Balancing survey workload and assessment needs

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NOAA FISHERIES
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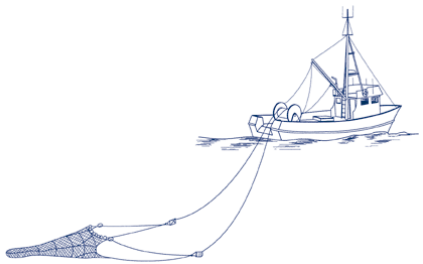
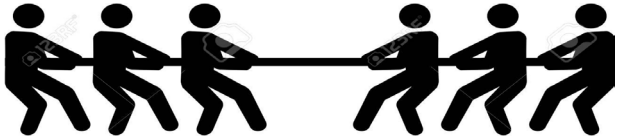
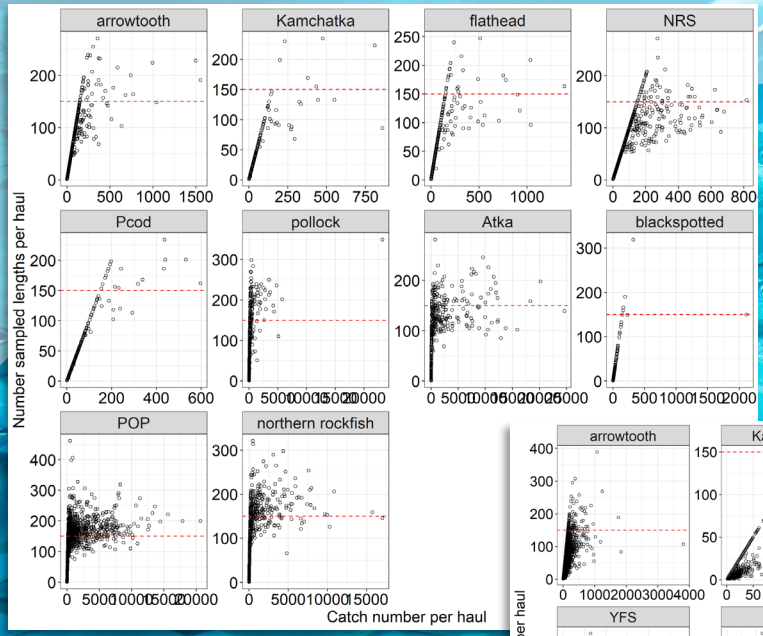
Background

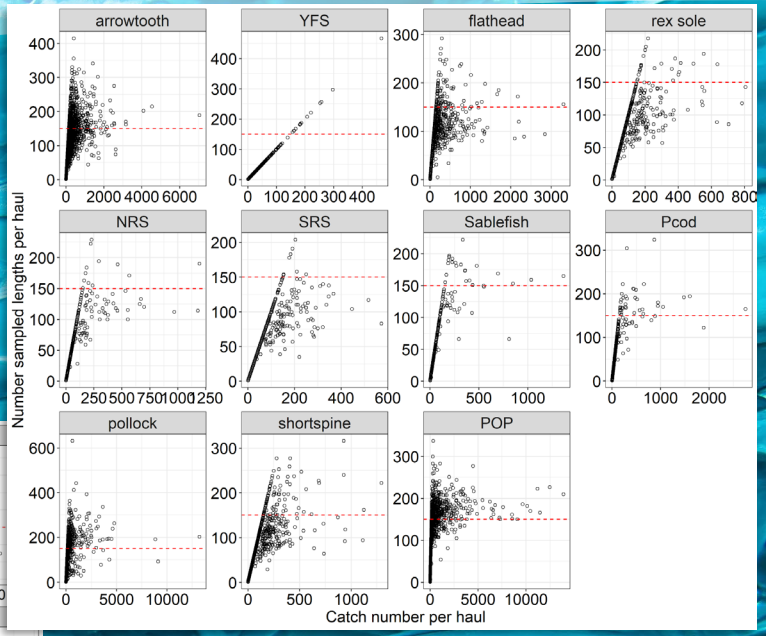
- **December 2021 SWO Working Group begins**

