 (0.05)	0.05, 0.26	0.27 (0.03)	0.22, 0.32
$\phi_{B2,E1}$	0.33 (0.05)	0.24, 0.42	0.37 (0.06)	0.28, 0.54	0.50 (0.08)	0.34, 0.66	0.37, (0.04)	0.31, 0.48
P_{A2}			0.99 (<0.01)	0.98, 1.02			0.99 (<0.01)	0.98, 1.00
P_{A3}	1.00		0.95 (0.02)	0.90, 0.98			0.97 (0.01)	0.94, 0.99
P_{A4}	0.88 (0.06)	0.73, 0.97	0.99 (0.01)	0.96, 1.00	0.95 (0.05)	0.81, 1.00	0.95 (0.02)	0.91, 0.98
P_{A5}	1.00		1.00		1.00		1.00	
P_{A6a}	1.00		0.90 (0.09)	0.63, 0.99			0.93 (0.06)	0.75, 1.00
P_{B1}	1.00		0.95 (0.02)	0.91, 0.98			0.97 (0.01)	0.94, 0.98
P_{B2}	1.00		1.00		1.00		1.00	
P_{B3a}	1.00		0.50 (0.35)	0.04, 0.96	1.00		0.71 (0.20)	0.45, 0.98
P_{C1a}								
P_{E1a}	1.00		0.89 (0.10)	0.59, 0.99	1.00		0.94 (0.06)	0.77, 1.00
P_{F1a}								
λ_{A6}	1.00		0.64 (0.13)	0.38, 0.85			0.76 (0.09)	0.59, 0.90
λ_{B3}	0.67 (0.19)	0.28, 0.94	0.2 (0.18)	0.01, 0.63			0.45 (0.12)	0.27, 0.71
λ_{C1}								
λ_{E1}	0.18 (0.07)	0.07, 0.33	0.16 (0.05)	0.08, 0.28	0.21 (0.09)	0.07, 0.42	0.17 (0.04)	0.11, 0.25
λ_{F1}								