Model (Red means implemented in RMark)	Code	RMark Example					P	aramet	ers				
Live Recaptures (CJS)	Live	•	Phi	р									
Dead Recoveries	Dead		S	r									
Both Live and Dead Encounters Burnham	Both		S	р	r	F							
Known Fate Closed Population Estimation	Known Closed	?Blackduck ?edwards.eberhardt	S n	С	N								
BTO Dead Recoveries and Unknown Ringings	BTO	redwards.ebernardt	ρ S	<u> </u>	IN								
Robust Design with Closed Population Estimation	Robust	?robust	S	Gamma"	Gamma'	р	С	N					
Both Live and Dead Encounters Barker	Barker		S	р	r	R	R'	F	F'				
Multi-state with Live Recaptures	Multistrata		S	р	Psi								
Brownie et al. Dead Recoveries	Brownie		S	f									
Jolly-Seber Lambda Burnham Huggins Closed Population Estimation	Jolly Huggins		Phi n	p C	Lambda	N							
Robust Design with Huggins' Estimator	RDHuggins		S	Gamma"	Gamma'	р	С						
Pradel Recruitment Only	Pradel		Gamma	р	Cumma								
Pradel Survival and Seniority	PradSen		Phi	р	Gamma								
Pradel Survival and Lambda	PradLambda		Phi	р	Lambda								
Pradel Survival and Recruitment	PradRec		Phi	p	f	DI.	C	Camanal				N.	
Barker Live and Dead with Closed Robust Design POPAN	RDBarker POPAN	?dipper	S Phi	p p	R pent	N N	Gamma"	Gamma'	- F	р	С	N	
Virtual Population Analysis (VPA)	VPA		M	F	pent	IN .							
Multi-state with Live and Dead Encounters	MSLiveDead			p	Psi	r							
Closed Captures with Heterogeneity	HetClosed	?edwards.eberhardt	pi	р	N								
Full Closed Captures with Heterogeneity	FullHet	?edwards.eberhardt	pi	р	С	N							
Nest Success	Nest	Thin to the same of the same o	S										
Huggins' Closed Captures with Heterogeneity Huggins' Full Closed Captures with Heterogeneity	HugHet HugFullHet	?edwards.eberhardt ?edwards.eberhardt	pi pi	p									
Occupancy Estimation with Detection < 1	Occupancy	?salamander; ?weta	pi n	p Psi	L								
RD Occupancy Estimation with psi, epsilon.	RDOccupPE		Psi	Epsilon	р								
RD Occupancy Estimation with psi, gamma.	RDOccupPG	?RDOccupancy; ?RDSalamander		Gamma	р								
RD Occupancy Estimation with psi(1), gamma, epsilon.	RDOccupEG	?RDSalamander	Psi	Epsilon	Gamma	р							
Link-Barker Jolly-Seber	LinkBarker		Phi	р	f	-1.							