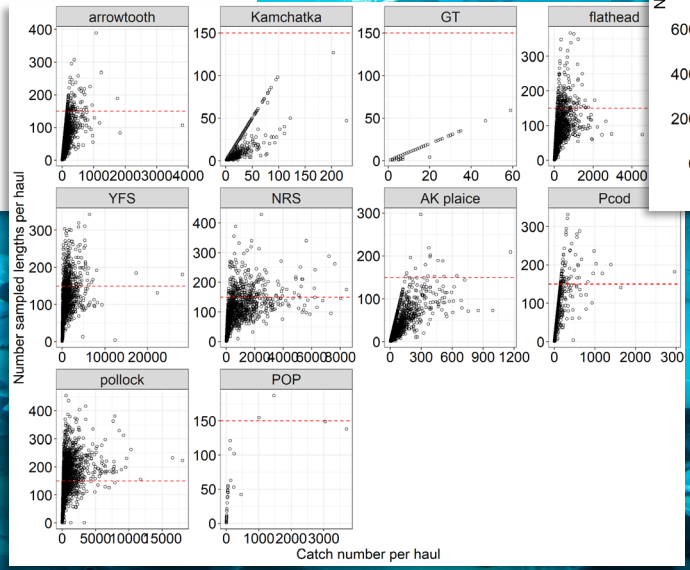
Can a balance be found between reducing sex-specific length frequency sampling load to improve workforce health with consequences to the uncertainty in data subsequently used in stock assessment models



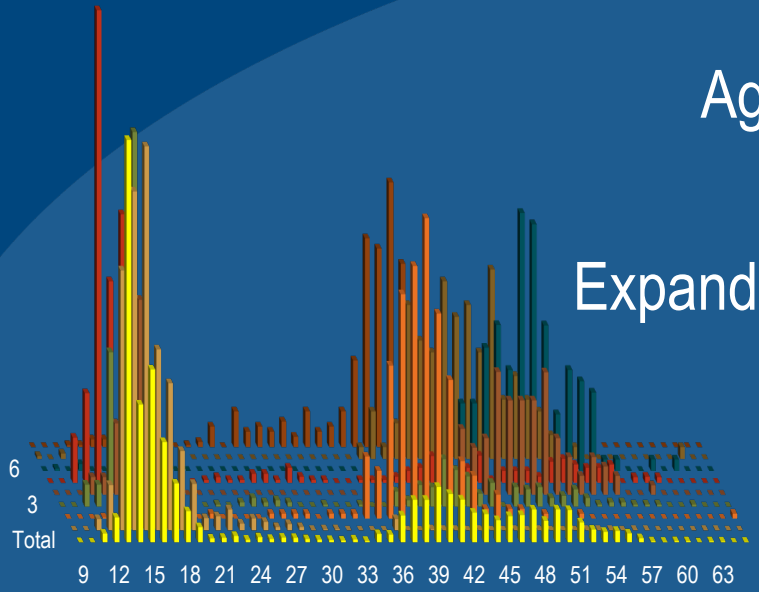



arrowtooth
Kamchatka
flathead
NRS
Pcod
pollock
Atka
blackspotted
POP
northern rockfish
Number sampled lengths per haul
Catch number per haul


arrowtooth
YFS
flathead
rex sole
NRS
SRS
Sablefish
Pcod
pollock
shortspine
POP
Number sampled lengths per haul
Catch number per haul


arrowtooth
Kamchatka
GT
flathead
YFS
NRS
AK plaice
Pcod
pollock
POP
Number sampled lengths per haul
Catch number per haul

How?



