0:0:0.0 --> 0:0:1.210  
Aaron Berger  
Main features of today.

0:0:4.50 --> 0:0:13.460  
Aaron Berger  
So, yeah, welcome everybody. Happy New Year to this. The 4th and final webinar in the spatial simulation Experiment Webinar series.

0:0:14.660 --> 0:0:16.190  
Aaron Berger  
However, there is still.

0:0:17.60 --> 0:0:37.590  
Aaron Berger  
Plenty of fun and interesting things ahead. Up next is the early the 5th to the 7th of March Workshop in Wellington, New Zealand. So just a reminder to please register for the March workshop. That's whether you're planning to attend in person or remotely.

0:0:38.390 --> 0:0:42.870  
Aaron Berger  
Umm, just as an overview, the agenda at the workshop will include.

0:0:43.660 --> 0:0:47.750  
Aaron Berger  
Things like updates and developments by the simulation experiment teams themselves.

0:0:49.520 --> 0:0:53.550  
Aaron Berger  
Uh, some discussion on the aggregate simulation results across teams to date.

0:0:54.810 --> 0:1:21.820  
Aaron Berger  
So a small group discussions on key topics and then several kind of discussion topics including things like data analysis and aggregation, identifying appropriate or adequate model structures, developing and refining best practices for spatial stock assessments, overcoming limitations, some of which we've encountered. And then this simulation experiment itself and also future directions and opportunities, so.

0:1:22.690 --> 0:1:28.500  
Aaron Berger  
Quite a a list of things that we're going to cover over the three day period. So we're really looking forward to that.

0:1:30.360 --> 0:1:55.450  
Aaron Berger  
Up today we have we had to had planned two teams, the spatial temporal team and the spasm team. The spatial temporal team did have some personal events that arose that has resulted in them postponing their updates presentation until the March workshop itself. So we will look forward to hearing from them at that time.

0:1:57.30 --> 0:2:4.310  
Aaron Berger  
So today we have the spasm team, which is going to start us off and we'll hear from them first.

0:2:5.290 --> 0:2:9.840  
Aaron Berger  
And have some question answers. Then follow that with a 30 minute open discussion.

0:2:11.0 --> 0:2:18.950  
Aaron Berger  
Time as we have in the past webinars, so in ways of introductions today we have with this.

0:2:19.30 --> 0:2:24.820  
Aaron Berger  
Umm, representing the spasm, teen John Deroba and Brian Langseth.

0:2:25.660 --> 0:2:32.30  
Aaron Berger  
They're gonna be splitting duties with presentations. I think we're going to hear from John 1st and then a little bit later hear from Brian.

0:2:33.90 --> 0:2:35.780  
Aaron Berger  
So John has been a NOAA fisheries.

0:2:36.180 --> 0:3:6.270  
Aaron Berger  
Umm, there has been at NOAA fisheries in Woods Hole, Massachusetts since 2009. He is the lead analyst for several stock assessments as well as the Regions Co lead on management strategy evaluation development. John also tries to stay busy by pursuing broad research and review activities and outside of work he likes to Fish, Hunt, hike and chases through your old daughter around. Brian has been with no off fisheries since 2014.

0:3:6.670 --> 0:3:11.430  
Aaron Berger  
And join the Northwest Fisheries Science Center in Seattle in 2020.

0:3:12.380 --> 0:3:16.750  
Aaron Berger  
He leads stock assessments and United States West Coast groundfish.

0:3:17.380 --> 0:3:31.150  
Aaron Berger  
But has experienced assessing other demersal and pelagic species in the Pacific Ocean. He has a background in fuel, food, web modeling, though focus is now on data analysis and assessment methodologies for single species.

0:3:32.30 --> 0:3:48.600  
Aaron Berger  
Outside of work, he enjoys playing board games with his family and hiking and camping in the mountains. So that's our two presenters today. And so I'm gonna just go right ahead and pass it to you, John. You can share your screen whenever you're ready and begin.

0:3:49.570 --> 0:3:50.210  
Aaron Berger  
At your leisure.

0:3:51.860 --> 0:3:52.850  
Jon Deroba  
Alright, thank you.

0:3:56.730 --> 0:3:57.550  
Jon Deroba  
One moment.

0:4:1.830 --> 0:4:4.310  
Jon Deroba  
Aaron, can you confirm you're seeing the slideshow?

0:4:5.290 --> 0:4:7.120  
Aaron Berger  
Yeah, I see full screen, it looks great.

0:4:7.870 --> 0:4:8.940  
Jon Deroba  
Great. Thanks.

0:4:10.370 --> 0:4:21.270  
Jon Deroba  
So this spasm experience I I think I can speak for Brian on this. I wanna thank the groups that went ahead of us. I think both of us garnered a great deal of benefit from hearing about our.

0:4:21.970 --> 0:4:25.530  
Jon Deroba  
Shared experiences, so thanks for letting us go last.

0:4:29.470 --> 0:4:45.680  
Jon Deroba  
First a bit about spasm, which the acronym came first and I think the words came second standing for spatial processes and stock assessment methods. It was developed around 2016 as a generic simulation estimation tool and not really a.

0:4:47.360 --> 0:4:50.790  
Jon Deroba  
A model we intended to be applied to to stock assessments.

0:4:51.930 --> 0:5:2.210  
Jon Deroba  
Yeah, here we are. If if you call this a real stock assessment yet it is capable of a broad range of operating model and estimation model structures including those listed there in the second bullet.

0:5:2.900 --> 0:5:9.710  
Jon Deroba  
It is strictly age based. It assumes an annual time step and instantaneous Markovian movement among areas.

0:5:10.720 --> 0:5:32.90  
Jon Deroba  
The estimation model can fit to tagging data mostly to inform movement, at least as it's coded right now and the usual suite of inputs written in a DMB. But we hope to make the move to TMB and A selfless ad here. We are actively seeking a post doc and we are attempting to hire one through the.

0:5:33.330 --> 0:5:35.440  
Jon Deroba  
The National Research Council in the US.

0:5:36.400 --> 0:5:39.10  
Jon Deroba  
So if there's any post docs out there, let them know.

0:5:39.990 --> 0:5:51.600  
Jon Deroba  
Uh spasm has never been used for an actual stock assessment, never been used to provide catch advice and has a relatively small group of of users, most of whom are on this call at the moment.

0:5:55.170 --> 0:5:58.490  
Jon Deroba  
That said, spasm has been used for a broad range of research projects.

0:5:59.850 --> 0:6:6.640  
Jon Deroba  
Somewhere in the neighborhood of 6 publications resulting from the Spasm modeling framework, including some evaluations on.

0:6:7.370 --> 0:6:13.70  
Jon Deroba  
The impacts of population structure on reference points how to spatially allocate quotas?

0:6:14.150 --> 0:6:22.740  
Jon Deroba  
They're in the the second major bullet. How do you misdiagnose movement and population structure and what is the consequence of that?

0:6:24.170 --> 0:6:27.450  
Jon Deroba  
Best models for tagging data and tagging design.

0:6:29.70 --> 0:6:30.950  
Jon Deroba  
And then looking at how best to.

0:6:32.80 --> 0:7:0.790  
Jon Deroba  
Model movement, for example, do you need annual movement or can you do some blocking by age of year? Those sorts of questions and then at the very bottom I I think our most recent publication or or nearly So what happens when you draw your your assessment and management boundaries incorrectly and misaligned with the biological boundaries. So despite being a fairly new spatial assessment platform it it has been utilized pretty heavily in the research area.

0:7:3.320 --> 0:7:12.320  
Jon Deroba  
Getting into our application of spasm to the yellowfin tuna data here and the yellowfin tuna data is as far as we got.

0:7:12.390 --> 0:7:12.700  
Jon Deroba  
Ohh.

0:7:14.700 --> 0:7:32.920  
Jon Deroba  
First, we quickly learned that even though we thought we wrote a very generic and general spatially explicit stock assessment model, we quickly learned that was not true. And so there's a list there of things we had to troubleshoot, features we had to add and things we had to do.

0:7:33.720 --> 0:7:47.720  
Jon Deroba  
To apply the spasm model to something that wasn't a a data set generated by itself, this became a a huge time suck and at least half of the time, if not more, was spent on the.

0:7:48.690 --> 0:7:59.900  
Jon Deroba  
Developing new features, correcting some errors and things like that, so it did not leave a ton of time for extensive data exploration or alternative model explorations. But I will cover what we did.

0:8:3.310 --> 0:8:14.660  
Jon Deroba  
Since this was our first foray for spasm into applying the spasm estimation component to data that was not generated by the spasm platform itself, so.

0:8:15.340 --> 0:8:17.720  
Jon Deroba  
Uh, across test, if you will.

0:8:18.630 --> 0:8:21.540  
Jon Deroba  
Uh, Brian and I just started decided to start very simple.

0:8:22.680 --> 0:8:52.910  
Jon Deroba  
With a single area UH-7 fleets as they were defined for us, we did not use the tagging data. Then in this single area setup, spasm does not have the ability. At least I don't think to use tagging data to do something like estimate natural mortality or anything like that. It's it's the tagging data can inform movement and then A1 area model. Clearly that's not necessary. We did no explicit accounting of spatial of spatial structure at all. We had 256 sudo years.

0:8:52.990 --> 0:8:55.340  
Jon Deroba  
At least to start in the 28th pseudo ages.

0:8:56.370 --> 0:9:13.900  
Jon Deroba  
We calculated the age, composition data of the fishery and the survey using an age length key that was provided to us and all the life history traits and and natural mortality rates and things like that were specified at the true values that were provided to us. So our our single area model is is.

0:9:14.950 --> 0:9:20.720  
Jon Deroba  
Very much so. Sort of a classic Fournier, Archibald, statistical catch at age model approach.

0:9:23.500 --> 0:9:29.890  
Jon Deroba  
Long line selectivity was logistic and all the others were double logistic which was our attempt at approximating the.

0:9:31.230 --> 0:9:39.730  
Jon Deroba  
The double normal spasm only has logistic and double logistic selectivity features available and we never got around to coding the more complicated.

0:9:41.530 --> 0:9:43.270  
Jon Deroba  
Selectivity parameterizations.

0:9:44.80 --> 0:9:48.820  
Jon Deroba  
There was a single catchability for the long line CPUE with a selectivity that mirrored the fleet.

0:9:50.80 --> 0:9:58.0  
Jon Deroba  
Recruitment deviations were estimated as a penalty from an underlying beverage and Holt with the standard deviation and steepness fixed at the true values.

0:9:59.680 --> 0:10:18.830  
Jon Deroba  
A fully selected fishing mortality rate parameter estimated for each fleet and pseudo year abundance at age estimated in the first pseudo year, except for recruitment which was set equal to the unfinished recruitment value which was estimated and ballpark that equals a 1266 parameters.

0:10:19.670 --> 0:10:23.40  
Jon Deroba  
At least to start, the standard errors of the fishery catches.

0:10:23.780 --> 0:10:37.320  
Jon Deroba  
And the survey CPUE were set to their true values, as were the effective sample sizes set equal to five for all fleets and pseudo years. Again, at least to start where wherever you see the words at least to start.

0:10:38.930 --> 0:10:41.550  
Jon Deroba  
We're going to come back around and revisit some of these decisions.

0:10:45.430 --> 0:10:47.240  
Jon Deroba  
We immediately hit brick walls.

0:10:49.10 --> 0:10:56.230  
Jon Deroba  
With this many parameters and our first learning experience for applying spasm to a data set like this.

0:10:57.60 --> 0:11:26.980  
Jon Deroba  
The first challenge was long run times. I would say they were prohibitive. We even turned off estimation of a Hessian matrix and depending on what parameters we were estimating and how we organize phases and things, runtimes were anywhere from 3 1/2 hours to 20 hours and no matter what fit we looked at gradients and fits to data. We're absolutely horrible, so we ran in circles. I remember I think it was the Gadget team said that they were banging their head against the wall. I think we ran in circles.

0:11:27.890 --> 0:11:30.680  
Jon Deroba  
Uh, so various metaphors for the challenges we're all facing.

0:11:32.530 --> 0:11:43.640  
Jon Deroba  
But we persevered and kept playing with phases, starting values. We tried various likelihood penalties aimed at improving speed and stability. We had very limited success with any of those.

0:11:44.680 --> 0:11:51.420  
Jon Deroba  
Ultimately, just to reduce runtimes and see if we could get closer to a more, I don't know. Digestible model.

