0:0:0.0 --> 0:0:0.660  
Aaron Berger  
All right.

0:0:3.390 --> 0:0:10.700  
Aaron Berger  
Well, let's go ahead and get started. Welcome, everybody to the third webinar in our series of four.

0:0:11.560 --> 0:0:16.790  
Aaron Berger  
Umm for the spatial stock assessment simulation experiment.

0:0:17.560 --> 0:0:41.900  
Aaron Berger  
Umm, that, you know, are all quite familiar with today. We've got three teams that will be presenting work that is ongoing, it's in progress. So it's a progress update of sort see where they're at and investigate some of the things that they've been working on, struggling with, et cetera. So we're really excited we have.

0:0:43.0 --> 0:0:49.840  
Aaron Berger  
A-Team from ISIS and the and in particular the Spanish Institute of Motionographer, who will start us off.

0:0:50.540 --> 0:1:0.370  
Aaron Berger  
Umm using stock synthesis as a modeling framework, they're gonna go first and then after them we've got a team that's using Gadget.

0:1:1.370 --> 0:1:13.310  
Aaron Berger  
After that we do have a longer schedule today than the other ones. So after the second team, we will take a little break. Just let everybody knows we will have a break today, a short break at least to get up and stretch your.

0:1:14.520 --> 0:1:38.670  
Aaron Berger  
Use the restroom or what you have you and then the third team we have today is working with Castle Castle 2 as a framework and that one will be interesting because it will be the first team that's presenting on the use of the antique toothfish simulated data set. So the others have so far been presenting on yellowfin tuna.

0:1:39.650 --> 0:1:45.180  
Aaron Berger  
And so that will be the first one with a different data set. So some interesting nuances there.

0:1:45.890 --> 0:1:56.710  
Aaron Berger  
Umm, I did want to also just mention that the 4th webinar that we have is scheduled for January 4th just after the new year. I'll send out a reminder to everybody.

0:1:57.510 --> 0:2:24.90  
Aaron Berger  
On that, when that is about a week early. But I just wanted to announce that here because a week early is right during the holiday time and sometimes emails and notifications such as that you don't get lost at that time of year. So just put reminder that that's coming up teams that will be presenting then are folks taking a spatial temporal approach to their assessment model as well as a team called spasm who is working with.

0:2:25.180 --> 0:2:30.540  
Aaron Berger  
It stands for spatial processes and stock assessment methods. It's a little bit more of a research based.

0:2:33.730 --> 0:3:4.180  
Aaron Berger  
Program or software that's used and they will be presenting also on the 4th. So we've got those coming. Lastly, an announcement just reminder that our in Person Workshop is scheduled for March 3rd or sorry March 5th through the 7th that's in Wellington, New Zealand and we are really excited to finally be able to have that which is really important because that's the culmination of you know getting eat all the our teams together. These webinars are great.

0:3:4.550 --> 0:3:12.880  
Aaron Berger  
Umm. And they're kind of greasing the wheels, if you will, towards that workshop. But we really think that's where we're going to collectively be able to.

0:3:13.600 --> 0:3:22.390  
Aaron Berger  
Make some progress. So we're really hoping people are going to be able to attend that there will be remote connection as well for those that can't. So just keep that in mind.

0:3:23.570 --> 0:3:39.740  
Aaron Berger  
Regarding the workshop, I will be sending out a tentative agenda to everybody, so you have a little bit more of an idea of what exactly we'll be doing there, but but in short, we're going to be talking with the participants and perhaps some other presentations as well. And a lot of discussion.

0:3:41.60 --> 0:3:58.990  
Aaron Berger  
As well as the attentive agenda I'm gonna send out a Google form to you all, just to kind of gauge plans, travel plans to be there, folks that want to participate but can only do remotely and things such as that. So keep a lookout for those going to be coming out shortly within the next week or so.

0:4:0.270 --> 0:4:6.170  
Aaron Berger  
Alright, I think that's all the announcements I had and the intro. So let me go ahead.

0:4:7.170 --> 0:4:14.550  
Aaron Berger  
And introduced the first team today, which is the team from.

0:4:16.30 --> 0:4:30.100  
Aaron Berger  
The Icies region, in particular the Spanish Institute of Oceanography. They're gonna be using CSS3. We have two presenters. They're gonna split their talk in half. The first is Francisco Esquerdo.

0:4:30.780 --> 0:4:33.910  
Aaron Berger  
Umm. And then also John Carlo grea.

0:4:34.850 --> 0:5:2.860  
Aaron Berger  
Uh Francisco has a degree in marine sciences from the University of Alicante in Spain and a Masters in Biostatistics from the University of Valencia, where he worked on species distribution by fitting Bayesian spatio temporal hierarchical models. Currently, he has a PhD student at the Spanish Institute of Oceanography working on stock assessment and spatio temporal distribution modeling.

0:5:4.190 --> 0:5:33.720  
Aaron Berger  
Uh Fran has been doing stock assessments since 2020 and has primarily worked with IC's S Atlantic hake stock using a separated stock synthesis model. So Frank's gonna be doing the first half of their presentation and then the second-half is gonna be by John Carlo and he is a fisheries biologist with a Masters of science in studies of applied mathematics from the San Marcos National.

0:5:33.840 --> 0:5:47.110  
Aaron Berger  
University in Peru John Carlo worked at the Marine Institute to of Peru, where he investigated the population dynamics and spatial ecology of small pelagic fishes in the northern Humboldt current system.

0:5:47.960 --> 0:6:17.440  
Aaron Berger  
He received his PhD from Oregon State University, where he investigated the impacts of climate on fish, somatic growth using population dynamic models, and currently John Carlo is a postdoctoral fellow at the University of Washington in Seattle, where he is developing new approaches to model somatic growth in state space stock assessment models. So with that, Fran, I'm going to hand it over to you to share your screen and you can go as soon as you're ready.

0:6:21.590 --> 0:6:22.870  
Francisco Izquierdo  
OK. Can you hear me?

0:6:23.690 --> 0:6:25.210  
Aaron Berger  
Yes, you sound very clear.

0:6:26.170 --> 0:6:30.20  
Francisco Izquierdo  
OK. And can you see the presenting mode?

0:6:30.590 --> 0:6:32.990  
Aaron Berger  
Yeah, it looks perfect. Thanks.

0:6:33.350 --> 0:6:46.660  
Francisco Izquierdo  
OK, cool. Well, thank you for the introduction. I, I'm Fran, and I'm gonna explain you the modelling progress that we have been doing for the yellowfin tuna data set with the touching bases.

0:6:49.540 --> 0:7:18.850  
Francisco Izquierdo  
And we started this presentation in six steps or points. In the first case in the 1st place, we explored the the data provided by the project and the 2nd place we did as CPUE standardization. In the Third Point, we will see the stock synthesis, parameterization and some key or main decisions that we took in the fourth step. We will see the page models that we achieved and some diagnostics.

0:7:19.620 --> 0:7:22.170  
Francisco Izquierdo  
And in the 5th and we will see the provisional.

0:7:22.750 --> 0:7:25.650  
Francisco Izquierdo  
Every for 20 assessment models.

0:7:26.470 --> 0:7:30.720  
Francisco Izquierdo  
And and at last we will see some future steps.

0:7:33.100 --> 0:7:36.710  
Francisco Izquierdo  
OK, so we exploded the they provided data.

0:7:37.310 --> 0:7:45.560  
Francisco Izquierdo  
In the case of areas we can see we have two different configurations. The one area and the four area.

0:7:47.360 --> 0:7:47.730  
Francisco Izquierdo  
1.

0:7:48.680 --> 0:7:52.370  
Francisco Izquierdo  
And regarding the cuts, what we we show is.

0:7:54.30 --> 0:8:5.210  
Francisco Izquierdo  
A1 is the one with the higher number of catches followed by Area 4 and if we look at the fleets pursuing is the one displaying the the bulk of the catches followed by troll.

0:8:8.210 --> 0:8:11.140  
Francisco Izquierdo  
Well, it look if we look at the frequency distribution.

0:8:11.870 --> 0:8:28.100  
Francisco Izquierdo  
A similar as we have seen in the cats, the area one is the one displayed in the the fire number of data frequency distribution and regarding the fleets, the Porsche is the one.

0:8:28.200 --> 0:8:32.890  
Francisco Izquierdo  
A display and also the the higher number of information.

0:8:34.180 --> 0:8:47.720  
Francisco Izquierdo  
What we can see in the right plot, we look at the distributions by fleet, is that more or less all of the the fleets have a range from 50 to 150 centimeters for the yellow film.

0:8:48.810 --> 0:8:54.410  
Francisco Izquierdo  
And we point here that the long line seems to be the fleet catching the the bigger individuals.

0:8:57.520 --> 0:9:1.300  
Francisco Izquierdo  
OK, so here we also analyze the 221.

0:9:1.400 --> 0:9:11.350  
Francisco Izquierdo  
And that's it. And we made this discretization of different ranges for small, medium and big individuals.

0:9:12.80 --> 0:9:22.680  
Francisco Izquierdo  
And if we look at the left plot, we can see the that the smaller individuals are targeted by pursuing and they are mainly located in Area 1 and area 4.

0:9:23.660 --> 0:9:31.290  
Francisco Izquierdo  
And regarding the longline fishery for the bigger individuals and we can see that they are found in area one in area.

0:9:31.770 --> 0:9:34.490  
Francisco Izquierdo  
Hey 2 in India for mainly.

0:9:38.650 --> 0:9:55.70  
Francisco Izquierdo  
OK, regarding the tagging data, we know that all of the tasks were made in the area one and all of the recaptures were done by pursuing in mainly in area 1 followed by Area 2 and a bit of them in the area 4.

0:9:58.310 --> 0:10:1.680  
Francisco Izquierdo  
OK. So regarding the CPUE standardization.

0:10:2.280 --> 0:10:24.790  
Francisco Izquierdo  
A as a warden is to fit a spatial stock assessment model and we thought that it would be very important to take into account the spatial temporal autocorrelation in the Amanda changes or in the CPUE in this case. So what we did was to fit a three different Bayesian spatial temporal models with in law.

0:10:26.50 --> 0:10:53.620  
Francisco Izquierdo  
And well, you have here the three models. In the first case we have the random effects model. This is not a truly special effect or or model, but we have this random effect for it. One of the of the sales in the study area. So we are somehow taking into account the differences in the in the variability among them. We also included in the rest of models smoother effect friend for the variable.

0:10:55.250 --> 0:11:5.860  
Francisco Izquierdo  
And well, the second model we tried is the best model. The second model is often used in spatial epidemiology.

0:11:6.660 --> 0:11:7.530  
Francisco Izquierdo  
And.

0:11:8.660 --> 0:11:16.0  
Francisco Izquierdo  
And these model contains a special structure. This component and also the the added the smoother thread.

0:11:17.140 --> 0:11:23.610  
Francisco Izquierdo  
And I can explain you a little bit better that the special effect implies that.

0:11:23.710 --> 0:11:47.280  
Francisco Izquierdo  
A nearby things are similar, So what we do is we construct the neighbor matrix by Polygon continuity in order to create this spatial correlation structure and we end up with this connectivity diagram that you see here. So the model this effect is taking into account the spatial autocorrelation.

0:11:49.750 --> 0:11:55.470  
Francisco Izquierdo  
And now we go to the third case, which is the best service spatial temporal model.

0:11:56.140 --> 0:12:4.320  
Francisco Izquierdo  
And this one is what we would call a truly spatial temporal model, because in this case the special effect.

0:12:4.420 --> 0:12:11.130  
Francisco Izquierdo  
A has an interaction with the time, so in this case the best structure.

0:12:11.250 --> 0:12:17.300  
Francisco Izquierdo  
A is interacting with the with around the relative process of of order one.

0:12:23.610 --> 0:12:25.960  
Francisco Izquierdo  
OK, so here we can see the model selection.

0:12:26.700 --> 0:12:35.990  
Francisco Izquierdo  
And from the three models, the spatial temporal or the one providing the lower value of the indicators. So the one showing a better goodness of fit.

0:12:36.720 --> 0:12:46.370  
Francisco Izquierdo  
But also it was the one showing the most time consume as you can see by the height difference and I think this one is around.

0:12:47.280 --> 0:12:49.900  
Francisco Izquierdo  
From from two to three hours, more or less.

0:12:51.130 --> 0:12:53.370  
Francisco Izquierdo  
And so there were the rest model.

0:12:54.100 --> 0:13:12.980  
Francisco Izquierdo  
Here you have to mention that to get the final prediction of the CPUE we just sum the predicted values in the different cells by area in each one of the several years. So we end up for instance, if for the for the area case we these four scale indices.

0:13:14.50 --> 0:13:20.130  
Francisco Izquierdo  
And for the what area case you have here the what? The single area prediction?

0:13:21.410 --> 0:13:36.470  
Francisco Izquierdo  
And here, just to point in the orange and black one, which are the restaurant the the research only spatial and the random effect model give a very similar trend and they were satisfaction temporal. The blue one is the is the model given.

0:13:36.550 --> 0:13:41.460  
Francisco Izquierdo  
Say he will a bit different trend respect to the others.

0:13:44.10 --> 0:13:52.250  
Francisco Izquierdo  
Well, so here if you look at the map, what you can see is the spatial temporal prediction of the this visual spatial temporal model.

0:13:52.990 --> 0:13:59.500  
Francisco Izquierdo  
And we can infer or we can see how the relative abundance is moving in our studio area along the time.

0:14:0.210 --> 0:14:11.410  
Francisco Izquierdo  
A. From here it's clear that the area one and two are the most abundant areas and the area three and four are the Lisa random one and more similar between them.

0:14:13.670 --> 0:14:16.870  
Francisco Izquierdo  
Here, just to make the difference to explain a little bit.

0:14:18.80 --> 0:14:19.990  
Francisco Izquierdo  
If we think in the two first models.

0:14:21.150 --> 0:14:44.430  
Francisco Izquierdo  
They only have a single especially effect or the in the case of the model. For instance, a single special effect, so a single map for all model years or so two years. But in this case the the spatial temporal model contains a random field for each of the years and they are connected with an authoritative 1 correlation parameter.

0:14:45.100 --> 0:14:49.100  
Francisco Izquierdo  
So we think this is an important.

0:14:49.220 --> 0:14:54.100  
Francisco Izquierdo  
A thing to take into account when modeling this. This type of indices.

0:14:56.890 --> 0:15:3.450  
Francisco Izquierdo  
OK. And now the Third Point, the regarding the parameterization of stock synthesis and the key decisions.

0:15:4.930 --> 0:15:14.70  
Francisco Izquierdo  
We did the 180 and 480 a model configurations but inside of them we tried two different configurations. They show the year one and the year 1.

0:15:14.940 --> 0:15:21.730  
Francisco Izquierdo  
And they said the year 1, the idea is to build uh finescale model with all of the provided information.

0:15:22.650 --> 0:15:46.930  
Francisco Izquierdo  
In the experiment. So this means from zero to 28 years as seasonal 8 etcetera, and in the year case we wanted to build a model, we can say a more simplistic model in terms of the parameter input. Trying to emulate what we will have in a real case situation. So we have we are using only cabbage for instance.

0:15:49.40 --> 0:15:50.330  
Francisco Izquierdo  
Well, I I will explain it.

0:15:50.450 --> 0:16:5.310  
Francisco Izquierdo  
A bit better here and regarding the biology and the model, as I said, we just input the parameters as provided. So as you can see here for the 80s or so, yes, you have a really good inform model.

0:16:6.110 --> 0:16:14.400  
Francisco Izquierdo  
But in the case of the year for the natural mortality, we did the same across sessions for each eight. So we end up with the seven values.

0:16:15.720 --> 0:16:25.670  
Francisco Izquierdo  
Regarding the maturity, we did the average value across sessions and regarding the case, we just input the .45 cabbage.

0:16:28.320 --> 0:16:34.770  
Francisco Izquierdo  
For the spatial relationship, we just fix all parameters and we're provided and we are zero.

0:16:35.780 --> 0:16:39.630  
Francisco Izquierdo  
And for the growth, we also fixed all of the parameters are provided.

0:16:43.370 --> 0:17:2.400  
Francisco Izquierdo  
OK. And now we will see a bit and the decision or the important decision that we took when building the models in the the talking about the recruitment for instance in the model for the one area and for the area models, the recruitment takes takes place.

0:17:2.560 --> 0:17:9.750  
Francisco Izquierdo  
Uh. In each of each of the sessions? I mean seasonally. So in each of the years.

0:17:11.230 --> 0:17:31.60  
Francisco Izquierdo  
It said let, but in the year case, as we have a seasonal configuration, we could play a little bit more. With this we try different options but in the end in the one area model we estimated settlements in the months 147 and 10 so would be a key valent or seasonal as the year.

0:17:31.790 --> 0:17:33.480  
Francisco Izquierdo  
But in the fourth area model.

0:17:33.660 --> 0:17:40.170  
Francisco Izquierdo  
And as a first approach, as is a complex model with all of movement parameters and.

0:17:41.670 --> 0:18:11.60  
Francisco Izquierdo  
And stuff we will see now what we did was to set only recruitment settlements in the area one and we settled them in the beginning and in the middle of the year. And we think this will catch some how they variability along the year and also we set a time varying effect on the on on July on the on the second settlement to allow the model to change the proportion of the estimated proportion of recruits along the time.

0:18:14.150 --> 0:18:25.550  
Francisco Izquierdo  
And regarding the recruitment deviation, the advanced parameters, what we did in both models was to run the model with Hessian in order to get the stock synthesis suggestions.

0:18:26.180 --> 0:18:29.690  
Francisco Izquierdo  
And then we input these suggestions again in the in the models.

0:18:30.650 --> 0:18:42.410  
Francisco Izquierdo  
Hey, an important decision that we made here was to change the early year, no bias adjustment parameter from the value suggested of 9050 from s s.

0:18:43.90 --> 0:18:59.330  
Francisco Izquierdo  
29070 because we will we show that in 1970 is the period where when we start to have more information on length distributions and coming for the for the clips from the fleets. So in this case I think in 19.

0:19:0.460 --> 0:19:7.70  
Francisco Izquierdo  
If the we had information on one fleet only and in 1970 we started to have a around four fleet.

0:19:8.650 --> 0:19:10.850  
Francisco Izquierdo  
Providing frequently frequency distributions.

0:19:13.950 --> 0:19:35.210  
Francisco Izquierdo  
OK. Regarding the selectivity for both cases, so the yeah and yeah, we tried selectivity at 8 and selectivity at length configurations. Our hypothesis was that selectivity attacks may work better in a seven-year model because there is not a huge difference in growth across the child wages we could say.

0:19:36.0 --> 0:19:54.450  
Francisco Izquierdo  
And it will work a worse for the for the year model, right? So finally this is what happened. We selected the selectivity at age for the model and in the case of the year model, the selectivity at length was given a best performance.

0:19:56.570 --> 0:20:2.950  
Francisco Izquierdo  
And well, regarding the selectivity of the fleets, we set all of them double normal unless the long line.

0:20:3.760 --> 0:20:14.890  
Francisco Izquierdo  
And in the four area case A at the beginning we tried to estimate different selectivities for all of the fleets in the four areas, the fleets across the different areas.

0:20:15.370 --> 0:20:18.260  
Francisco Izquierdo  
A. At first they are different.

0:20:18.960 --> 0:20:46.80  
Francisco Izquierdo  
But what we show is that for fleets like pursuing, which is the one that is catching all of the sizes of the fish, it was not making sense that in the area 1, the selectivity was logistic. And then in the area for the selectivity was double normal. So following this and trying to start with a simplistic model, we just mirror all the selectivity parameters of the same fleets across areas.

0:20:46.900 --> 0:20:53.650  
Francisco Izquierdo  
It's true that we'll something for a fleet like the one calling others. That is a mixed fishery.

0:20:54.310 --> 0:21:3.740  
Francisco Izquierdo  
It could be interesting to try to let the model estimate different selectivities in the different areas, but this is something to to explore.

0:21:6.820 --> 0:21:12.450  
Francisco Izquierdo  
And OK and now regarding the tagging data, following the manual we.

0:21:13.840 --> 0:21:27.840  
Francisco Izquierdo  
Well, yes, autogenerated the all the parameters and we realized that the model was not well capable of estimating all of the parameters. So what we decided was to.

0:21:28.750 --> 0:21:47.520  
Francisco Izquierdo  
We'll take a information from the references that appeared in the real report, the assessment report of the stock, which are the initial tag parameter that we fix in a 10% the Tagalogs chronic. What we fix in at 3% and the mixing latency period.

0:21:47.990 --> 0:21:50.370  
Francisco Izquierdo  
Hey that we try some values.

0:21:50.530 --> 0:21:52.870  
Francisco Izquierdo  
A taking on the.

0:21:53.350 --> 0:21:55.360  
Francisco Izquierdo  
Umm, I've shared and expected.

0:21:55.570 --> 0:22:1.210  
Francisco Izquierdo  
A model fitting and in the end I think we end up with a value of three sessions.

0:22:4.490 --> 0:22:10.670  
Francisco Izquierdo  
Now talking about the movement, we have information about the movement from tagging data.