Open Robust Design Multi-state	ORDMS CRDMS		S	Psi	pent	Phi	p						
Closed Robust Design Multi-state Huggins' Closed Robust Design Multi-state	HCRDMS	?crdms	S	Psi Psi	p p	С	N						
Heterogeneity Closed Robust Design Multi-state	HetRDMS		S	Psi	pi pi	р	N						
Full Heterogeneity Closed Robust Design Multi-state	FHetRDMS		S	Psi	pi	р	С	N					
Huggins' Het. Closed Robust Design Multi-state	HHetRDMS		S	Psi	pi	р							
Huggins' Full Het. Closed Robust Design Multi-state	HFHetRDMS		S	Psi	pi	р	С						
Robust Design with Heterogeneity Estimator Robust Design with Full Heterogeneity Estimator	RDHet RDFullHet	.100050	S S	Gamma"	Gamma' Gamma'	pi pi	p	N C	N				
Robust Design with Full Heterogeneity Estimator Robust Design with Huggins' Het. Estimator	RDHHet		S	Gamma"	Gamma'	pi	p p	· ·	IN				
Robust Design with Huggins' Full Het. Estimator	RDHFHet		S	Gamma"	Gamma'	pi	p p	С					
Barker Live and Dead with Huggins' Robust Design	RDBarkHug		S	r	R	R'	Gamma"	Gamma'	F	р	С		
Barker Live and Dead with Heterogeneity Robust Design	RDBarkHet		S	r	R	R'	Gamma"	Gamma'	F	pi	р	N	
Barker Live and Dead with Full Het. Robust Design	RDBarkFHet		S	r	R	R'	Gamma"	Gamma'	F	pi	р	С	N
Barker Live and Dead with Huggins' Het. Robust Design Barker Live and Dead with Huggins' Full Het. Robust Design	RDBarkHHet RDBarkHFHet		S	r	R R	R' R'	Gamma" Gamma"	Gamma' Gamma'	F	pi pi	p		
Lukacs Young Survival from Marked Adults	LYSMA		Phi	р	N.	N	Gaillilla	Gaiiiiia	Г	pi	р	С	
Robust Design Pradel Seniority Closed Population Estimation	RDPdGClosed		Phi	Gamma	р	С	N						
Robust Design Pradel Seniority Huggins' Closed Populations	RDPdGHuggins		Phi	Gamma	р	С							
Robust Design Pradel Seniority Closed Captures with Heterogeneity	RDPdGHet		Phi	Gamma	pi	р	N						
Robust Design Pradel Seniority Full Closed Captures with Het.	RDPdGFullHet		Phi	Gamma	pi	p	С	N					
Robust Design Pradel Seniority Huggins' Closed Captures with Het. Robust Design Pradel Seniority Huggins' Full Closed Captures with Het.	RDPdGHugHet RDPdGHugFullHet		Phi Phi	Gamma Gamma	pi pi	p	C						
Robust Design Pradel Seniority Huggins Full Closed Captures with Het. Robust Design Pradel Lambda Closed Population Estimation	RDPdGHugFullHet		Phi	Lambda	pi p	p c	C N						
Robust Design Pradel Lambda Huggins' Closed Populations	RDPdLHuggins		Phi	Lambda	p	С							
Robust Design Pradel Lambda Closed Captures with Heterogeneity	RDPdLHet		Phi	Lambda	pi	р	N						
Robust Design Pradel Lambda Full Closed Captures with Het.	RDPdLFullHet		Phi	Lambda	pi	р	С	N					
Robust Design Pradel Lambda Huggins' Closed Captures with Het.	RDPdLHugHet		Phi	Lambda	pi	р							
Robust Design Pradel Lambda Huggins' Full Closed Captures with Het. Robust Design Pradel Recruitment Closed Population Estimation	RDPdLHugFullHet RDPdfClosed		Phi Phi	Lambda f	pi n	р	C N						
Robust Design Pradel Recruitment Closed Population Estimation Robust Design Pradel Recruitment Huggins' Closed Populations	RDPdfHuggins		Phi	f	p p	С	N						
Robust Design Pradel Recruitment Hoggins Closed Populations Robust Design Pradel Recruitment Closed Captures with Heterogeneity	RDPdfHet		Phi	f	pi pi	р	N						
Robust Design Pradel Recruitment Full Closed Captures with Het.	RDPdfFullHet		Phi	f	pi	р	С	N					
Robust Design Pradel Recruitment Huggins' Closed Captures with Het.	RDPdfHugHet		Phi	f	pi	р							
Robust Design Pradel Recruitment Huggins' Full Closed Captures with Het.	RDPdfHugFullHet		Phi	f	pi	р	С						
Open Robust Design Pradel Multi-state	ORDPdMS		S	Psi	Gamma	pent	Phi	р					