0:11:52.350 --> 0:11:56.710  
Jon Deroba  
We decided to delete the 1st 105 pseudo years because most fleets had very.

0:11:57.580 --> 0:12:13.20  
Jon Deroba  
Minimal, if not 0 catches, and we found that was creating very odd F and selectivity parameter estimates in those years and so to help speed up runtime and maybe try to alleviate some of the estimation problems we are having, we deleted the 1st 105 pseudo years.

0:12:13.700 --> 0:12:27.390  
Jon Deroba  
We also collapsed from 7 fleets to four by combining the the per Seine troll and the other fleet, and the gillnet fleet with the hand line fleet, and that was based on similar selectivity.

0:12:28.70 --> 0:12:30.460  
Jon Deroba  
Shapes estimated for each of those fleets. So.

0:12:32.0 --> 0:12:37.390  
Jon Deroba  
The the black anything in black we we decided rather objectively.

0:12:39.910 --> 0:12:47.900  
Jon Deroba  
Uh, subjectively, I'm sorry. Anything in black we deemed was similar enough of a selectivity pattern to be reduced to a single fleet. Anything in orange?

0:12:48.540 --> 0:12:56.810  
Jon Deroba  
We reduced to a single fleet and then the the blue and the Gray remained on their own. So the blue would be the bait and the Gray the long line, which is the index.

0:12:57.530 --> 0:13:1.930  
Jon Deroba  
And so we combined some fleets to remove from 7 fleets to four.

0:13:3.730 --> 0:13:11.830  
Jon Deroba  
This did help with runtimes, so deleting the 105 years and reducing the fleet certainly help with runtime. Scott goes down to about an hour.

0:13:12.620 --> 0:13:21.810  
Jon Deroba  
Which allowed us to do a lot more quick and dirty fit explorations. Even so, we had pretty four fits to the index. You can see some.

0:13:23.550 --> 0:13:28.160  
Jon Deroba  
Some temporal patterns on the the survey fit residuals, which is the right hand panel here.

0:13:28.850 --> 0:13:34.700  
Jon Deroba  
And then from about pseudo year, what we're calling pseudo year 50, most of the residuals are positive.

0:13:35.770 --> 0:13:38.800  
Jon Deroba  
We also had some very odd F and selectivity parameters.

0:13:40.120 --> 0:13:46.50  
Jon Deroba  
We felt we were also overfitting. The fishery catches so on the left are the catch residuals.

0:13:47.670 --> 0:13:56.720  
Jon Deroba  
And this is on the scale of of metric tons. This is a true difference in catches on this plot. And so we're fitting the catches nearly perfectly.

0:13:58.310 --> 0:14:7.70  
Jon Deroba  
Here's an example of what we're calling odd selectivity estimates, so you can see fleet three and fleet four completely unreasonable.

0:14:9.170 --> 0:14:27.580  
Jon Deroba  
This is the fit to the aggregate age comps, so the the age composition aggregated across all years for each fleet. And I apologize for the labeling here. The fleets are labeled 1234. This was a spasm specific challenge where we weren't easily set up to carry forward fleet labeling.

0:14:29.400 --> 0:14:33.80  
Jon Deroba  
So you're just gonna have to believe me and hope that I'm correct when I describe a sleep.

0:14:34.220 --> 0:14:41.130  
Jon Deroba  
But anyway, for the for the purposes of today, it doesn't really matter. You can see we're not fitting. The page comes very well.

0:14:43.870 --> 0:15:0.960  
Jon Deroba  
So our next move was to start playing with data weighting. We wondered what would happen if we didn't fit the the catches so tightly. So we increased the standard errors of the catches from .1 to .2 for all fleets and years. And we saw some notable improvements so.

0:15:2.940 --> 0:15:13.540  
Jon Deroba  
Of note was an improved gradient which now got much closer to one and was well less than one. The fit improved and some of the selectivity and F oddities.

0:15:14.120 --> 0:15:22.230  
Jon Deroba  
Uh, we're resolving themselves, so fleet three now has something that's a bit more believable. Fleet four was still a little bit wonky.

0:15:23.680 --> 0:15:32.680  
Jon Deroba  
Uh here again. Is the the fit to the aggregate age compositions again you can see we still have some pretty horrific problems, but.

0:15:34.120 --> 0:15:44.150  
Jon Deroba  
I'll say. Sadly, sadly, we took this as good news because we were making improvements. We were fitting the data a bit better. We had runtimes that allowed us to keep chugging along.

0:15:45.530 --> 0:15:46.460  
Jon Deroba  
Uh, so again.

0:15:47.490 --> 0:15:51.600  
Jon Deroba  
Uh, we ran in circles even longer, playing with various data weightings.

0:15:52.60 --> 0:16:2.330  
Jon Deroba  
Uh, eventually, to try to force a fit to fleet four, which continued to give us headaches in terms of fitting that age comp and producing very odd selectivity per parameters.

0:16:4.360 --> 0:16:7.990  
Jon Deroba  
We increase the effective sample sizes for all the fleets from 5 to 15.

0:16:8.790 --> 0:16:16.110  
Jon Deroba  
Uh and fleet four, we increase the effective sample size to 25 to try to sort of force the issue.

0:16:17.270 --> 0:16:28.940  
Jon Deroba  
And here's the result in selectivity parameters you can see fleet four is maybe improve, maybe the other three fleets are doing OK, at least they have believable selectivity shapes. Fleet 4 remained a challenge.

0:16:30.450 --> 0:16:42.960  
Jon Deroba  
But again, improving baby steps. Here's the fit to the aggregate age comps. The fit to the fleet one age comps in the upper left is at least digestible Fleet 2, which is I believe the.

0:16:44.10 --> 0:17:2.850  
Jon Deroba  
The survey CPUE age composition isn't great, but I've seen worse fleet three making long strides there in in improvements to fitting those age compositions clearly still problems, but we're at least improving and fleet four against still pretty bad, but.

0:17:3.690 --> 0:17:7.280  
Jon Deroba  
We took some comfort in the fact that we were we were making improvements.

0:17:9.290 --> 0:17:24.500  
Jon Deroba  
A fit to the survey trend was still terrible, so we still we now have a pretty strong temporal trends in the fit to the CPUE index with negative residuals early and positive residuals late in the time series.

0:17:26.480 --> 0:17:38.910  
Jon Deroba  
Uh, unfortunately, we continue to run in circles and tried new fits and for a long time, what I describe as that garbage fit, which I think is appropriate was was the best we could do.

0:17:39.330 --> 0:17:45.610  
Jon Deroba  
Umm, so this presentation date was quickly arriving and so Brian and I decided, well, why don't we just?

0:17:46.280 --> 0:17:49.530  
Jon Deroba  
Take that data structure and fit it to the hundred data sets.

0:17:50.350 --> 0:17:54.930  
Jon Deroba  
And and see what happens. Let's let's just give it a go. So we have something to talk about.

0:17:55.800 --> 0:18:14.790  
Jon Deroba  
And we quickly found out that that fell on its face. At least half of the fits to the 100 datasets had terrible gradients. By terrible I mean 20,000, not 3 or even in the hundreds, you know, gradients in the thousands. And the fits were absolute trash, meaning they were completely nonsensical and useless.

0:18:16.90 --> 0:18:26.280  
Jon Deroba  
That led us to do a very quick and dirty jitter analysis where we just changed the starting values for some of the selectivity parameters and the model fit to the single data set.

0:18:27.210 --> 0:18:29.390  
Jon Deroba  
Arrived at a drastically different solution.

0:18:30.600 --> 0:18:36.330  
Jon Deroba  
And likelihood space, then the fit we had used in our application to the hundred data sets.

0:18:37.290 --> 0:18:44.170  
Jon Deroba  
Uh, so on a whim, and I I do mean a whim. We were kind of again, I I say we were running in circles and we were.

0:18:45.200 --> 0:18:53.360  
Jon Deroba  
We went back and we tried A7 fleet model again, but having learned that already that data weighting was gonna be something important to monitor.

0:18:54.640 --> 0:19:2.230  
Jon Deroba  
And we were gonna definitely have to continue to to do some jitter analysis to check for model stability before we went back to doing the hundred data sets.

0:19:3.210 --> 0:19:9.190  
Jon Deroba  
Lo and behold, when we did that, we got a a a really decent gradient.

0:19:10.230 --> 0:19:16.850  
Jon Deroba  
Ohh near 0 the model converged when the the Hessian was invertible. The fit took only an hour and a half.

0:19:17.840 --> 0:19:23.680  
Jon Deroba  
The fit to the data was much better and I'll go over that in a moment, I think and the jitter was stable.

0:19:24.710 --> 0:19:27.810  
Jon Deroba  
Here's the selectivity estimates for now the seven fleets.

0:19:29.180 --> 0:19:32.410  
Jon Deroba  
Fleets 4 and six and this will come back to haunt us.

0:19:33.750 --> 0:19:41.500  
Jon Deroba  
Please four and six were specified as double logistic and you can see here, though they're estimated is nearly flat top and we'll come back to that.

0:19:41.570 --> 0:19:41.830  
Jon Deroba  
Ohh.

0:19:43.130 --> 0:19:59.400  
Jon Deroba  
But now we have a fit to the survey index that still has some temporal patterning, but at least it's centered on zero, and there's no sort of large blocks of of positive and negative residuals. Some of the patterning aside were. But this is by far the best fit we had.

0:20:1.60 --> 0:20:15.90  
Jon Deroba  
Here's the fit to the aggregate age comps for each of the seven fleet and I hope you can recall how ugly the previous ones were. This is obviously much, much better. Still some problems here and there, but we're in a much better place now.

0:20:17.570 --> 0:20:18.260  
Jon Deroba  
So.

0:20:19.920 --> 0:20:49.430  
Jon Deroba  
On the 1st bullet, which I'll I already covered, we had a fit that we were actually kind of happy with at this point in the theme of running in circles, we went back and we thought, well, if if using all 7 fleets worked, trying all 7 fleets again was was beneficial, maybe trying all years would also be beneficial. So if you recall, we had deleted the 1st 105 pseudo years because of 0 or minimal catches that we're giving our model fits. We added those back in.

0:20:49.720 --> 0:20:53.700  
Jon Deroba  
The gradient once again became terrible. The fit took about 8 hours.

0:20:54.530 --> 0:20:59.980  
Jon Deroba  
And the fit to things like the survey index and the age compositions.

0:21:0.820 --> 0:21:11.180  
Jon Deroba  
We're similar to what we had had with deleting those 105 years and the time series estimates of things like spawning stock biomass were similar to our truncated model, so.

0:21:12.340 --> 0:21:17.710  
Jon Deroba  
We went back to deleting the 1st 105 years of pseudo years and.

0:21:18.950 --> 0:21:25.370  
Jon Deroba  
And going with that and that's also what we did. So we when we fit to the hundred data sets again. So I'm looking third bullet down.

0:21:26.660 --> 0:21:30.10  
Jon Deroba  
We deleted. We always deleted the 1st 105 pseudo years.

0:21:31.820 --> 0:21:43.230  
Jon Deroba  
Running in circles, you had again about half of the data sets that we fit to now we're trash again with very poor gradients, again with completely nonsensical results.

0:21:44.560 --> 0:22:0.70  
Jon Deroba  
Which was pretty disheartening because we thought we had a much better model at the moment, but going back to those fleet foreign fleet six, which were specified as double logistic, this is when we noticed that that's the gillnet and handling fleets by the way.

0:22:1.50 --> 0:22:20.300  
Jon Deroba  
The model, for whatever reason, was estimating those parameters on bounds and effectively estimating a flat topped logistic selectivity shape. So we change those fleets to logistic knowing full well that that was wrong and and very much misspecified. We knew they were Dome shaped. I believe double normal.

0:22:21.550 --> 0:22:44.30  
Jon Deroba  
Obviously logistic does not match that, at least for the domes that we were told existed. Nonetheless, it was our best model, so we just ran with it. So this became our final one area model. It had a decent gradient. It converged with a Hessian. The estimate of log unfinished recruitment was, at least in the ballpark of the truth, which I values. I gave you down below there.

0:22:45.240 --> 0:22:47.890  
Jon Deroba  
And so we felt pretty good about ourselves.

0:22:49.960 --> 0:22:54.510  
Jon Deroba  
And so here's the fit to the single data set for this final model.

0:22:55.320 --> 0:23:3.520  
Jon Deroba  
At least final one area model you can see we're still fitting the catches fairly tightly, except for Fleet six, which I think is the hand line.