0:22:11.650 --> 0:22:25.150  
Francisco Izquierdo  
And we know that the fish uh is studied and recapture in area 1 to Area 1, Area 1/2, Area 2 and area 1/2 Area 4. But what happened with the area 3? Because it's not connected with the rest of them?

0:22:26.40 --> 0:22:44.700  
Francisco Izquierdo  
A we have here some ideas or points. The first one would be that the CPU is passion. Temporal maps that I showed you before indicate that the area 3 and area 4 are more similar in terms of relative abundance, so this could be a good connectivity.

0:22:45.820 --> 0:22:55.820  
Francisco Izquierdo  
Also that the CPUE is a scale as I mentioned in the previous slides. So we could assume a constant catchability parameter.

0:22:56.520 --> 0:23:10.230  
Francisco Izquierdo  
And we think that this will help also the model to to properly estimate the, the, the movement right and the Third Point is that we are assuming that all of the recruitment is taking place in area 1 by now.

0:23:10.960 --> 0:23:27.480  
Francisco Izquierdo  
Uh, and if the individuals uh, get out from area one, they must come back for reproduction. So with the ideas we define need a the movement between area 1/2, area 1/4 and area four and three.

0:23:31.720 --> 0:23:36.580  
Francisco Izquierdo  
OK, so now about the base model and diagnostics.

0:23:36.880 --> 0:23:54.130  
Francisco Izquierdo  
And as we said before, we have the one and four area configurations and we will need to, yeah, highlight that we tried the two options, the original CPUE they provided CPUE and the spatial temporal Bayesian CPUE.

0:23:54.960 --> 0:24:4.970  
Francisco Izquierdo  
And I have to say that in both cases we show a good performance across the different configurations regarding the retrospective.

0:24:6.840 --> 0:24:13.980  
Francisco Izquierdo  
Analysis or the diagnostics. But in the end we decide to select or to focus on the spatial temporal model configurations.

0:24:15.260 --> 0:24:20.340  
Francisco Izquierdo  
Because the CPU is taking into account the spatial temporal autocorrelation.

0:24:22.880 --> 0:24:30.810  
Francisco Izquierdo  
So here I'm presenting you the summary of the base model of 1 area in the year configuration.

0:24:32.370 --> 0:24:35.800  
Francisco Izquierdo  
These modelling class the CPUE spatial temporal.

0:24:36.0 --> 0:24:38.540  
Francisco Izquierdo  
A the for settlement.

0:24:39.340 --> 0:24:51.260  
Francisco Izquierdo  
The selectivity of pursuing longline and others. It's estimated that logistic, but within this is nothing to is not a big assumption. I mean it's fine by now.

0:24:52.90 --> 0:25:2.980  
Francisco Izquierdo  
And I have to say that the Italian data in the in this model in the year configuration without the tagging data, the model was not capable of estimate DF scale.

0:25:4.120 --> 0:25:31.490  
Francisco Izquierdo  
We try different things, but in any of the cases the model was estimated in an F higher than 0.05 or something like that for for the whole time series. So in this case the the tagging data is making a big impact, so it's informing on the fishing mortality, especially on the pursuing fleet and it's helping it seems it's it's helping the model to properly estimate the death and to get.

0:25:31.790 --> 0:25:32.120  
Francisco Izquierdo  
I.

0:25:32.190 --> 0:25:35.890  
Francisco Izquierdo  
OK, well a a lower volume mass, right?

0:25:38.810 --> 0:25:50.60  
Francisco Izquierdo  
Regarding their retrospectives, we can see that this model have a good retrospective pattern unless the retro or the bill #5 that is a bit out of the.

0:25:50.750 --> 0:25:51.910  
Francisco Izquierdo  
They intervals.

0:25:53.170 --> 0:25:58.30  
Francisco Izquierdo  
And it happened the same with the with the retros for the index for the CPU.

0:26:1.430 --> 0:26:3.840  
Francisco Izquierdo  
And you know, if I'm talking too fast, I'm sorry.

0:26:7.230 --> 0:26:12.420  
Francisco Izquierdo  
So here we have the base model for areas in your configuration.

0:26:13.620 --> 0:26:24.800  
Francisco Izquierdo  
And a well, the settings of this model are the CPUE spatial, temporal, the share catchability parameter across all of the areas.

0:26:25.810 --> 0:26:36.220  
Francisco Izquierdo  
And as I mentioned before, the settlement only in area one with the equipment set with with settlements in in the 1st and the seven months.

0:26:37.220 --> 0:26:39.370  
Francisco Izquierdo  
Hey we input also the movement definitions.

0:26:40.110 --> 0:26:54.320  
Francisco Izquierdo  
And again, this is that I have here in red. They happened the same with the Italian data in the four area model without tagging data the the model was not estimating an F higher than 0.05 or something like that.

0:26:55.330 --> 0:27:2.0  
Francisco Izquierdo  
And here I think I forgot to mention something that is good for discussion is interesting.

0:27:2.780 --> 0:27:4.520  
Francisco Izquierdo  
In the tagging data we have.

0:27:5.820 --> 0:27:11.70  
Francisco Izquierdo  
The mixing latency period parameter, which is a parameter that is.

0:27:12.460 --> 0:27:14.590  
Francisco Izquierdo  
Telling us how many seasons.

0:27:14.730 --> 0:27:24.420  
Francisco Izquierdo  
The needs a target fish to be recovered with equal probability in the whole area, right? So in the case of the for areas.

0:27:25.140 --> 0:27:35.230  
Francisco Izquierdo  
A this parameter is is fine. I mean it's important in the model properly because the model knows that for instance in Area 3 there is no tagging data.

0:27:36.550 --> 0:27:41.160  
Francisco Izquierdo  
So the model is is able to identify in which area we are tagging and recovering.

0:27:42.560 --> 0:27:56.0  
Francisco Izquierdo  
Just to mention that in the one area model we are assuming the various because this model is considering the whole area as a single one, so it's assuming that the fish can be equally found in the whole area.

0:27:56.200 --> 0:27:57.630  
Francisco Izquierdo  
A show.

0:27:58.360 --> 0:27:59.190  
Francisco Izquierdo  
Just mentioned this.

0:28:1.270 --> 0:28:3.460  
Francisco Izquierdo  
I here we can see that the red.

0:28:3.710 --> 0:28:11.260  
Francisco Izquierdo  
Those uh, from these four area model are fine for the USB and also for the indices.

0:28:13.660 --> 0:28:18.470  
Francisco Izquierdo  
And I think I'm done now. Young Carlo will present the configuration.

0:28:20.220 --> 0:28:21.550  
Francisco Izquierdo  
They will stop selling.

0:28:30.530 --> 0:28:35.810  
Giancarlo Correa  
OK, I am a really sharing my screen so let me know if you can see it yet.

0:28:37.180 --> 0:28:38.670  
Aaron Berger  
Looks good, John Carlo.

0:28:39.420 --> 0:28:45.210  
Giancarlo Correa  
OK, great. I will keep my camera off because just to save some Internet, I haven't having some problem with my.

0:28:48.110 --> 0:28:49.620  
Giancarlo Correa  
Hello I will keep it off.

0:28:50.340 --> 0:29:3.410  
Giancarlo Correa  
Umm, so OK, so so we're gonna, I am going to present the section about the seller GR configuration. As Francisco mentioned that this is a working progress we are we are still discussing many.

0:29:4.300 --> 0:29:8.50  
Giancarlo Correa  
A couple of things about the configuration that we are using and we are.

0:29:8.770 --> 0:29:14.470  
Giancarlo Correa  
Starting to understand where the reason of the differences between the both configurations.

0:29:16.150 --> 0:29:20.620  
Giancarlo Correa  
OK, so this is the some figures like submarines.

0:29:21.740 --> 0:29:24.970  
Giancarlo Correa  
So summary figures about the Sato GR configuration.

0:29:25.600 --> 0:29:34.810  
Giancarlo Correa  
And one of the things that we had some problems to understand at the beginning was about the parameterization of somatic growth.

0:29:35.340 --> 0:30:8.670  
Giancarlo Correa  
Umm. Especially we were not sure about what they mean. Letter Dash 0 should be and it it and also we were not sure if that is that is important because the Acero is not part of the population yet because the settlements occurs at age 1. So the model right now is the configuration of the model right now is in this way. So the model is assuming that the min layer that zero is the same or the min let at each one. So it's 22 centimeters and so now the things that I would like to discuss at the end of this presentation is that.

0:30:8.990 --> 0:30:29.900  
Giancarlo Correa  
If other groups have a similar configuration that this one, and if, if this is important again because I don't know how what are gonna be the impacts of this kind of configuration for H1 and all their edges. The mean database is very very very similar to the information provided. So we are pretty confident about the meaning that they.

0:30:30.420 --> 0:30:34.240  
Giancarlo Correa  
And one and all their for for for this configuration.

0:30:35.690 --> 0:30:40.260  
Giancarlo Correa  
Umm, OK. So for the selectivity of Francisco say we tried.

0:30:41.200 --> 0:30:45.760  
Giancarlo Correa  
Two different kind of selectivity selectivity at age and selectivity at length?

0:30:46.230 --> 0:31:16.750  
Giancarlo Correa  
Ohh we didn't find explicit information about what kind of selectivity we should use for this model and so that's why we wanted to try two different selectivities for both configurations and after SQL say like for the GR configuration it was hard to include the selectivity adage because in that configuration there there are only 7 edges. So in my opinion I think there is no enough information to estimate good a good selectivity for that.

0:31:16.820 --> 0:31:27.480  
Giancarlo Correa  
OK. Correlation. Because we only have 7 edges and there is no resolution. So for that reason in the gear configuration we use the selectivity at Len.

0:31:28.380 --> 0:31:34.100  
Giancarlo Correa  
However, for this configuration, we kept the selectivity at day.

0:31:34.860 --> 0:31:35.540  
Giancarlo Correa  
And.

0:31:36.220 --> 0:31:45.280  
Giancarlo Correa  
Because we see the fits for the selectivity at learning and selectivity at age, we are gonna find that the residuals are smaller for selectivity.

0:31:46.240 --> 0:31:49.930  
Giancarlo Correa  
And this is one of the things that we want to discuss here. This is for the one area model.

0:31:51.250 --> 0:32:20.30  
Giancarlo Correa  
In Francis, in a paper by Francis, 2016, I think or 2014 I. I don't remember right now. And he mentioned that in most cases that selectivity should be at land or land based. However, he also mentioned that in some cases when there is movement between areas, in those cases the selectivity at age could be that the best option. So that's something that we have no clear. We don't have the.

0:32:20.110 --> 0:32:29.350  
Giancarlo Correa  
Be some very clear right now is like why the selectivity at the edge is performing better in this case for the one I am model instead of the selectivity at length.

0:32:30.50 --> 0:32:30.450  
Giancarlo Correa  
Umm.

0:32:31.160 --> 0:32:37.50  
Giancarlo Correa  
Because there is no movement here. So we expect that to to to see a better performance for the selectivity at learn.

0:32:37.570 --> 0:32:44.600  
Giancarlo Correa  
Umm. So yeah, that was one of the results that we got and maybe it would be important to discuss that with the presentation.

0:32:45.330 --> 0:32:46.270  
Giancarlo Correa  
Umm.

0:32:48.720 --> 0:32:59.520  
Giancarlo Correa  
OK, now one of the other things that we are also discussing right now is about the effects of the dead tagging data for the one area model before starting this workshop, we were.

0:33:0.150 --> 0:33:22.100  
Giancarlo Correa  
We understood that the tagging data is important because it it provides information about the movement between ideas and for us, that was the main information that that kind of data provides. However, for that one area model, we don't have movement, we don't have areas. So one of the things that we are still discussing about what why they digging data is important for the one area model.

0:33:23.290 --> 0:33:35.900  
Giancarlo Correa  
And that's what people say. That's what, like, one of the things that we believe that this is the tagging data is, is is providing information, it's about the fishing mortality or the mortality in general. However, since we have the natural mortality fixed.

0:33:36.300 --> 0:33:39.240  
Giancarlo Correa  
And in this case, the fishing mortality.

0:33:40.150 --> 0:33:44.180  
Giancarlo Correa  
Mortality section that is is by changing.

0:33:45.70 --> 0:33:47.830  
Giancarlo Correa  
So this is a comparison between the spawning biomass.

0:33:48.640 --> 0:33:50.650  
Giancarlo Correa  
For the one area model.

0:33:51.640 --> 0:33:52.420  
Giancarlo Correa  
Uh.

0:33:53.380 --> 0:34:17.550  
Giancarlo Correa  
Including the standardized CPUE without touching data and the one area model with standardized CPUE including the tagging data. And as you can see there is a big difference in the spanning biomass. Here we don't include attaching data here. We have very huge respond environments for over the years, but when we include the digging data, it looks like spawning biomass is is is is better.

0:34:18.160 --> 0:34:40.450  
Giancarlo Correa  
And you know, talking about the scale and we see the fishing mortality as well. We are gonna see that the fishing mortality gives more better estimate when we include the tagging data. So that's one of the other point that we want to discuss is about what information provides that you data we only have one item is something that we want maybe to understand better.

0:34:42.370 --> 0:34:45.710  
Giancarlo Correa  
About that diagnostics, we didn't see like.

0:34:47.50 --> 0:34:58.590  
Giancarlo Correa  
Super bad patterns for their receipt. Once these are the receipt ones, what we observe, however, is some negative results. Consistent negative residuals for the beginning of the time period here.

0:35:0.90 --> 0:35:12.800  
Giancarlo Correa  
This is all this was the only strange or weird pattern that we found for the CPU wise, and we believe that the what this Gaussian this is that we are estimating the recruitment deviates.

0:35:14.750 --> 0:35:20.190  
Giancarlo Correa  
Starting from from 1G, I think was 1972 or something like that.

0:35:21.340 --> 0:35:31.330  
Giancarlo Correa  
So we believe that if we start to to estimate recruitment deviate before or before that year, we are gonna fix this receivers here.

0:35:32.10 --> 0:35:48.10  
Giancarlo Correa  
And the reason why we are starting to see recruitment deviates in that year is because we are starting to have Langley positions in that year or so. So in this case for this configuration for this model, then composition is an important.

0:35:49.600 --> 0:35:49.820  
Giancarlo Correa  
Good.

0:35:50.440 --> 0:36:1.380  
Giancarlo Correa  
Might information about the recruitment deviance in your opinion? So that's why we are estimating or we are starting to estimate the recruitment deviate front idea at that's something that we would like to discuss as well at the.

0:36:2.770 --> 0:36:12.890  
Giancarlo Correa  
I think what the presentation is that's a correct assumption. We should start to estimate recruitment deviate when we when we start to have good data or we can start to estimate deviates before that year.

0:36:13.960 --> 0:36:14.660  
Giancarlo Correa  
Umm.

0:36:16.230 --> 0:36:17.60  
Giancarlo Correa  
OK, cool.

0:36:18.530 --> 0:36:49.890  
Giancarlo Correa  
And these are some prospective patterns, but this is the respective analysis that we did for the one I model for the case of the Monroe index with the we, we got a pretty good index that's saying that there are no, we are respective pattern here. However, for the predictive skill of the model, this is an index that is telling me information about the predictive skill of the model. We are not getting good result for this index. We expect to have this index of smaller than one. However, this index is pretty large.

0:36:50.300 --> 0:37:6.850  
Giancarlo Correa  
And and it's we see the plot here. We're gonna find that the predictive skill is gonna be pretty bad. It will remove AGS of data for the CPUE. In this case, there is gonna be always sending a bias here when talking about the predictive skill of the model.

0:37:9.390 --> 0:37:15.360  
Giancarlo Correa  
OK, for the for Alan Model, again, this configuration is pretty similar.

0:37:16.20 --> 0:37:25.530  
Giancarlo Correa  
Umm. And this this configuration when we include this a standardized CPU we include that so tagging data movement and the treatment between areas.

0:37:26.80 --> 0:37:34.130  
Giancarlo Correa  
Umm, I think this blood is is pretty clear already and for this guy we also use the selectivity at age.

0:37:36.180 --> 0:37:38.810  
Giancarlo Correa  
And again, we run some diagnostics for this.

0:37:40.0 --> 0:38:0.130  
Giancarlo Correa  
For this runs, we didn't find we are pattern for the for the residual for the index except for the early years. And I think that what discussing this negative residuals is the recruitment estimates that we are assuming and also the residuals for the for the mainland.

0:38:1.770 --> 0:38:2.530  
Giancarlo Correa  
Which fishery?

0:38:4.920 --> 0:38:22.810  
Giancarlo Correa  
And similarly here we the Monroe Index was pretty good. So we didn't find a retrospective pattern here and also the predictive skill for some indices are we're pretty bad especially for the index one or for the for the CPU one or for the CPU for.

0:38:26.480 --> 0:38:32.790  
Giancarlo Correa  
OK, this and then the next the analysis that we perform was the production model.

0:38:33.970 --> 0:38:45.300  
Giancarlo Correa  
In this case, we use the speech model, which is a stochastic soft production model in continuous time. For this model, the input data is gonna be the cache data in tons.

0:38:47.660 --> 0:38:56.310  
Giancarlo Correa  
And we use it catch data and original CPU as well, but also we included the spatial temporal CPU with the standardized CPUE that we use for for the computation that we showed.

0:38:59.80 --> 0:38:59.650  
Giancarlo Correa  
And then.

0:39:1.470 --> 0:39:12.770  
Giancarlo Correa  
I move, I move the result here. These are the results of the sub production model. As you can see here the the red line is a result of this surplus production model.

0:39:13.530 --> 0:39:15.180  
Giancarlo Correa  
And we have four different.

0:39:15.280 --> 0:39:20.830  
Giancarlo Correa  
A before different the results for the for the all the configuration that we use show.

0:39:23.160 --> 0:39:44.790  
Giancarlo Correa  
This is a result that is still in progress because we want to do this analysis for all their replicates. This is this plot is you showing the the result for the first replicate is. You're only for a single replicate, so maybe this is too. This is still too early to get conclusion from this analysis, but what we can see here is that the one area model which is the.

0:39:45.370 --> 0:40:16.200  
Giancarlo Correa  
A green line and the blue line are pretty similar to the speak model to the surplus production model and you can see here, but for the four area model, we got different results for the GR configuration and sell dog R configuration. The purple line here is estimating higher biomass than this the speech model and the GR configuration is estimated lower biomass standard speak model. So as I said it's I think it's still too early to get conclusion from this.

0:40:16.300 --> 0:40:22.500  
Giancarlo Correa  
Analysis and hopefully we are going to present the final results in the next in the next meeting.

0:40:24.160 --> 0:40:46.440  
Giancarlo Correa  
And then we run some provisional 20 assessment considering 20 replicates for the one I model. These are the result for the one I am model and we are showing here the older runs that we have for the fishing mortality and spawning biomass and this first column is for the Synology year PY means cello gear and the Y means Ligia configuration.

0:40:48.590 --> 0:41:4.110  
Giancarlo Correa  
This is again this is for 20 replicates, as some provisional results, and what we can see here, so that the spawning violent trends over time are pretty similar for both configurations. However, there is a small difference in the scale.

0:41:4.530 --> 0:41:24.140  
Giancarlo Correa  
Uh. Between the server jar configuration and the year configuration? I think the the spawning biomass is a little bit smaller for the salvager configuration compared to the jar configuration. And again we got some kind of descriptive statistics for this for these runs.

0:41:25.880 --> 0:41:33.760  
Giancarlo Correa  
Maybe the most important one is the percentage of convergent runs for the gear configuration with found out.

0:41:33.840 --> 0:41:43.970  
Giancarlo Correa  
The 85% of convergence and for the Steven your configuration with online 95% and again it looks like the CB.

0:41:44.160 --> 0:41:53.80  
Giancarlo Correa  
And for the spawning biomass fishing mortality, as recruitment is a little bit higher for the seller. You are configuration compared to the general configuration.

0:41:54.210 --> 0:42:0.240  
Giancarlo Correa  
And this results are for the one area model and this results are for the two area model.

0:42:1.150 --> 0:42:18.800  
Giancarlo Correa  
And again, the temporal trends in spawning biomass and fishing mortality are pretty similar. However, the most the difference here is that the spawning biomass for the syllogism configuration in this case is a little bit higher compared to the GL configuration that we.

0:42:19.670 --> 0:42:38.480  
Giancarlo Correa  
And also we can observe that the variability among replicates are larger for the several year configuration compared to the GR configuration. This is the percentage of convergent runs for the GL configuration, while 75% and for the cello GR configuration it was 90%.

0:42:41.10 --> 0:42:57.710  
Giancarlo Correa  
OK, this was they were the the results that we have so far. As I say, we are still exploring other configurations and we are discussing the resource we are starting to understand where the reasons that these driving the differences between the GR configuration and the seller GR configuration.

0:42:59.420 --> 0:43:14.80  
Giancarlo Correa  
So this is these are only a few, a few points that we want to mention before a finishing this presentation and we want to keep exploring the trial without tagging data as I say one of the things that we want to understand that we want to make sure is that what?

0:43:15.600 --> 0:43:19.570  
Giancarlo Correa  
What information is providing the tagging data, especially for the one I am model?