Huggins Closed Robust Design Multi-state with State Probabilities Huggins Heterogeneity Closed Robust Design Multi-state with State Probabilities	CRDMSOHug CRDMSOHet		S	Psi Psi	Omega	p pi	C						
Huggins Heterogeneity Closed Robust Design Multi-state with State Probabilities Huggins Full Heterogeneity Closed Robust Design Multi-state with State Probabilities	CRDMSOFHet		S	Psi	Omega Omega	pi pi	p p	С					
Occupancy Heterogeneity Estimation with Detection < 1	OccupHet			р	Psi								

Logit Normal Mark Resight Logit Normal Mark Resight Poisson Mar Resight with Robust Design Poisson Mar Resight with Robust Design Multiple-State Occupancy Estimation Multiple-State Occupancy Estimation Multiple-State Occupancy Estimation Occupancy Estimation Royle Poisson Counts Occupancy Estimation Royle Poisson Counts Occupancy Estimation Royle Registry Estimation Occupancy Estimatio											
RD Occupancy Hetrogeneity Estimation with psi(1), gamma, psilon Occupancy Stimation Royle/Richols Poisson Abundance OccupinNPoisson Occupancy Estimation Royle/Richols Poisson Abundance OccupinNPoisson ZeperOccup Poisson Mark Resignt Logit Normal Mark Resignt Poisson Mark Resignt Multiple State Occupancy Estimation Cocupancy Estimation Royle Poisson Courts Cocupancy Estimation Royle Residue Binomial Courts Cocupancy Estimation Royle Poisson Courts Cocupancy Estimation Royle Poisson Courts Cocupancy Estimation Royle Poisson Royle Register Binomial Courts Cocupancy Estimation Royle Poisson Courts Cocupancy Estimation Royle Poisson Royle Register Binomial Royle Poisson Royle Register Binomial Royle Poisson Royle Register Binomial Royle Register Binomial Royle Register Binomial Royle Poisson Royle Register Binomial Royle Register Binomial Royle Register Binomial Royle Register Binomial Royle Poisson Royle Register Binomial						- P-	р				
Occupancy Estimation Royle/Nichols Pegative Binomial Abundance OccupARNPoisson 7 Poonovan 7 r Lambda Occupancy Estimation Royle/Richols Regative Binomial Abundance OccupARNPoisson 7 Poonovan 7 r Lambda VarAdd Tyro species Occupancy Estimation 125perCoccup PBIAB PBIA PBIB PA PB rAB rAB rAB rAB rAB rAB rAB rAB rAB rA				Psi	Gamma	pi	р				
Occupancy Estimation Royle/Nicholis Negative Binomial Abundance Occupancy Estimation Royle/Nicholis Negative Binomial Abundance Deptition of the September of September		RDOccupHetEG		Psi	Epsilon	Gamma	pi	р			
Two species Occupancy Estimation SpecOccup PiJAB PSIA PS		OccupRNPoisson	?Donovan.7	r	Lambda						
Logit Normal Mark Resight Logit Normal Mark Resight Poisson Mar Resight with Robust Design Poisson Mar Resight with Robust Design Multiple-State Occupancy Estimation Multiple-State Occupancy Estimation Multiple-State Occupancy Estimation Occupancy Estimation Royle Poisson Counts Occupancy Estimation Royle Poisson Counts Occupancy Estimation Royle Registry Estimation Occupancy Estimatio	Occupancy Estimation Royle/Nichols Negative Binomial Abundance	OccupRNNegBin	?Donovan.7	r	Lambda	VarAdd					
PoissonMark Resight with Robust Design PoissonMark Resight with Robust Design Multiple-State Occupancy Estimation MSOccupancy PoissonMark Resight with Robust Design MUltiple-State Occupancy Estimation Royle Poisson Courts Occupancy Estimation Royle Poisson Courts Occupancy Estimation Royle Negative Binomial Royle R	Two species Occupancy Estimation	2SpecOccup		PsiAB	PsiA	PsiB	pA	pB	rAB	rAb	raB
Multiple-State Occupancy Estimation Occupancy Estimation Royle Poisson Counts Occupancy Estimation Royle Regative Binomial Royle Regat	Logit-Normal Mark Resight	LogitNormalMR	?LogitNormalMR	р	sigma	N					