0:23:4.650 --> 0:23:10.300  
Jon Deroba  
Which still isn't fitting poorly. It's just relative to the others, though there's some larger residuals there.

0:23:11.640 --> 0:23:29.90  
Jon Deroba  
I'm gonna go through these kind of quick because I mean I think we can all glance at these and take away the the main points without me narrating too much. Here's the fit to the index trend. Again, no major blocks of positive and negative, albeit there's definitely some temporal trends in there, but they're far better than where we started.

0:23:30.420 --> 0:23:44.950  
Jon Deroba  
Fit to the aggregate age comps Fleet 3 which is whatever fleet is the CPUE index. That's the page count for that fleet. But most of these fits on the aggregate age comps are are pretty good with with some exceptions.

0:23:47.570 --> 0:23:57.460  
Jon Deroba  
Things get a little uglier, and what you're seeing here are bubble plot residuals for the fits to the age comps rather than present them as aggregate. These are the.

0:23:59.60 --> 0:24:8.630  
Jon Deroba  
Fits with, I believe pseudo year is on the horizontal axis and pseudo aid is on the vertical axis and then each of the fleets. So this is the first three fleets.

0:24:9.900 --> 0:24:15.890  
Jon Deroba  
There's pretty gross patterning for for all of these fleets that we obviously have not resolved.

0:24:16.960 --> 0:24:23.780  
Jon Deroba  
Here's that same plot for the other four fleets. There's pretty gross patterning for all of these fleets.

0:24:25.620 --> 0:24:33.460  
Jon Deroba  
Which without either adding time varying selectivity features which the spasm model currently does not have available to it.

0:24:34.240 --> 0:24:43.30  
Jon Deroba  
Or moving to a spatial model we didn't feel we could resolve this and this wasn't worth trying to fix any longer, so this was what we lived with.

0:24:45.150 --> 0:24:49.480  
Jon Deroba  
There's the final selectivity shape estimates for each fleet.

0:24:51.730 --> 0:25:3.780  
Jon Deroba  
There's the recruitment time series. I'm not going to spend a ton of time on these. I think these are here just for our own sake and and for other groups. If they need a point of comparison, which is certainly something that Brian and I did throughout model development was.

0:25:5.770 --> 0:25:13.370  
Jon Deroba  
Take some usually solace in the fact that we were getting results that at least were comparable and in the ballpark of of the efforts of previous groups.

0:25:15.530 --> 0:25:19.460  
Jon Deroba  
Here's total biomass in the upper panel spawning stock biomass in the lower panel.

0:25:23.650 --> 0:25:27.520  
Jon Deroba  
Here's the fully selected fishing mortality rates by year and fleet.

0:25:33.750 --> 0:25:40.480  
Jon Deroba  
Getting now into the application of that modeling structure to the hundred data sets.

0:25:41.660 --> 0:25:50.370  
Jon Deroba  
We did not estimate try to invert the Hessian for all of the hundred data sets because it because it it added something like 2 hours of runtime for each data set.

0:25:51.270 --> 0:26:19.670  
Jon Deroba  
So we kind of relied on gradient as a proxy for convergence here and we had 17 datasets with a gradient greater than one which we took to be a bad thing and gradients less than one. We just said we're we're we're OK just the same, I'm actually going to all of the plots you're about to see for the fits to the hundred data sets will include all of the fits regardless of the the gradient. I just wanted to point out that we certainly have some fits in here that are are.

0:26:20.340 --> 0:26:22.570  
Jon Deroba  
Off the wall and a little bit bonkers.

0:26:23.560 --> 0:26:30.850  
Jon Deroba  
Here's a box plot of the 100 estimates of the log of Unfished recruitment.

0:26:31.670 --> 0:26:35.370  
Jon Deroba  
The horizontal line is the true value, the horizontal dashed line.

0:26:36.80 --> 0:26:46.860  
Jon Deroba  
Uh, so you can see for the most part, all of our fits are coming in at a scale that's slightly too high. I think there's probably lots of reasons that could be true.

0:26:48.340 --> 0:26:51.290  
Jon Deroba  
Especially given the known misspecifications we have here.

0:26:53.700 --> 0:27:0.910  
Jon Deroba  
Here's a time series of box plots, box plots of our estimates of spawning stock biomass, and and so again.

0:27:2.30 --> 0:27:30.510  
Jon Deroba  
Many of these outliers, which are the dots, are coming from fits that are are very nonsensical that have poor gradients, and we didn't have time to go into each of the lousy fits and then troubleshoot them and make make improvements. But by and large, the sort of the median and the interquartile ranges are in the vicinity of our fit to the the single data set that we saw in greater detail with similar trend as well.

0:27:34.0 --> 0:27:41.890  
Jon Deroba  
This is a bit difficult to soak in, but it's the box plots of fully selected fishing mortality rates for each of the fleets.

0:27:43.770 --> 0:27:49.560  
Jon Deroba  
I think there's probably some interesting threads to pull here. For example Fleet 2, which is in the middle upper panel.

0:27:50.330 --> 0:28:3.260  
Jon Deroba  
Umm, you can kind of see almost two rows, especially early in the time series. You can kind of see the the data sets are falling almost in a categorically into two rows. So the solutions are finding.

0:28:4.730 --> 0:28:12.270  
Jon Deroba  
Some of the data sets are finding a solution in one space and some of the data sets are finding a solution and another and and that seems to appear in multiple panels.

0:28:15.520 --> 0:28:23.190  
Jon Deroba  
There's a box plot of the time series of survey residuals. Again, the interquartile ranges are mostly centered around 0 without any.

0:28:24.450 --> 0:28:30.590  
Jon Deroba  
Overly grotesque patterning through time, although clearly in the extremes, that's not so true. We have.

0:28:31.270 --> 0:28:35.20  
Jon Deroba  
Some fits with negative residuals followed by positive residuals.

0:28:40.60 --> 0:28:46.390  
Jon Deroba  
Believe it or not, these are box plots as well of residuals to the fits to the fishery catches.

0:28:47.970 --> 0:28:50.100  
Jon Deroba  
Clearly, there are some huge outlier fits here.

0:28:51.290 --> 0:28:51.690  
Jon Deroba  
Umm.

0:28:53.350 --> 0:28:59.710  
Jon Deroba  
This is that same plot, but now I'm just zooming in, scaling the Y axis to -, 5 to 5, just so that.

0:29:0.370 --> 0:29:6.600  
Jon Deroba  
Just so that the outliers aren't dominating the scale as badly and you can see for the most part the inter quartile ranges.

0:29:7.280 --> 0:29:14.590  
Jon Deroba  
Are are centered around zero. Fleet 6 is really a bit problematic and has some temporal patterning and.

0:29:15.670 --> 0:29:20.580  
Jon Deroba  
Again, many of these fits have some pretty strong outliers where the fits pretty horrible.

0:29:24.80 --> 0:29:25.180  
Jon Deroba  
So a quick summary.

0:29:27.90 --> 0:29:37.250  
Jon Deroba  
Platform limitations were formidable and continue to be so, but not insurmountable. Brian and I point out here there's a benefit to a community of users.

0:29:38.160 --> 0:29:54.810  
Jon Deroba  
Where you have multiple folks troubleshooting and and contributing and we have some of that with the spasm group, but not as much as some other platforms that have been around a bit longer. And when you have multiple eyes on things, it certainly makes things a lot easier.

0:29:56.470 --> 0:30:2.500  
Jon Deroba  
A collapsing the fleets and deleting some of the pseudo yours was very useful in terms of reducing run times.

0:30:3.160 --> 0:30:10.680  
Jon Deroba  
Umm. And when you're developing these sort of large scale models, which will certainly have large runtimes in in many instances.

0:30:11.860 --> 0:30:31.310  
Jon Deroba  
It was helpful to sort of reduce the scale and dimensions of things, at least to start and then running in circles actually became really helpful to us. So I think reducing those dimensions, at least to get yourself into a better place to start, was was very helpful for us. Data waiting was very influential.

0:30:31.970 --> 0:30:38.460  
Jon Deroba  
I'm the the square box I have is a sub bullet. Here was more of an afterthought than anything else but.

0:30:38.990 --> 0:30:44.90  
Jon Deroba  
Uh, we have 7 fleets. Eventually we're going to try a multi area model.

0:30:45.770 --> 0:31:14.440  
Jon Deroba  
Data weighting is difficult even in a single species. One fleet, single area model at times, data weighting can be a bit influential, and it'll certainly be more so in these larger dimensioned types of exercises, especially spatially explicit models. And I was sort of wondering out loud how state space models might offer more objective solutions to to what we did, which was really just try things until the fit looked better to us.

0:31:15.260 --> 0:31:20.150  
Jon Deroba  
I mean, you could do the McAllister. Your Nelly approaches of the Francis approaches, but even those.

0:31:21.790 --> 0:31:43.460  
Jon Deroba  
Don't allow sort of an objective estimation of data weighting, and I know there's tons of active research on that topic. I I think exploring those options and A spatially explicit explicit setting will be really interesting, standard diagnostics or at least informative for us. Getting to a model that we found to be acceptable.

0:31:45.250 --> 0:31:51.960  
Jon Deroba  
And I don't know how scientific of the recommendation this is, but at times trusting your whimsy and intuition was really beneficial.

0:31:53.330 --> 0:32:3.410  
Jon Deroba  
With thought. Well, what if we tried this? Maybe this is happening and you know, sometimes we right. Sometimes we were wrong. But there's there's value in giving yourself some credit.

0:32:5.460 --> 0:32:13.990  
Jon Deroba  
In this particular case, we found there was a great deal of benefit to maintaining the seven fleets of the four fleet model we attempted based on similar selectivity shapes.

0:32:15.80 --> 0:32:18.560  
Jon Deroba  
Really was not an acceptable model in in any sense.

0:32:19.250 --> 0:32:22.670  
Jon Deroba  
Umm, we know that there are spatial and seasonal.

0:32:24.650 --> 0:32:32.880  
Jon Deroba  
Processes happening here that we are ignoring and there are certainly some spatial structure to the way these fleets operate.

0:32:34.180 --> 0:32:51.390  
Jon Deroba  
We think that basically by using the seven fleets as they were defined for us has some implicit fleets as areas baked into it. And in this particular case, it really went a long way to developing a model that was.

0:32:53.660 --> 0:33:0.250  
Jon Deroba  
I don't know. OK to maintaining that seven fleet structure as opposed to trying to reduce the dimensions across fleets.

0:33:2.580 --> 0:33:19.310  
Jon Deroba  
And then I ask another sort of questions, thinking out loud at what level of complexity does this remain beneficial? Meaning there probably are lots of times where you can reduce the dimensions of fleets down to 654, whatever, and save yourself a lot of hassle.

0:33:19.890 --> 0:33:26.370  
Jon Deroba  
On based on our experience with this one area, yellowfin tuna approach wasn't clear to us.

0:33:28.130 --> 0:33:37.860  
Jon Deroba  
At what level of spatial complexity in the fleet operations will your model start to crumble and at what level of simplicity would it may maybe actually work?

0:33:41.940 --> 0:33:49.440  
Jon Deroba  
With that, I am gonna pass this over to Brian and stop sharing my screen so I can figure out how.

0:33:54.920 --> 0:34:0.810  
Jon Deroba  
And Brian is going to talk about some early attempts at a of spatially explicit spasm model.

0:34:2.120 --> 0:34:3.60  
Jon Deroba  
You good to go, Brian.

0:34:3.570 --> 0:34:6.320  
Brian Langseth  
I am. Thank you, John.

0:34:7.590 --> 0:34:10.420  
Jon Deroba  
You're good to go, by the way. I can see full screen and here you will.

0:34:10.870 --> 0:34:11.810  
Brian Langseth  
Excellent.

0:34:12.590 --> 0:34:14.840  
Brian Langseth  
As John mentioned, we.

0:34:16.190 --> 0:34:45.930  
Brian Langseth  
There is benefit in collaboration and so as John was running around in circles trying to improve stability and runtime for the one area model after getting some initial progress with having something that we could at least present, I started my hand on figuring out the four area model. I liken that to plain 4 dimensional chess shown here by Spock and McCoy. And the key thing that came up and is probably evident.

0:34:46.0 --> 0:35:5.90  
Brian Langseth  
To those who also did this exercise is it's A4 area model that at least to start and we'll talk a little bit about that. So my approach with the four area model was to again as John mentioned, start simple and work from our best one area set up.

0:35:7.40 --> 0:35:14.770  
Brian Langseth  
So this included four areas and seven fleets. We have tagging data now in the model contributing to the likelihood.