0:43:21.220 --> 0:43:39.460  
Giancarlo Correa  
We want to try different recruitment settlement settings in the four area model, especially what happens if we don't have tagging data in the model. We want to see if the model is able to estimate recruitment among areas without the need of using tagging data or estimated moving parameters.

0:43:40.800 --> 0:43:44.180  
Giancarlo Correa  
Explore different movement movement settings in the four area model.

0:43:44.300 --> 0:44:0.190  
Giancarlo Correa  
And Francisco, right, you say the the the configuration that we use however we we are aware that there are other configuration that could be suitable for this for this experiment. So that's something that we are we are already exploring.

0:44:2.260 --> 0:44:21.260  
Giancarlo Correa  
Compare and discuss the difference between both configurations are compared and discussed the the difference between the one area and the four area configuration. Just understand what happens if we if N.O.R.E the spatial structure in the in the stochastic memorial and we only keep the model in one area configuration.

0:44:22.150 --> 0:44:31.570  
Giancarlo Correa  
And thank you for your attention. These are the the emails of the group and you can find more information also in the on these two websites.

0:44:32.940 --> 0:44:34.320  
Giancarlo Correa  
And thanks. Yeah.

0:44:38.980 --> 0:44:39.670  
Aaron Berger  
All right.

0:44:41.10 --> 0:44:46.730  
Aaron Berger  
Thanks, Fran, and thanks John Carlo for your presentation. It was very thorough.

0:44:47.110 --> 0:45:10.240  
Aaron Berger  
Umm. And and then. Thanks for staying on time. We we do have about 10-12 minutes for some questions right now. So folks go ahead and use the raise hand feature and I can call on you and just remind you we'll have 30 minutes at the end of all the presentations for a more broad discussion as well.

0:45:12.550 --> 0:45:18.140  
Aaron Berger  
So I'll just pause a minute so folks can collect their thoughts, but use the raise hand feature.

0:45:27.340 --> 0:45:30.620  
Aaron Berger  
Alright, Brian is the quickest with his hand. So Brian, I'm going to go to you first.

0:45:32.620 --> 0:45:33.470  
Brian Langseth  
Yes.

0:45:34.980 --> 0:45:35.570  
Brian Langseth  
Hi, Fran.

0:45:37.530 --> 0:45:43.400  
Brian Langseth  
First off, I really liked your presentation. We go after you. I feel like you've raised the bar.

0:45:44.220 --> 0:45:45.130  
Brian Langseth  
My question.

0:45:46.10 --> 0:45:50.870  
Brian Langseth  
Is in relation to the tagging data, particularly for the one area model.

0:45:52.150 --> 0:45:57.630  
Brian Langseth  
You showed that it's affecting fishing mortality estimates. I'm just curious kind of the.

0:45:58.380 --> 0:46:7.470  
Brian Langseth  
Hearing your thoughts on where that is coming into play M is being fixed and wondering if it's.

0:46:8.370 --> 0:46:14.550  
Brian Langseth  
Kind of alternating a total mortality estimate, and the only thing that can vary is the fishing mortality estimates.

0:46:15.290 --> 0:46:19.350  
Brian Langseth  
That's my thought, maybe out of left field, but curious if your thoughts.

0:46:20.320 --> 0:46:20.690  
Brian Langseth  
Thank you.

0:46:21.960 --> 0:46:23.570  
Francisco Izquierdo  
Of my my thought about.

0:46:27.650 --> 0:46:28.50  
Brian Langseth  
Just.

0:46:23.670 --> 0:46:28.550  
Francisco Izquierdo  
A. The fixed parameters you mean or? Sorry I didn't get it.

0:46:29.740 --> 0:46:34.750  
Brian Langseth  
What model parameters are being estimated when you turn tagging on for the 1 area?

0:46:35.600 --> 0:46:42.330  
Brian Langseth  
And how that translates into what the model is thinking the populations doing.

0:46:45.610 --> 0:46:53.220  
Francisco Izquierdo  
Well, as I understood from the what from the manual and also from some.

0:46:53.300 --> 0:46:55.760  
Francisco Izquierdo  
A comments in the forum.

0:46:57.10 --> 0:47:6.750  
Francisco Izquierdo  
The differential is regarding tagging data between the one area model and the four area. One is that in the four areas you can the model.

0:47:6.830 --> 0:47:11.420  
Francisco Izquierdo  
A. The model knows in which of the areas.

0:47:11.520 --> 0:47:20.660  
Francisco Izquierdo  
A what? Which fleet is acting in which of the areas? Right. So an important difference or an important point is that.

0:47:21.220 --> 0:47:36.630  
Francisco Izquierdo  
If the initial reporting rate for the fleets is gonna make a big impact on the model as we as we saw the beginning and as in the one area model, the if you let the model estimate all the initial reporting rate parameters.

0:47:38.350 --> 0:47:44.390  
Francisco Izquierdo  
It's expecting that all of the fleets can report again data and they were making a what a big impact.

0:47:44.950 --> 0:47:52.640  
Francisco Izquierdo  
A. This is something that that we fixed or we realize just setting the reporting rate for Porsche.

0:47:54.90 --> 0:47:54.960  
Francisco Izquierdo  
And.

0:47:56.110 --> 0:48:0.830  
Francisco Izquierdo  
But I I think I'm not answering your question. I I don't know. I'm I'm not sure if if I.

0:48:2.10 --> 0:48:3.40  
Francisco Izquierdo  
If I can answer it.

0:48:2.300 --> 0:48:8.880  
Giancarlo Correa  
And so I I think I think Frank, also the question is related to what parameters we estimated.

0:48:9.950 --> 0:48:15.810  
Giancarlo Correa  
Related to tagging for the one area model and I think the short answer would be.

0:48:14.280 --> 0:48:16.340  
Francisco Izquierdo  
Yeah, we we had only estimating the.

0:48:17.750 --> 0:48:18.400  
Giancarlo Correa  
Yeah, go ahead.

0:48:18.180 --> 0:48:26.870  
Francisco Izquierdo  
We're estimated we're estimating the initial reporting rate and the reporting rate decay. The rest of parameters are fixed by now.

0:48:27.850 --> 0:48:37.240  
Giancarlo Correa  
Yeah. And that's important to say that those parameters are being estimated only for the percent fishery, which is the only fishery that we get tagging data.

0:48:41.350 --> 0:48:49.770  
Francisco Izquierdo  
We also tried to to let the model estimate in fishery in long line not only percent because we thought that longline fishery could be also.

0:48:50.270 --> 0:48:58.300  
Francisco Izquierdo  
A collecting tagging data. But this is just a trial. We have a still.

0:48:59.170 --> 0:48:59.930  
Francisco Izquierdo  
OK passcode.

0:49:1.230 --> 0:49:16.170  
Giancarlo Correa  
Yeah. And that's just some of the discussion that we had at the beginning is that if we should get fix the parameter for all the other fleets, I mean all the other fields except the pound sign or we should let those fleets also to have.

0:49:17.720 --> 0:49:32.680  
Giancarlo Correa  
Estimate what parameter I think. I think what I am trying to say here is that we only have data for the full pool safe fishery and we wanted to understand what was the reason of that. It's only the reason is because the ponseti fishery is only fishery reporting tagging data.

0:49:33.470 --> 0:49:42.100  
Giancarlo Correa  
All because the points and Fisher is a fishery with a larger caches and that's why that fishery has a higher probability to report touching data.

0:49:42.790 --> 0:49:47.0  
Giancarlo Correa  
And I think in my, in our opinion, it's important to understand that aspect.

0:49:48.90 --> 0:49:59.340  
Giancarlo Correa  
Because that's gonna have some influence in if we fix the parameter for all the features except the pool sign or we estimate the parameter for all the features as well.

0:50:0.130 --> 0:50:8.640  
Giancarlo Correa  
That's something that we decided used to keep fix the parameter for all these features except the pool scene and all the parameter for the pool scene fishery.

0:50:9.340 --> 0:50:28.490  
Giancarlo Correa  
Yeah, because we only have the tagging data featuring and that's another part of your question I think was about the natural mortality of fishing mortality in this case, the natural mortality is a fixed, so all the variation and all the changes are are directed towards the fishing mortality.

0:50:29.410 --> 0:50:30.630  
Giancarlo Correa  
And that's what we believe.

0:50:31.130 --> 0:50:41.200  
Giancarlo Correa  
And maybe one of the questions that we are we also have is that what happens if we estimate the next time mortality, the natural mortality is gonna change it. We have the dodging data and the one I am model.

0:50:42.520 --> 0:50:45.270  
Giancarlo Correa  
Yeah. And that's something that we will really know what's going to happen.

0:50:51.550 --> 0:50:57.130  
Aaron Berger  
Alright, thank you very much for your responses Rick. I see your hand is up. Let you go next.

0:50:57.50 --> 0:50:59.830  
Rick Methot (Guest)  
Yeah, thank you and great presentations are really like it.

0:51:1.790 --> 0:51:5.720  
Rick Methot (Guest)  
One comment I would make is that in the.

0:51:7.280 --> 0:51:37.60  
Rick Methot (Guest)  
In the four area model and and the one area model for the per same because the person has such Dome shapes, selectivity that degree of Dome shapes, selectivity is really going to interact with the degree to which the tagging data can inform the fishing mortality rates. So that's something I don't think we looked at closely, but definitely don't shapes selectivities will interact with the inference about Z that comes from the tagging data.

0:51:37.360 --> 0:51:50.580  
Rick Methot (Guest)  
And I really like in your presentation that in the one area model you brought out the point that you really need to look at reporting rates for the other fleets. I think that was an important factor to bring to the forefront. Thanks.

0:51:52.790 --> 0:51:53.300  
Francisco Izquierdo  
Thank you.

0:51:57.580 --> 0:51:58.290  
Giancarlo Correa  
Thank you, Rick.

0:52:8.890 --> 0:52:11.420  
Aaron Berger  
OK. Any other questions or comments?

0:52:19.600 --> 0:52:23.290  
Aaron Berger  
I guess we'll folks are thinking I'll ask one, I was curious.

0:52:24.420 --> 0:52:26.550  
Aaron Berger  
Ohh, I'd Dan has his hand raised. Go ahead Dan.

0:52:29.630 --> 0:52:31.80  
Dan Goethel  
Yeah. Can you hear me?

0:52:32.450 --> 0:52:32.840  
Giancarlo Correa  
Yep.

0:52:32.200 --> 0:52:32.940  
Dan Goethel  
Slow Internet.

0:52:34.480 --> 0:53:1.530  
Dan Goethel  
Yeah. So I was just interested if you could talk a bit more about kind of your estimated movement rates and whether you have had any of the issues that we've seen in some of the previous models about kind of the confounding between recruitment and movement parameters. And you know, you said you fixed where the recruitment occurred in the spatial model. So I was wondering if that had any kind of a knock on effects on your movement estimates and things like that. Thanks.

0:53:7.660 --> 0:53:9.270  
Giancarlo Correa  
And you you wanna go ahead with that?

0:53:10.750 --> 0:53:15.30  
Francisco Izquierdo  
Yeah. Can you can you go to the movement like, I think it's the next one.

0:53:21.730 --> 0:53:35.270  
Francisco Izquierdo  
And well, they. The truth is that we haven't explored the interaction between the recruitment and the movement because we we ask end up with this model like a couple of weeks ago.

0:53:36.180 --> 0:53:37.130  
Francisco Izquierdo  
A.

0:53:38.300 --> 0:53:45.780  
Francisco Izquierdo  
Go ahead, go. We did was just to to set the well the the movement definitions that you can see here.

0:53:46.670 --> 0:53:56.560  
Francisco Izquierdo  
And with the recruitment we wanted to explore a the this interaction by letting the model having agreement in different areas, not only in Area 1.

0:53:57.330 --> 0:53:57.780  
Francisco Izquierdo  
But.

0:53:59.840 --> 0:54:19.690  
Francisco Izquierdo  
As a first approach, as we have to to define a different like, I think around 20 maybe a little bit less movement parameter for each decrement settlement from the source area to the rest of them. Increasing the recruitment areas will also increase quite a lot. This number of parameters.

0:54:20.550 --> 0:54:28.490  
Francisco Izquierdo  
A. So I don't have any by now information on that, but we we want to explore it for sure.

0:54:35.640 --> 0:54:35.970  
Dan Goethel  
To.

0:54:36.100 --> 0:54:36.370  
Dan Goethel  
And.

0:54:35.250 --> 0:54:37.750  
Giancarlo Correa  
Yeah, we we are at new. Sorry, sorry.

0:54:39.850 --> 0:54:48.220  
Dan Goethel  
Ohh no, go ahead. I was just gonna. I mean, I was just gonna ask if, you know, there was any issues estimating movement itself or you know what those estimates kind of looked like.

0:54:50.40 --> 0:55:19.330  
Giancarlo Correa  
Hi. Yeah. Yeah, maybe maybe after. After this different and show the the result of the movement. But that we we also had a discussion about that question that you you made is especially for Area 3 because we didn't have movement or touching information for area 3. So one of the questions that we had is like what happened with that area hold the model is going to estimate movement rates to that area and we don't have tagging information for that area.

0:55:19.890 --> 0:55:50.580  
Giancarlo Correa  
Then what it is going to see made a movement parameter or or or or. It's going to estimate the recruitment, higher recruitment or lower recruitment for that area. So we wanted we we want to explore what the model is gonna do with dietry, especially about the recruitment and movement. It's going to give more weight to the recruitment or it's nice to made a higher movement parameter. That's something that we don't know yet. So do you wanna show the the movement rates?

0:55:50.670 --> 0:55:51.240  
Giancarlo Correa  
That you.

0:55:52.190 --> 0:55:53.210  
Giancarlo Correa  
To cut.

0:55:52.730 --> 0:56:8.410  
Francisco Izquierdo  
No. Yeah. When? No, no, no. But about the movie. Well, two things. About what you just said. I have a guest that it's a if we if we just think on the movement, I think that the fact of having the constant catchability among areas.

0:56:9.150 --> 0:56:38.140  
Francisco Izquierdo  
A make somehow it might get. We have to explore it. But it's not gonna make a big difference if the connectivity with the area 3 is for the media four or is for the media two. I mean, because the model already has a the knows the the the level of abundance or the SMB that there is in each of the areas. So the movement rate parameters will be estimated to to raise that level.

0:56:38.810 --> 0:56:43.150  
Francisco Izquierdo  
That's my race. That's something that we still have to explore to change the the connectivities.

0:56:43.870 --> 0:56:47.800  
Francisco Izquierdo  
And reading the estimated parameter that you were mentioned.

0:56:50.970 --> 0:57:9.760  
Francisco Izquierdo  
We still have some touching the bounds. It's true that I I think was one from your suggestions, we were fixing the resident parameter in in one, and now that we change it to my new 0.25, I think one 8070% of residents.

0:57:10.380 --> 0:57:21.100  
Francisco Izquierdo  
A. The bounds are I mean there are less parameters touching the the the upper and the lower bounds, but we have we still have to to to explore that.

0:57:28.810 --> 0:57:44.400  
Aaron Berger  
Yeah, I have a little bit of a similar follow-up question, if I can. I was really curious, you know the difference you had between your one area model while let me start with the the similarity with the one area model and the surplus production.

0:57:45.610 --> 0:57:48.110  
Aaron Berger  
Model that you guys did to to.

0:57:48.850 --> 0:57:58.480  
Aaron Berger  
There's an additional diagnostic or model to run, and then the difference between those that set and then you're 4 area model.

0:57:59.540 --> 0:58:30.610  
Aaron Berger  
And, Umm, the the difference? Yeah, exactly. The difference in scale. And I can see that arising with the addition of tagging day and working through all the additional things and potential confounding that movement recruitment and things like that that interact when you move to a multi area model. But I was curious if you had any hypotheses about why it's the directional difference between the time component there, right, the single year versus the pseudo year?

0:58:32.50 --> 0:58:36.860  
Aaron Berger  
And do you think that has to do with the way that the the?

0:58:37.650 --> 0:58:44.520  
Aaron Berger  
The year model averaged over the pseudo year values, the biological values or any just any other thoughts on?

0:58:46.780 --> 0:58:48.880  
Aaron Berger  
That bidirectionality of scale here.

0:58:58.210 --> 0:59:0.160  
Giancarlo Correa  
I don't know. I I kind of start with that.

0:59:1.740 --> 0:59:2.270  
Giancarlo Correa  
I am.

0:59:3.570 --> 0:59:27.100  
Giancarlo Correa  
I don't know. I don't know if I we can get this conclusion from this experiment. Yeah, that's I said there was only for a single replica. So we are not sure if for the older replicates we are gonna find the same pattern for this analysis. And that's something that we are going to update for the next meeting only for this single replicate. We found that.

0:59:27.720 --> 0:59:32.260  
Giancarlo Correa  
It is a four area model with a cell Dodger configuration.

0:59:33.10 --> 0:59:36.410  
Giancarlo Correa  
Had high responding biomass in this case.

0:59:37.100 --> 0:59:53.230  
Giancarlo Correa  
But however, for other replicates, we found that the biomass for the four area model several gear configuration was lower and does it show here? For example, we see all the replicas we are gonna see that the.

0:59:53.830 --> 0:59:58.590  
Giancarlo Correa  
A medium was spawning biomass across. Replicates are gonna be a little bit.

1:0:0.430 --> 1:0:1.860  
Giancarlo Correa  
So my guess is that.

1:0:2.780 --> 1:0:7.510  
Giancarlo Correa  
I I think it's still too early to get some conclusion from this analysis.

1:0:9.630 --> 1:0:26.790  
Giancarlo Correa  
So yeah, yeah, actually, I I I don't know what to say about the that question, because I think that we we need to run more replicas to to really understand what is driving these difference in, in, in biomass in the scale of the biomass. Then if you you have some hipotesis about.

1:0:32.330 --> 1:0:33.360  
Francisco Izquierdo  
And.

1:0:32.650 --> 1:0:34.330  
Aaron Berger  
Well, yeah, girlfriend.

1:0:34.980 --> 1:0:35.600  
Francisco Izquierdo  
No, no, no, no.

1:0:35.680 --> 1:0:36.90  
Francisco Izquierdo  
I.

1:0:39.270 --> 1:0:47.440  
Aaron Berger  
Well, I I just wanna say I think that's reasonable. I mean you could expect variability to be higher I suppose in the Fourier model, so waiting to see how those replicates.

1:0:49.260 --> 1:0:50.80  
Aaron Berger  
Pan out.

1:0:50.820 --> 1:0:51.300  
Aaron Berger  
Umm.

1:0:57.210 --> 1:0:57.470  
Giancarlo Correa  
Yeah.

1:0:52.70 --> 1:1:4.370  
Aaron Berger  
Is a worthy thing because the you know the confidence bounds on there might drastically overlap. So I think that's a good point. I did see one last maybe Dan raised his hand in response to this question or do you have something new?

1:1:8.310 --> 1:1:8.980  
Dan Goethel  
That was it.

1:1:10.730 --> 1:1:19.860  
Aaron Berger  
OK. OK, great. OK, well, let's, let's pause here again. There's more time for questions. In the 30 minutes at the end.

1:1:21.230 --> 1:1:23.930  
Aaron Berger  
Thanks very much, Fran and John Carlo for.

1:1:24.630 --> 1:1:25.610  
Aaron Berger  
Presenting.

1:1:25.130 --> 1:1:25.640  
Francisco Izquierdo  
Thank you.

1:1:27.40 --> 1:1:27.400  
Giancarlo Correa  
Thanks.

1:1:28.30 --> 1:1:31.540  
Aaron Berger  
And let's move on to our second.

1:1:32.610 --> 1:1:37.280  
Aaron Berger  
Uh presentation today, which is going to be from William Butler.

1:1:39.40 --> 1:1:40.820  
Aaron Berger  
Originally from the United Kingdom.

1:1:41.390 --> 1:2:5.250  
Aaron Berger  
Uh William Butler obtained a pH. D from the University of Iceland under the supervision of Good run Martin Dorsia. The topic of his thesis was modeling the behavior and dispersal of Gatewood early life stages. He started his postdoc at the Marine and Freshwater Research Institute in Iceland two years ago.

1:2:6.370 --> 1:2:19.280  
Aaron Berger  
He is based in the demersal division, working predominantly with the Gadget Modeling framework, which is what he is going to be talking about right now. We'll go ahead and share your screen and you can get started when you're.

1:2:26.570 --> 1:2:27.200  
Will Butler - HAFRO  
Thank you.

1:2:28.20 --> 1:2:29.310  
Will Butler - HAFRO  
Uh, let me just get up.

1:2:35.250 --> 1:2:35.700  
Will Butler - HAFRO  
Here we go.

1:2:40.850 --> 1:2:41.590  
Will Butler - HAFRO  
Can you see it?

1:2:42.20 --> 1:2:44.730  
Aaron Berger  
Oh yeah, that looks good and we can hear you very well.

1:2:45.310 --> 1:2:55.960  
Will Butler - HAFRO  
OK, great. Yes, hi. My name is William Butler. I'm a postdoctoral researcher at the university at the Marina Freshwater Research Institute in Iceland.

1:2:57.50 --> 1:3:2.310  
Will Butler - HAFRO  
And I'll be presenting on half of the gadget team for the spatial Assessment Modelling Workshop.