Occupancy Estimation Royle Poisson Counts Occupancy Estimation Royle Negative Binomial Counts Occupancy Estimation Royle Negative Binomial Counts Occupancy Estimation Royle Negative Binomial Counts Open Robust Design Multi-state with State Probabilities ORDMSState SPsi Omega pent Phi p Indigent Phi p Omega pent Phi p Omega p O	Poisson Mark Resight with Robust Design	PoissonMR	?PoissonMR, ?Poisson_twoMR	alpha	sigma	U	Phi	Gamma"	Gamma'		
Occupancy Estimation Royle Negative Binomial Counts Open Robust Design Multi-state with State Probabilities ORMSState Open Robust Design Multi-state with State Probabilities ORMSState Open Robust Design Multi-state with State Probabilities ORMSState Open Robust Design Multi-state Closed with Mis-classification Open Robust Design Multi-state Closed with Mis-classification Open Robust Design Multi-state Closed with Mis-classification Open Robust Design Multiple-State Occupancy Estimation Conditional Binomial Open Robust Design Multiple-State Occupancy Estimation General Open Robust Design Multiple-State Occupancy Estimation General Opensity estimation with Huggins p and c Opensity estimation with Huggins heterogeneity pl and p Opensity estimation with Huggins heterogeneity pl and p Opensity estimation with Huggins full heterogeneity pl, p and c Opensity estimation with Huggins full heterogeneity pl, p and c Opensity estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full heterogeneity pl, p and c Opensity Estimation with Huggins full h	Multiple-State Occupancy Estimation	MSOccupancy	?NicholsMSOccupancy	Psi1	Psi2	p1	p2	Delta			
Open Robust Design Multi-state with State Probabilities ORDMSState IELogitNormalMR 7IELogitNormalMR Psign Nulti-state Closed with Mischassification Order Aboust Design Multi-state Occupancy estimation Order Aboust Design Multi-state Occupancy Estimation Conditional Binomial Order Aboust Design Multi-state Occupancy Estimation Conditional Binomial Order Aboust Design Multiple-State Occupancy Estimation Conditional Binomial Order	Occupancy Estimation Royle Poisson Counts	OccupRPoisson	?Donovan.8	r	Lambda						
Immigration-Emigration Logit-Normal Mark Resight IELogitNormalMR ?IELogitNormalMR p sigma Nbar alpha Nstar ROBUST Design Multi-state Closed with Mis-classification MultscalOcc Psi Delta MultscalOcc Psi Delta p Delta ROBUST Design Multiple-State Occupancy Estimation Conditional Binomial RDMSOccRepro Phi0 Psi R p Delta ROBUST Design Multiple-State Occupancy Estimation General RDMSOccupancy Phi0 Psi R p Delta Density estimation with Huggins pand c Densitype Phi0 Psi p c ptilde Density estimation with Huggins full heterogeneity pi and p DensityHet pi p p c ptilde Density estimation with Huggins full heterogeneity pi, p and c DensityHet pi p p c c ptilde Density-Seber model with Pledger mixtures CISMixture pi Phi p p Gamma Pradel Survival and Seniority with Pledger mixtures Pradel Survival and Recruitment with Random Effects Link-Barker Survival and Recruitment with Random Effects	Occupancy Estimation Royle Negative Binomial Counts	OccupRNegBin	?Donovan.8	r	Lambda	VarAdd					
RDMSMisClass S Psi pi Omega p Delta MultScale occupancy estimation MultScale occupancy estimation Conditional Binomial RDMSOccRepro Philo Psi R p Delta Robust Design Multiple-State Occupancy Estimation General RDMSOccRepro Philo Psi p Density estimation with Huggins pand c Density pestimation with Huggins pand c Density estimation with Huggins heterogeneity pi and p Density estimation with Huggins full heterogeneity pi, p and c Density	Open Robust Design Multi-state with State Probabilities	ORDMSState		S	Psi	Omega	pent	Phi	р		
