

HEALTH AND BODY CONDITION

Photogrammetry to monitor growth and body condition of SRKWs



*Agenda Item B.3, May 23, 2019
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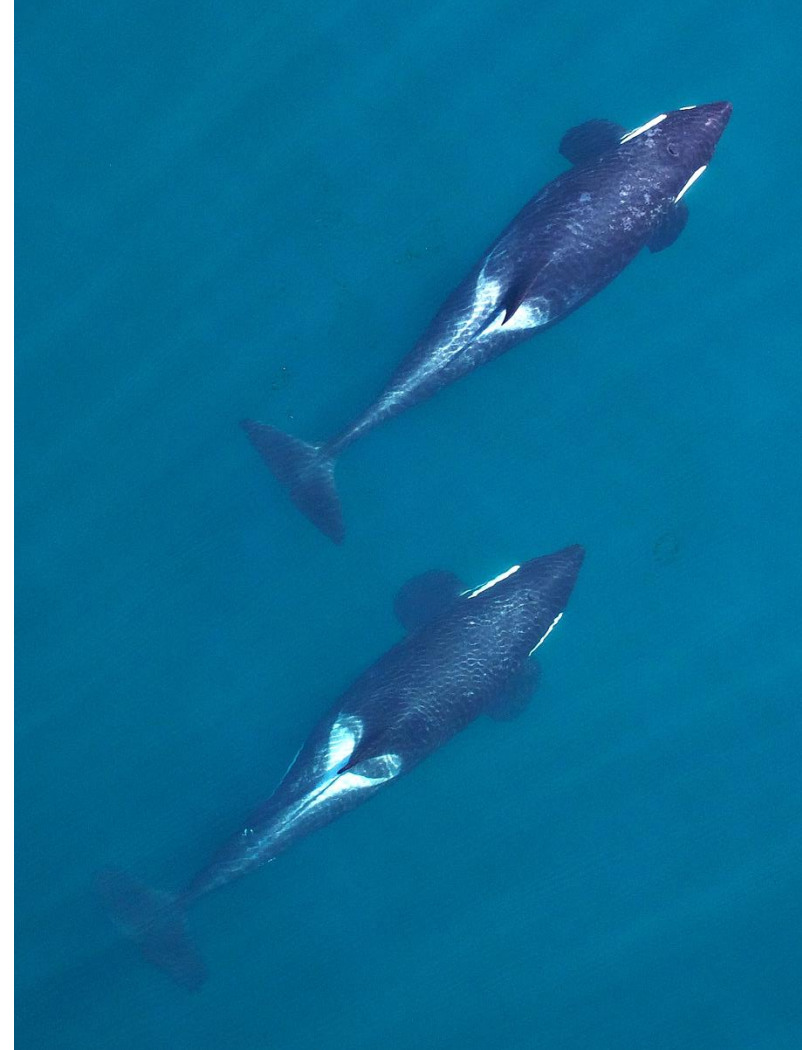
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Aerial Photogrammetry

- Non-invasive health check
- 1cm pixel resolution from 100ft
- Length measurements <0.1% bias



Durban et al. 2015. J. Unmanned Vehicle Systems



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Photogrammetry metrics



- September sampling in 2008, 2013, annually 2015-2018
- May sampling since 2016 to add seasonal component
- Imaged 98/103 whales living since 2008
- 77-100% of the population imaged each year

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Linking to known individuals



Fearnbach et al. 2011. Endangered Species Research. Durban et al. 2015. JUVS

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Low reproductive success



- Increased width at mid body is reliable pregnancy indicator
- 68% loss of detected pregnancies

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Center for Conservation Biology, University of Washington, Photo: Hogan