Age/length composition data uncertainty primer:

Expand from haul level scale up to assessment scale

‘Realized sample size’ < ‘Actual sample size’

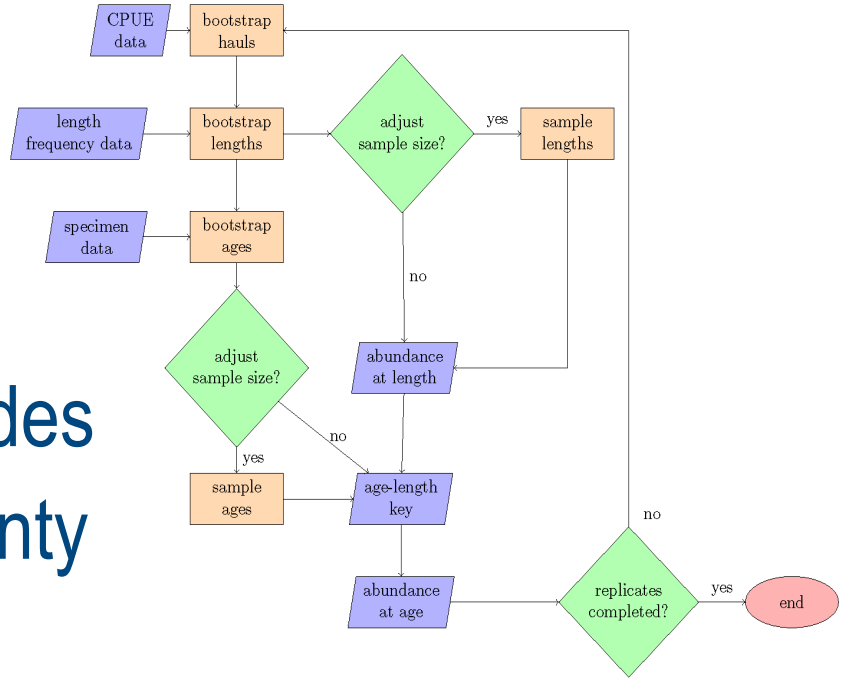
Related to how we weight comp data (‘Realized’ → ‘Input’)

Approach

- What could have been?

- Bootstrap resampling provides basis to determine uncertainty

- Reduce sample size within bootstrap helps quantify change as consequence of sampling intensity