1:3:3.180 --> 1:3:14.460  
Will Butler - HAFRO  
And so I've been leading the team and then there's Yaki through Alverson, who's also from the green and Freshwater Research Institute, the Lario Barcelo, and Alfonso Perez Rodriguez.

1:3:16.780 --> 1:3:29.480  
Will Butler - HAFRO  
And so I just want to start by giving you a brief overview of gadgets. So there's a ancient length based eco simulator and stock assessment tool you can simulate mostly smooth stocks and multiple areas.

1:3:30.260 --> 1:3:41.670  
Will Butler - HAFRO  
So it's asking the the rest of the team kind of about experiences with using cache in multiple areas and there's a few examples I've listed here. There's a.

1:3:43.50 --> 1:3:45.840  
Will Butler - HAFRO  
There's a cloud model developed by Laura Taylor.

1:3:46.420 --> 1:3:52.620  
Will Butler - HAFRO  
And in early 2000s and this modelled migration of code between North and South of Iceland.

1:3:53.610 --> 1:4:0.660  
Will Butler - HAFRO  
And there's also the normal con region, which is the IT was developed by goodness, Stephenson and.

1:4:1.360 --> 1:4:10.740  
Will Butler - HAFRO  
And coming in Vietnam. But anyway that was the precursor to gadget and that was a probably a migration model. And there's also multispecies multi area.

1:4:11.650 --> 1:4:16.20  
Will Butler - HAFRO  
Apparently study looking at interactions between uh minky, whales and.

1:4:17.40 --> 1:4:17.800  
Will Butler - HAFRO  
And God.

1:4:19.260 --> 1:4:27.990  
Will Butler - HAFRO  
My personal experience is I haven't really looked at spatial modelling within the gadget framework yet, so this is.

1:4:28.770 --> 1:4:31.130  
Will Butler - HAFRO  
Yes, to make it opportunity to test this out.

1:4:32.210 --> 1:4:32.740  
Will Butler - HAFRO  
And.

1:4:34.390 --> 1:4:39.440  
Will Butler - HAFRO  
And I think other studies between the Griffith there seem to be some in-house studies really, but.

1:4:41.170 --> 1:4:49.880  
Will Butler - HAFRO  
So what we have gadgets capabilities of are there. It hasn't been kind of spatial models haven't been developed that much using the gadget framework.

1:4:51.710 --> 1:4:56.140  
Will Butler - HAFRO  
And so I'm just gonna introduce budget three now so.

1:4:57.120 --> 1:5:4.230  
Will Butler - HAFRO  
And this is the latest version of the gadget frameworks written by Jamie Linton, the shuttle thread and Yaki Thorson.

1:5:5.530 --> 1:5:6.120  
Will Butler - HAFRO  
And.

1:5:7.80 --> 1:5:14.220  
Will Butler - HAFRO  
So this is is the models are written in now and then they use the TMB to build the objective function.

1:5:15.200 --> 1:5:19.170  
Will Butler - HAFRO  
So this is a number of improvements over Gadget 2 and.

1:5:20.20 --> 1:5:25.720  
Will Butler - HAFRO  
Many of them relating to figures of TMP, such as automated differentiation, which is.

1:5:26.400 --> 1:5:28.530  
Will Butler - HAFRO  
And swimming, prove the.

1:5:29.270 --> 1:5:33.990  
Will Butler - HAFRO  
And kind of optimization speeds of model and then there are other benefits including.

1:5:34.70 --> 1:5:39.460  
Will Butler - HAFRO  
And getting out uncertainty reports, variables, random effects.

1:5:40.440 --> 1:5:44.760  
Will Butler - HAFRO  
The General Vera frameworks highly customizable. What I mean because this.

1:5:45.520 --> 1:6:7.120  
Will Butler - HAFRO  
But you compile the our model, it's very easy to kind of, UM, add in a custom made for instance like selectivity functions or functions. They can just be imported into model very easily. And another benefit over Gadget too is that the objective function is mobile and by that I mean it's.

1:6:8.270 --> 1:6:14.620  
Will Butler - HAFRO  
It is compiled and then it can be used with our optimizes, whereas started two was predominantly in House.

1:6:16.600 --> 1:6:20.560  
Will Butler - HAFRO  
In house model, so the current status of Gadget 3 is.

1:6:21.880 --> 1:6:36.400  
Will Butler - HAFRO  
I mean, the model is pretty much there, so it it it replicates, say for instance if you start off the we have a assessment of great silver smart and if you start the model scattered 2 and get it three in the same spot then they produce the same result.

1:6:37.910 --> 1:7:0.700  
Will Butler - HAFRO  
And we've been working on lots of tools to help for and improve the interface and kind of the capabilities for building models and analyzing your outfits. And there's also some areas which still working on France we haven't. This is this workshop here is going to be the first chance of using the migration routines and also tagging.

1:7:1.340 --> 1:7:4.450  
Will Butler - HAFRO  
And and I've also been having some.

1:7:5.350 --> 1:7:8.60  
Will Butler - HAFRO  
Yeah, kind of finding finding the best way to.

1:7:8.820 --> 1:7:12.240  
Will Butler - HAFRO  
It's kind of easy, optimizes this. Still a bit of a work in progress.

1:7:14.790 --> 1:7:26.370  
Will Butler - HAFRO  
And so I'll just talk about the modeling process. I I just give a little disclaimer here, 1st and that we've kind of been battling the single area model of the moment. So we're we're still not quite there yet.

1:7:27.70 --> 1:7:27.720  
Will Butler - HAFRO  
And.

1:7:29.540 --> 1:7:30.610  
Will Butler - HAFRO  
And some.

1:7:31.750 --> 1:7:32.380  
Will Butler - HAFRO  
Uh.

1:7:33.40 --> 1:7:44.70  
Will Butler - HAFRO  
As I said, it's just been a bit of a, you know, going on with Circle Spit, but I think I believe we're heading in the right direction. So just in this presentation, I'm just gonna kind of tell you what we've been doing.

1:7:45.710 --> 1:7:54.800  
Will Butler - HAFRO  
Kind of the assumptions we've made, how we've set up models and then I'll just go through the results of the most recent run. And in terms of.

1:7:56.110 --> 1:8:6.210  
Will Butler - HAFRO  
Uh, so we haven't. We obviously haven't expanded it to four areas yet or haven't includes tagging data. So it's a, yeah, we're still focusing, just trying to get this one model up and running.

1:8:7.620 --> 1:8:8.230  
Will Butler - HAFRO  
And.

1:8:10.210 --> 1:8:15.860  
Will Butler - HAFRO  
Save the data, we import it into MSDB database so the database is used for.

1:8:16.680 --> 1:8:21.330  
Will Butler - HAFRO  
Kind of processing data for inputs for gadgets and other ecosystem models.

1:8:22.870 --> 1:8:28.900  
Will Butler - HAFRO  
And then once I was already, we basically just run a kind of out-of-the-box model with Direct 3.

1:8:29.660 --> 1:8:35.610  
Will Butler - HAFRO  
So in this case, growth maturity, initial bond system recruitments all estimated, it's just kind of get a fix of.

1:8:36.280 --> 1:8:36.830  
Will Butler - HAFRO  
And.

1:8:37.500 --> 1:8:40.700  
Will Butler - HAFRO  
OK, what the population dynamics would look like?

1:8:43.770 --> 1:8:50.720  
Will Butler - HAFRO  
And the next steps, and I've looked at this and then we just sat there and had a discussion about kind of how we're gonna set up the module.

1:8:51.110 --> 1:8:52.740  
Will Butler - HAFRO  
And for instance.

1:8:54.40 --> 1:9:1.730  
Will Butler - HAFRO  
Uh, we decided obviously with great parent as we won't get to estimate them because there's no age data and they're, they're they're provided.

1:9:4.90 --> 1:9:13.170  
Will Butler - HAFRO  
I would say just like how are we going to set up routines and how, like whether or not they should follow the operational model and key ones, how to set up recruitment and?

1:9:14.210 --> 1:9:14.820  
Will Butler - HAFRO  
In.

1:9:16.110 --> 1:9:20.0  
Will Butler - HAFRO  
Say the typical gutter approach from modelling recruitment is to use free premises.

1:9:20.670 --> 1:9:21.290  
Will Butler - HAFRO  
UM.

1:9:22.620 --> 1:9:28.430  
Will Butler - HAFRO  
Rather than kind of using the stock for recruitment curve. So that's the approach we've taken here and.

1:9:30.420 --> 1:9:38.350  
Will Butler - HAFRO  
And then we just highlighted this here, this is the stage replace the act where kind of fitting in diagnosing the models for the 1 area.

1:9:39.860 --> 1:9:41.400  
Will Butler - HAFRO  
Without taking data at the moment.

1:9:43.160 --> 1:9:46.200  
Will Butler - HAFRO  
So if model structure we've gone with is.

1:9:46.670 --> 1:9:55.660  
Will Butler - HAFRO  
And initial equip visual conditions there and taken from equilibrium. So we were using.

1:9:57.790 --> 1:10:1.370  
Will Butler - HAFRO  
Uh. A free parameter per age group per stock.

1:10:2.70 --> 1:10:2.600  
Will Butler - HAFRO  
And.

1:10:5.210 --> 1:10:7.700  
Will Butler - HAFRO  
And every voice they try, it kind of.

1:10:8.670 --> 1:10:10.990  
Will Butler - HAFRO  
Estimating carrying capacity and then.

1:10:11.530 --> 1:10:28.450  
Will Butler - HAFRO  
And ascribing the numbers at each age based on proportion and and the page is natural mortality. And but now that we've gone for this approach, so we just spin up the model without any efficient pressure and then take for the state of equilibrium.

1:10:29.600 --> 1:10:32.680  
Will Butler - HAFRO  
And maturity is length based.

1:10:33.290 --> 1:10:36.880  
Will Butler - HAFRO  
And so we just kind of estimated the OGI of to.

1:10:38.650 --> 1:10:43.320  
Will Butler - HAFRO  
If it's approximately the data provided and.

1:10:45.410 --> 1:10:50.20  
Will Butler - HAFRO  
And services and maturity is considered the continual process in this area at each step.

1:10:50.940 --> 1:10:56.610  
Will Butler - HAFRO  
Aging is annual, so we've we went for the calendar year approach as opposed to the pseudo years.

1:10:57.270 --> 1:10:57.830  
Will Butler - HAFRO  
Umm.

1:11:0.620 --> 1:11:9.380  
Will Butler - HAFRO  
And for many of the well for the process that vary per age, so the ages were zero to two and one to 7.

1:11:10.120 --> 1:11:20.890  
Will Butler - HAFRO  
Umm, but for the promises. For instance K&M which varied within the seasons per age group, we average season across seasons.

1:11:22.270 --> 1:11:28.20  
Will Butler - HAFRO  
And Infinity was fixed to the operational order one.

1:11:29.700 --> 1:11:35.910  
Will Butler - HAFRO  
Uh, yeah, natural terrorization depends on average those scenes and full review. We just took a free parameter per quarter.

1:11:38.90 --> 1:11:40.500  
Will Butler - HAFRO  
And fleets we followed the.

1:11:41.440 --> 1:11:56.500  
Will Butler - HAFRO  
And operational models. So we had 7 fleets and for selectivity functions, we used the six Dome shaped and one in logistic curve which was a long line. And we also have the survey feet which took the selectivity of the long line.

1:11:58.900 --> 1:11:59.370  
Will Butler - HAFRO  
And.

1:12:0.670 --> 1:12:3.100  
Will Butler - HAFRO  
So I'm just going to jump straight into the results now.

1:12:4.400 --> 1:12:6.150  
Will Butler - HAFRO  
And so this is what?

1:12:7.30 --> 1:12:10.170  
Will Butler - HAFRO  
This is basically from better recent model. We've ended up with and.

1:12:11.60 --> 1:12:11.530  
Will Butler - HAFRO  
And.

1:12:13.650 --> 1:12:18.920  
Will Butler - HAFRO  
So we see essays, so therefore we stopped by most. It's kind of in the ballpark of where we want to be.

1:12:19.0 --> 1:12:19.390  
Will Butler - HAFRO  
Yeah.

1:12:19.710 --> 1:12:20.280  
Will Butler - HAFRO  
And.

1:12:21.820 --> 1:12:22.590  
Will Butler - HAFRO  
And.

1:12:24.290 --> 1:12:39.640  
Will Butler - HAFRO  
Obviously it's heading in the right direction as well. This was the IT took a while to get here, mainly because recruitment prior to the period when the prior to period when the CPU was there, recruitment was normally shooting through the roof.

1:12:40.720 --> 1:12:41.270  
Will Butler - HAFRO  
And.

1:12:43.250 --> 1:12:46.340  
Will Butler - HAFRO  
But yeah, so this is working now.

1:12:47.770 --> 1:12:52.140  
Will Butler - HAFRO  
And and here we see recruitment services per quarter.

1:12:53.510 --> 1:12:54.80  
Will Butler - HAFRO  
Uh, yeah.

1:12:54.900 --> 1:12:55.450  
Will Butler - HAFRO  
And.

1:12:57.150 --> 1:13:3.720  
Will Butler - HAFRO  
It's kind of it's fluctuating quite a lot, but it's generally above the Arnaud provided by the model.

1:13:4.480 --> 1:13:4.960  
Will Butler - HAFRO  
Umm.

1:13:8.790 --> 1:13:12.230  
Will Butler - HAFRO  
We can see how these are basically feeding into the CSV.

1:13:13.870 --> 1:13:21.140  
Will Butler - HAFRO  
And we have tried out approaches, so we've also set up a Beaverton Holtz curve and.

1:13:23.140 --> 1:13:27.330  
Will Butler - HAFRO  
Yeah, this was just a just trying to get around the issue of this period when.

1:13:28.740 --> 1:13:36.330  
Will Butler - HAFRO  
At between 1952 and 72 when, when there wasn't the index, just to try and hold the.

1:13:38.0 --> 1:13:42.750  
Will Butler - HAFRO  
Not population growth to to the to the level of B0 and.

1:13:43.890 --> 1:13:49.820  
Will Butler - HAFRO  
And I've tried bolting on the three parameters to the person Hale curve as well, but in the end I think this.

1:13:50.630 --> 1:13:53.300  
Will Butler - HAFRO  
At this kind of the best model we've come up with so far.

1:13:56.110 --> 1:13:58.780  
Will Butler - HAFRO  
And and here's the fits to be abundance index.

1:14:1.170 --> 1:14:2.320  
Will Butler - HAFRO  
And so this.

1:14:3.950 --> 1:14:7.590  
Will Butler - HAFRO  
So I mean this is coming out pretty well at the moment. It's kind of tracking the.

1:14:8.880 --> 1:14:10.330  
Will Butler - HAFRO  
The middle of the CPUE.

1:14:11.430 --> 1:14:11.900  
Will Butler - HAFRO  
Umm.

1:14:18.780 --> 1:14:27.380  
Will Butler - HAFRO  
And here we have the selectivity curves and so on. The right receiver logistic code for the lower fleets.

1:14:28.130 --> 1:14:28.710  
Will Butler - HAFRO  
And.

1:14:29.770 --> 1:14:40.100  
Will Butler - HAFRO  
M 50s coming out at about 106 centimetres, which I mean I had a look at the previous model and the IT seems like be overshooting it a little bit.

1:14:40.840 --> 1:14:43.800  
Will Butler - HAFRO  
And here we have the Dome shaped curves for each.

1:14:45.240 --> 1:14:47.410  
Will Butler - HAFRO  
Each of the commercial fleas.

1:14:48.170 --> 1:14:58.230  
Will Butler - HAFRO  
And big boots is first to the left, followed by hand line and the troll and then further to the right we have the same and the other ones.

1:14:59.280 --> 1:15:1.310  
Will Butler - HAFRO  
So selectivity is probably.

1:15:4.700 --> 1:15:11.810  
Will Butler - HAFRO  
I I think we need to have a think about how to improve the selectivity curves and maybe try some different selectivity functions and.

1:15:12.570 --> 1:15:13.50  
Will Butler - HAFRO  
Umm.

1:15:14.200 --> 1:15:17.530  
Will Butler - HAFRO  
And maybe because it fishing mortality is coming out very.

1:15:17.870 --> 1:15:29.200  
Will Butler - HAFRO  
And what's coming out high for the images stock and the IT maybe we need to kind of track the earlier parts of the selectivity down for the smaller ones to a certain degree?

1:15:30.620 --> 1:15:32.400  
Will Butler - HAFRO  
Have you set up link based library?

1:15:38.400 --> 1:15:43.590  
Will Butler - HAFRO  
And here are the length of distributions and we so there's a.

1:15:44.530 --> 1:15:54.30  
Will Butler - HAFRO  
Taken over the the whole time period and kind of see the where the some of the problems are coming in here and it's just it's been very hard to track the.

1:15:54.810 --> 1:16:3.310  
Will Butler - HAFRO  
At the spiky length, just distributions and the data, and we're having these little these little blips earlier.

1:16:4.310 --> 1:16:6.190  
Will Butler - HAFRO  
And kind of in for the younger fish.

1:16:10.660 --> 1:16:16.70  
Will Butler - HAFRO  
And if we look at the kind of length distributions by season, then we can see the 1st.

1:16:17.80 --> 1:16:18.850  
Will Butler - HAFRO  
And I I think this is been the kind of the.

1:16:19.990 --> 1:16:25.550  
Will Butler - HAFRO  
One of the consistent problems of the the modelling exercise for us as being trained to capture these.

1:16:27.450 --> 1:16:37.140  
Will Butler - HAFRO  
These spiky length distributions, because there's not really a clear mode moving through the seasons, so it's quite hard to kind of track cohort strength.

1:16:37.650 --> 1:16:41.770  
Will Butler - HAFRO  
And this is this is good as we've gotten so far.

1:16:44.880 --> 1:16:47.990  
Will Butler - HAFRO  
That, yes, there's definitely room for improvement here.

1:16:49.320 --> 1:16:49.860  
Will Butler - HAFRO  
And.

1:16:51.710 --> 1:16:57.600  
Will Butler - HAFRO  
So problems with encountered so far is that for the recruitment we utilize the standard gadget approach which was.

1:16:58.660 --> 1:17:0.320  
Will Butler - HAFRO  
Is to take 3 parameters.

1:17:4.800 --> 1:17:14.470  
Will Butler - HAFRO  
I mean this maybe isn't the in this case study. Maybe this wasn't the best approach to take, or maybe we need to start thinking about introducing penalties.

1:17:15.160 --> 1:17:15.910  
Will Butler - HAFRO  
And.

1:17:17.240 --> 1:17:21.40  
Will Butler - HAFRO  
For if the the variation in recruitment does too high.

1:17:21.730 --> 1:17:29.800  
Will Butler - HAFRO  
Obviously moved towards stock recruitment curve and and start thinking about it including year class multipliers.

1:17:30.840 --> 1:17:42.360  
Will Butler - HAFRO  
And finally, probably that's probably the direction that which we're gonna go with in Gadget 3, and that will be to start modeling recruitment as a round effect random effects using the.

1:17:42.940 --> 1:17:43.340  
Will Butler - HAFRO  
Umm.

1:17:44.750 --> 1:17:48.360  
Will Butler - HAFRO  
Yeah, kind of. The facilities provided by TMB.

1:17:49.910 --> 1:17:50.470  
Will Butler - HAFRO  
And.

1:17:51.380 --> 1:17:58.340  
Will Butler - HAFRO  
So growth, we think there's still maybe a misspecification in in the growth model. So we need to go back and look at this.

1:18:3.20 --> 1:18:17.240  
Will Butler - HAFRO  
It's maybe because the gadgets utilizes the maximum enfinity, so we could be kind of leading to negative growth in the the larger fish and also it could be a problem with averaging K over the seasons.

1:18:17.780 --> 1:18:24.530  
Will Butler - HAFRO  
And potentially move to a length based K or try maybe alternative ways to to look at growth.

1:18:25.940 --> 1:18:30.130  
Will Butler - HAFRO  
Uh, and then another problem is the spiky length distributions.

1:18:30.650 --> 1:18:38.750  
Will Butler - HAFRO  
Umm. And for reasons it's just, uh, maybe trying ternative selectivity functions and possibly clamping parameters to try and.

1:18:39.760 --> 1:18:43.850  
Will Butler - HAFRO  
Trying to force the uh selectivity into the right.

1:18:44.980 --> 1:18:47.300  
Will Butler - HAFRO  
And if you have the right picture.

1:18:49.230 --> 1:18:49.820  
Will Butler - HAFRO  
And.

1:18:50.900 --> 1:18:59.980  
Will Butler - HAFRO  
And the next steps. So we're still working on the single area model. We want to check the the growth and selectivity. Yeah, possibly was to try some different likelihood functions.

1:19:1.250 --> 1:19:4.200  
Will Butler - HAFRO  
And once we've got to a stage where we're kind of.

1:19:4.900 --> 1:19:12.930  
Will Butler - HAFRO  
Happy with this model ruin run through a set of diagnostics, including retrospective analysis. Leave one out and and jitter just to.

1:19:13.740 --> 1:19:16.70  
Will Butler - HAFRO  
Kind of. You know, make sure the models in the right spot.

1:19:17.330 --> 1:19:23.670  
Will Butler - HAFRO  
And then we'll start digging the tagging data. So it's interesting from the last presentation about how the.