0:35:15.640 --> 0:35:38.560  
Brian Langseth  
However, to start I did not want to try movement the the spasm model has a lot of options for various movements age based year based, grouped based that I did not want to turn on yet and so hoping to have something that would run slightly longer than the hour that we had.

0:35:39.180 --> 0:35:45.340  
Brian Langseth  
But not too much more and just seeing what what the model would come out, we did not originally start with movement.

0:35:46.460 --> 0:35:49.120  
Brian Langseth  
We assumed a single stock recruitment curve.

0:35:50.240 --> 0:35:55.140  
Brian Langseth  
And we started at an estimate of the provided R0.

0:35:56.100 --> 0:36:5.0  
Brian Langseth  
Uh, what this means, then is that we're assuming a metapopulation overall single population split out into.

0:36:6.250 --> 0:36:9.860  
Brian Langseth  
Not distinct, but interrelated areas.

0:36:11.280 --> 0:36:20.0  
Brian Langseth  
Our initial assumption and we have not gotten to a point where we're changing this yet is to apportion recruitment equally among areas, so to start.

0:36:20.670 --> 0:36:21.970  
Brian Langseth  
25%.

0:36:23.820 --> 0:36:35.760  
Brian Langseth  
Using again the assumption of removing the 1st 105 pseudo years, we're operating with a model with 151 suit a years. That was a decision to try to improve runtime initially.

0:36:36.500 --> 0:36:42.840  
Brian Langseth  
UH-28 ages and then using the the choices that John found to relax some of the fits.

0:36:43.700 --> 0:36:51.250  
Brian Langseth  
And the inherent data weighting questions. So we used this effective sample size either 15 or 25.

0:36:52.70 --> 0:37:1.250  
Brian Langseth  
Based on the OR one area experience and then the survey and catch, I should say SE standard error of 20 or .2.

0:37:3.150 --> 0:37:25.660  
Brian Langseth  
Initially, we did not estimate initial abundance. You'll see in some of the results that doing this presumably could improve fits early on. Removing those first 105 years certainly suggests that estimating this would be beneficial or attempts to do this further on in our explorations revealed that that reduced.

0:37:26.790 --> 0:37:33.320  
Brian Langseth  
Introduced some issues so we are not estimated initial abundance and have not yet turned that option on.

0:37:35.260 --> 0:37:42.760  
Brian Langseth  
So this first simple runtime that I had hoped and crossed my fingers when I hit run would not be too long, took about 20 hours.

0:37:43.700 --> 0:37:48.520  
Brian Langseth  
That's kind of on average here in the initial phase and.

0:37:49.250 --> 0:38:8.280  
Brian Langseth  
There were a number of structural constraints related to how spasm treats F and selectivity that required some further simplification. So in talking with this with the John, we decided to follow our approach for the one area model. In simplify we're able.

0:38:9.80 --> 0:38:12.670  
Brian Langseth  
So what this meant initially was based on our.

0:38:13.620 --> 0:38:20.420  
Brian Langseth  
Analysis of the data to to reduce the number of areas, and so we went from 4 areas to two areas.

0:38:21.40 --> 0:38:51.990  
Brian Langseth  
This was a bit fast in terms of deciding how to do this and not as objective as it could be, but looking both at the regions where Ketch is available, which is this left figure of green and red with X's, and then also looking at the years where composition data were available by fleet, with each panel being the area and the Y axis being the fleets, we decided to combine.

0:38:52.950 --> 0:39:0.830  
Brian Langseth  
Uh, separate areas, one in four and then combine areas two and three respectively into those.

0:39:1.540 --> 0:39:1.900  
Brian Langseth  
Uh.

0:39:2.980 --> 0:39:21.540  
Brian Langseth  
Kind of smaller components. And so we combined areas one and two and combined areas three and four and what that meant was something that catches to try to match scale, summing the tag recapture proportions as now that they would be reflected in a single larger area.

0:39:22.890 --> 0:39:40.920  
Brian Langseth  
And then just discard and not use the comps in regions or areas two and three. We thought this was a fairly safe assumption. There's very little comp data in area three more in area 2, but it doesn't necessarily seem to.

0:39:42.40 --> 0:39:46.10  
Brian Langseth  
Add New Years of data compared to Area 1.

0:39:46.990 --> 0:39:54.920  
Brian Langseth  
As I mentioned, this choice was done somewhat subjectively by me looking at the map.

0:39:55.580 --> 0:40:3.600  
Brian Langseth  
And looking at my limited knowledge of tuna, biology was thinking more that regions one and two.

0:40:4.660 --> 0:40:12.360  
Brian Langseth  
And being along the eastern edges of Africa, thinking that could be a recruitment zone compared to.

0:40:14.90 --> 0:40:19.570  
Brian Langseth  
Kind of Indonesia area, which could also be a recruitment's own splitting in East West seemed like a reasonable choice.

0:40:22.450 --> 0:40:47.810  
Brian Langseth  
In discussions with colleagues, another reasonable choice could be to simplify to two areas, but just do area one and areas 2-3 and four combined, and that'll be one of the take homes in terms of kind of decision points on how to simplify. If either run time is prohibited or just based on the data that seems to make sense.

0:40:48.710 --> 0:41:0.640  
Brian Langseth  
So with this two area model, our explorations are ongoing. What we have now in terms of a kind of a best case which in in.

0:41:1.810 --> 0:41:20.890  
Brian Langseth  
Yeah, are still still needs some work, but we have added movement to the model and have again started simply, which is kind of our approach using age invariant and time invariant movement. We have applied a penalty which spasm the spasm model allows.

0:41:21.850 --> 0:41:29.940  
Brian Langseth  
Penalizing any any movement that deviates greatly from about 80% residency, we've found that this is stabilized estimation.

0:41:30.990 --> 0:41:34.580  
Brian Langseth  
And has helped uh the model get to a better place.

0:41:36.390 --> 0:41:59.920  
Brian Langseth  
These next set of slides are some preliminary results. My intent in showing these is to hopefully foster dialogue, get ideas from others on ways to continue to explore and improve, but also provide some of our initial explorations and discuss our choices kind of as we're right in the thick of it.

0:42:1.520 --> 0:42:1.990  
Brian Langseth  
So.

0:42:2.730 --> 0:42:7.800  
Brian Langseth  
Here are selectivities for these new area one and two.

0:42:8.840 --> 0:42:12.520  
Brian Langseth  
With the numbers along the Y axis being the fleets.

0:42:13.520 --> 0:42:23.290  
Brian Langseth  
Uh, I highlight fleet three in Area 2, is that has been a issue for us and it will show in the next slide and then areas four and six.

0:42:24.560 --> 0:42:33.200  
Brian Langseth  
That John had fixed as logistic right now we are still estimating them as double logistic.

0:42:34.10 --> 0:42:40.710  
Brian Langseth  
I've been doing some initial explorations and and fixing these to logistic has improved the gradient and stability of the model.

0:42:43.370 --> 0:42:56.660  
Brian Langseth  
Kind of the the fits that we have now are shown here. These are fits to the aggregate composition data. As you can see these aren't too bad. Fleet 7 perhaps is fairly poor.

0:42:57.310 --> 0:43:1.510  
Brian Langseth  
Umm. And the last slide I highlighted, fleet three and.

0:43:2.590 --> 0:43:12.200  
Brian Langseth  
The reason for being this is is the single panel fit on the right is results that we have often got in our explorations and that the fit.

0:43:12.920 --> 0:43:23.430  
Brian Langseth  
Is very poor and doesn't seem to be really fitting the composition data at all, and this shows up about half the time so far.

0:43:24.360 --> 0:43:41.810  
Brian Langseth  
And it's likely due to trade-offs are are survey is in both areas, but we have a single catchability estimate and the scale of the survey differs and thus we think there's trade-offs in terms of fitting to that survey requires a different selectivity for area 2.

0:43:42.910 --> 0:43:44.80  
Brian Langseth  
Then area one.

0:43:44.920 --> 0:43:48.80  
Brian Langseth  
And trades off with fits to the composition data.

0:43:51.130 --> 0:44:4.420  
Brian Langseth  
Here are are fits to our surveys. Based on these, we aren't horribly off. As I mentioned, initial estimates of abundance may improve our fits in those early years.

0:44:7.650 --> 0:44:12.980  
Brian Langseth  
And then these are estimates of fully selected F by year for each fleet.

0:44:14.130 --> 0:44:30.580  
Brian Langseth  
This again is a result that I see repeated in my explorations in that oftentimes the scale at which John showed those were, you know, on the order of of .1 was the Max for the figures here. We're up to .25 in any year.

0:44:31.440 --> 0:44:42.440  
Brian Langseth  
And fleet three and fleet four are showing some spikes. These are either because, uh, kind of gaps in the composition data the when they start again.

0:44:43.870 --> 0:44:49.630  
Brian Langseth  
Whether the model recalibrating to try to fit those or else just trying to match other.

0:44:50.290 --> 0:44:59.20  
Brian Langseth  
Bits in the data that this model is kind of compensating for movement by applying higher fishing mortality.

0:45:1.790 --> 0:45:15.230  
Brian Langseth  
I will note that these spikes tend to appear more often when we are estimating movement. Our initial run did not show these and so that may remains a an area to explore and investigate.

0:45:17.370 --> 0:45:26.550  
Brian Langseth  
So that's a synthesis. We are continuing to work on improving runtime, which remains a formidable challenge for us.

0:45:27.110 --> 0:45:32.920  
Brian Langseth  
Uh. Current run times about 13 hours and that is not including the Hessian.

0:45:33.740 --> 0:45:41.670  
Brian Langseth  
We haven't heard any challenges about this from other groups, and so it might be unique to our modeling platform.

0:45:43.90 --> 0:45:50.150  
Brian Langseth  
But our experience with the one area model shows that improvements can be made and more hopeful they will be for the for the two.

0:45:50.790 --> 0:45:52.420  
Brian Langseth  
Slash 4 area model.

0:45:53.660 --> 0:46:1.750  
Brian Langseth  
Collapsing fleets. This is similar to what John said here. Really reducing areas has been useful thus far.

0:46:2.900 --> 0:46:10.550  
Brian Langseth  
And obviously more work remains. And so in terms of kind of basic questions that that we've encountered is.

0:46:12.150 --> 0:46:15.610  
Brian Langseth  
Kind of choices on informing aerial reductions.

0:46:16.890 --> 0:46:25.510  
Brian Langseth  
What is a best way do we combine 1234 or do we combine have one and combine areas 2 through 4?

0:46:26.310 --> 0:46:33.890  
Brian Langseth  
Uh movement. Right now we have very simple choices. We've explored aerial or age varying.

0:46:34.570 --> 0:46:46.380  
Brian Langseth  
Uh, time varying movement. I explored, but that added a lot of time to the run time, and so right now in terms of trying to improve stability and fit, we're starting simple, but obviously.

0:46:47.10 --> 0:46:49.330  
Brian Langseth  
What assumptions do you start with?

0:46:50.370 --> 0:47:5.690  
Brian Langseth  
And then of course, how to balance kind of these trade-offs with accruement or apportionment with movement and mortality remains a challenging question and one that certainly others have encountered.

0:47:7.10 --> 0:47:9.20  
Brian Langseth  
Both in research and application.

0:47:10.680 --> 0:47:11.820  
Brian Langseth  
So with that.

0:47:13.510 --> 0:47:23.240  
Brian Langseth  
Although John and I are presenting this work has reflected numerous years and numerous partners, many of which well, many of which are on.

0:47:24.320 --> 0:47:28.40  
Brian Langseth  
Shown here in these figures, a few of which are on this call.

0:47:28.970 --> 0:47:42.810  
Brian Langseth  
And so we certainly appreciate the work of this group. I've enjoyed it. I I believe John was feel safe to say that John has enjoyed it as well and it's been quite fruitful.

0:47:43.610 --> 0:47:46.640  
Brian Langseth  
So with that, we're happy to take any questions.

0:47:50.200 --> 0:47:54.400  
Aaron Berger  
Alright, thanks so much, John and Brian for your presentation.

0:47:56.750 --> 0:48:17.930  
Aaron Berger  
I'd also like to thank you guys for your willingness and courage to take on this difficult data set using a platform that that has perhaps lesser user input and experience in some of the other ones. So well done. Yeah, let's open up for questions. We can go ahead and put questions in the chat.

0:48:19.240 --> 0:48:29.130  
Aaron Berger  
Or raise your hand and I can call on you. I see one Jeremy's got the quickest trigger. So, Jeremy McKenzie, you want to answer or ask a question first, go ahead.