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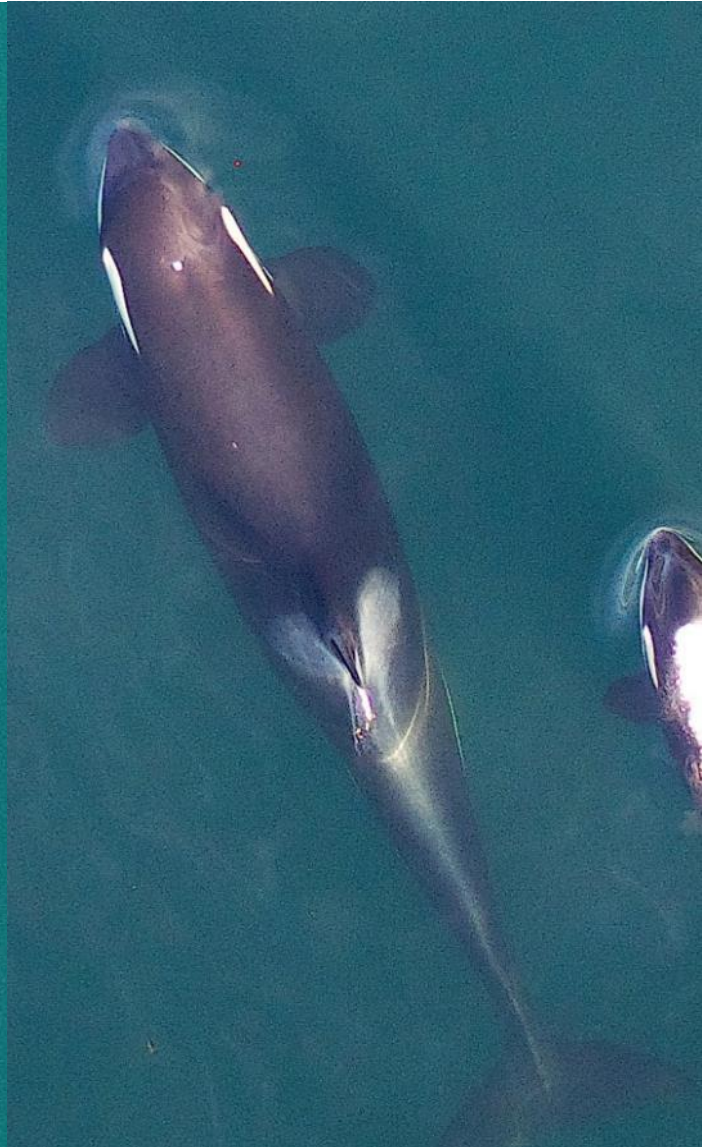
Changes in condition: example J36