Multi-scale occupancy estimation Robust Design Multiple-State Occupancy Estimation General RDMSOccrapro RDMSOccupancy Philo Psi R p Density estimation with Huggins p and c Density pc Density estimation with Huggins full heterogeneity pi and p Density estimation with Huggins full heterogeneity pi, p and c Density estimation with Huggins full heterogeneity pi, p and c Density estimation with Huggins full heterogeneity pi, p and c Density estimation with Huggins full heterogeneity pi, p and c Density estimation with Huggins full heterogeneity pi, p and c Density estimation with Huggins full heterogeneity pi and p Density estimation with Huggins full heterogeneity pi, p and c Density estimation with Huggins full heterogeneity pi and p Density estimation with Huggins full heterogeneity pi, p and c Density estimation with Huggins full heterogeneity pi, p and c Density estimation with Huggins full heterogeneity pi and p Density estimation with Huggins full heterogeneity pi and p Density estimation with Huggins p p Endel Survival and Seniority with Pledger mixtures Pradel Survival and Lambda with Pledger mixtures Pradel Survival and Recruitment with Random Effects LinkBarkRan Sigmaphi Phi Sigmap p Sigmaph Phi Sigmap p	Immigration-Emigration Logit-Normal Mark Resight	IELogitNormalMR	?IELogitNormalMR	р	sigma	Nbar	alpha	Nstar			
Robust Design Multiple-State Occupancy Estimation Conditional Binomial RDMSOccRepro Philo Psi R p Delta Robust Design Multiple-State Occupancy Estimation General RDMSOccupancy Philo Psi p Density estimation with Huggins p and c Density estimation with Huggins heterogeneity pi and p Density Het pi p p tilde Density estimation with Huggins full heterogeneity pi, p and c Density Fhet pi p c Density Fhet pi p c Cormack-Jolly-Seber model with Pledger mixtures Pradel Survival and Lambda with Pledger mixtures Pradel Survival and Recruitment with Pledger mixtures Pradel Survival and Recruitment with Pledger mixtures Pradel Recruitment with Pledger mixtures Pradel Survival and Recruitment with Pledger mixtures Link-Barker Survival and Recruitment with Random Effects	Robust Design Multi-state Closed with Mis-classification	RDMSMisClass		S	Psi	pi	Omega	р	Delta		
Robust Design Multiple-State Occupancy Estimation General Romost Desity estimation with Huggins p and c Density estimation with Huggins heterogeneity pi and p Density estimation with Huggins full heterogeneity pi, p and c Density-Flet	Multi-scale occupancy estimation	MultScalOcc		Psi	Delta	р					
Density estimation with Huggins p and c Density estimation with Huggins heterogeneity pi and p Density estimation with Huggins heterogeneity pi and p Density estimation with Huggins full heterogeneity pi, p and c Density Flet Density Flet Density Flet Density Flet Density Flet Density estimation with Huggins full heterogeneity pi, p and c Density Flet Density Blet Density Flet Density Flet Density Flet Density Flet Density Blet Density Flet Density Blet Density Blet Density Blet De	Robust Design Multiple-State Occupancy Estimation Conditional Binomial	RDMSOccRepro		Phi0	Psi	R	р	Delta			
Density estimation with Huggins heterogeneity pi and p Density estimation with Huggins heterogeneity pi, p and c Density FHet pi p c ptilde Cormack-Jolly-Seber model with Pledger mixtures Pradel Survival and Seniority with Pledger mixtures Pradel Survival and Seniority with Pledger mixtures Pradel Survival and Lambda with Pledger mixtures Pradel Survival and Recruitment with Pledger mixtures UnkBarker Survival and Recruitment with Pledger mixtures UnkBarkRan Sigmaphi Phi Sigmap p Sigmaf f	Robust Design Multiple-State Occupancy Estimation General	RDMSOccupancy		Phi0	Psi	р					