0:48:30.520 --> 0:48:38.50  
Jeremy McKenzie  
Yeah, don't know. Looks a bit screen you observational datasets on catch it age.

0:48:39.170 --> 0:48:44.360  
Jeremy McKenzie  
Can you throw up any of your steps to the catch? Catch it? Ice plots?

0:48:50.790 --> 0:48:52.670  
Brian Langseth  
So the comps, Jeremy?

0:48:53.270 --> 0:48:54.50  
Jeremy McKenzie  
The cops.

0:48:56.10 --> 0:48:58.470  
Brian Langseth  
Would this do? Or do you want the one area?

0:49:0.180 --> 0:49:10.100  
Jeremy McKenzie  
We we run the same model first with Castle and we were we didn't have age. Umm we we were we used link frequency.

0:49:10.860 --> 0:49:18.610  
Jeremy McKenzie  
But you've got age from from the SPM simulations, but what schoolly to me is there's no plus school there.

0:49:19.400 --> 0:49:31.380  
Jeremy McKenzie  
Umm in any of the observations with the GS that none of them are logistic, which I don't know why or wrong but working, retiring out to the.

0:49:32.660 --> 0:49:37.930  
Jeremy McKenzie  
Once we actually picked the logistic, the models expected A+ group because it's got a big take at the end.

0:49:38.790 --> 0:49:40.110  
Jeremy McKenzie  
But it's not saying yet.

0:49:41.950 --> 0:49:48.70  
Jeremy McKenzie  
I'm just wondering if there's something wrong with the data. See if in terms of that that cost group.

0:49:49.30 --> 0:49:52.830  
Jeremy McKenzie  
Because he was that that kind of flat.

0:49:53.620 --> 0:49:58.250  
Jeremy McKenzie  
Then you project beyond the age of 30. You're expecting a huge plus group.

0:49:59.650 --> 0:50:0.370  
Jeremy McKenzie  
And there wasn't.

0:50:2.820 --> 0:50:3.280  
Brian Langseth  
Yeah.

0:50:2.820 --> 0:50:7.530  
Jeremy McKenzie  
We're not sure what's what's going on with observational data, whether there's a problem with it.

0:50:8.210 --> 0:50:12.880  
Brian Langseth  
That's a good question, Jeremy. I mean, we'd have to look at our.

0:50:13.570 --> 0:50:17.600  
Brian Langseth  
Our age length key in terms of how that's being treated.

0:50:21.60 --> 0:50:22.550  
Brian Langseth  
To to confirm.

0:50:23.270 --> 0:50:23.780  
Brian Langseth  
No.

0:50:25.130 --> 0:50:27.600  
Brian Langseth  
Yeah, hearing from other groups to see if they've had large.

0:50:28.620 --> 0:50:32.410  
Brian Langseth  
Large plus groups with ages.

0:50:33.510 --> 0:50:36.380  
Brian Langseth  
Would certainly raise some flags for us.

0:50:37.950 --> 0:50:50.130  
Jeremy McKenzie  
Yeah, I've I've checked that one out because you, you know, you got garbage it if it's something wrong with the generated data, you know you got the garbage in garbage out scenario. So it could even models expecting A+ Group where it's got logistic.

0:50:51.240 --> 0:50:58.810  
Jeremy McKenzie  
Umm. And yet the none of those observational data sets have one, so I just checked that out.

0:51:1.880 --> 0:51:2.820  
Brian Langseth  
And we appreciate that.

0:51:3.460 --> 0:51:9.670  
Jon Deroba  
Yeah, I don't have a good solution for you to bail you out, Ryan. Yeah, we'll we'll have to check that. Thanks. Thanks, Jeremy.

0:51:23.890 --> 0:51:26.460  
Aaron Berger  
OK, Dan, gather go ahead.

0:51:28.280 --> 0:51:56.90  
Dan Goethel  
Yeah, I could ask questions all day, but I guess my main one, this one's kind of loaded since I'm on the development team or what exists of it. You know, you said there's a lot of, you know, platform limitations and stuff like that, which is pretty obvious. I was just wondering what types of features do you think would have been the most beneficial or helpful that you didn't have that you would have liked to have seen included or, you know, available to use?

0:51:59.870 --> 0:52:3.280  
Brian Langseth  
I can start with that, John, and then let you add.

0:52:5.670 --> 0:52:8.920  
Brian Langseth  
Umm. Having flexibility so.

0:52:10.360 --> 0:52:31.260  
Brian Langseth  
The current version of spasm and and the intent of spasm was to set up an operating model to then simulate data and then estimate within an estimation model that data and so from a research standpoint, it was set up to have kind of fully populated.

0:52:31.960 --> 0:52:37.60  
Brian Langseth  
Uh data matrices and so having all fleets and all areas.

0:52:38.450 --> 0:52:53.540  
Brian Langseth  
Having consistent selectivity across time, so having flexibility to to turn off fleet scenarios would be helpful. We spent a fair bit of time trying to add bits to the to the code where.

0:52:55.430 --> 0:53:6.510  
Brian Langseth  
If if the survey is 0, it's just not included in the likelihood and not estimated. Likewise, if catches 0, there are no F parameters. Trying to estimate that.

0:53:7.200 --> 0:53:11.90  
Brian Langseth  
Umm we have it in a way that we feel like is working.

0:53:11.360 --> 0:53:17.370  
Brian Langseth  
Umm, but having that have been a little bit more simple and straightforward would be super helpful.

0:53:21.310 --> 0:53:27.540  
Jon Deroba  
What Brian said, yeah, there there were. And I think, Dan, you appreciate as well as any of us.

0:53:28.700 --> 0:53:38.170  
Jon Deroba  
You know, we had a a project funded, you have a limited amount of time to complete the project and so you put in a lot of placeholders. When we first started developing the one area model.

0:53:39.390 --> 0:53:58.30  
Jon Deroba  
I think one of the major hurdles was all of the fleets had to have the same general selectivity shape. So if you had, if you you wanted some to have double logistic and some have logistic, you couldn't and that sounds like a simple fix. But when you have the spatially explicit stock assessment models.

0:53:58.930 --> 0:54:5.240  
Jon Deroba  
And you're already talking about, you know, six and seven dimensions, in some cases tracking.

0:54:6.50 --> 0:54:15.700  
Jon Deroba  
Heterogeneity metapopulation multiple fleets, so on and so forth. It sounds easy to make each fleet have its own unique selectivity shape, but it took us some time.

0:54:16.290 --> 0:54:23.510  
Jon Deroba  
Uh, I think Brian ran into that. He highlighted the the survey currently has to have the same catchability in all the areas.

0:54:24.230 --> 0:54:29.540  
Jon Deroba  
And so that wasn't something we needed in the process of research, at least previously.

0:54:30.270 --> 0:54:37.400  
Jon Deroba  
And most of these things aren't all that difficult, but they do take some time and you do wanna troubleshoot them and make sure you fix them.

0:54:39.280 --> 0:54:53.520  
Jon Deroba  
Yeah, so so making sure your your model is coded for, I don't know about maximum flexibility, but a a good amount of flexibility among space and among the other dimensions I think is probably one of the biggest hurdles.

0:54:56.70 --> 0:54:57.430  
Jon Deroba  
At least to do something generic.

0:55:1.90 --> 0:55:3.820  
Aaron Berger  
Thanks. And then did you have a follow up with your hand raised there?

0:55:4.750 --> 0:55:34.130  
Dan Goethel  
Uh, I mean, I would just add that one of the issues is just because we were so generic and doing so, it does have that Natal homing kind of ability where you track where the where the fish started, where it goes and adds that many partitions to it. We ran into limitations with Admb actually in terms of the number of ragged arrays that we could do and things like that and that really I think that was the main one that prevented the fleets.

0:55:34.670 --> 0:55:42.800  
Dan Goethel  
From changing cause we made that decision to go Natal homing and have that capability. But yeah, it's I think that's an important factor is just.

0:55:43.580 --> 0:56:0.310  
Dan Goethel  
The degree the number of degrees and complexity in terms of the coding kind of you have to make those tradeoffs sometimes, which ends in well appreciated when you're thinking of like a one area model versus starting to get into the spatial stuff and the population structure.

0:56:1.320 --> 0:56:4.50  
Dan Goethel  
But yeah, it's a lot of improvements that can be made.

0:56:5.470 --> 0:56:6.860  
Jon Deroba  
I think that was a great way to say it, Dan.

0:56:9.500 --> 0:56:17.990  
Aaron Berger  
Right, which is in direct conflict with our you know our desire to have flexibility in all these dimensions, sometimes those trade-offs just.

0:56:19.80 --> 0:56:22.580  
Aaron Berger  
Are insurmountable. OK, Mark Mondry go ahead.

0:56:29.740 --> 0:56:30.470  
Mark Maunder  
I can you hear me?

0:56:32.120 --> 0:56:33.20  
Aaron Berger  
Ohh yeah, Yep, there you are.

0:56:32.990 --> 0:56:46.610  
Mark Maunder  
OK. Yeah. Thanks for the presentation. I just wanted to ask a a clarification about how you implemented the phishing mortality. Was it as a free parameter for each?

0:56:47.530 --> 0:56:51.760  
Mark Maunder  
Fishery in each time period or did you have at some function of effort?

0:56:55.730 --> 0:57:4.820  
Jon Deroba  
Uh, it was a free parameter, so the fully selected F for each fleet in each pseudo year is a free parameter although.

0:57:5.530 --> 0:57:21.600  
Jon Deroba  
At one point we did implement a week penalty just as sort of a a hope and a prayer to get runtime and a stable model. The one area model ultimately did not need that, and so they are free parameters, at least currently.

0:57:23.540 --> 0:57:24.310  
Mark Maunder  
Thanks.

0:57:22.750 --> 0:57:29.490  
Jon Deroba  
Which is why we have thousands of parameters which is kind of problematic, whereas I think Brian and I talked about this. You know, s s can do the uh.

0:57:30.800 --> 0:57:33.270  
Jon Deroba  
What's it called? Brian? Uh. Come on, Brian.

0:57:33.750 --> 0:57:35.70  
Brian Langseth  
The hybrid approach.

0:57:34.910 --> 0:57:39.120  
Jon Deroba  
Yeah, the hybrid approach, which would probably be really beneficial when you get to this.

0:57:40.220 --> 0:57:46.810  
Jon Deroba  
These numbers are dimensions of of area and fleets, but yeah, right now they're free parameters, including in the multi area model.

0:57:48.940 --> 0:57:56.570  
Mark Maunder  
Thanks. The other thing I wanted to point out while I've got the microphone was that it was really interesting to see.

0:57:57.750 --> 0:58:3.560  
Mark Maunder  
The results from the 100 simulations and the one area model of the residuals.

0:58:4.220 --> 0:58:5.310  
Mark Maunder  
For the index.

0:58:6.330 --> 0:58:11.560  
Mark Maunder  
Where they were all showed the same sort of trends over time.

0:58:12.380 --> 0:58:14.570  
Mark Maunder  
Right. So it wasn't like random around the?

0:58:15.630 --> 0:58:25.160  
Mark Maunder  
Zero those trends, and they all had the same trend, which was interesting and A it's kind of not intuitive to me about why all the models would.

0:58:26.60 --> 0:58:36.690  
Mark Maunder  
Be different in the same year in terms of the fit to the index and I was wondering you know what, what model must specification would be causing that? They'd be interesting thing to to understand.

0:58:38.790 --> 0:58:42.740  
Jon Deroba  
Uh, I agree with the observation and agree that it's it's interesting.

0:58:44.340 --> 0:58:46.890  
Jon Deroba  
So there are I. I'm wondering if there are.

0:58:48.830 --> 0:58:57.440  
Jon Deroba  
The one thing I I keep remembering when I'm looking at those temporal trends is that these are pseudo years. So within a year.

0:58:58.540 --> 0:59:0.220  
Jon Deroba  
I'm wondering if.

0:59:1.290 --> 0:59:7.0  
Jon Deroba  
The proportion of the stock within the survey range is changing among pseudo years.

0:59:8.480 --> 0:59:13.740  
Jon Deroba  
But that that was sort of just an early knee jerk reaction I had into thinking about.

0:59:14.920 --> 0:59:16.100  
Jon Deroba  
Why this might be?

0:59:31.870 --> 0:59:32.160  
Mark Maunder  
Yeah.