Sep '15



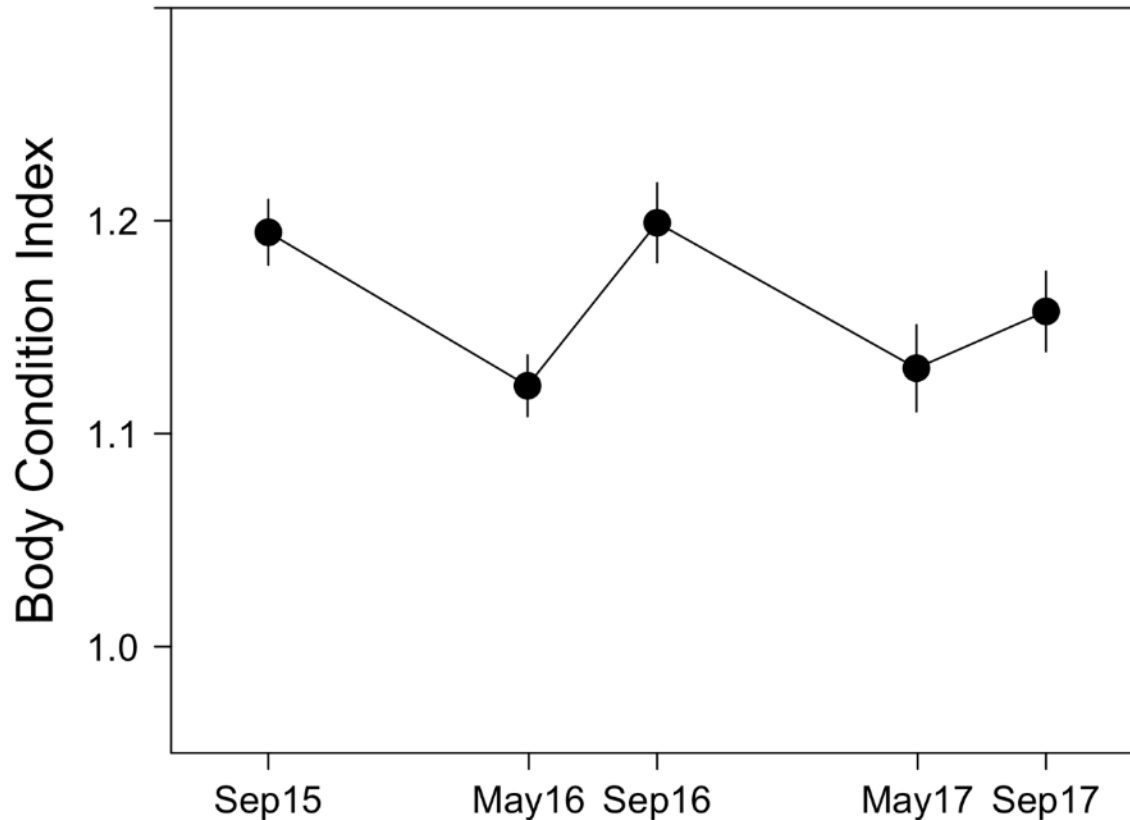
May '16



Sep '16

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Changes in condition (example J36)



Low measurement variability = power to resolve changes

Fearnbach et al. 2019. Marine Mammal Science. In Review

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Mortalities linked to condition