1:19:24.390 --> 1:19:29.490  
Will Butler - HAFRO  
Including typing data kind of drags up F, which is a kind of something where.

1:19:30.170 --> 1:19:33.890  
Will Butler - HAFRO  
Anticipating an opening for whatever kind of improve some of model fits.

1:19:35.160 --> 1:19:36.170  
Will Butler - HAFRO  
And then we'll.

1:19:37.180 --> 1:19:39.520  
Will Butler - HAFRO  
Kind of run out on the other hundred sets of inputs.

1:19:40.310 --> 1:19:43.580  
Will Butler - HAFRO  
And and it's also for the recruitment. There's a random effect.

1:19:44.770 --> 1:19:48.800  
Will Butler - HAFRO  
And something we're keen to try out at some stage using Gadget 3.

1:19:49.750 --> 1:19:50.200  
Will Butler - HAFRO  
And.

1:19:51.160 --> 1:20:1.210  
Will Butler - HAFRO  
And then we haven't as a group, we haven't really discussed the multi area approach yet. We've just been focusing on the single area model. And so these are really to be discussed in the in the future.

1:20:2.850 --> 1:20:8.270  
Will Butler - HAFRO  
Umm, so I guess the like take away at the moment is is it's been a bit of a.

1:20:9.120 --> 1:20:9.610  
Will Butler - HAFRO  
And.

1:20:11.470 --> 1:20:19.320  
Will Butler - HAFRO  
Have you know? Banging our head against the wall of it, trying to trying to get the single area model working, but I think that now we're heading in the right direction. Still some.

1:20:20.10 --> 1:20:21.900  
Will Butler - HAFRO  
Symptom tweaks left to do and.

1:20:22.970 --> 1:20:24.710  
Will Butler - HAFRO  
Uh, we're having to.

1:20:25.650 --> 1:20:31.220  
Will Butler - HAFRO  
Kind of, you know, get moving on the multi area part relatively soon and.

1:20:32.930 --> 1:20:44.0  
Will Butler - HAFRO  
As I the focus of this workshop is the kind of decision point analysis, but we haven't been able to add much to that just at the moment, but hopefully.

1:20:44.870 --> 1:20:50.40  
Will Butler - HAFRO  
And then rich, not reports, I mean, when we meet for the next workshop, either remotely or.

1:20:51.40 --> 1:20:59.650  
Will Butler - HAFRO  
In person will be able to do that in uh, you know, we'll be able to give you a proper update on that kind of decisions we make going with the spatial model.

1:21:0.450 --> 1:21:3.460  
Will Butler - HAFRO  
Umm yeah, so that's it.

1:21:4.570 --> 1:21:4.950  
Will Butler - HAFRO  
Thank you.

1:21:10.690 --> 1:21:12.440  
Aaron Berger  
All right. Thanks very much, will.

1:21:20.240 --> 1:21:20.510  
Will Butler - HAFRO  
Yep.

1:21:15.540 --> 1:21:24.260  
Aaron Berger  
Yeah, let's let's maybe keep the presentation. Oh, yeah, you got it there. OK, just in case there's questions on anything specific. Yeah. So we'll open it up for questions.

1:21:25.520 --> 1:21:26.940  
Aaron Berger  
For will and.

1:21:28.200 --> 1:21:30.310  
Aaron Berger  
Team Gadget and what they've done so far.

1:21:31.850 --> 1:21:34.140  
Aaron Berger  
Go ahead and raise your hand if you have one.

1:21:36.610 --> 1:21:40.880  
Aaron Berger  
And maybe while people are thinking, I'll just make a comment, it's really interesting. Well, the.

1:21:41.640 --> 1:21:48.790  
Aaron Berger  
Even the decision points that have been made so far in terms of, you know, perhaps sometimes these decisions are based on.

1:21:50.790 --> 1:22:8.370  
Aaron Berger  
The software we have available and how much effort it takes to alter that to do the things we want. One of the advantages of Gadget I see it's already ready to implement random effects in recruitment as you mentioned. So I'm really interested to see how that turns out when you guys get to it.

1:22:9.820 --> 1:22:11.620  
Aaron Berger  
When I'm also curious about.

1:22:11.790 --> 1:22:37.400  
Aaron Berger  
Uh, the way in which recruitment is used and to estimate in terms of free parameters and how that's gonna perform when moving to a four area model, you know, given the additional potential confounding if as free parameters, that makes it even more difficult maybe compared to a functional form or with recruitment devious or what have you. So submit really some interesting.

1:22:38.130 --> 1:22:50.880  
Aaron Berger  
Avenues there and again, even in Fourier model, how random effects might improve things relative to free parameters. So already some very interesting kind of avenues to explore.

1:22:52.860 --> 1:22:53.180  
Will Butler - HAFRO  
Yeah.

1:22:52.970 --> 1:22:53.870  
Aaron Berger  
Yeah, go ahead.

1:22:54.710 --> 1:23:12.590  
Will Butler - HAFRO  
Uh, yeah, I've gotta say, I think it's the the the random effects is quite a quite a a config exciting venture for for gadgets and we were working with Jamie over the summer to sort of to try and get it up and running. So I think is should be fairly.

1:23:13.490 --> 1:23:17.650  
Will Butler - HAFRO  
Yeah. Something we're gonna be trying out and trying to get get rolling fairly soon.

1:23:18.560 --> 1:23:23.850  
Will Butler - HAFRO  
And I think this would be a a good case study to to try and roll it out in.

1:23:24.710 --> 1:23:31.350  
Will Butler - HAFRO  
Umm. Regarding the free parameters for the multi area model, I kind of agree that this might become a problem.

1:23:32.50 --> 1:23:40.450  
Will Butler - HAFRO  
Umm, I know for I'll probably start looking into, um, kind of stop recruitment costs for parameterizing recruitment.

1:23:41.260 --> 1:23:41.640  
Will Butler - HAFRO  
And.

1:23:44.30 --> 1:23:47.860  
Will Butler - HAFRO  
I think well, one of the benefits of this workshop is actually that we've now.

1:23:48.870 --> 1:23:49.300  
Will Butler - HAFRO  
Yeah.

1:23:51.110 --> 1:23:59.570  
Will Butler - HAFRO  
Yeah, we, we've, we've got some ideas for add-ons 2 gadgets in terms of the stock recruitment tonight. So I think this will be a good opportunity to add these in.

1:24:0.890 --> 1:24:1.360  
Will Butler - HAFRO  
And.

1:24:5.590 --> 1:24:7.480  
Aaron Berger  
OK, great. I see.

1:24:8.900 --> 1:24:10.730  
Aaron Berger  
Dan, you had your hand up. Go ahead.

1:24:12.810 --> 1:24:33.450  
Dan Goethel  
Yep. Yeah. So this kind of an open-ended question, but UM along the lines of sort of how you analyze the data and some of those decision points and things like that. I know you mentioned you used the MSDB database and to kind of analyze your input data, I was wondering if you could maybe just like talk about that a bit and.

1:24:34.640 --> 1:24:45.290  
Dan Goethel  
How that influenced some of those decisions just in like the one area model. And if you kind of notice anything in the data that might influence your how you set up your spatial model and things like that.

1:24:47.210 --> 1:24:50.320  
Will Butler - HAFRO  
Yeah, so the MDB databases the.

1:24:51.670 --> 1:24:55.0  
Will Butler - HAFRO  
This kind of a I'll go to method for storing the data.

1:24:55.320 --> 1:25:5.500  
Will Butler - HAFRO  
And A time Fr and and then confusing. Using it as a tool so you can develop tools on top of it to visualize data and then run the.

1:25:6.320 --> 1:25:11.470  
Will Butler - HAFRO  
And kind of to getting it ready for running gadgets and.

1:25:12.770 --> 1:25:15.740  
Will Butler - HAFRO  
In terms of in this particular case study.

1:25:16.530 --> 1:25:17.20  
Will Butler - HAFRO  
I mean.

1:25:20.300 --> 1:25:25.280  
Will Butler - HAFRO  
Kind of getting the data into MFDB was what got me familiarized with the data.

1:25:27.930 --> 1:25:28.420  
Will Butler - HAFRO  
And.

1:25:29.940 --> 1:25:36.350  
Will Butler - HAFRO  
Say it's kind of how it sets up and how to read it in kind of what structure I wanted to read into MFDB the.

1:25:37.790 --> 1:25:42.320  
Will Butler - HAFRO  
I'd have to think about it. The more I'm sure it did inform my decisions as to how I set up the model.

1:25:44.880 --> 1:25:46.550  
Will Butler - HAFRO  
I don't tell you took my head.

1:25:48.180 --> 1:25:49.410  
Will Butler - HAFRO  
What they are?

1:26:0.880 --> 1:26:1.330  
Will Butler - HAFRO  
You know.

1:25:59.970 --> 1:26:8.690  
Aaron Berger  
OK, well, I see Yorkie has his hand up maybe from earlier. So maybe you can go ahead and maybe have a comment from before or or anything you have. Go ahead.

1:26:9.490 --> 1:26:14.220  
Bjarki Elvarsson - HAFRO  
I can actually come on on the the one that you were talking about, the MDP.

1:26:15.560 --> 1:26:37.320  
Bjarki Elvarsson - HAFRO  
However, I remember correctly that you will. You are trying. You're trying to put it, put it analyzing the data. You you actually know this discrepancies between the four area model and that and then two area models because you can so even the B can allow you to import data from various sources. So you and then you can do these spatial analysis.

1:26:38.540 --> 1:26:45.670  
Bjarki Elvarsson - HAFRO  
Sorry, you can. You can. You can mix and remerge datasets depending on what activities you want. So if you want to have.

1:26:46.890 --> 1:26:47.490  
Bjarki Elvarsson - HAFRO  
Uh.

1:26:48.210 --> 1:26:49.750  
Bjarki Elvarsson - HAFRO  
Area based uh.

1:26:51.30 --> 1:27:8.370  
Bjarki Elvarsson - HAFRO  
Uh, if you want. If you want to have an air base area area splitting the data you can you just specify it in the beginning of the query and if you want to. If you don't want to have that, you can. You can merge those into one unit. That's just a simple query and the rest of it. Rest of the queries all sort of match up so.

1:27:9.430 --> 1:27:24.850  
Bjarki Elvarsson - HAFRO  
It's allows you to to quickly create new datasets from based on the same data. Same, so it's it stores data minimally aggregated, so you can use it going forward into your model which ever way you want to get them.

1:27:26.400 --> 1:27:50.370  
Bjarki Elvarsson - HAFRO  
But I just wanted to comment sort of more about the the random F is being the man going through this, this, this journey of trying to build a model that will have been going through it. The main main thing has been to sensibly sort of clamp down the range of parameters and and it's sort of, yeah, it's one of those.

1:27:51.150 --> 1:28:5.680  
Bjarki Elvarsson - HAFRO  
Those things, if you if you have a have a fairly well uh every have a fairly detailed data set you can you can put in as many parameters you want so you will get a sort of almost sensible estimates. But in this case you really need to.

1:28:5.750 --> 1:28:12.320  
Bjarki Elvarsson - HAFRO  
Umm to uh to build in a couple of assumptions for for the entire thing to work.

1:28:13.270 --> 1:28:14.640  
Bjarki Elvarsson - HAFRO  
And so.

1:28:15.760 --> 1:28:24.250  
Bjarki Elvarsson - HAFRO  
There's quite a lot of, yeah, there's quite a lot of things you just need to just take at face value from the operating model which. Yeah, which.

1:28:26.190 --> 1:28:31.750  
Bjarki Elvarsson - HAFRO  
Just for this this access to work and I think that's sort of key thing here.

1:28:32.650 --> 1:28:38.800  
Bjarki Elvarsson - HAFRO  
And if you were, if you were to approach this problem without knowing anything about about the underlying parameters, it's going to be.

1:28:39.550 --> 1:28:42.430  
Bjarki Elvarsson - HAFRO  
You're gonna run into a higher degree of problems.

1:28:52.500 --> 1:28:54.970  
Aaron Berger  
Yeah. Thanks for that PR. I also think you know.

1:28:56.0 --> 1:29:26.150  
Aaron Berger  
Uh, just to add on to that, this the way and I don't understand it, but the way you've described the MF DB approach, it seems very useful in terms of aggregating data to different spatial hypothesis, if you will, you know in the simulation experiment we we kind of asked for A1 area and a four area and you can explore other areas if you want. But operationally when you're developing assessment models, you're likely.

1:29:26.380 --> 1:29:49.280  
Aaron Berger  
Gonna have to aggregate the data and test a couple different spatial configurations, perhaps even a sensitivity models. I mean so. And typically those decisions are made at square one and then you build your data up. So to go back all the way to square one is not feasible. So to have something that is can quickly aggregate data to different spatial units and things like that seems really advantageous.

1:29:53.40 --> 1:30:6.610  
Bjarki Elvarsson - HAFRO  
Yes, and I I totally agree. And that has been very useful and not interested in in terms of the spatial aggregation. There's also just what size distribution you want to work with or age distribution you want to work with. I think this is a very, very good.

1:30:7.90 --> 1:30:21.900  
Bjarki Elvarsson - HAFRO  
Good. I mean, it allows you to do these these analysis quite quickly. So if nothing else, I would, I would totally recommend that you you use something similar when you build as a basis for your for your model modelling work.

1:30:31.960 --> 1:30:32.980  
Aaron Berger  
Dan, go ahead.

1:30:37.850 --> 1:31:8.940  
Dan Goethel  
Yep, sorry my Internet is not very good. Yeah, thanks for that. I think that's kind of interesting to how you can disaggregate and aggregate relatively easily, but looking at kind of like looking ahead, I don't know that much about gadget especially kind of the spatial capabilities of it. And I was just wondering if one of you might be able to like give a quick breakdown or update about what you were thinking in terms of you know what the possibilities are for modelling movement?

1:31:9.300 --> 1:31:17.610  
Dan Goethel  
And then this kind of like spatial recruitment, Umm, the kind of those two processes and what you were thinking about of you know in terms of handling those?

1:31:24.140 --> 1:31:25.910  
Will Butler - HAFRO  
And yes, I.

1:31:27.150 --> 1:31:32.680  
Will Butler - HAFRO  
I don't think she's gonna take this like my my. So I haven't really used the spatial movement in gadget much.

1:31:32.780 --> 1:31:35.240  
Will Butler - HAFRO  
Yeah. Ohh if it's too really.

1:31:36.0 --> 1:31:36.560  
Will Butler - HAFRO  
And.

1:31:40.450 --> 1:31:45.40  
Bjarki Elvarsson - HAFRO  
OK, so the the so the.

1:31:46.360 --> 1:31:52.620  
Bjarki Elvarsson - HAFRO  
The the main structure in Gadget is that you you add dimension to your to your, to your population matrix. So.

1:31:53.280 --> 1:32:1.270  
Bjarki Elvarsson - HAFRO  
Uh area, it's just like is simply a new dimension to your, to your, to your work. So you. So it's defining a model.

1:32:2.290 --> 1:32:16.520  
Bjarki Elvarsson - HAFRO  
And based in terms of areas is is doesn't, I mean it's it's a it's a fairly simple thing you just say that you just add a dimension to your to your stock and then it can in populate different different.

1:32:17.900 --> 1:32:26.460  
Bjarki Elvarsson - HAFRO  
Different areas, you just attract the numbers of individuals. I think the main main trick here is to sensibly parameterize the migration methods between the areas.

1:32:27.540 --> 1:32:36.490  
Bjarki Elvarsson - HAFRO  
And as such, the the guys catching framework allows you to to set up, uh, sort of formally, so you can you can specify.

1:32:38.330 --> 1:32:48.610  
Bjarki Elvarsson - HAFRO  
First of all, you just specify just proportions with. You gonna put in? Are these gonna be estimated or if you have some way of thinking about the biomass?

1:32:49.270 --> 1:32:54.380  
Bjarki Elvarsson - HAFRO  
Have you? I mean, you can think you can also you can. You can complicate things as well because you can set up.

1:32:55.530 --> 1:33:16.910  
Bjarki Elvarsson - HAFRO  
Differences in you can set up functions which which could be parameterized in terms of biomass. So you can think about the sourcing dynamic or something like that. But for what I got from the translation I've seen so far as it seems to be that the populations are fairly proportions, are fairly simple, sort of.

1:33:17.620 --> 1:33:25.750  
Bjarki Elvarsson - HAFRO  
Fixed in the in the different areas so you you can but but then you could sort of problem twice that as well. Just simple.

1:33:27.60 --> 1:33:36.130  
Bjarki Elvarsson - HAFRO  
I migration metrics but that's something just to yeah, we just need to to, to work, work on and test and and and the next revision of this model.

1:33:44.90 --> 1:33:46.400  
Bjarki Elvarsson - HAFRO  
If that helps your answer your question.

1:33:50.520 --> 1:33:52.410  
Dan Goethel  
Yeah, for sure. That's great. Thank you.

1:33:59.340 --> 1:34:1.200  
Aaron Berger  
OK. Other questions or comments?

1:34:36.600 --> 1:34:40.20  
Aaron Berger  
I guess I'm going to ask one question if I can the.

1:34:41.220 --> 1:34:43.790  
Aaron Berger  
Those examples you just had up there? Yeah. Well, yeah, exactly.

1:34:46.310 --> 1:34:56.680  
Aaron Berger  
Are those? Is that the two area code model? An operational model? It's used directly for management? Or is that a research? A model that uses get?

1:34:55.830 --> 1:34:59.120  
Will Butler - HAFRO  
As it is the expert to remodel.

1:35:1.60 --> 1:35:9.100  
Will Butler - HAFRO  
Umm that I am. I think it is called capelin shrimp interactions and the code migrating North and South.

1:35:9.890 --> 1:35:13.220  
Will Butler - HAFRO  
And yeah, it wasn't easy for assessment running.

1:35:21.150 --> 1:35:21.470  
Will Butler - HAFRO  
Yeah.

1:35:14.280 --> 1:35:26.990  
Aaron Berger  
OK, OK. But it has, it would presumably have with migration includes the movement, a movement matrix and tracks those and and recruitment in one or more areas. And so it, yeah, OK, this was curious. Thanks.

1:35:27.80 --> 1:35:29.470  
Will Butler - HAFRO  
Yeah, and definitely be a.

1:35:30.440 --> 1:35:35.600  
Will Butler - HAFRO  
Kind of. Yeah, jumping off point for figuring out how to, you know.

1:35:37.70 --> 1:35:39.80  
Will Butler - HAFRO  
How? How to prioritize it and everything?

1:35:40.810 --> 1:35:41.160  
Aaron Berger  
Great.

1:35:42.260 --> 1:35:43.940  
Aaron Berger  
Dan, see your hand up. Go ahead.

1:35:48.890 --> 1:35:50.950  
Fu, Dan (NFITD)  
Yeah. And just a slightly different.

1:35:49.310 --> 1:35:51.10  
Aaron Berger  
Sorry, Dan. Food this time, yes.

1:35:52.570 --> 1:35:53.700  
Fu, Dan (NFITD)  
Slightly different question.

1:35:54.330 --> 1:35:58.390  
Fu, Dan (NFITD)  
And the issues on the face to the to the side state I.

1:35:59.960 --> 1:36:30.40  
Fu, Dan (NFITD)  
Appears to be some issues you mentioned about. Apart from those spiky the the issues for some of the spiky distribution. Some of the proof is still. Do you think how? How is that related to the fact you you use the slightly? I mean you use a different kind of you reparameterized to gross basically the growth is kind of difference to what's used in the in the operation model. I understand it's not we're not trying to kind of replicate what their operational operating model is doing but the fact using a.

1:36:30.480 --> 1:36:30.930  
Fu, Dan (NFITD)  
You know.

1:36:37.210 --> 1:36:38.280  
Will Butler - HAFRO  
Yeah, yeah.

1:36:32.120 --> 1:36:39.580  
Fu, Dan (NFITD)  
And the girls he used, I think you mentioned about how your average across Caesars, I just wondering how it got done.

1:36:41.160 --> 1:36:52.230  
Will Butler - HAFRO  
Yeah, so this this really came about when I was just doing some patch work on the model and basically on the we have a look up table for the.

1:36:53.110 --> 1:37:3.440  
Will Butler - HAFRO  
Umm have a look up table for the age and uh season which I was using for to get the the K parameters per sudo year.

1:37:4.0 --> 1:37:13.50  
Will Butler - HAFRO  
And obviously, when you had continual recruitment, we this this wasn't really an option anymore. So so I averaged in and it's.

1:37:13.940 --> 1:37:27.580  
Will Butler - HAFRO  
It's just until I found something like a better solution or something else to test it against, so it's kind of well, one of the steps I want to do next, and I think the solution will be to just age the stock.

1:37:28.590 --> 1:37:38.480  
Will Butler - HAFRO  
Per quarter. So then these lookup tables will function as kind of as we wish them to, and then and then we can basically carry out a direct comparison between.

1:37:39.490 --> 1:37:50.10  
Will Butler - HAFRO  
And between what we effect of averaging K over seasons is as opposed to, you know, taking the pseudo year value face.

1:37:57.610 --> 1:37:58.20  
Will Butler - HAFRO  
So.