0:59:17.60 --> 0:59:33.50  
Jon Deroba  
I'll be interested to see if Brian's continued multi area explorations show the same pattern, because my my guts telling me that there's just seasonal spatial variation availability. But again, that's just my first guess.

0:59:33.630 --> 0:59:45.420  
Mark Maunder  
Made it be interesting to see this for the other other assessment models too, to see if it's a a, a standard thing and whether you could actually use it to diagnose model misspecification.

0:59:47.940 --> 0:59:48.920  
Jon Deroba  
Yes, I agree.

0:59:47.680 --> 0:59:49.710  
Brian Langseth  
Mark, this is the figure you're talking about.

0:59:53.570 --> 0:59:54.550  
Mark Maunder  
Yeah, that's the one, yeah.

0:59:59.150 --> 1:0:9.830  
Jon Deroba  
Yeah, you you can see those trends across pseudo years, even to the 5th to the single data set. But yeah, I agree it's there is something ingrained in the dynamics that.

1:0:11.450 --> 1:0:17.960  
Jon Deroba  
Couldn't make it a common among all the data sets and I I agree it would be interesting to continue to pull that thread.

1:0:27.870 --> 1:0:34.580  
Dan Goethel  
I I wonder so you guys haven't explored other apportionment option or is this this is the one area model? Yeah.

1:0:35.720 --> 1:0:37.60  
Dan Goethel  
I'm the I wonder if that's.

1:0:37.840 --> 1:0:45.230  
Dan Goethel  
Here you get into the four area model if there's a recruitment kind of impact here. If you see a similar trend.

1:0:46.700 --> 1:0:54.700  
Brian Langseth  
Yeah, I did. Uh, spasm has density dependent apportionment. It also has apportionment that can be defined.

1:0:55.560 --> 1:1:4.330  
Brian Langseth  
And so I did do density dependent and that did not answer many questions that I had hoped it would.

1:1:5.520 --> 1:1:17.800  
Brian Langseth  
Yet that was a quick run. It wasn't really looked at in depth. That will be something, obviously, that we can think about. I think one of the groups of portioned fully to area 1.

1:1:18.970 --> 1:1:24.890  
Brian Langseth  
Either the last presentation or the second one and and that is an interesting idea and choice.

1:1:26.120 --> 1:1:30.170  
Brian Langseth  
But yeah, at the moment it is just another axis of uncertainty that.

1:1:31.500 --> 1:1:44.20  
Brian Langseth  
As the risk of increasing runtime and perhaps making the model more stable, yet one in which would be important once we kinda have a a good well behaved model to begin with.

1:1:46.720 --> 1:2:9.370  
Dan Goethel  
I had another question. So John, you mentioned like the potential for using states that state space models, you know it's spatial context. Do you know of any that have done that and or you know the woods hole assessment model WAM, I know you have some familiarity with that there any plans to kind of go down that road route or explore that option?

1:2:10.560 --> 1:2:21.340  
Jon Deroba  
Yeah. So the the primary developer on the woods hole assessment model, Tim Miller, is actually coding that right now. I don't know how.

1:2:22.780 --> 1:2:39.200  
Jon Deroba  
I don't know how generic he's striving to make it. He's doing it rather quickly to address a Black Sea bass stock assessment, so it's it's gonna be driven by whatever they need in that research track stock assessment. But the that door has been opened, for better or worse.

1:2:41.540 --> 1:2:46.450  
Jon Deroba  
But I I don't know. I don't know if anybody knows does is has Anders gone spatial yet with Sam?

1:2:59.550 --> 1:3:1.240  
Aaron Berger  
Not that I am aware of.

1:3:2.940 --> 1:3:5.310  
Aaron Berger  
Others on the call can correct me.

1:3:14.870 --> 1:3:19.850  
Jon Deroba  
Thanks, Craig, Craig said. I don't think so as well and I'm unaware of it. If it has happened too.

1:3:29.520 --> 1:3:40.460  
Aaron Berger  
OK. Other other questions, we are into the general discussion time. So welcome questions specific to the presentation or in more general discussion sense as well.

1:3:44.430 --> 1:3:45.340  
Aaron Berger  
Let's go to Patrick.

1:3:47.600 --> 1:4:3.10  
Patrick Lynch  
Thanks, this was still on the spasm I think, or at least this effort. I I was wondering if you could tease out whether there's an like the relative importance of spatial structure versus fleet structure?

1:4:3.780 --> 1:4:14.50  
Patrick Lynch  
As that I don't think you Umm collapsed bleach structure in the spatial model. Is that right? You kind of started you went with.

1:4:14.700 --> 1:4:26.410  
Patrick Lynch  
What you thought was best from the single area model, but I didn't know if there was some sort of interaction there where collapsing fleet structure actually would be better in the spatial model.

1:4:28.480 --> 1:4:38.80  
Brian Langseth  
I did try that but encountered some user error that at the time was challenging to for me to overcome.

1:4:39.140 --> 1:4:43.130  
Brian Langseth  
I think I have a solution to that and so the code is set up to.

1:4:44.270 --> 1:4:48.900  
Brian Langseth  
Kind of our our data manipulation code is set up to to set that up.

1:4:49.630 --> 1:5:5.790  
Brian Langseth  
That's something I just haven't gotten into yet. I think with some of the results from the one area with with collapsing down to 4 fleets and having that that 4th and final kind of aggregate fleet be odd, we had John and I had discussed about.

1:5:6.440 --> 1:5:16.990  
Brian Langseth  
How that would look like with a spatial model and whether this spatial dynamics could kind of tease that apart and be able to result in improved.

1:5:18.120 --> 1:5:19.360  
Brian Langseth  
Selectivity estimate.

1:5:20.590 --> 1:5:20.870  
Brian Langseth  
Yeah.

1:5:21.870 --> 1:5:31.400  
Patrick Lynch  
OK, cool. And what was the scale of the? What was the difference in parameters, kind of the general sense that were estimated between the two?

1:5:34.550 --> 1:5:36.50  
Brian Langseth  
What type of parameters?

1:5:36.860 --> 1:5:43.950  
Patrick Lynch  
Whatever you estimated, I think I forget. What what it was in the single it started at like 1000 something, right? And then.

1:5:45.60 --> 1:5:54.40  
Patrick Lynch  
I can't remember where you ended up, but you've got a run time that's like 20 times. So I didn't know how many additional estimated parameters you had.

1:5:56.160 --> 1:5:58.570  
Brian Langseth  
I do not have that right in front of me.

1:6:0.460 --> 1:6:3.760  
Patrick Lynch  
OK, I just didn't know if it's scaled in some way. Just curious.

1:6:4.610 --> 1:6:8.360  
Brian Langseth  
Yeah, with F is the main parameter so.

1:6:9.760 --> 1:6:13.250  
Brian Langseth  
Seven Fleet, one area model versus the seven Fleet, 4 area model.

1:6:15.100 --> 1:6:17.710  
Brian Langseth  
The one area would have about as a fourth as many.

1:6:18.890 --> 1:6:20.820  
Brian Langseth  
So it doesn't scale to be 20.

1:6:36.910 --> 1:6:38.550  
Aaron Berger  
Yeah. Craig Marsh, go right ahead.

1:6:40.960 --> 1:6:41.960  
Craig Marsh  
Yeah. Can you hear me OK?

1:6:43.220 --> 1:6:46.30  
Craig Marsh  
Cool. Yeah. I just wanted to.

1:6:48.290 --> 1:6:51.260  
Craig Marsh  
No, but just revisit that state space.

1:6:51.380 --> 1:6:51.910  
Craig Marsh  
Umm.

1:6:53.500 --> 1:7:7.950  
Craig Marsh  
Idea because it is something that I've kind of toyed with. Yeah, I don't think we've seen any of the one area models do state space yet. Is that right? It is there. Has there been any state space?

1:7:9.360 --> 1:7:9.670  
Craig Marsh  
No.

1:7:11.150 --> 1:7:16.210  
Craig Marsh  
I've missed one of the seminars so I'm not sure if I've across all platforms everyone here.

1:7:17.280 --> 1:7:20.830  
Aaron Berger  
Not not in this experimental framework, right?

1:7:21.310 --> 1:7:22.300  
Craig Marsh  
Yeah, because that's.

1:7:23.980 --> 1:7:32.610  
Craig Marsh  
That would be quite interesting, like a Sam Esque where basically you'd have to just aggregate all the fleet to up and then.

1:7:33.570 --> 1:7:35.510  
Craig Marsh  
And then you allow that.

1:7:36.450 --> 1:7:39.510  
Craig Marsh  
You know that process here to just come through and those random effects.

1:7:41.570 --> 1:7:57.230  
Craig Marsh  
Because I think the single area the the way the single area models it probably we've all been doing, they're at least fixed to fix and probably are quite constrained. There is kind of the beauty of those state spaces, you basically free up a lot of that stuff and.

1:7:58.390 --> 1:8:0.310  
Craig Marsh  
Hope that you it converges.

1:8:1.430 --> 1:8:15.50  
Craig Marsh  
But the trade off for going for that approach is you have to scale across all your fleets cause I think they have to have like a general annual if so they kind of aggregate across all fleets.

1:8:15.880 --> 1:8:16.520  
Craig Marsh  
Umm.

1:8:17.550 --> 1:8:24.540  
Craig Marsh  
But there's Sam's not part of this. Yeah. OK, that's because that's something.

1:8:25.330 --> 1:8:26.20  
Craig Marsh  
A lot of our.

1:8:26.750 --> 1:8:40.500  
Craig Marsh  
Beckett and my experience with the fisheries in New Zealand, as well as like we are the spatial thing, always pops up it's head. And so we often go for complexity because it's more intuitive, I guess in terms of you're trying to.

1:8:41.670 --> 1:8:48.400  
Craig Marsh  
You know, split up that variation and you know try and describe it with fleets and whatnot, but.

1:8:49.150 --> 1:8:54.20  
Craig Marsh  
The alternative is you just bundle it all up and you hope that you scale right.

1:8:54.630 --> 1:9:5.840  
Craig Marsh  
And then, but you need to kind of flexible platform like Sam to then actually have your if by age be quite variable, because now you've got like four or five selectivities in there.

1:9:8.100 --> 1:9:13.530  
Craig Marsh  
But that's often not done and I I do often wonder if.

1:9:14.890 --> 1:9:27.300  
Craig Marsh  
That is something really worth you know, instead of splitting out fleets and space, you just try and scale it up and then estimate an if by year and age.

1:9:28.680 --> 1:9:35.250  
Craig Marsh  
I don't know if anybody has any experience of doing that stuff, but it's there something that I kinda think about what this spatial problems.

1:9:37.210 --> 1:9:50.900  
Jon Deroba  
I don't have any experience with that, Craig, but I it's an attractive idea and I think the like in the in a single area, Sam fit, you'd have the sort of that random walk and F is your process error and the random walk.

1:9:52.190 --> 1:10:12.280  
Jon Deroba  
To be 2 dimensional correlated across years and ages, I believe and you can just add a spatial dimension to that as well to that process and have sort of a single fleet with the process error sort of. I think you said scaling sort of I I would use maybe distributed across age, time and space.

1:10:13.610 --> 1:10:15.760  
Jon Deroba  
I don't know how well that would work, but I mean.

1:10:16.700 --> 1:10:17.380  
Jon Deroba  
Sounds cool.

1:10:21.240 --> 1:10:26.930  
Craig Marsh  
Yeah. The other thing that I'm often when I see Sam models that number of ages or.

1:10:27.810 --> 1:10:36.980  
Craig Marsh  
Age cohorts in the petitions are quite small and I also the other thing was if you have got like 25 age cohorts, how well those.

1:10:37.800 --> 1:10:46.910  
Craig Marsh  
Random effects can be stretched out to some of those ages that aren't really that well represented in the data, but that's not really a special question. That's just, you know.

1:10:47.990 --> 1:10:49.160  
Craig Marsh  
Anyway, I just wanted to.

1:10:50.200 --> 1:10:51.30  
Craig Marsh  
Chat about that.

1:10:53.60 --> 1:11:0.60  
Aaron Berger  
Well, I think it's a really good point and I think it's one that is speaks to one of the objectives of this whole experiment, right is.

1:11:1.10 --> 1:11:5.670  
Aaron Berger  
This quote, this notion of well, if we had this capability, we might have explored it.

1:11:7.10 --> 1:11:21.980  
Aaron Berger  
You can have this capability, but it doesn't. It's not paired with the ability to do spatial assessments. Currently you know things like that, so this is a really good point to bring out. Thanks for bringing it up, Greg. And I think you're right. I think it probably has crossed the minds of a lot of different teams.