Still alive

1 month

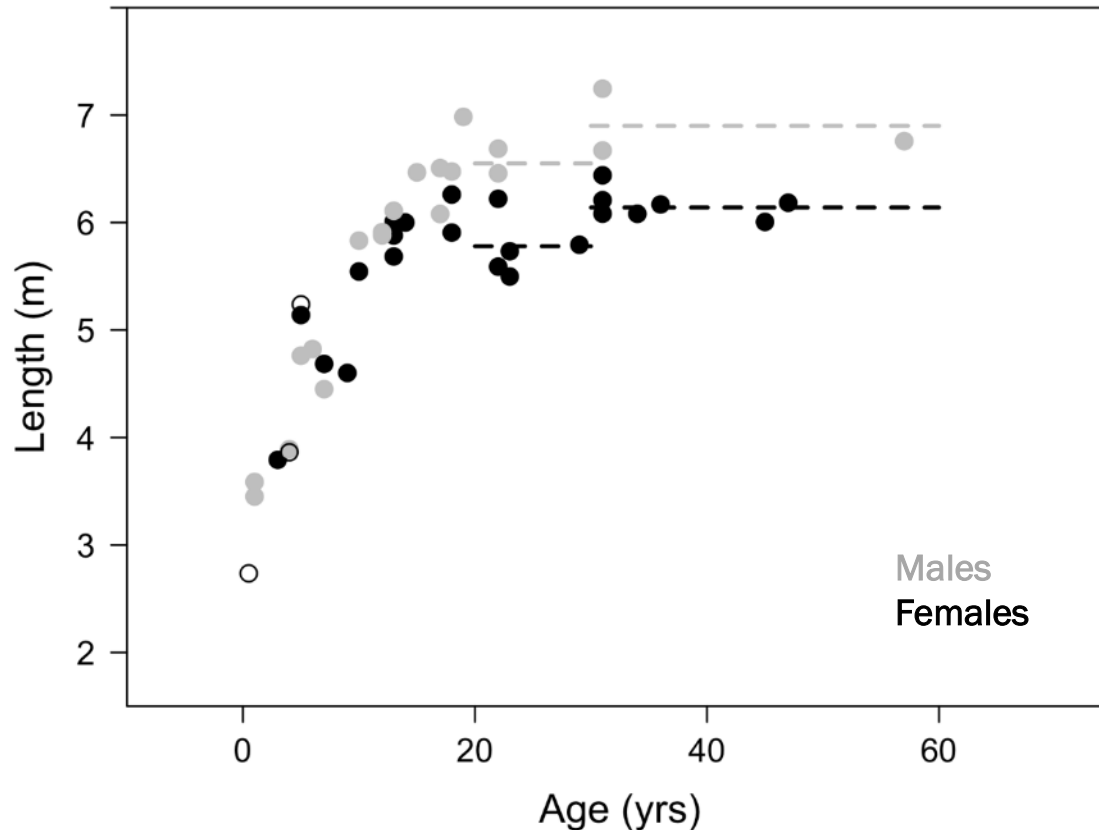
1 Week

Time Prior to death

Fearnbach et al. 2018. Endangered Species Research

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Growing to smaller sizes

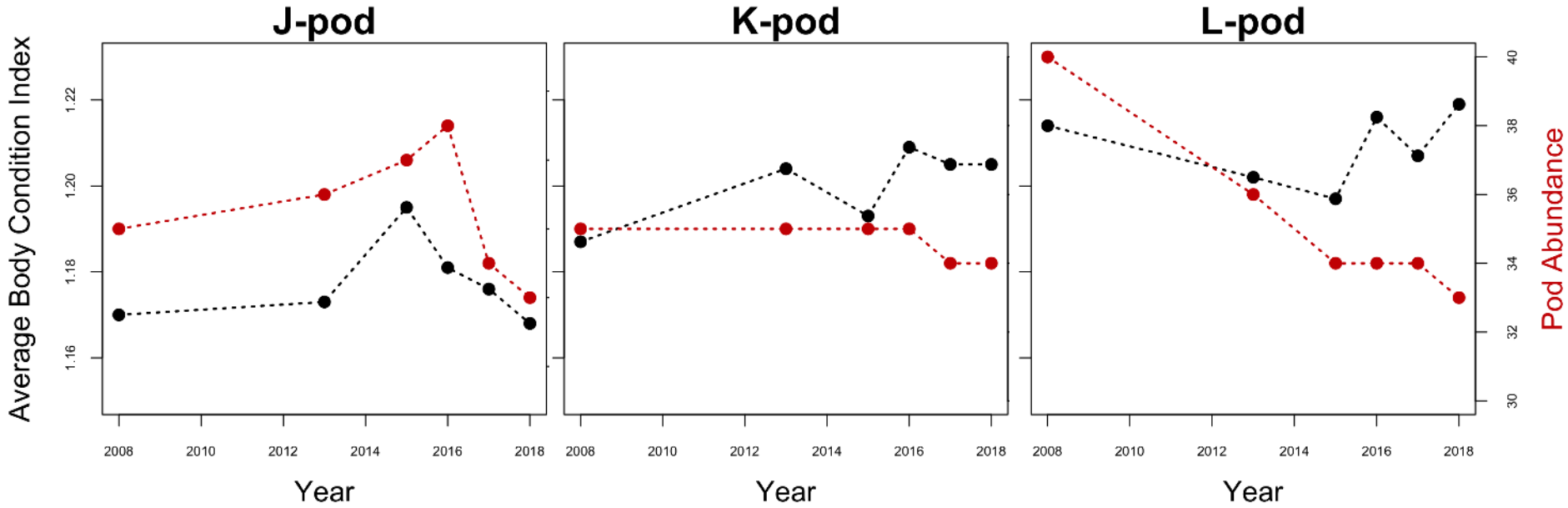


- Adults <30 yrs in 2008 were typically smaller than older adults
- Smaller adults grew in 1990s with lower Chinook abundance

Fearnbach et al. 2011. Endangered Species Research

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Mortalities linked to condition