1:37:57.310 --> 1:38:9.880  
Fu, Dan (NFITD)  
So so the growth is still pretty sick. So the growth is still pretty similar to the original. You know, the pitch quarterly specific growth, it's kind of similar, right? Just did a little average that's almost think.

1:38:9.980 --> 1:38:16.950  
Will Butler - HAFRO  
Yeah, it's it's it's very similar. But I mean I can't. So I don't have something to compare it with at the moment.

1:38:19.290 --> 1:38:23.600  
Will Butler - HAFRO  
But so yes, but we'll be carrying out a comparison office.

1:38:29.180 --> 1:38:30.490  
Will Butler - HAFRO  
I I I mean I think.

1:38:31.770 --> 1:38:37.420  
Will Butler - HAFRO  
I think we see they've probably kind of a few things going on here. Growth may be part of it.

1:38:37.960 --> 1:38:51.870  
Will Butler - HAFRO  
And it was like this selectivity function that I think we just need to have a, you know, have a little thing contest in different different ways of implementing these functions to see if this helps iron out these length distributions bit more.

1:39:11.330 --> 1:39:19.460  
Aaron Berger  
I will. Are the Dome shaped selectivities a double normal formulate formulation or something else?

1:39:21.140 --> 1:39:21.690  
Will Butler - HAFRO  
And.

1:39:23.560 --> 1:39:30.650  
Will Butler - HAFRO  
So it's so it is. Yeah, it is. It's pretty similar. I'm not. I'm not sure if he's act like a double normal one, but it's.

1:39:31.510 --> 1:39:35.400  
Will Butler - HAFRO  
You you can either side of the Dome depending on the.

1:39:37.320 --> 1:39:40.250  
Will Butler - HAFRO  
Yeah, you know, I I various nicely.

1:39:42.650 --> 1:39:55.650  
Bjarki Elvarsson - HAFRO  
It is cold in Anderson Curve, but it's it's, uh, yeah, it's. I think it's pretty much a double normal. It's the uh, I haven't. I haven't looked at the formulation and stock synthesis, but it's definitely a a normal kernel that's used.

1:40:9.220 --> 1:40:9.480  
Aaron Berger  
OK.

1:40:9.550 --> 1:40:15.990  
Aaron Berger  
Hey, how about last call for questions for now. Anyways we can we will have time again later to revisit.

1:40:36.170 --> 1:40:39.40  
Aaron Berger  
All right. Well, I don't see any other hands raised.

1:40:41.110 --> 1:40:53.720  
Aaron Berger  
And I don't see anybody on the phone that may not be able to raise their hands. So I'm gonna just assume we're done with questions for now. What we're going to do next is just take a little bit of a break. We've been going for almost 2 hours. So let's take a break.

1:40:54.510 --> 1:40:56.120  
Aaron Berger  
Uh, until.

1:40:57.580 --> 1:40:58.220  
Aaron Berger  
Oh.

1:40:59.330 --> 1:41:5.830  
Aaron Berger  
And let's go 55 after the hour. That's just a little bit over 10 months. That should give enough people, you know, people enough time to.

1:41:6.500 --> 1:41:8.420  
Aaron Berger  
Do what they need to do, stretch, etcetera.

1:41:9.760 --> 1:41:12.690  
Aaron Berger  
And we'll start back up in about 12 minutes.

1:41:13.460 --> 1:41:15.260  
Aaron Berger  
Thanks everybody. Thanks will for the presentation.

1:41:16.570 --> 1:41:16.810  
Will Butler - HAFRO  
Thanks.

1:53:19.600 --> 1:53:21.220  
Aaron Berger  
All right. Welcome back, everybody.

1:53:23.100 --> 1:53:27.670  
Aaron Berger  
Uh, it's 55 past the hour on my watch.

1:53:28.790 --> 1:53:41.820  
Aaron Berger  
And so let's just jump right back into a where we left off. So what we're going to do is we're going to move on to the third team today. And this is a.

1:53:42.790 --> 1:53:45.100  
Aaron Berger  
Teamworking with the software castle.

1:53:45.820 --> 1:53:55.480  
Aaron Berger  
And they are, as I mentioned earlier, we're going to be talking about applying it to the Antarctic, toothfish simulated data. So we've been.

1:53:56.490 --> 1:54:0.790  
Aaron Berger  
I'm thinking of a lot about uh, yellowfin tuna in the IOTC region.

1:54:1.450 --> 1:54:9.950  
Aaron Berger  
Umm. And so you're gonna shift your mindset a little bit here, and this is a great segue to also, you know, letting people know that there is a second simulated data set.

1:54:12.440 --> 1:54:23.880  
Aaron Berger  
So there's a further opportunities to test out your spatial models. Hopefully it's a little bit smoother giving you already have a framework constructed with the yellowfin.

1:54:25.340 --> 1:54:49.430  
Aaron Berger  
But at any rate, this is a great opportunity to learn a little bit more about this simulated data set, as well as what the team has been up to. So in way of an introduction, I'd like to introduce our know Gruss. Our know is a fisheries population monitor at NIWA, the National Institute of Water and Atmospheric Research in Wellington, New Zealand.

1:54:50.570 --> 1:55:7.780  
Aaron Berger  
He works with different models that have spatial capabilities, including models such as vast. You know, the vector autoregressive, spatio temporal model, and SPM. The spatial population model. He is leading the Ross Sea Region Antarctic toothfish stock assessment.

1:55:8.640 --> 1:55:26.970  
Aaron Berger  
Umm and Niwa has a long standing or has long been using castle for the Ross Sea Region Antarctic toothfish assessment, and that's what the he'll be presenting on, and their plan is to, in the future transition that to castle two in 2023.

1:55:27.720 --> 1:55:44.790  
Aaron Berger  
Uh to be technically correct, I think. I've been saying that the team is going to use Castle 2 today. Just wanna make just be clear that they're using Castle and the nuances then improvements that castle two will have. Sounds like they will be available in 2023.

1:55:45.770 --> 1:55:53.50  
Aaron Berger  
Anyways, Arnaud can tell us more about that if needed. So yeah, go looks like you're already sharing perfect. Go right ahead or no and take it away.

1:55:54.570 --> 1:55:56.220  
Arnaud Grüss  
Yeah. Thank you very much, Aaron.

1:55:57.430 --> 1:56:2.380  
Arnaud Grüss  
So very nice introduction, so that will shorten my introduction quite a lot.

1:56:3.180 --> 1:56:12.690  
Arnaud Grüss  
Uh, yeah, In Sync. Thanks a lot everyone for attending this presentation today. So my name is Arnaud Gruss from Newington.

1:56:13.110 --> 1:56:23.580  
Arnaud Grüss  
Uh, so I'm presenting this special simulation experiment for Rusty region and talking to speech today on behalf of newer team.

1:56:24.800 --> 1:56:36.700  
Arnaud Grüss  
So as I would say, that's a a work we've been doing with a castle modelling platform, which is a modelling platform developed in New Zealand that we use a lot for or stock assessments.

1:56:37.730 --> 1:56:40.270  
Arnaud Grüss  
And as Owen said.

1:56:41.430 --> 1:56:46.590  
Arnaud Grüss  
So we've started to transition to Casal 2, but.

1:56:47.830 --> 1:56:57.300  
Arnaud Grüss  
For for the stock assessment of Russia region dot to speech. But in effect we are going really to.

1:56:58.320 --> 1:57:6.10  
Arnaud Grüss  
To conduct the actual assessment, uh with Casal 2. Only uh, next year in 2023.

1:57:9.30 --> 1:57:21.930  
Arnaud Grüss  
So today, so we'll be 6 different parts in my presentation. So I will start with a few slides just to present Russy region and darting toothfish.

1:57:23.40 --> 1:57:34.490  
Arnaud Grüss  
Because as Ian said, uh, that's a case study. Uh, that, uh, I'm the only one to have picked UM. And so a lot of people are not aware about this fish stock.

1:57:35.350 --> 1:57:54.610  
Arnaud Grüss  
And it's actually an interesting case study because it's it contrasts with a yellowfin tuna because in case of yellowfin tuna we have a a population that understands that undertakes this massive seasonal migrations and that's.

1:57:55.390 --> 1:58:2.390  
Arnaud Grüss  
That's an important ecological featured consider to to structure the the spatial stock assessment models.

1:58:3.550 --> 1:58:15.800  
Arnaud Grüss  
But in the case of Antarctic toothfish, so the the the key ecology called featured consider are the the ontogenetic migrations that toothfish undertake.

1:58:16.530 --> 1:58:27.80  
Arnaud Grüss  
Where? Uh, the two speech uh move into deeper waters so more and more into deeper waters as they grow older.

1:58:28.810 --> 1:58:42.410  
Arnaud Grüss  
So yeah, the first part of this presentation will be that Antarctic toothfish in the Russi. And then I will say a few words about the operating model that was developed for Antarctic toothfish.

1:58:43.90 --> 1:58:56.800  
Arnaud Grüss  
For this uh, spatial assessment modelling workshop so that that's an operating model that relies on the spatial population model, which is also a tool that has been developed at NIWA.

1:58:58.20 --> 1:59:1.170  
Arnaud Grüss  
Originally actually for Russia region and darting toothfish.

1:59:2.780 --> 1:59:13.940  
Arnaud Grüss  
Then I'll be describing the stock assessment models that we've been developing for the spatial Assessment Modelling Workshop. So the one area and four area models.

1:59:15.300 --> 1:59:25.550  
Arnaud Grüss  
And then at present, the results of UH workshop objective one. So where we consider only one replicate from the operating model?

1:59:27.150 --> 1:59:38.880  
Arnaud Grüss  
And after this is this is done. So I present the results for workshop Objective 2 where we consider all of the 100 replicates.

1:59:41.940 --> 1:59:44.70  
Arnaud Grüss  
From the operating model.

1:59:45.570 --> 1:59:55.360  
Arnaud Grüss  
And finally, so there will be some concluding remarks and some, yeah, some recommendations in terms of potential avenues for future research.

1:59:59.330 --> 2:0:11.480  
Arnaud Grüss  
So regarding uh Rusty region Antarctic toothfish. So Antarctic toothfish is an economically important large but it species.

2:0:11.600 --> 2:0:29.650  
Arnaud Grüss  
Uh, that is found in the Antarctic and subantarctic waters. And so we have two species of two speech in a in Antarctica but Argonian toothfish that is far more in a similar tactic quarters and Antarctic to speech that is close to the.

2:0:30.210 --> 2:0:42.60  
Arnaud Grüss  
And dotty continents and so as I mentioned earlier. So release the key ecology called feature for for Antarctic toothfish.

2:0:42.360 --> 2:0:46.430  
Arnaud Grüss  
Uh, all the ontogenetic spatial distribution patterns.

2:0:46.580 --> 2:1:4.980  
Arnaud Grüss  
And all of this species. So in the Ross Sea region, we find the juveniles and the young adults on the shelf of the Rossi region. So that's where they recruit adept, less than 800 meters.

2:1:6.110 --> 2:1:13.980  
Arnaud Grüss  
And then as they grow older, so the toothfish move progressively into deeper water and so.

2:1:16.50 --> 2:1:17.900  
Arnaud Grüss  
As a result, we find the.

2:1:18.760 --> 2:1:27.90  
Arnaud Grüss  
The oldest and largest Antarctic toothfish in the North, well, primarily in the north of the Ross Sea region.

2:1:29.690 --> 2:1:40.510  
Arnaud Grüss  
Regarding also ecological features, so spinning in Antarctic toothfish takes place in the north on Simmons, Regis and Banks.

2:1:41.170 --> 2:1:44.360  
Arnaud Grüss  
And spawning takes place in the winter season.

2:1:45.580 --> 2:1:50.400  
Arnaud Grüss  
So very likely between mid-july and August.

2:1:51.540 --> 2:1:53.160  
Arnaud Grüss  
And so that's uh.

2:1:53.940 --> 2:2:8.810  
Arnaud Grüss  
That's a fact that is important to keep in mind because so spawning takes place in winter, but actually fishing in the Ross Sea region takes place only in the server, so during the summer season.

2:2:10.100 --> 2:2:20.330  
Arnaud Grüss  
And so after spawning the eggs and lava, authentic toothfish are transported by the gear to the shelf of the roster region.

2:2:21.710 --> 2:2:29.900  
Arnaud Grüss  
So we have a a life cycle for toothfish that is described on this little figure that is provided on this slide and.

2:2:31.300 --> 2:2:43.190  
Arnaud Grüss  
We we assume that Antarctic toothfish in the Ross Regen is an enclosed unit stock centered on the gear.

2:2:44.20 --> 2:2:54.360  
Arnaud Grüss  
And this this assumption that we make that is important for the assessment is actually backed up by a number of stock structure analysis.

2:2:57.570 --> 2:3:0.550  
Arnaud Grüss  
So regarding fishing.

2:3:1.830 --> 2:3:13.960  
Arnaud Grüss  
So Antarctic 2 fish is a is currently targeted by only one fishery, which is the bottom longline fishery.

2:3:14.990 --> 2:3:20.560  
Arnaud Grüss  
That has started operating in the Ross Sea region in 1997 nineteen 98.

2:3:21.310 --> 2:3:25.250  
Arnaud Grüss  
And as as just mentioned earlier so.

2:3:26.450 --> 2:3:40.840  
Arnaud Grüss  
So bottom longline fishing takes place only in summer in the Ross Sea region, so fishing starts on the 1st of December each year in the north and then fishing progresses progresses.

2:3:41.960 --> 2:4:3.210  
Arnaud Grüss  
Uh S as as CI three treats and uh yeah, the the fisheries and is closed when the catch limit is reached, and this is actually typically in in January or February. So as you can see, we have like a pretty short fishing season for Antarctic toothfish in the Russia region.

2:4:5.20 --> 2:4:19.520  
Arnaud Grüss  
So, um regarding, you know, the the the management in the Ross regions, so a very important event to be aware of is the fact that in the 2018 fishing season.

2:4:20.270 --> 2:4:30.0  
Arnaud Grüss  
The largest 9 protected area of the world was was established in the Russia region. So that's the Rossi region Marine protected area.

2:4:31.310 --> 2:4:36.10  
Arnaud Grüss  
And the establishment of this large scale MPA has had like.

2:4:36.330 --> 2:4:41.440  
Arnaud Grüss  
Uh, massive consequences for management in the Ross region because.

2:4:42.130 --> 2:4:55.670  
Arnaud Grüss  
This has LED us to totally redefine uh management areas in the Ross Sea region and so also for the for the for the assessment of Rusty region, Antarctic to speech.

2:4:56.840 --> 2:4:57.870  
Arnaud Grüss  
So now.

2:4:59.170 --> 2:5:8.930  
Arnaud Grüss  
In the in the Ross Sea region, because of the establishment of the Ross Sea MPA, we have different types of management areas.

2:5:9.860 --> 2:5:20.530  
Arnaud Grüss  
With uh so the management areas on this slide that are in red, which are the management areas that are part of the Ross Sea Marine Protected Area.

2:5:21.630 --> 2:5:33.540  
Arnaud Grüss  
So first we have a general protection zones within the Russian PA where fishing is not allowed. So fishing is totally.

2:5:35.380 --> 2:5:44.340  
Arnaud Grüss  
Uh not permitted and also within the Ross Emma in protected area we have the special research zone.

2:5:45.930 --> 2:5:52.600  
Arnaud Grüss  
So which is a a smaller zone where fishing is permitted, but at A at a low exploitation rate.

2:5:54.620 --> 2:6:2.990  
Arnaud Grüss  
Otherwise, the other management areas in the Ross Sea region that matters for Antarctic toothfish or?

2:6:3.590 --> 2:6:9.90  
Arnaud Grüss  
And the S70, so South of 70 degrees South management area.

2:6:10.230 --> 2:6:17.520  
Arnaud Grüss  
And the north of 70 degrees South and 70 management IL.

2:6:18.520 --> 2:6:27.710  
Arnaud Grüss  
So and so, so those are two uh management areas within the Ross region where fishing is fully permitted.

2:6:28.490 --> 2:6:38.980  
Arnaud Grüss  
And and we distinguish between those two two areas because we don't have a yeah, that's the same life stages of Antarctic toothfish.

2:6:40.820 --> 2:7:3.230  
Arnaud Grüss  
Leaving inhabiting those two areas so we have, uh, predominantly small and smaller and younger Antarctic toothfish in the S70 management area and predominantly larger and older Antarctic toothfish within the and 70 management area.

2:7:6.600 --> 2:7:23.710  
Arnaud Grüss  
So now regarding the operating model that we use for Antarctic 2 speech for this spatial assessment modelling workshop. So this operating model uses spatial population model software. So the SPM software.

2:7:24.540 --> 2:7:37.710  
Arnaud Grüss  
And as I mentioned earlier, the SPM was actually originally developed for Ross Region and darting toothfish, and it's only very recently that it's been applied to other.

2:7:38.770 --> 2:7:50.630  
Arnaud Grüss  
User fish stocks, so it's been applied. As you all aware to Indian, Austrian, yellowfin tuna, but also recently the SPM has been applied to.

2:7:50.840 --> 2:7:55.900  
Arnaud Grüss  
And some invertebrate species from the Chatham rise in New Zealand.

2:7:57.460 --> 2:8:7.430  
Arnaud Grüss  
So the latest published version of the SPM front for Russian tactic toothfish that's back from 2014.

2:8:8.260 --> 2:8:21.410  
Arnaud Grüss  
So for the spatial assessment Modelling Workshop workshop so Sophie Mormede has updated the spatial population model for Antarctic toothfish two 2021.

2:8:22.490 --> 2:8:36.790  
Arnaud Grüss  
And so it's really so this operating model that we are considering for the spatial assessment Modelling Workshop is is really not for management purposes, but solely for modelling exercises.

2:8:38.140 --> 2:8:43.910  
Arnaud Grüss  
Umm, so that's a yeah, especially explicit operating model.

2:8:45.150 --> 2:8:48.140  
Arnaud Grüss  
Where we where as a rusty region.

2:8:49.540 --> 2:8:55.990  
Arnaud Grüss  
Is considered as a as as being made of a number of grid cells and.

2:8:56.710 --> 2:9:1.440  
Arnaud Grüss  
Their population dynamics happening between these grid cells and also movement between.

2:9:1.600 --> 2:9:3.860  
Arnaud Grüss  
Uh. Between these grid cells?

2:9:4.740 --> 2:9:11.870  
Arnaud Grüss  
And so for the spatial assessment Modelling Workshop, specific management area was.

2:9:13.0 --> 2:9:18.880  
Arnaud Grüss  
Was assigned to each of the grid cells of the spatial population model.

2:9:19.640 --> 2:9:24.490  
Arnaud Grüss  
Although yeah, it's a, it's a. It's a simplification because. UM.

2:9:25.270 --> 2:9:33.70  
Arnaud Grüss  
In in in reality those grid cells very likely well in reality.

2:9:33.160 --> 2:9:38.520  
Arnaud Grüss  
And they're real fun. Fall within several management areas.

2:9:40.210 --> 2:9:46.680  
Arnaud Grüss  
So again, it's it's really an operating model for modeling exercises only.

2:9:48.900 --> 2:9:57.850  
Arnaud Grüss  
So that operating model for the spatial Assessment Modelling Workshop provided us with a spatially explicit data.

2:10:0.150 --> 2:10:13.610  
Arnaud Grüss  
So they were quite a lot of spatially explicit data that the operating model provided, but ultimately we didn't choose all of those data in the stock assessment models that we developed for the workshop.

2:10:14.890 --> 2:10:16.340  
Arnaud Grüss  
So UM.

2:10:18.210 --> 2:10:24.80  
Arnaud Grüss  
For so for the different objectives of the workshop we use.

2:10:25.520 --> 2:10:37.440  
Arnaud Grüss  
So just a sum of the data provided by the operating model which include the total catches in biomass for each year of the period 1998 to 2021.

2:10:38.840 --> 2:10:52.330  
Arnaud Grüss  
Uh, we also use uh, the proportions at age of the catch. So provided by the operating model for project for each year of the period 2002, 2020.

2:10:54.230 --> 2:11:6.530  
Arnaud Grüss  
And we use also the spatially explicit taking data provided by the operating model. So we use the proportions at age of tag, then release fish.

2:11:7.170 --> 2:11:14.670  
Arnaud Grüss  
For each year of the period 2001 to 2020 and the proportions at age of feature capture with A tag.

2:11:15.340 --> 2:11:18.810  
Arnaud Grüss  
So each year of the period 2002 to 2020.

2:11:20.140 --> 2:11:21.100  
Arnaud Grüss  
So.

2:11:22.740 --> 2:11:30.500  
Arnaud Grüss  
We didn't use the catches per unit effort. CPUE is provided by the operating model.

2:11:30.820 --> 2:11:41.730  
Arnaud Grüss  
And and the reason why we we did this is because the CPUE's are actually not used in the actual rusty region, Antarctic to assessment.

2:11:44.10 --> 2:11:45.620  
Arnaud Grüss  
Because there's like.

2:11:47.340 --> 2:12:8.870  
Arnaud Grüss  
This uh, this belief, you know, use it and fishing groups that the changes in Antarctic toothfish CPUE are not consistent with the likely fish down changes in two fish abundance and the appear to partially reflect special management boundary changes is driven availability.