Density estimation with Huggins full heterogeneity pi, p and c Cormack-Jolly-Seber model with Pledger mixtures CISMixture pi Phi p pradel Survival and Seniority with Pledger mixtures Pradel Survival and Lambda with Pledger mixtures Pradel Survival and Lambda with Pledger mixtures Pradel Survival and Recruitment with Pledger mixtures UinkBarker Survival and Recruitment with Random Effects	Density estimation with Huggins p and c	Densitypc		р	С	ptilde					
Cormack-Jolly-Seber model with Pledger mixtures CISMixture Prade Survival and Seniority with Pledger mixtures Pradel Survival and Lambdawith Pledger mixtures Pradel Survival and Recruitment with Random Effects UinkBarkkix Phi p f cormack-Jolly-Seber model with Random Effects Link-Barkkr Survival and Recruitment with Random Effects	Density estimation with Huggins heterogeneity pi and p	DensityHet		pi	р	ptilde					
Pradel Survival and Seniority with Pledger mixtures Pradel Survival and Lambda with Pledger mixtures Pradel Survival and Lambda with Pledger mixtures Pradel Survival and Recruitment with Pledger mixtures Pradel Survival and Recruitment with Pledger mixtures Pradel Recruitment with Pledger mixtures Phi pi p f Cormack-Jolly-Seber model with Random Effects CJSRandom sigmaphi Phi sigmap p Link-Barker Survival and Recruitment with Random Effects Link-Barker Survival Phi sigmap p sigmaf f	Density estimation with Huggins full heterogeneity pi, p and c	DensityFHet		pi	р	С	ptilde				
Pradel Survival and Lambda with Pledger mixtures Pradel Survival and Recruitment with Pledger mixtures Pradel Survival and Recruitment with Pledger mixtures Pradel RecMix Phi pi p f Link-Barker Survival and Recruitment with Pledger mixtures Link-Barker Survival and Recruitment with Random Effects	Cormack-Jolly-Seber model with Pledger mixtures	CJSMixture		pi	Phi	р					
Pradel Survival and Recruitment with Pledger mixtures Pradel RecMix Phi pi p f Link-Barker Survival and Recruitment with Pledger mixtures Link-Barker Survival and Recruitment with Random Effects Link-Barker Survival And Re	Pradel Survival and Seniority with Pledger mixtures	PradSenMix		Phi	pi	р	Gamma				
Link-Barker Survival and Recruitment with Pledger mixtures LinkBarkMix Phi pi p f Cormack-Jolly-Seber model with Random Effects CJSRandom Sigmaphi Phi sigmap p Link-Barker Survival and Recruitment with Random Effects LinkBarkRan Sigmaphi Phi sigmap p Sigmaf f	Pradel Survival and Lambda with Pledger mixtures	PradLambdaMix		Phi	pi	р	Lambda				
Cormack-Jolly-Seber model with Random Effects Ciskandom sigmaphi Sigmap p Link-Barker Survival and Recruitment with Random Effects LinkBarkRan sigmaphi Phi sigmap p sigmap p	Pradel Survival and Recruitment with Pledger mixtures	PradelRecMix		Phi	pi	р	f				
Link-Barker Survival and Recruitment with Random Effects LinkBarkRan sigmaphi Phi sigmap p sigmaf f	Link-Barker Survival and Recruitment with Pledger mixtures	LinkBarkMix		Phi	pi	р	f				
	Cormack-Jolly-Seber model with Random Effects	CJSRandom		sigmaphi	Phi	sigmap	р				
Two species Conditional Occupancy Estimation	Link-Barker Survival and Recruitment with Random Effects	LinkBarkRan		sigmaphi	Phi	sigmap	р	sigmaf	f		
	Two species Conditional Occupancy Estimation	2SpecConOccup		PsiA	PsiBA	PsiBa	pA	pB	rA	rBA	rBa