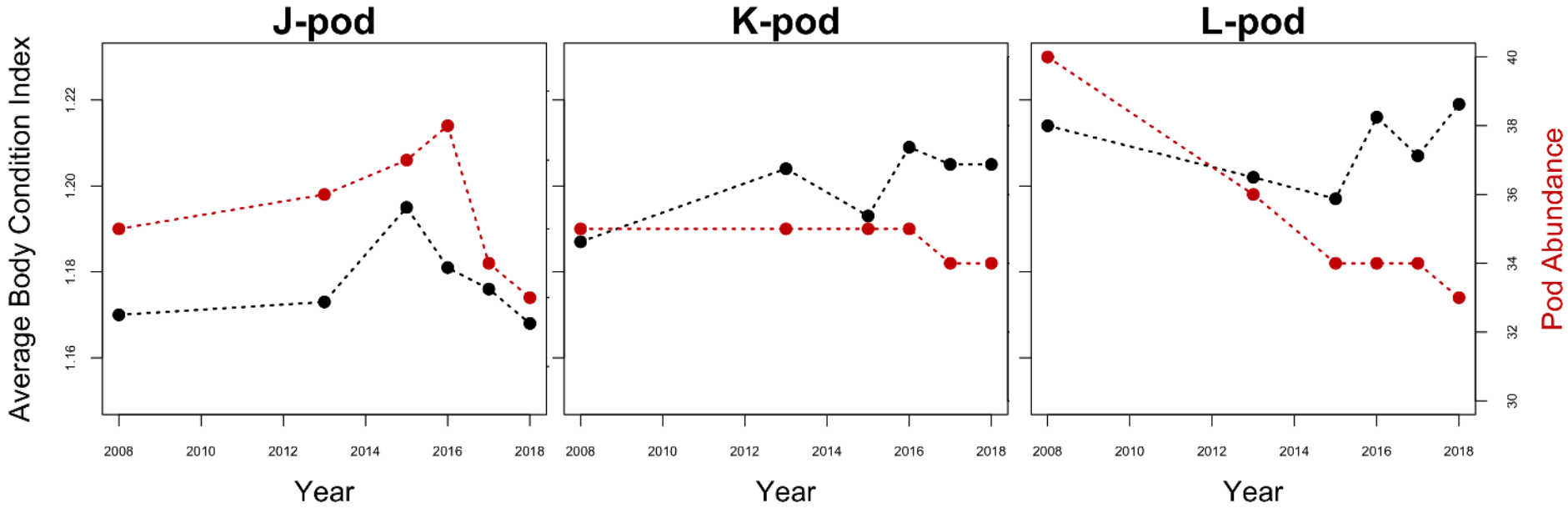


Southern Resident KW Necropsies (1999-2016)

Field ID	Pod	Animal ID	Mother	Father	Year	Month	day	Sex	Ecotype	Age (years)	Age Class	Body Length (cm)	COD	Notes	Location Found
L51	L	L51	L3?		1999	September		F	SRKW		~26adult		Reproductive issue?	Prolapsed uterus? Retained placenta?	Race Rocks, Canada
J18	J	J18	J10		2000	March		M	SRKW		23adult		Infection - systemic	Septicemia, pneimonisa	Tsawassen, Canada
L60	L	L60	L26?	Unsampled M2	2002	April		16F	SRKW		~30adult	606	Trauma	Milk also present in mammary glands	Long Beach, WA
L98	L	L98	L67	Unsampled M3	2006	March		10M	SRKW		6.5sub-adult		Trauma	Alone for extended period of time. Had been associating with boats and people. Death by tugboat prop in Nootka Sound, Vancouver Island.	Nootka Sound, Vancouver Island, BC
SJ00035	J	20080726	J11	L57	2008	July		26M	SRKW		0fetus	152.4	Abortion/Premature/Stillborn	Post-mortem condition was very poor. Sex was determined through genetic analysis. J11 (the mother) went missing in July 2008 as well.	Open Bay, Henry Island, WA
PSU 12-02-11 (L112)	L	L112	L86	L41	2012	February		11F	SRKW		3sub-adult	375	Trauma	Trauma from unknown origin	Long Beach, WA
MBH0107130o	J	20130107	J28	L41	2013	January		7M	SRKW	<3 days estimated	neonate	236	Perinatal/neonatal death		Dungeness Spit, WA
J32	J	J32	J20	J1	2014	December		6F	SRKW		18adult	562	Other - reproductive	Fetus died in utero and was not expelled. Led to systemic infection.	Bates Beach, BC
J32 fetus	J	J32 fetus	J32	L85	2014	December		6F	SRKW		0fetus	220	In utero death	Fetus intact in uterus of deceased female J32	Bates Beach, BC
2016-1664 (field ID 16-0079) ?		20160323	UNK	K26	2016	March		23F	SRKW	< 2 weeks estimated	neonate	218	Trauma (?)	Notes on gross necropsy stated that hematoma was superficial and there were no broken bones	Floating off Otter Point in Sooke, BC
16-0092 (L95)	L	L95	L43	L41	2016	April		1M	SRKW		20adult	664.21	Infection - systemic	Tagged	Floating off Esperanza Inlet, BC, Nootka Island
16-6517 (J34)	J	J34	J22	L41	2016	December		21M	SRKW		18adult	673	Trauma	Trauma likely from ship impact	Trial Island, BC