1:11:30.850 --> 1:11:33.200  
Aaron Berger  
OK, further questions, comments.

1:11:40.470 --> 1:11:44.860  
Craig Marsh  
I'm just jumping. Sorry I not a question but more.

1:11:45.880 --> 1:11:53.710  
Craig Marsh  
So we've probably you guys probably talked about this, but did a lot of a lot of the teams talked about the kind of.

1:11:55.170 --> 1:12:8.610  
Craig Marsh  
Energy input and just getting this stuff up and running and I was wondering now that like we have all this R code, I imagine I mean if it's anything like what I wrote, it's probably not well documented because we're all doing it in a rush. But.

1:12:10.80 --> 1:12:17.860  
Craig Marsh  
I just wanted, are we gonna cache some of these are codes because we were all using kind of a generic almost S like.

1:12:19.30 --> 1:12:29.740  
Craig Marsh  
Simulated data to then be put across all these platforms and where the we're gonna cache that cause that could save a lot of time for future.

1:12:30.870 --> 1:12:32.450  
Craig Marsh  
Kind of experiments like this.

1:12:38.560 --> 1:12:45.450  
Aaron Berger  
Well, I I think that's another good idea, Craig. We could potentially use the GitHub site to.

1:12:46.150 --> 1:12:51.840  
Aaron Berger  
Put down code chunks or something like that. I I admit that wasn't.

1:12:53.270 --> 1:12:57.720  
Aaron Berger  
As to date, any sort of concrete plan, but that's certainly something to discuss.

1:13:3.760 --> 1:13:4.600  
Aaron Berger  
Yeah, Mark, go ahead.

1:13:3.970 --> 1:13:4.980  
Brian Langseth  
I'll try. I'm in here.

1:13:5.400 --> 1:13:7.960  
Aaron Berger  
Ohh Yep, Brian wants you. Go ahead first.

1:13:6.360 --> 1:13:11.630  
Brian Langseth  
Just just to jump jump the gun, Craig, that did take a a fair bit of work.

1:13:12.380 --> 1:13:17.490  
Brian Langseth  
To get the data in a format that our model needs it to be in.

1:13:18.420 --> 1:13:32.140  
Brian Langseth  
Uh. Working with John and and not being colocated certainly helped putting it up on GitHub and then ensuring that we were using the same version and could understand what each other were doing.

1:13:33.300 --> 1:13:38.670  
Brian Langseth  
I is one of the benefits with working with other people and so our ours is a little bit more commented.

1:13:39.430 --> 1:13:39.880  
Brian Langseth  
Uh.

1:13:40.770 --> 1:13:43.200  
Brian Langseth  
But it it can always be improved.

1:13:44.610 --> 1:14:15.880  
Craig Marsh  
Yeah, I I was the I was more thinking more outside the scope of probably this work and that I actually quite like this idea where you know, which is not easy done. And a lot of kudos for the guys to organizing this and that you try and give a single simulated data set to multiple platforms and actually there are a lot of questions that I could see that would be quite interesting to play with in the future. And if you know there was some generic art code to take an SSH output into format into castle type.

1:14:16.340 --> 1:14:19.490  
Craig Marsh  
Or Gadget and Multifan and whatnot then.

1:14:21.90 --> 1:14:27.590  
Craig Marsh  
Yeah, because that's that was a big thing and my experience was just, yeah, formatting the data. And but anyway, just just to comment.

1:14:34.750 --> 1:14:35.840  
Aaron Berger  
OK, Mark, why don't you go ahead?

1:14:37.720 --> 1:15:2.280  
Mark Maunder  
Yeah. Thanks. So this is a general question. I mean a little bit related to the presentation today, but more general and it's about the use of tagging data in these spatial models. We obviously if we doing a spatial model with movement that tagging data could be quite important. It's also important to estimate the absolute abundances and particularly as you have different abundance levels in each of the areas in that.

1:15:4.150 --> 1:15:14.480  
Mark Maunder  
And it's a tuna application. And so most of the tuna tagging is is kind of opportunistic in the sense that you tag where you can actually tag rather than.

1:15:15.190 --> 1:15:22.120  
Mark Maunder  
You know a really well designed tagging study and so mixing rates is a big issue. And I was wondering.

1:15:23.280 --> 1:15:29.390  
Mark Maunder  
Maybe I missed one of the this the fine scale spatial modelling applications.

1:15:30.190 --> 1:15:51.960  
Mark Maunder  
Umm, but I was wondering what what kind of work has people been doing in terms of trying to deal with tag mixing and whether they've tried any fine scale spatial modelling of the tagging data to determine that mixing and even in the simulation is is tag mixing gonna be a problem in the simulated data rows? It's something that hasn't really.

1:15:53.440 --> 1:15:56.580  
Mark Maunder  
Been looked at in terms of how the data was simulated.

1:16:8.360 --> 1:16:8.640  
Aaron Berger  
Well.

1:16:8.720 --> 1:16:15.370  
Aaron Berger  
Umm Simon, can I turn to you on the simulated question for the tagging data?

1:16:19.300 --> 1:16:20.470  
Simon Hoyle  
Yeah, sure. I'm.

1:16:24.20 --> 1:16:32.230  
Simon Hoyle  
We haven't. I guess we haven't really looked in detail at the tagging though to see how well it was mixed and how long it took to mix.

1:16:33.270 --> 1:16:33.750  
Simon Hoyle  
Umm.

1:16:35.810 --> 1:16:40.250  
Simon Hoyle  
And I'm not sure how much any of the groups have looked at that either though.

1:16:41.340 --> 1:16:45.370  
Simon Hoyle  
I think that is a key question, and that was actually one of the things that motivated.

1:16:46.550 --> 1:16:49.0  
Simon Hoyle  
Asked to start this project this project.

1:16:52.80 --> 1:16:54.370  
Simon Hoyle  
Obviously, mixing rights are going to be different.

1:16:56.120 --> 1:17:1.170  
Simon Hoyle  
It's time to make things gonna be different. Whether you got a four area or A2 area or or a single area model.

1:17:1.970 --> 1:17:2.420  
Simon Hoyle  
Umm.

1:17:4.980 --> 1:17:6.690  
Simon Hoyle  
Yeah, that's all I've got.

1:17:17.250 --> 1:17:20.980  
Aaron Berger  
Maybe it is. We're thinking about that. I'll follow up with a similar question.

1:17:21.70 --> 1:17:21.540  
Aaron Berger  
Umm.

1:17:23.280 --> 1:17:33.740  
Aaron Berger  
Brian, I think you presented the the right, the four area model that then you reduced to two areas and that was a really interesting aspect that we hadn't seen quite.

1:17:34.450 --> 1:17:38.180  
Aaron Berger  
Yet by other teams presenting that and.

1:17:39.790 --> 1:17:52.440  
Aaron Berger  
And I know you said you you, you did that quick cause you were just doing explorations, but you based that off of catch and comps. I saw I was curious if if if Speaking of tagging if if the tagging data played into.

1:17:53.560 --> 1:18:5.360  
Aaron Berger  
The the availability of the tagging data cause in that could potentially speak to a mark talking about mixing rates and that actually might define areas you know. One example is in the western Central Pacific they use their area set up.

1:18:6.470 --> 1:18:18.360  
Aaron Berger  
In some cases based on tag mixing in the, the location of tagging data helps actually structure their area. So I was just curious if that was part of the thought process there or maybe that's down the line.

1:18:18.770 --> 1:18:20.350  
Aaron Berger  
Umm, you know?

1:18:20.760 --> 1:18:36.300  
Aaron Berger  
Uh, and then and then also just basically tuning ecology in the region. I know you mentioned you, you really didn't have much information to go on there, but kind of kind of how those things can kind of formulate area boundaries and things like that?

1:18:37.270 --> 1:18:39.260  
Brian Langseth  
Yeah, that's that's a good question.

1:18:40.710 --> 1:18:45.750  
Brian Langseth  
My choice was primarily to solve the problem of runtime.

1:18:46.550 --> 1:18:53.80  
Brian Langseth  
And as such, looking at, you know, few samples of data.

1:18:53.900 --> 1:19:19.0  
Brian Langseth  
And with our modeling framework, where there are zeros, it can be complicated and so approaching it primarily from that and that really dictated my choices of of looking at little data in areas to in three and trying to either just outright remove them, which in some cases I did. But trying to combine catch and tag proportions.

1:19:20.280 --> 1:19:27.870  
Brian Langseth  
In terms of tag mixing, the quick answer is no, that did not come into my thought process.

1:19:28.710 --> 1:19:38.40  
Brian Langseth  
In relation to Marc's question, there is some latency period that that we have in our model that that we haven't turned on.

1:19:39.560 --> 1:19:42.450  
Brian Langseth  
That would be a step much further down the road.

1:19:43.140 --> 1:19:48.510  
Brian Langseth  
Uh, within the data set itself, looking at tag recaptures our. I recall that there is.

1:19:49.930 --> 1:19:52.60  
Brian Langseth  
A field that has latency. Period but.

1:19:52.980 --> 1:20:1.990  
Brian Langseth  
When generating the data and moving it into our format, I did not incorporated that, it just included any recapture.

1:20:3.40 --> 1:20:7.660  
Brian Langseth  
Whether it occurred quickly or not was assumed to be one.

1:20:13.960 --> 1:20:19.240  
Aaron Berger  
Thanks, Brian. I saw a couple of hands pop up. I'm not sure who was first between Simon and Jeremy, so.

1:20:20.670 --> 1:20:23.310  
Aaron Berger  
You guys battle it out or if you guys know who was first, go ahead.

1:20:26.600 --> 1:20:28.610  
Jeremy McKenzie  
I've got a question to Simon.

1:20:29.890 --> 1:20:41.910  
Jeremy McKenzie  
Umm, so I'll, I'll shoot this down. So my understanding of our operating model, the revolving you know using simulated data from we've got.

1:20:43.280 --> 1:20:55.500  
Jeremy McKenzie  
True kind of seasonal migration going on at somewhere like three, 300 good sale level, which has been driven by preference functions.

1:20:56.570 --> 1:21:0.670  
Jeremy McKenzie  
So what I'm getting at is that that's quite complicated movement.

1:21:1.520 --> 1:21:5.730  
Jeremy McKenzie  
Seasonal movement in the real operating world.

1:21:6.770 --> 1:21:16.200  
Jeremy McKenzie  
Umm, we're limited to what we've got and where tagging data represent that and more to Mark's point that that it.

1:21:17.70 --> 1:21:22.650  
Jeremy McKenzie  
Probably reflecting the opportunistic tagging in particular areas. So we haven't got reciprocal movement over rule.

1:21:23.550 --> 1:21:32.990  
Jeremy McKenzie  
All the spatial domain and temporal domain of the of the operating model from the tagging data. So we're that limited on how we can interpret it with our own models.

1:21:33.740 --> 1:21:39.850  
Jeremy McKenzie  
But someone can you confirm that the reality in the operating model has?

1:21:40.680 --> 1:21:41.320  
Jeremy McKenzie  
Umm.

1:21:42.500 --> 1:21:43.960  
Jeremy McKenzie  
Basically what I assume.

1:21:44.660 --> 1:21:47.590  
Jeremy McKenzie  
Umm preference function, seasonal movement so.

1:21:48.480 --> 1:21:59.750  
Jeremy McKenzie  
If we had perfect data from that system, we technically could be able to resolve the the the movement dynamics of the system with it. Is that right?

1:22:2.920 --> 1:22:4.130  
Simon Hoyle  
Yeah, Jeremy, I'm.

1:22:4.800 --> 1:22:5.930  
Simon Hoyle  
That's pretty right.

1:22:6.630 --> 1:22:7.500  
Simon Hoyle  
It is.

1:22:9.720 --> 1:22:16.420  
Simon Hoyle  
Yeah, tags being released, most ordinary you one and then mixing driven by preference functions.

1:22:17.580 --> 1:22:19.90  
Simon Hoyle  
There's a preference for.

1:22:19.800 --> 1:22:20.300  
Simon Hoyle  
Umm.

1:22:22.930 --> 1:22:34.360  
Simon Hoyle  
This the preference based on distance, so you know the closer it is, the more likely it is to go there. There's a preference based on temperature, so sea surface temperature, which is why you get the seasonal movements coming in.

1:22:35.410 --> 1:22:37.810  
Simon Hoyle  
And there's a preference based on.