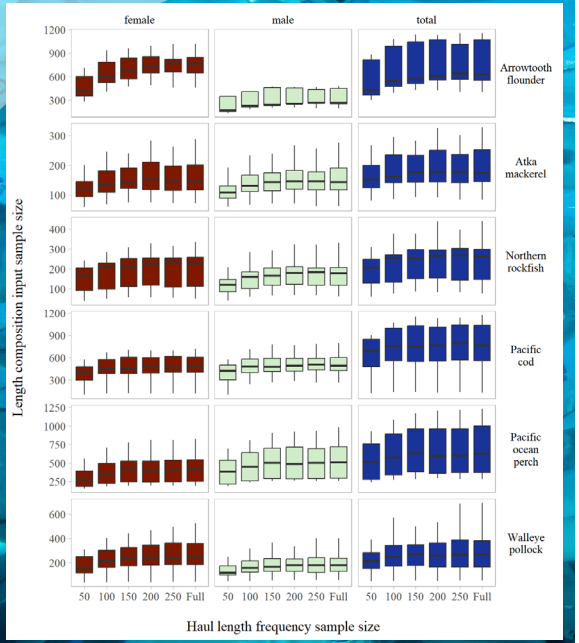


Application

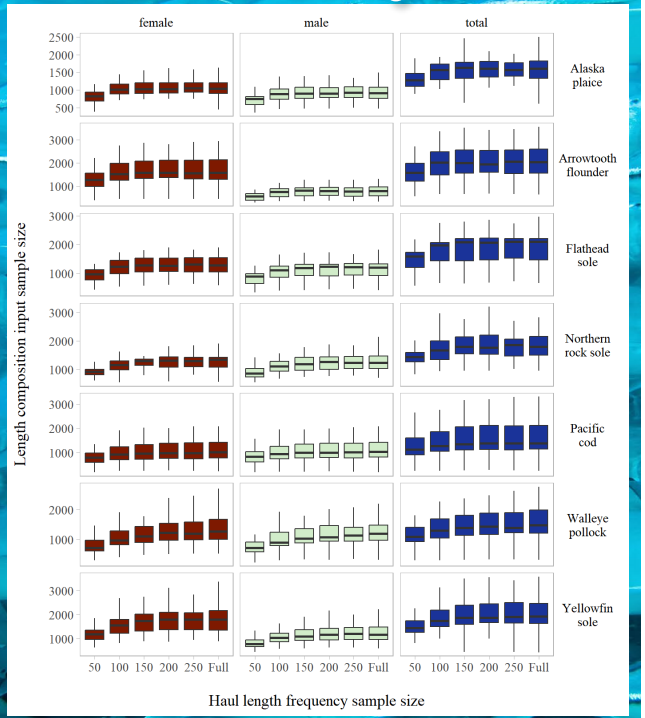
Stock	Scientific name	AI	EBS	GOA
Alaska plaice (f)	*Pleuronectes quadrituberculatus*	–	10,486	–
arrowtooth flounder (f)	*Atheresthes stomias*	9,868	14,928	36,842
Atka mackerel (o)	*Pleurogrammus monopterygius*	7,888	–	–
flathead sole (f)	*Hippoglossoides elassodon*	4,602	22,356	15,233
northern rock sole (f)	*Lepidopsetta polyxystra*	10,754	24,698	3,685
northern rockfish (r)	*Sebastes polyspinis*	14,928	–	2,298
Pacific cod (g)	*Gadus macrocephalus*	5,723	11,477	3,452
Pacific ocean perch (r)	*Sebastes alutus*	32,491	–	23,319
rex sole (f)	*Glyptocephalus*	–	–	12,878
southern rock sole (f)	*Lepidopsetta billineta*	–	–	7,190
walleye pollock (g)	*Gadus chalcogrammus*	10,806	49,544	16,772
yellowfin sole (f)	*Limanda aspera*	–	28,108	–