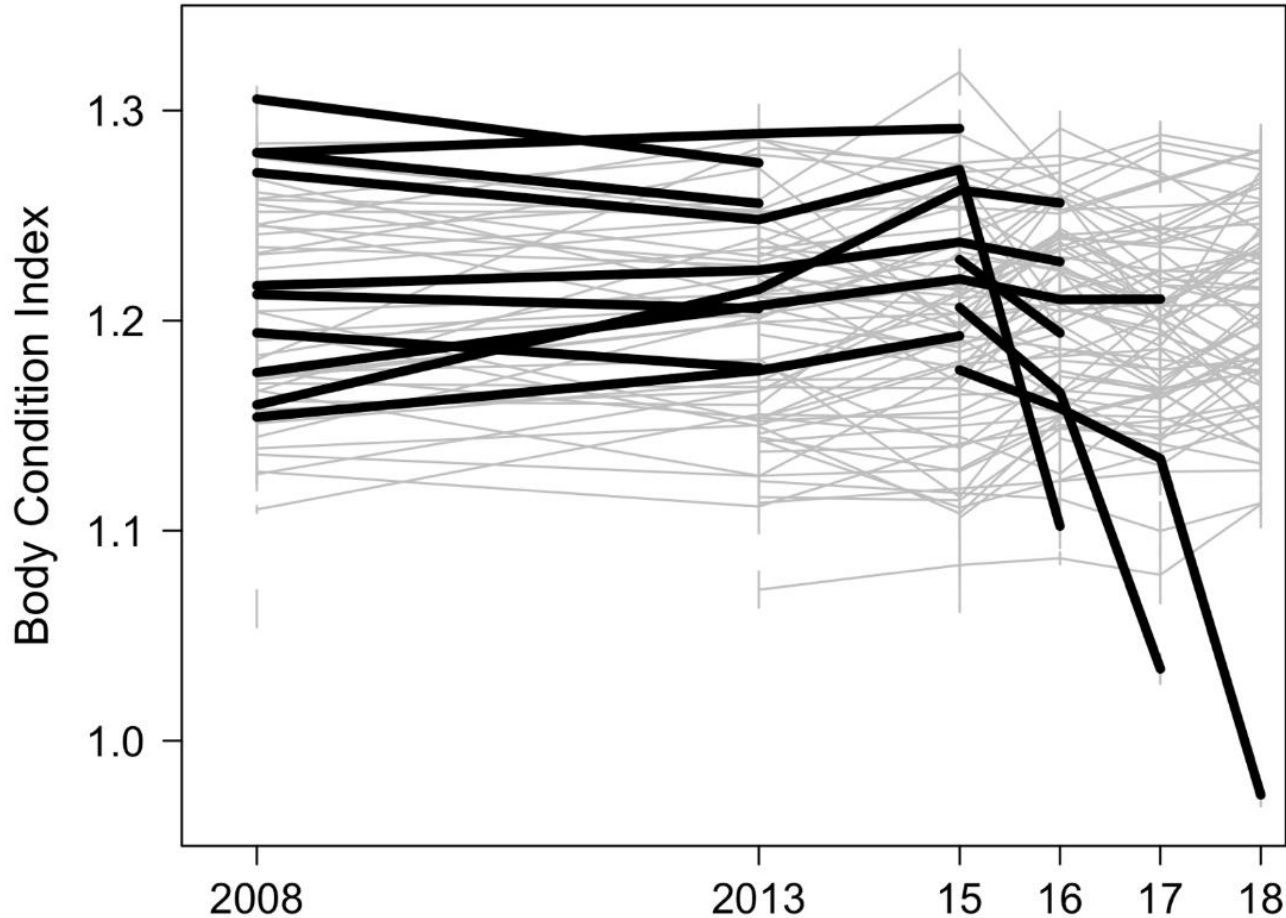
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Mortalities linked to condition