1:22:38.620 --> 1:22:43.210  
Simon Hoyle  
I think I I chlorophyll as well, which has some special component too so.

1:22:45.400 --> 1:22:47.230  
Simon Hoyle  
That's what's driving the fish around.

1:22:47.980 --> 1:22:48.680  
Simon Hoyle  
I think.

1:22:49.390 --> 1:22:52.40  
Simon Hoyle  
The mixing in this model is I mean.

1:22:52.990 --> 1:22:56.620  
Simon Hoyle  
Though, though, and those are the only things that are driving the fishing around so.

1:22:58.860 --> 1:23:0.830  
Simon Hoyle  
In in the real world, you might get other.

1:23:1.950 --> 1:23:12.660  
Simon Hoyle  
Like extra complexity like fish wanting to stick around in one area or or and we see things like that with islands in the in the Western and Central Pacific and probably in the Indian Ocean so.

1:23:14.20 --> 1:23:17.370  
Simon Hoyle  
But we don't have to deal with this with that, all we've got is that.

1:23:18.150 --> 1:23:20.120  
Simon Hoyle  
The right of movement and I guess.

1:23:21.550 --> 1:23:32.700  
Simon Hoyle  
So in theory, we should be able to, if we had the, you know, a model with the same resolution and in theory we should be able to replicate it. But in in a.

1:23:33.430 --> 1:23:37.340  
Simon Hoyle  
In reality, we've got much simpler models with only four areas, so.

1:23:38.280 --> 1:23:49.510  
Simon Hoyle  
We'd have to have pretty long mixing periods to get the same, you know, to be able to replicate that level of mixing and get an accurate estimate of abundance and and the appropriate harvest rights.

1:23:52.400 --> 1:23:53.390  
Simon Hoyle  
There are some.

1:23:54.380 --> 1:24:15.690  
Simon Hoyle  
Hypothesis tests you can use, I think, to which which nobody has used, but in theory you could do some testing with these taking data with alternative methods for for mixing and tagging data like. I think there's there's something I use in MULTIFAN CL which they all use and all the MFCL assessments.

1:24:16.430 --> 1:24:17.800  
Simon Hoyle  
And there was a paper we did.

1:24:17.880 --> 1:24:30.690  
Simon Hoyle  
Umm del. Cloudy and I back in 2015 were with a hypothesis test for whether tags will make staff to, you know, after four or five, six or seven quarters. So that's something that that could be used.

1:24:31.960 --> 1:24:32.330  
Simon Hoyle  
Yeah.

1:24:45.840 --> 1:24:48.370  
mtv  
This is Matt. Vincent, can you hear me?

1:24:49.290 --> 1:24:50.640  
Aaron Berger  
Yeah, I can hear you, Matt. Go ahead.

1:24:50.250 --> 1:25:5.440  
mtv  
OK. Yeah. I had a question to Simon about the mixing that I've always struggled with with the tags is when you say that the tags are fully mixed, do they need to be mixed just with the?

1:25:6.440 --> 1:25:19.360  
mtv  
Why the region that they're released from? Or do they need to be mixed with the entire population? Because in some regards it seems like if if you can.

1:25:20.760 --> 1:25:22.620  
mtv  
Reduce the stringency so that it's.

1:25:23.860 --> 1:25:44.660  
mtv  
Representative of the region. Then it can be used earlier, but then it might not necessarily inform your movement rates correctly, and so that's I've I've always struggled with. Yeah, if what mean? What does a fully mixed tag mean and at what level doesn't need to be mixed?

1:25:45.850 --> 1:25:54.580  
mtv  
In order to do this, and I guess I I didn't understand what you were saying about the test that were available in MULTIFAN.

1:25:55.350 --> 1:26:1.770  
mtv  
Because I wasn't aware of any other than the one that you had presented in your 2007 paper.

1:26:6.200 --> 1:26:6.690  
Simon Hoyle  
Right.

1:26:8.850 --> 1:26:18.280  
Simon Hoyle  
Sticking question the test that's available. It's not actually available in MULTIFAN it's it's I guess I misspoke, it's available in.

1:26:19.440 --> 1:26:22.70  
Simon Hoyle  
It's commonly used, I think.

1:26:23.830 --> 1:26:24.920  
Simon Hoyle  
With each of the.

1:26:26.360 --> 1:26:30.290  
Simon Hoyle  
WCPO assessments by SPC when using Multifan.

1:26:32.360 --> 1:26:40.60  
Simon Hoyle  
And I can't remember all the details of it, but it's I think it was applied recently in a paper by.

1:26:41.910 --> 1:26:44.460  
Simon Hoyle  
Tom Peatman looking at mixing.

1:26:46.520 --> 1:26:48.710  
Simon Hoyle  
So yeah, I guess we can talk about that offline.

1:26:51.200 --> 1:26:59.600  
Simon Hoyle  
The other point about how whether tags need to be mixed. I guess in my opinion is that they.

1:27:2.930 --> 1:27:4.700  
Simon Hoyle  
They need to be mixed within the.

1:27:5.510 --> 1:27:7.680  
Simon Hoyle  
Region in which they're being used so.

1:27:8.720 --> 1:27:9.190  
Simon Hoyle  
Umm.

1:27:10.560 --> 1:27:25.800  
Simon Hoyle  
Simply so that you know the catch that you've got the proportion of tags and the cat should be the same as the proportion of tags in the population or in the in the vulnerable population within that particular region and. And if you're going to a different region.

1:27:26.520 --> 1:27:34.60  
Simon Hoyle  
Then you've got movement to that other region. Then they. If you're making inferences using the data from that other region, then they need to be.

1:27:34.780 --> 1:27:40.890  
Simon Hoyle  
This sorry from the tagging data on that other region, then the tags need to be mixed within that region as well.

1:27:42.340 --> 1:27:48.150  
Simon Hoyle  
But if you're not, if you, you know, if you, if you disregarding the text in that region, then.

1:27:49.800 --> 1:27:58.960  
Simon Hoyle  
They don't need to be mixed in that original, I guess vice versa if if the if they're not gonna be mixed in that region, then you can probably just district it's best to just disregard the tags there.

1:28:1.200 --> 1:28:1.970  
Simon Hoyle  
I have that helps.

1:28:4.60 --> 1:28:13.690  
mtv  
I guess my follow-up question would then be, how do you disregard them? Because if you just remove them, you'll potentially just be putting them into natural mortality.

1:28:14.570 --> 1:28:15.830  
mtv  
And that seems.

1:28:16.880 --> 1:28:21.930  
mtv  
Like a worse problem that you'd be inflating natural mortality than potentially having a.

1:28:22.800 --> 1:28:24.50  
mtv  
Higher AFF or something.

1:28:25.230 --> 1:28:37.520  
Simon Hoyle  
Yeah, I think you can just regard them by not including them in the model fit and setting your reporting rates to zero and then the model doesn't expect them and it doesn't see them. So it's you're just ignoring them essentially.

1:28:43.530 --> 1:28:56.230  
Aaron Berger  
Thanks, Matt and Simon. Yeah, tag mixing, certainly a huge topic and one that hopefully we can bring up again at the March workshop. I was gonna give the last question to raise your hands up, Rick, or maybe he had to go.

1:28:58.570 --> 1:29:1.120  
Rick Methot (Guest)  
No, I put it down. It's haven't covered it very well.

1:29:3.80 --> 1:29:9.450  
Aaron Berger  
OK, OK, great. Well, it's it's we're at the stopping point for today.

1:29:10.750 --> 1:29:23.710  
Aaron Berger  
I did want to remind everybody to register for the March workshop because we hope to continue to hear your thoughts on spatial stock assessments and the software that is used to support them.

1:29:25.740 --> 1:29:31.10  
Aaron Berger  
Thanks to our presenters today, John and Brian and to the rest of you all for joining today.

1:29:33.160 --> 1:29:34.120  
Aaron Berger  
And.

1:29:35.610 --> 1:29:37.610  
Aaron Berger  
Let's see over John. Did you want to say something?

1:29:39.370 --> 1:29:43.810  
Jon Deroba  
Uh, yeah, it's a question not about fitting stock assessments.

1:29:44.970 --> 1:29:58.370  
Jon Deroba  
And you don't have to answer this today. I'm just wondering where you and the organizers see the finish line being for this work, I mean due to COVID and stuff, a lot of this has been delayed.

1:29:59.210 --> 1:30:1.780  
Jon Deroba  
Uh, we have the March meeting in New Zealand.

1:30:2.940 --> 1:30:12.720  
Jon Deroba  
We've gotten updates from the groups and we're at various stages of getting into the multi areas spatially explicit fitting. Most groups haven't touched the other species yet.

1:30:13.340 --> 1:30:23.210  
Jon Deroba  
Umm, so I would I just wanted any sense and it doesn't even have to be today. You can e-mail me later or something like just wondering where is the finish line and how are we feeling?

1:30:26.450 --> 1:30:32.510  
Aaron Berger  
That's a great question, John. And I think there the finish line is a is a Gray zone.

1:30:34.70 --> 1:30:50.240  
Aaron Berger  
That's not clearly defined. I think the hopes is that we'll have a little bit more discussion. Well, clearly a lot more discussion at the workshop including getting some updates from presenters and you know where they've gotten to date because that's still 60 days out or so.

1:30:50.630 --> 1:31:11.730  
Aaron Berger  
Umm. And then you really used the workshop as a discussion forum to, you know, highlight and bring it, bring about some of these issues that we've been talking about this, especially the decision points. So in some sense the the objective of eliciting decisions and things that people go through when developing a spatial stock assessment, well, we don't have to have a perfect model for.

1:31:12.680 --> 1:31:34.350  
Aaron Berger  
We'll also be sharing kind of what the quote UN quote truth is from the operating model. So people can start to explore and look at that as well. And then also putting together what everybody's done so far into kind of just a a comparison of of different approaches. Anyways to tackling the problem. So those are all kind of coming up for the March workshop. And then beyond that.

1:31:35.650 --> 1:31:53.640  
Aaron Berger  
There is, I'll share some early thoughts at least on will potentially reach out to folks see if there's interest in the special issue, which then essentially would mean individual teams can take and continue on what they're doing and and submit as a publication some of their findings that way.

1:31:53.910 --> 1:32:1.300  
Aaron Berger  
Umm. Again at the workshop, there's probably getting it. Well, I know there'll be discussion on people's preferences on some of these things so.

1:32:2.10 --> 1:32:5.470  
Aaron Berger  
That's an incomplete answer other than I there is no.

1:32:6.240 --> 1:32:27.960  
Aaron Berger  
You know full finish line per se at this point, but in terms of expectations from the organizing side, we were really hoping that teams can participate either in person or remotely, at least one member, preferably all from each team at the workshop. And then you know, everybody's been gracious already with donating their time towards this so.

1:32:29.270 --> 1:32:31.330  
Aaron Berger  
We'll just kind of see how people.

1:32:32.80 --> 1:32:33.200  
Aaron Berger  
Want to take it from there?

1:32:34.360 --> 1:32:40.260  
Aaron Berger  
And anybody else wanna add Simon, Pat, Dan organizers that want to add to that.

1:32:42.770 --> 1:33:9.500  
Dan Goethel  
No, I mean, I think you got it mostly I would just say the workshop is kind of the the main stopping line. But if there's enough interest in terms of the special issue, I think that's like where groups can kind of take it to the to the ultimate finish and hopefully we can come up with some ideas that maybe groups can work together a little bit after the workshop to develop some papers and do some of their own comparisons and things like that.

1:33:9.860 --> 1:33:24.730  
Dan Goethel  
Umm but yeah, if people have interest in a special issue if you know specific topics that they would be interested in publishing in terms of this, definitely let us know so we can kind of get that ball rolling to see if we have enough interest to pursue that further.

1:33:29.60 --> 1:33:36.870  
Aaron Berger  
Yeah. Thanks, Dan. And and and we can follow up with an e-mail essentially saying that that's on the two to To Do List here coming up shortly.

1:33:37.820 --> 1:33:39.50  
Aaron Berger  
Umm is that help John?

1:33:41.600 --> 1:33:42.720  
Jon Deroba  
Yeah. Thanks very much.

1:33:43.570 --> 1:33:47.730  
Aaron Berger  
OK, cool. All right. Well, thank you again everybody, for joining today.

1:33:49.370 --> 1:33:52.760  
Aaron Berger  
Look forward to seeing your registration to the workshop.

1:33:54.290 --> 1:33:57.140  
Aaron Berger  
And have a great rest your day. Thanks.