Results

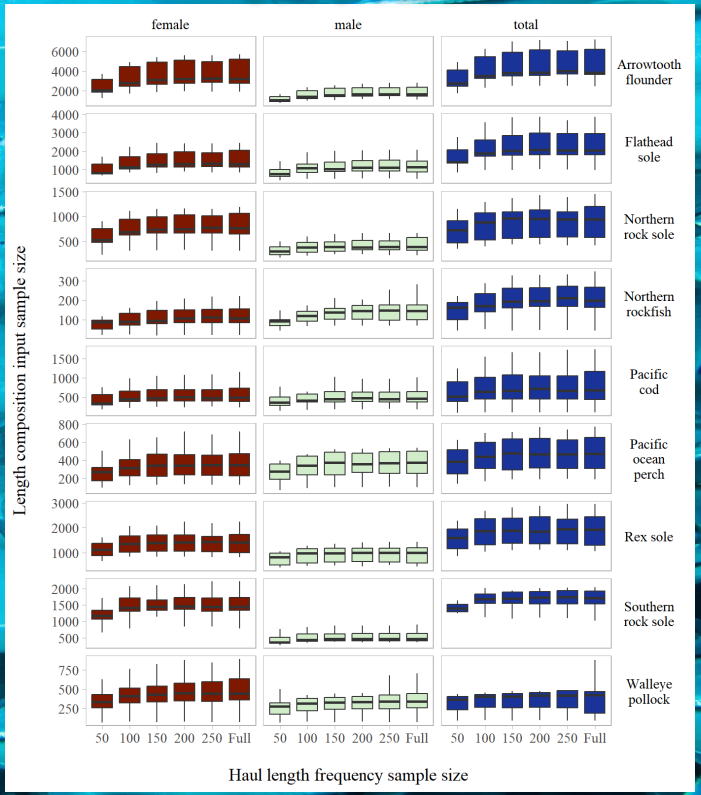
Aleutian Islands



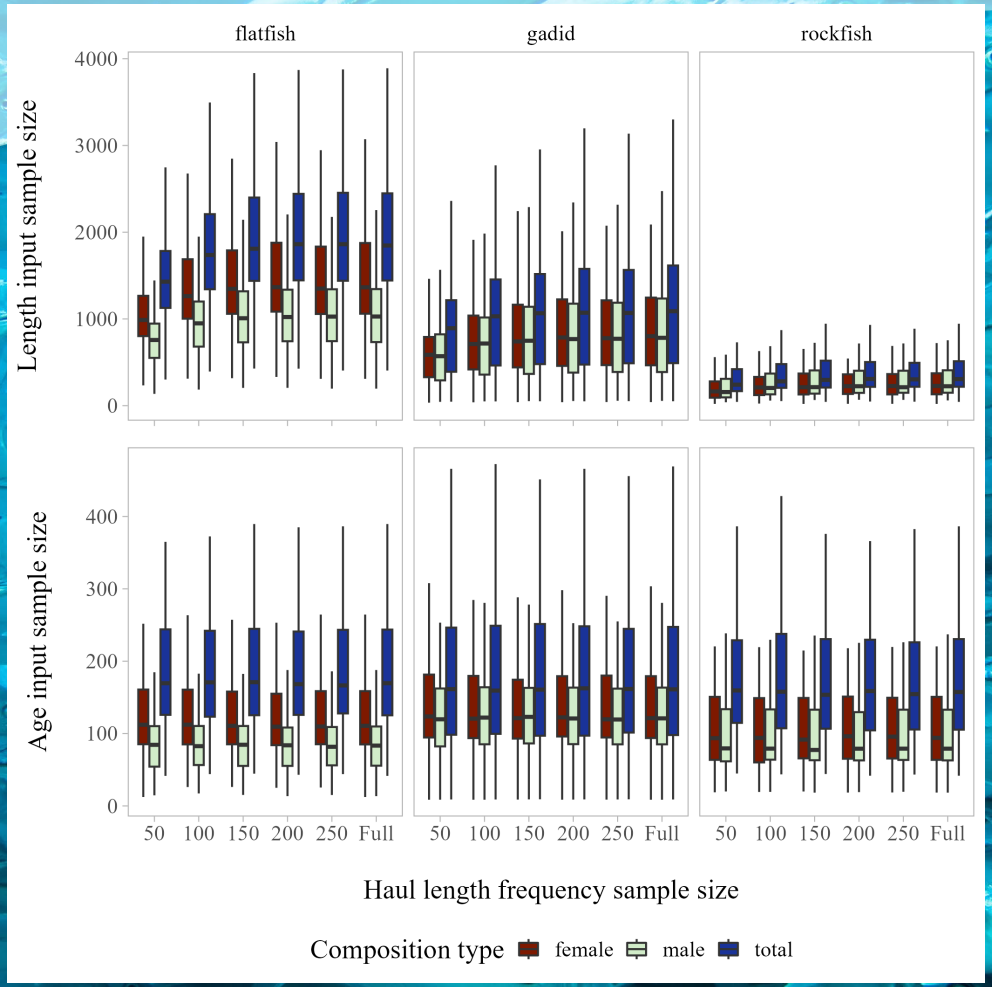
Eastern Bering Sea



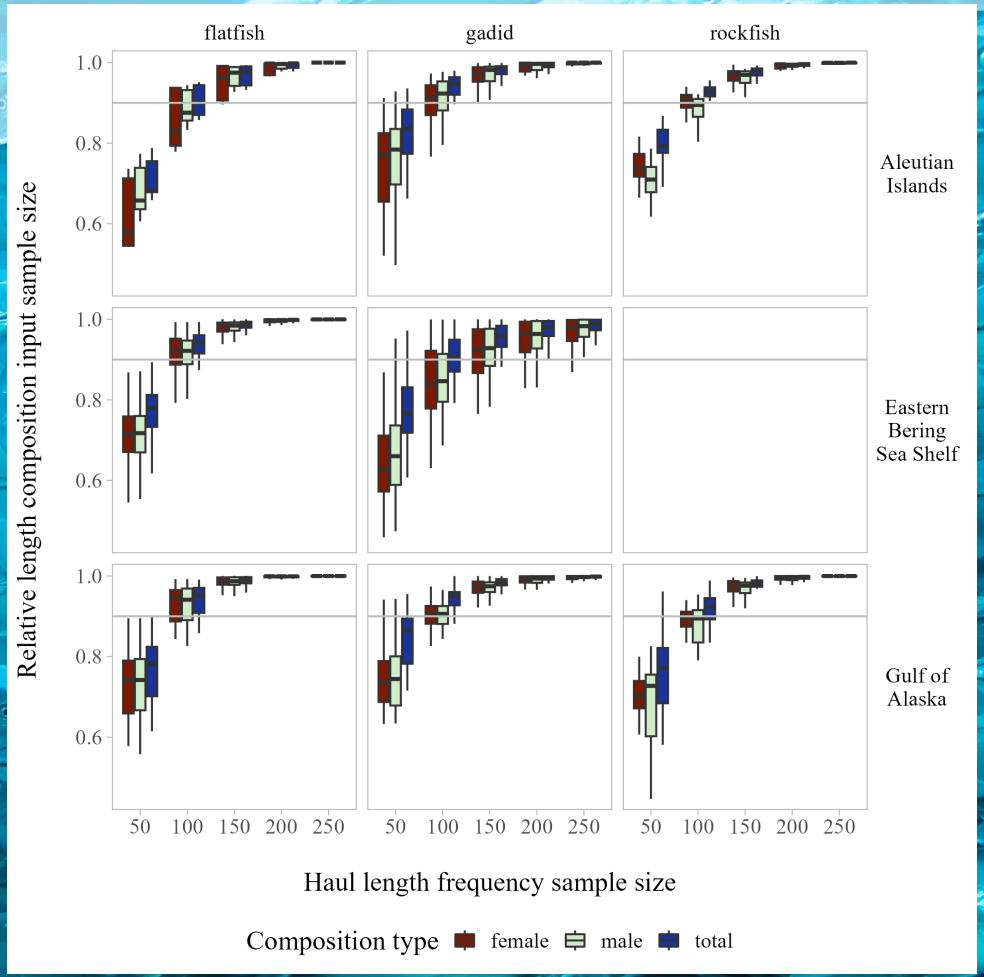
Gulf of Alaska



Results


flatfish
gadid
rockfish
Length input sample size
4000
3000
2000
1000
0
Age input sample size
400
300
200
100
0
50
100
150
200
250
Full
Haul length frequency sample size
Composition type
female
male
total

Results


flatfish
gadid
rockfish
Aleutian Islands
Eastern Bering Sea Shelf
Gulf of Alaska
Relative length composition input sample size
1.0
0.8
0.6
50
100
150
200
250
Haul length frequency sample size
Composition type
female
male
total

Stock	AI	EBS	GOA
Alaska plaice	–	200 - 700	–
arrowtooth flounder	400 - 1,200	600 - 2,000	2,900 - 8,300
Atka mackerel	400 - 1,700	–	–
flathead sole	200 - 600	1,000 - 3,500	500 - 2,200
northern rock sole	–	1,400 - 4,400	100 - 400
northern rockfish	1,600 - 4,800	–	100 - 500
Pacific cod	100 - 500	200 - 800	100 - 200
Pacific ocean perch	4,300 - 12,000	–	2,200 - 7,300
rex sole	–	–	100 - 800
southern rock sole	–	–	100 - 400
walleye pollock	100 - 2,500	5,300 - 14,500	2,600 - 4,700
yellowfin sole	–	2,000 - 6,300	–
Total	**7,000 - 23,000**	**11,000 - 32,000**	**9,000 - 25,000**

Take homes

- As you decrease sampling, uncertainty increases
- Reached asymptote in length ISS
- Only 10% decrease in ISS for haul sampling levels of 100-150 (~30% for 50 per haul)
- Translates to 10s of thousands of less samples that would need to be obtained in any given survey

What happened?

- SWO working group met with assessment authors in late-spring 2021
- Agreement was reached to reduce sampling of sex-specific length frequency to 150 per haul
- Implemented in 2021 surveys, will be ‘rule’ going forward

Many thanks

- SWO working group members and Stan Kotwicki

- All you survey and lab folks making assessment possible