2:12:9.600 --> 2:12:34.20  
Arnaud Grüss  
And yeah, on and you were basis and also the continued improvement in skill and fishing gear strategy by the fishing fleets. So all these rather than the underlying toothfish abundance. So we didn't use the CPU is provided by CSPM and also for our project for the workshop we didn't use.

2:12:36.370 --> 2:12:44.830  
Arnaud Grüss  
The proportion spinning for each length in the cache that are provided by the operating model because.

2:12:44.910 --> 2:12:52.180  
Arnaud Grüss  
Uh, this particular data also are not used in the actual worst region, Antarctic to switch assessment.

2:12:54.560 --> 2:13:16.500  
Arnaud Grüss  
So regarding the stock assessment models that we developed for the for the workshops, so those are implemented using the Castle software package, which is a standard assessment, but in platform in New Zealand that we use for quite a lot of assessments here in New Zealand and which shows Castle.

2:13:18.320 --> 2:13:24.190  
Arnaud Grüss  
Falls for falls the workshop because Cassola special capabilities.

2:13:25.0 --> 2:13:49.650  
Arnaud Grüss  
So, uh, we schedule, it's possible to implement Arias fleets, models and so that's what we did for the workshop. But also we scale. So it's possible to implement spatially explicit models with migrations that are being simulated between the different regions considered in the spatially explicit model.

2:13:50.950 --> 2:14:2.490  
Arnaud Grüss  
And also it uh, it's interesting to note that in a New Zealand most of for spatially explicit stock assessment assumes not not to the fidelities so.

2:14:3.600 --> 2:14:6.440  
Arnaud Grüss  
We schedule in New Zealand, we are able.

2:14:8.50 --> 2:14:16.420  
Arnaud Grüss  
To uh, account for the fact that speech fish that are spawned from a given stock will uh return to their little spinning ground.

2:14:17.340 --> 2:14:18.130  
Arnaud Grüss  
Also.

2:14:19.700 --> 2:14:41.490  
Arnaud Grüss  
Beside the fact that Cassola special capabilities so which shows Casal because Casal can can account for tag releases and recaptures by age and length and this is very important to conduct an assessment of species like Antarctic toothfish, for which we have like a lot of tagging data.

2:14:43.460 --> 2:14:57.190  
Arnaud Grüss  
Examples of special stock assessment models uh with guests also includes the actual grocery region, Antarctic to switch assessments, which relies on Arias as fleets model.

2:14:58.10 --> 2:15:1.490  
Arnaud Grüss  
Where uh tagging data are critical data inputs.

2:15:3.320 --> 2:15:10.30  
Arnaud Grüss  
And it's another example of alias as fleets model with Casal is the ones that.

2:15:12.110 --> 2:15:17.200  
Arnaud Grüss  
That is implemented in New Zealand for or carewise stocks.

2:15:18.880 --> 2:15:38.630  
Arnaud Grüss  
And also Casal is used in New Zealand for uh snap assessments and in that case. So for the assessment of snapper for the northeast coast of the North Island, we use especially explicit gasoline model with three regions, three stocks and natural fidelity with periods of mixing.

2:15:39.750 --> 2:15:53.490  
Arnaud Grüss  
And also casserole is used for an economically important stock here in New Zealand or Key. And in that case Casal is used as a specially specially explicit.

2:15:54.180 --> 2:16:2.780  
Arnaud Grüss  
Uh assessment model with four regions, two separate spinning stocks and natural fidelity. We separate stock spawning grounds.

2:16:4.900 --> 2:16:16.660  
Arnaud Grüss  
So falls the workshop. We developed two types of assessment models, so we developed one area models and four area models.

2:16:17.610 --> 2:16:47.100  
Arnaud Grüss  
And of for I am models were areas that as fleets model. So that means that those four area models are continued for some special structure by estimating, estimating, separate phishing selectivities for the different management areas of the Ross Sea region which are the General protection zone, the special research Zones and Stevens.

2:16:47.560 --> 2:16:49.810  
Arnaud Grüss  
Yeah, and and and 70 area.

2:16:51.740 --> 2:17:4.850  
Arnaud Grüss  
So for the workshop we developed insects, CASAL models, but actually the actual rusty region Antarctic toothfish assessment model is a sex model.

2:17:5.700 --> 2:17:19.550  
Arnaud Grüss  
And so we were, we developed uh unsexed model for the workshop because the operating model did not provided us with a sex data that was with unsexed data.

2:17:21.780 --> 2:17:38.20  
Arnaud Grüss  
Also, Casal assessment models where edge structure models where we represented the dynamics of toothfish edged between 2 year old and 30 plus year old.

2:17:39.280 --> 2:17:51.570  
Arnaud Grüss  
And so the reason why we represented those particular edge classes is because the operating model provided us with data for those specific classes.

2:17:53.50 --> 2:18:1.30  
Arnaud Grüss  
And so with uh, the castle assessment models that we developed, we, uh, followed, tackled through time.

2:18:2.200 --> 2:18:6.780  
Arnaud Grüss  
So more precisely, we followed A20 tacos.

2:18:7.740 --> 2:18:15.570  
Arnaud Grüss  
Is that corresponded to uh tag the tag releases that happened in years 2001 to 2020.

2:18:18.210 --> 2:18:46.960  
Arnaud Grüss  
Uh, so with the so Casal assessment models that we develop, we represented 2 speech dynamics in years 1995 to 2001. So we started running the model just two years before fishing started operating in the Ross Region and 2021 is or current here. So that's the last year.

2:18:47.30 --> 2:18:50.630  
Arnaud Grüss  
For which we had data provided by the operating model.

2:18:52.190 --> 2:19:15.720  
Arnaud Grüss  
And so based on the ecological features of entity 2 switch in the roster region that I mentioned earlier, so we chose to divide all Casal assessment models for Antarctic fish. I mean, so year we chose to divide each year in those assessment models into three time steps.

2:19:16.510 --> 2:19:32.780  
Arnaud Grüss  
And so three times steps included summer. So November to April Winter, which is made to October and the very last time step was a simple edge incrementation time step.

2:19:34.350 --> 2:19:54.820  
Arnaud Grüss  
And so as I mentioned, uh, as I just said, uh, we divided each year into three time steps based on the ecological features of Antarctic toothfish in the rest region and also based on the characteristics of the bottom longline fishery in the Ross Sea region.

2:19:56.30 --> 2:20:4.560  
Arnaud Grüss  
And so in our assessment models, in uh time step one or equipment takes place and then we.

2:20:6.50 --> 2:20:10.620  
Arnaud Grüss  
Uh simulates the tag release and tag recapture processes.

2:20:12.300 --> 2:20:13.90  
Arnaud Grüss  
Next.

2:20:13.170 --> 2:20:24.520  
Arnaud Grüss  
Uh does in still in time step one, we apply all of the natural mortality and and then after that stealing type step one.

2:20:25.220 --> 2:20:30.10  
Arnaud Grüss  
Uh. We apply uh instantaneous fishing mortality.

2:20:31.180 --> 2:20:45.50  
Arnaud Grüss  
And then in time Step 2, so we start by applying the like the second-half of natural mortality, and we simulate the spinning process.

2:20:45.940 --> 2:20:55.600  
Arnaud Grüss  
And so the spawning stock biomass SSB is recorded after half of the natural mortality has been applied in time Step 2.

2:20:58.90 --> 2:21:6.740  
Arnaud Grüss  
So, uh, who CASAL models for the workshop include two types of models. So.

2:21:8.420 --> 2:21:18.60  
Arnaud Grüss  
First, we developed one area models where we consider only one single fleets which is a rusty region fleets.

2:21:19.380 --> 2:21:27.190  
Arnaud Grüss  
And then what we did is that we developed for Aria models. So for Arias as fleets models.

2:21:27.980 --> 2:21:32.270  
Arnaud Grüss  
And where we considered UH-4 fleets.

2:21:33.140 --> 2:21:38.770  
Arnaud Grüss  
So where each of these fishing fleets uh correspond to uh.

2:21:39.530 --> 2:21:57.240  
Arnaud Grüss  
A particular management area in the Ross region. So in the four area models, we have AN 70 fleet and 70 fleet special research zone fleets or SRZ it fleets and a general protection zones fleet, so GPZ fleets.

2:21:58.830 --> 2:22:20.320  
Arnaud Grüss  
And so for each of the fleets represented in our castle assessment models. So we estimated selectivity at age and we assume that selectivity at age followed kept double normal distribution and we estimated the parameters of the selectivity attach functions.

2:22:21.480 --> 2:22:45.590  
Arnaud Grüss  
And So what we did is that in the one area model, so the selectivity attached parameters in the water in the one area model where estimated using the same priors as the priors for the main fleet in the four area model, which is 70 fleets because so in the.

2:22:46.340 --> 2:22:55.230  
Arnaud Grüss  
In the roster region, the the great majority of fishing takes place each year of our study period within the S70 area.

2:22:56.840 --> 2:22:57.510  
Arnaud Grüss  
So.

2:22:58.760 --> 2:23:13.820  
Arnaud Grüss  
We provide a annual catches as inputs to the Casal assessment models, and in Castle we assume maximum fishing pressure of 0.9999.

2:23:14.670 --> 2:23:15.180  
Arnaud Grüss  
And.

2:23:16.580 --> 2:23:27.410  
Arnaud Grüss  
To impose a constraints constraints in settlement models we implement catch limit penalties and also some fish tagged penalties.

2:23:31.100 --> 2:23:48.390  
Arnaud Grüss  
Proportions at age are provided to Gasol as observations, and along with those proportions at age we provide inputs, input, sample sizes for the different uses for which we have proportions at age.

2:23:49.640 --> 2:23:55.550  
Arnaud Grüss  
And so here we're using a multinomial distribution and what's important to note is that so.

2:23:57.480 --> 2:24:7.850  
Arnaud Grüss  
We provide input sample sizes to the Casal assessment models, but those inputs sample sizes are real reweighted using the Francis Francis method.

2:24:9.190 --> 2:24:11.420  
Arnaud Grüss  
Because we want to done wait.

2:24:11.590 --> 2:24:31.160  
Arnaud Grüss  
And the influence of proportions at age compared to the influence of tagging data, you know, Casal assessment models, since the annual trends in Castle will be informed by the tagging data as we are not providing CPU and we want.

2:24:32.320 --> 2:24:39.430  
Arnaud Grüss  
Tagging data to have more influence in the in the assessment models than the proportion at age data.

2:24:41.10 --> 2:24:44.300  
Arnaud Grüss  
Regarding tag releases and tag recaptures so.

2:24:46.100 --> 2:24:50.810  
Arnaud Grüss  
For each year of the period 2001 to 2020.

2:24:52.210 --> 2:24:58.880  
Arnaud Grüss  
We specify a total number of tag releases and proportions tag at age.

2:25:0.580 --> 2:25:5.250  
Arnaud Grüss  
Uh in castle? So those are provided as inputs of the castle assessment models.

2:25:6.450 --> 2:25:17.830  
Arnaud Grüss  
And also we provide tagger capture observations to the Casal assessment models. So for each year of the period 2002 to 2020, so.

2:25:18.570 --> 2:25:25.460  
Arnaud Grüss  
Uh, we provide the Casal assessment models with proportion scanned at age and proportions recaptured at age.

2:25:26.680 --> 2:25:56.210  
Arnaud Grüss  
And So what we do is that we, uh, ignore, ignore the in your recaptures and we consider only the tags that have been at liberty for maximum of six years as this is something that we also do in the actual browser region and tactic to switch assessment. So we use CASI binomial distributions for the tag. I capture data and so this means that we have a dispersion term for the.

2:25:56.370 --> 2:25:57.660  
Arnaud Grüss  
That could capture likelihood.

2:25:58.550 --> 2:26:8.960  
Arnaud Grüss  
And this uh, this person term is initially set to one, but it it is an uh reweighted using a procedure from Francis.

2:26:9.600 --> 2:26:21.0  
Arnaud Grüss  
And and this was to uh again give uh more importance to the tagging data in CASAL compared to the proportions at age data.

2:26:22.520 --> 2:26:33.820  
Arnaud Grüss  
So regarding the recruitment process in our assessment models, so we assume that Fisher could at age 2 based on the guidelines that were provided to workshop participants.

2:26:34.450 --> 2:26:47.560  
Arnaud Grüss  
And we model the recruitment process using Beaverton old spawning stock recruitment relationship where recruitment is given by the unfinished recruitment R0.

2:26:49.280 --> 2:27:2.60  
Arnaud Grüss  
And we use a steep net steepness parameter of 0.75 based on the guidelines that were provided to workshop participants and we.

2:27:2.760 --> 2:27:13.340  
Arnaud Grüss  
With the Castle assessment models, we estimate your clusterings in each year of the period 1993 to 2009.

2:27:13.990 --> 2:27:21.540  
Arnaud Grüss  
And we estimate your clusterings AWACS for those particular years, since fish or crypt at age 2 in the assessment models.

2:27:23.40 --> 2:27:46.780  
Arnaud Grüss  
Regarding the maturation process, so this process takes place in next Step 2 and we specify maturation as a time invariant proportion of fish at age that are mature and we use logistic function and the parameters coming from the same node paper on Russia region and to switch.

2:27:48.470 --> 2:27:56.420  
Arnaud Grüss  
Was it was we use the natural mortality and growth length, weight parameters that were provided to work for participants.

2:27:58.40 --> 2:28:12.660  
Arnaud Grüss  
So now I'm going to, uh, report the results that we got for workshop objective one. So in workshop objective one we consider only one of the replicates.

2:28:13.130 --> 2:28:16.660  
Arnaud Grüss  
And from the operating model.

2:28:18.670 --> 2:28:29.480  
Arnaud Grüss  
And so, uh, to address objective one, we used uh replicate 2 and what we do with observations provided.

2:28:29.650 --> 2:28:39.690  
Arnaud Grüss  
And buy a replicate 2 is that we developed one area and four area CASAL models and both of these.

2:28:39.770 --> 2:28:54.530  
Arnaud Grüss  
Uh, CASAL models will run in the maximum posterior density mode. So in the NPD mode and in the Markov chain Monte Carlo MCMC mode, and so running.

2:28:55.800 --> 2:29:8.310  
Arnaud Grüss  
Those CASAL models in the MCMC modes allowed us to to have like estimation of uncertainties around parameter stimulates and derived quantities.

2:29:10.0 --> 2:29:23.160  
Arnaud Grüss  
And so two evaluates the one area in Florida CASAL models. So we developed quite a lot of diagnostics that are provided in the extra slides at the bottom of this presentation, so.

2:29:23.770 --> 2:29:42.430  
Arnaud Grüss  
And the presentation will be made to you guys, so you can just examine them. But so just very briefly, we dive, yeah, we developed a whole bunch of diagnostics. So looking at things like the Pearson residuals of the proportions at age.

2:29:42.600 --> 2:29:46.910  
Arnaud Grüss  
And bubble plots of the person 8 residuals.

2:29:48.310 --> 2:30:15.300  
Arnaud Grüss  
And we looked also at the Pearson tag recapture residuals and yeah, a bunch of other diagnostics for the age and tagging data that are listed here. And since for objective one, we also run Castle in the MCMC mode. So we looked at MCMC posterior trace plots and at a number of classical MCMC diagnostics.

2:30:17.410 --> 2:30:29.810  
Arnaud Grüss  
And also we looked at MCMC predicted median ages versus observed median edges in the cache for the different fleets represented in the one area. And for a CASAL models.

2:30:32.100 --> 2:30:44.220  
Arnaud Grüss  
So, first, uh, yeah, I'm. I'm showing you guys a few results that we got that are relative to biomass, spinning stock, biomasses and.

2:30:45.0 --> 2:30:48.120  
Arnaud Grüss  
And and recruitment so.

2:30:48.920 --> 2:30:58.630  
Arnaud Grüss  
Uh, we as a CASAL models run run in the NYPD and NCMC modes. We look at the results in terms of spawning stock biomass.

2:30:59.340 --> 2:31:6.230  
Arnaud Grüss  
Uh. Initial, uh SSBB 0 initial treatment R0 and Q and stock status.

2:31:7.430 --> 2:31:22.440  
Arnaud Grüss  
Well, Q and SSD so, but you must in in 2021 and current stock status which is given by the ratio of the biomass in 2021 over initial biomass.

2:31:23.780 --> 2:31:38.990  
Arnaud Grüss  
And so, uh, what we observed when we compared the results of the four area and one area models is that all of the spanning stock by mass quantities and R0.

2:31:39.600 --> 2:31:58.200  
Arnaud Grüss  
And we're all slightly higher for the four area model than for the one area model. So that's what you can observe here with those figures provided here and the numbers that are reported in the table provided in this slide.

2:32:0.470 --> 2:32:1.80  
Arnaud Grüss  
So.

2:32:2.890 --> 2:32:6.260  
Arnaud Grüss  
Also, what was, uh, interested is that uh.

2:32:7.310 --> 2:32:19.790  
Arnaud Grüss  
I am since we we run. Uh, the Casal assessment model is in the MCMC mode. We were able to so to look both at.

2:32:21.670 --> 2:32:22.470  
Arnaud Grüss  
Uh.

2:32:23.570 --> 2:32:33.500  
Arnaud Grüss  
Mean expected quantities, but also at uncertainties around the Arab quantities. And So what we were able to.

2:32:34.550 --> 2:32:38.910  
Arnaud Grüss  
To to observe by looking at the MCMC results is that.

2:32:38.990 --> 2:32:59.250  
Arnaud Grüss  
Uh, busy OR0, but you must in two thousand, 2021 and 20, stock status were all slightly higher for the for area model, but also those all of those quantities were also less uncertain for the for area models and for the one area model.

2:33:0.70 --> 2:33:6.780  
Arnaud Grüss  
And also if we look at the results in terms of current stock status, we could actually interpret that.

2:33:7.20 --> 2:33:16.190  
Arnaud Grüss  
Umm, but the the full area and when I am with estimated a relatively similar queue and stock status.

2:33:18.380 --> 2:33:44.840  
Arnaud Grüss  
So next we look at the results from the assessment models relative to fishing pressures and what we observed when we looked at MPD and MCMC results is at the four area model usually estimated slightly higher annual fishing pressures than the one I am model.

2:33:47.360 --> 2:33:53.720  
Arnaud Grüss  
Umm, next. We look at the results in term of cache.

2:33:55.870 --> 2:33:57.320  
Arnaud Grüss  
And so, uh.

2:33:58.100 --> 2:34:28.860  
Arnaud Grüss  
We look so as a total catch in the four area model for the four different fleets that are represented in that 4 area model. And we look at the total cache in the one area model. So which is for the rusty region fleets and what we observed is that the trends in total cache for the rusty region fleets in the one area model are similar to the trends in total cache for the S70 fleets, which is a main fleet.

2:34:28.930 --> 2:34:30.250  
Arnaud Grüss  
Means for I model.

2:34:30.970 --> 2:34:43.410  
Arnaud Grüss  
And so for both the rusty region fleet in the one area model and the 70 fleet, we observed an increase bit between 1997 and 2021 in total catch.

2:34:44.230 --> 2:34:53.520  
Arnaud Grüss  
Is that reflected the tendency for fishing effort to be, uh, more and more concentrated on the slope of the Russia region?

2:34:55.350 --> 2:35:2.80  
Arnaud Grüss  
Since the the the, the since the the start of the bottom longline fishery in the Ross region.

2:35:3.910 --> 2:35:16.640  
Arnaud Grüss  
Also, what we observed by looking at the results in terms of total cache is that in recent years the there was a slight increase in the total catch for the N70 fleets.

2:35:17.340 --> 2:35:24.640  
Arnaud Grüss  
And that, uh, my hold the decrease in total catch for the GPZ and SRZ fleets.

2:35:25.270 --> 2:35:26.670  
Arnaud Grüss  
And so, uh.

2:35:28.320 --> 2:35:36.70  
Arnaud Grüss  
This this slight increase in total catch in the less inventive feet is most likely due to a displacement of fishing effort.

2:35:37.60 --> 2:35:51.920  
Arnaud Grüss  
From where from some displacement of fishing effort from the Russian mine protected area to the north of the Rusty region since the establishment of the Ross Region MPA in 2008.

2:35:54.230 --> 2:36:13.230  
Arnaud Grüss  
Next we look at the results in term of selectivities at age. And So what we found out is that the estimated selectivity function for the rest region fleet was similar to the estimated selectivity function for the S70 fleet. So again the main fleet in the 4I model.

2:36:14.60 --> 2:36:35.760  
Arnaud Grüss  
So for both the Rusty region fleet in the one area model and the S 70 fleet we obtained downshifts Dome shaped selectivity at H and that was also. We also got a Dome shaped selectivity at age function for the SRZ and GPZ fleets.

2:36:36.620 --> 2:36:54.570  
Arnaud Grüss  
And the estimated selectivity function for the N 70 N 7, N 70 fleet is different. So for the N 70 fleet, the four area CASAL assessment model estimated flat topped selectivity at age.

2:36:55.300 --> 2:36:56.310  
Arnaud Grüss  
And.

2:36:57.170 --> 2:37:11.780  
Arnaud Grüss  
This uh reflects the fact that the oldest Antarctic toothfish in the Russian region are found in the north of the Ross Sea, and those are fully selected. So by.