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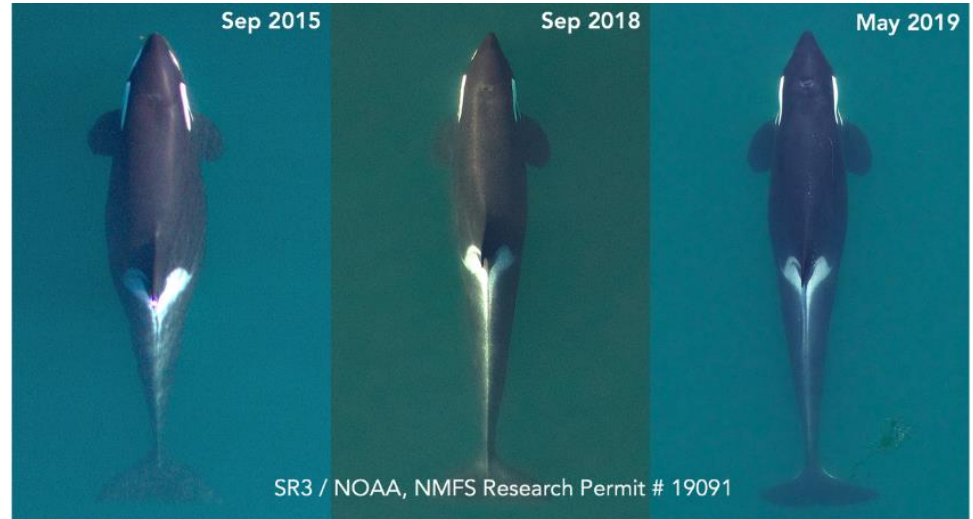
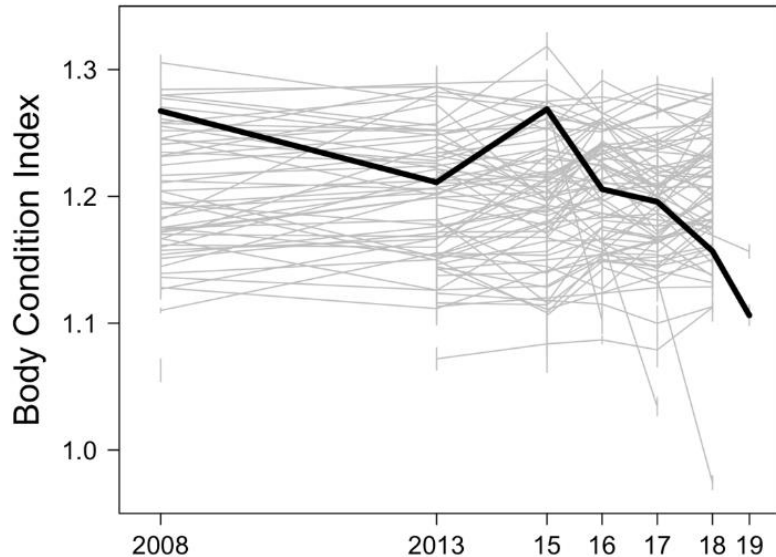
Recent deaths



- 9/15 most recent deaths declined in condition before death
- all 6 since 2015 are J-pod

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An early warning system (e.g. J17)



J17 of current concern
Declining condition since 2015
Rate of decline increasing