2:37:13.140 --> 2:37:16.370  
Arnaud Grüss  
By the end, by the end 70 feet.

2:37:18.100 --> 2:37:43.70  
Arnaud Grüss  
So next we looked at the results in term of abundance at age. And so when we looked at the MPD results, we noted differences in abundance at age between the four area and the four models in particular, more variability, edge structure for the younger age for the younger toothfish in the for our model.

2:37:44.60 --> 2:37:53.670  
Arnaud Grüss  
And this was even more the case when we looked at the abundance at age predicted by the assessment model in the more recent years.

2:37:55.990 --> 2:38:23.160  
Arnaud Grüss  
That also we looked at the MCMC results and when we looked at the MCMC results, is that what what we noted is that there was more variability in edge structure for the younger toothfish in the four area model than in the one area model, but also more in more uncertainty in the estimated age structure in the one area model.

2:38:26.640 --> 2:38:35.350  
Arnaud Grüss  
So finally we looked at the results in term of your class strength and what's what we found out.

2:38:35.720 --> 2:39:1.100  
Arnaud Grüss  
Uh. When looking at the results in terms of your clustering, is that the results explain the differences in structure. We had noticed earlier because the estimated your clusterings add more into annual variability, but we are also less uncertain for the four area model compared to the one area model.

2:39:3.370 --> 2:39:17.460  
Arnaud Grüss  
So uh, next in terms of results for Objective 2. So for workshop Objective 2, we looked at the results across the 100 replicates predicted.

2:39:18.820 --> 2:39:28.850  
Arnaud Grüss  
By Zippering model, but this time we run the Castle assessment models, so the one area and 4I models only in the NPD mode.

2:39:29.580 --> 2:39:37.510  
Arnaud Grüss  
Because MCMC runs text really a lot of time, so it was not doable to run MCMC for workshop Objective 2.

2:39:38.300 --> 2:39:59.570  
Arnaud Grüss  
And again, so as we did for workshop objective, one for Workshop Workshop Objective 2, we compared the results of the one area and four area models. So in terms of spawning stock, biomasses, fishing pressure, age structure and your clusterings.

2:40:0.290 --> 2:40:19.230  
Arnaud Grüss  
And in addition to that, compared to workshop objective one, we also produce boxplots of Visio biomass in 2021. Current stock status and AR0. And we compared those bug plots for one the one area and for a model.

2:40:20.360 --> 2:40:21.830  
Arnaud Grüss  
And also uh.

2:40:23.80 --> 2:40:28.990  
Arnaud Grüss  
Because the operating model provided us with a value for R0.

2:40:30.10 --> 2:40:35.720  
Arnaud Grüss  
But all zero is estimated by the four area and one area model.

2:40:36.510 --> 2:40:40.950  
Arnaud Grüss  
We were able so because of this two.

2:40:42.200 --> 2:40:55.20  
Arnaud Grüss  
Estimate bias in the R0 that is estimated by the one area in Fourier models and compare biases in R0 for the one area versus for a model.

2:40:57.160 --> 2:40:57.890  
Arnaud Grüss  
So.

2:40:57.970 --> 2:41:2.20  
Arnaud Grüss  
Uh, regarding spending stock biomasses.

2:41:4.560 --> 2:41:5.320  
Arnaud Grüss  
And.

2:41:8.480 --> 2:41:20.370  
Arnaud Grüss  
So with with 100 replicates, once again we we found that the spanning stock by masses were higher for the area models and for the one area model.

2:41:21.780 --> 2:41:39.910  
Arnaud Grüss  
And regarding the median fishing pressures over the 100 replicates, what we observed is that those median fishing pressures over the 100 replicates tended to be very slightly higher for the for area models and for the one area model.

2:41:41.720 --> 2:41:43.710  
Arnaud Grüss  
Regarding abundance.

2:41:43.790 --> 2:41:53.770  
Arnaud Grüss  
Uh. Abundance at age, estimated by the the the Castle assessment models. So again we noticed.

2:41:55.30 --> 2:41:58.920  
Arnaud Grüss  
With the with the 100 replicates differences.

2:41:59.110 --> 2:42:4.480  
Arnaud Grüss  
And in the abundance at age estimated by the four area and one area models.

2:42:5.410 --> 2:42:18.170  
Arnaud Grüss  
In especially more variability in edge structure for the younger to switch that are young girls and 15 year old in the four area model compared to the one area model.

2:42:19.320 --> 2:42:29.30  
Arnaud Grüss  
And again, the. So here's here's in term of age structure could be explained by looking at the results in terms of your class strength.

2:42:30.720 --> 2:42:44.130  
Arnaud Grüss  
So when we looked at the individual replicates provided by the operating model, again what we noticed is that the estimated your clusterings had more interannual variability.

2:42:45.530 --> 2:42:53.540  
Arnaud Grüss  
For the for area models and for the one area model. So you have like here a couple of examples that are provided on this slide.

2:42:56.630 --> 2:43:3.420  
Arnaud Grüss  
So we looked also so we also produced bugs plots of B0.

2:43:3.720 --> 2:43:20.670  
Arnaud Grüss  
Uh, joined by chunk by your mass in your 2021 and current stock status and looking at these but plots we saw that the initial spanning stock by mass OV0 was higher for the four area models and for the one area model.

2:43:21.790 --> 2:43:41.60  
Arnaud Grüss  
We also observe that, uh, that you must in your 2021 was very slightly higher for the four area models and for the one area model. And finally we found that current status was similar for the for area and the one area models.

2:43:44.990 --> 2:43:58.220  
Arnaud Grüss  
Yeah, I think the results for initial equipment be 0. So we found that the estimated initial recruitment was higher for the four area models and for the one area model.

2:43:59.380 --> 2:44:22.200  
Arnaud Grüss  
And so, uh, as I mentioned earlier, uh, because the operating model provided us with a value for P040R0. Sorry, while R0 is estimated with the Casal assessment model, we were able to evaluate biases in R0 for the one area and the for area models.

2:44:25.200 --> 2:44:31.790  
Arnaud Grüss  
And so it's interesting to evaluate biases in a in our zero.

2:44:33.770 --> 2:44:56.530  
Arnaud Grüss  
Uh, because uh, in alias as fleets assessment models, we are making the important assumptions that the probability of recapturing attached fish is the same as that of an untagged fish. And this effective of the location at which tagged fish were released or the subsequent spatial distribution of fishing effort from which.

2:44:58.460 --> 2:45:5.830  
Arnaud Grüss  
Fish are scanned to to detect recaptures. So in other words, in alias fleets models.

2:45:5.920 --> 2:45:33.720  
Arnaud Grüss  
And we are assuming complete mixing of tagged and untagged fish and and this is an very strong assumption that is likely not met in the real world because of the spatial management that we have in place in the Ross Sea region, but also because of the constraints imposed by cisyk extent on phishing. So on the impose on the spatial distribution of fishing based sales and also.

2:45:34.130 --> 2:45:49.670  
Arnaud Grüss  
And rusty region. Antarctic sushi fish actually move over relatively short this short distances. So for all of these reasons, it's very likely that or strong assumption of complete mixing of tagged and untagged fish is not met in the real world.

2:45:50.710 --> 2:46:5.30  
Arnaud Grüss  
So we looked at the bias in all zero and we found that ozio was biased, biased low by more than 40% in both 1 area and four area models.

2:46:5.840 --> 2:46:17.210  
Arnaud Grüss  
And however, the negative bias in all zero, so was found to be significantly lower for the for area models and for the one area model.

2:46:19.660 --> 2:46:38.100  
Arnaud Grüss  
So in conclusions uh compared to the one fleets as Arias models, so the four fleets as Arias model predicted slightly higher spawning stock, biomasses, B0Q and biomass and annual fishing pressures.

2:46:39.190 --> 2:46:43.960  
Arnaud Grüss  
But predicted similar current stock status.

2:46:45.310 --> 2:46:57.120  
Arnaud Grüss  
Also, the four I am done a lot for the estimation of several selectivity at age functions that accounted for the ontogenetic migration patterns in Russia region Antarctic toothfish.

2:46:58.30 --> 2:46:59.360  
Arnaud Grüss  
And.

2:47:0.560 --> 2:47:10.80  
Arnaud Grüss  
As a thought, I am adult was able to estimate your cluster strengths that add more interannual variability and will also less uncertain.

2:47:11.840 --> 2:47:20.790  
Arnaud Grüss  
As a result of this, the FOIA model predicted more variability in the ESTRUCTURE for the younger toothfish and also.

2:47:21.990 --> 2:47:24.920  
Arnaud Grüss  
The edge switch predicted for two speech was.

2:47:25.10 --> 2:47:25.330  
Arnaud Grüss  
And.

2:47:26.530 --> 2:47:28.760  
Arnaud Grüss  
Less uncertain with a 4I mother.

2:47:30.710 --> 2:47:39.810  
Arnaud Grüss  
Uh also implemented A4 area model instead of A1 area model resulted in slightly reduced bias.

2:47:40.860 --> 2:47:42.930  
Arnaud Grüss  
And ill in the estimated audio.

2:47:44.10 --> 2:47:49.520  
Arnaud Grüss  
So finally, I'm going to conclude this presentation with a few avenues for future research. So.

2:47:51.980 --> 2:47:57.250  
Arnaud Grüss  
Uh, possibly a few just to this could try to.

2:47:59.710 --> 2:48:12.180  
Arnaud Grüss  
Apply well, use Casal 2 user Casal 2 model with the data that were simulated for Russia, region Antarctic toothfish for the workshop.

2:48:13.10 --> 2:48:25.310  
Arnaud Grüss  
And what would be interesting then would be for this Casal 2 model to be specially explicit and to represent migrations between different regions of the Ross Sea region.

2:48:28.920 --> 2:48:33.700  
Arnaud Grüss  
Also potentially Ave for future research would be to improve.

2:48:35.0 --> 2:48:50.0  
Arnaud Grüss  
So Q and spatial population model for Antarctic toothfish and later estimate that you sees in in stock size for Antarctic toothfish to inform management within the communal space.

2:48:50.650 --> 2:49:4.360  
Arnaud Grüss  
And regarding the improvements that would be introduced in the operating model, what would be particularly valuable would be to represent the Rusty Chef survey in the operating model and this way.

2:49:5.0 --> 2:49:8.860  
Arnaud Grüss  
And we could have a catch at age data for.

2:49:8.960 --> 2:49:17.690  
Arnaud Grüss  
Uh, a young toothfish. And this would allow us to better than estimate your clusterings.

2:49:18.720 --> 2:49:24.510  
Arnaud Grüss  
Uh, within the stock assessment model fitted to data simulated by the operating model.

2:49:25.780 --> 2:49:33.430  
Arnaud Grüss  
And so finally I I added one final so that that came from Simon about.

2:49:35.450 --> 2:49:40.0  
Arnaud Grüss  
About uh, yeah, about the tagging data and.

2:49:40.710 --> 2:49:54.340  
Arnaud Grüss  
It's small. Yeah. Something I'm not really familiar with. And it's more like something that included in this slides just as as food for thought later in the process for this workshop.

2:49:57.20 --> 2:50:3.110  
Arnaud Grüss  
So yeah, send. Thank you very much for your attention. Sorry, I have took quite a lot.

2:50:3.960 --> 2:50:5.590  
Arnaud Grüss  
It's more than I was supposed to.

2:50:9.590 --> 2:50:26.390  
Aaron Berger  
Well, thanks very much, Arno. And I think it was, you know, I appreciate anyways the the depth that you went into given that many of us haven't really thought about this data set too much yet. So that was really helpful to kind of set the stage.

2:50:27.140 --> 2:50:32.450  
Aaron Berger  
So thanks very much. Yeah, great presentation. Let's open it up to questions.

2:50:53.290 --> 2:50:55.150  
Aaron Berger  
Simon, looks like you were first. Go ahead.

2:50:57.810 --> 2:50:58.960  
Simon Hoyle  
Yeah. Thanks and thanks, Anna.

2:50:59.80 --> 2:51:7.530  
Simon Hoyle  
Umm I had a an initial question about something that is relevant to this presentation, but also to the.

2:51:9.610 --> 2:51:10.540  
Simon Hoyle  
To the yellowfin.

2:51:12.270 --> 2:51:18.140  
Simon Hoyle  
Presentations, which is about the that sort of mixing latency period issue.

2:51:19.430 --> 2:51:27.800  
Simon Hoyle  
Given that you, I mean as you mentioned you have this bias in biomass that's driven by the tagging data.

2:51:27.920 --> 2:51:30.610  
Simon Hoyle  
I'm due to the lack of mixing.

2:51:32.170 --> 2:51:36.400  
Simon Hoyle  
And that's an issue that comes up with the tuna assessments as well.

2:51:36.500 --> 2:51:43.50  
Simon Hoyle  
I'm in the yellowfin assessments. They have this latency period where they allow a period for mixing.

2:51:45.920 --> 2:51:49.420  
Simon Hoyle  
And in this assessment, what happens if you extend?

2:51:50.180 --> 2:52:2.450  
Simon Hoyle  
That latency period, I think you only have you don't include recoveries in the current year, but you include recoveries in every subsequent year up to six years.

2:52:4.780 --> 2:52:18.730  
Simon Hoyle  
If you extended that, mixing latency period, would you get less bias? I mean, I guess that's it's it's obvious because you'll have less taking data and the likelihood than so will be probably causing waste bias. But I just wondered if you'd like to.

2:52:19.430 --> 2:52:20.910  
Simon Hoyle  
To talk about that one. Thanks.

2:52:21.980 --> 2:52:33.30  
Arnaud Grüss  
So when do you talk about the latency period? Are you talking about the time at Liberty, which currently we restrict to six years in all assessment models?

2:52:34.500 --> 2:52:35.530  
Simon Hoyle  
Yeah, I'm.

2:52:37.360 --> 2:52:40.150  
Simon Hoyle  
I'm not sure if it's available in Castle, but in.

2:52:42.180 --> 2:52:55.70  
Simon Hoyle  
Say stock synthesis or multifan CL, there's a a parameter which is the the mixing period and and rather it's. It's the delay before tag start to be included in the.

2:52:55.770 --> 2:52:58.800  
Simon Hoyle  
Models. So if you release them in year one and there's a.

2:53:0.120 --> 2:53:2.40  
Simon Hoyle  
A latency period of two years.

2:53:2.690 --> 2:53:20.720  
Simon Hoyle  
They wouldn't be included in the year 2. They wouldn't be included in year three, but they would be included in year four or or maybe not in year one, not in year 2, but they would be included in the year 3. So there's a that latency period is a delay and then after the delay that they're included in the likelihood. So that gives the tags.

2:53:21.610 --> 2:53:38.60  
Simon Hoyle  
Sort of a couple of years to mix through the population and until you get the same proportion of until you assume that the tags are completely mixed. So any sample will have the same proportion of tags in the.

2:53:38.790 --> 2:53:41.220  
Simon Hoyle  
Recoveries as are in the population.

2:53:42.580 --> 2:53:43.50  
Arnaud Grüss  
OK.

2:53:43.120 --> 2:53:47.520  
Arnaud Grüss  
I see. Well, probably it's it's pretty straightforward to implement then because you just.

2:53:49.820 --> 2:53:54.90  
Arnaud Grüss  
You just choose to drop, you know for.

2:53:55.200 --> 2:54:12.290  
Arnaud Grüss  
When you consider the tagger captures, you know you consider tagger captures relative to the years of tag releases, and so to implement what you describe, probably what we will need to do would be to drop the first few years of.

2:54:12.350 --> 2:54:12.590  
Arnaud Grüss  
Umm.

2:54:14.560 --> 2:54:17.830  
Arnaud Grüss  
Yeah, tegrity this just consider just like, yeah.

2:54:18.590 --> 2:54:21.670  
Arnaud Grüss  
And so yes, something like three or four years after.

2:54:22.340 --> 2:54:25.710  
Arnaud Grüss  
The the, the, the, the. Yeah, the tagging was done.

2:54:28.210 --> 2:54:28.630  
Arnaud Grüss  
Uh.

2:54:30.320 --> 2:54:34.830  
Arnaud Grüss  
But yeah, obviously if we do this, it means it's it's a very important you know.

2:54:36.0 --> 2:54:58.530  
Arnaud Grüss  
Uh, since you know, tags we we don't use CPUE tags are driving the assessment. So those are the main data sources in in the assessment that are driving pretty much everything. If we just try this kind of changes, it would be this would be very important sensitivity analysis that probably we would have to present several times two Camilla.

2:54:59.230 --> 2:54:59.830  
Arnaud Grüss  
And.

2:55:0.530 --> 2:55:5.680  
Arnaud Grüss  
Before they, they are convinced that that's something we could do for the actual assessment.

2:55:18.310 --> 2:55:20.340  
Aaron Berger  
Thanks are no. Yeah, it seems like there's.

2:55:21.860 --> 2:55:28.930  
Aaron Berger  
Always a trade off of delaying the mixing period for this effectively you're throwing that information out because it.

2:55:30.770 --> 2:55:33.880  
Aaron Berger  
Invalidates assumptions, but then also.

2:55:34.640 --> 2:55:35.630  
Aaron Berger  
Reducing.

2:55:36.600 --> 2:55:48.40  
Aaron Berger  
What you have for data that comes from the tags, so it's an interesting concept. It continually think about, but I did see Jeremy, you had your hand up maybe a new comment or or things to add here. Go ahead.

2:55:47.480 --> 2:55:51.50  
Jeremy McKenzie  
Yeah. So it thanks Aaron, as I just.

2:55:52.580 --> 2:56:19.740  
Jeremy McKenzie  
I've been through this with with Alan before and I just sort of just wanted to clarify something. I know this is really interesting result because it's it's showing the the the problem of incomplete mixing. The fact that you've got spatial heterogeneity in the tags, that the fact that in some areas you're tagging adult fish and some areas you're taking juvenile fish and then through time these fish move around and say age.

2:56:20.470 --> 2:56:24.250  
Jeremy McKenzie  
So the interesting question is what period of latency?

2:56:25.90 --> 2:56:49.520  
Jeremy McKenzie  
Good Simon Rice would would sort of meteorite that that initial bias, you just the model's gonna assume that it's all homogeneously mixed from the start. If you say you're not gonna look at them till we're been out for six years, then maybe they're emotionality assumption is is met. But the interesting to test that. And I just have a question on on the tagging data because it is actually driving your whole abundance.

2:56:50.180 --> 2:56:56.630  
Jeremy McKenzie  
And you model, I'm assuming you are kind of using it as a as a relative.

2:56:57.310 --> 2:57:19.720  
Jeremy McKenzie  
Change in abundance because you explicitly not, I mean you the model will sort of interpret into particular ways, but are you telling it about like initial mortality tag loss, those sort of things that affect the absolute interpretation of the mark rates of it? How is how is your model dealing with the?

2:57:20.320 --> 2:57:20.910  
Jeremy McKenzie  
Umm.

2:57:21.790 --> 2:57:29.410  
Jeremy McKenzie  
Uncertainties around around uh, yeah, whether you're actually seeing all the tags and all the tags are surviving.

2:57:30.740 --> 2:57:40.300  
Arnaud Grüss  
Ah, yes indeed. You consider those you know datas. You know relative, you know, providing relative information. And then you also specify.

2:57:41.90 --> 2:57:45.260  
Arnaud Grüss  
A number of things about the tagging process, so you know, yeah.

2:57:45.400 --> 2:57:53.80  
Arnaud Grüss  
UM, Douglas rates what is called shading your so assume like.

2:57:54.730 --> 2:57:58.550  
Arnaud Grüss  
And multi DT specifically for the tax fish.

2:58:2.210 --> 2:58:2.670  
Arnaud Grüss  
Uh.

2:58:3.840 --> 2:58:12.0  
Arnaud Grüss  
Yeah. And you you don't. Uh assume the same rates for fish that have have been.

2:58:12.210 --> 2:58:16.30  
Arnaud Grüss  
And you know single tag then double tagged as well.

2:58:17.180 --> 2:58:22.670  
Jeremy McKenzie  
So the so the model is pretty much interpreting the tags is is an absolute signal.

2:58:26.420 --> 2:58:34.290  
Jeremy McKenzie  
Mark and Mark ratio, Tyler. So it's going to interpret. I'm a mark rate as a biomass.

2:58:38.640 --> 2:58:39.120  
Jeremy McKenzie  
Yeah.

2:58:33.750 --> 2:58:42.110  
Arnaud Grüss  
Well, actually, yeah, it's it's more absolute because there's no scaling that is being, you know, estimated by the assessment model. So that's correct, yeah.

2:58:43.550 --> 2:58:53.740  
Jeremy McKenzie  
So you, you, you, you, you are adjusting for that. But those that sort of uncertainty is is gonna propagate in in there as well. So you know scan a success forwarding success.

2:58:54.930 --> 2:58:58.750  
Jeremy McKenzie  
Umm tag lost whether the doubled or single tag.

2:59:0.840 --> 2:59:5.510  
Jeremy McKenzie  
That's factors revenue model, but but uncertainty around them will affect the system as well.

2:59:7.440 --> 2:59:10.370  
Arnaud Grüss  
Yeah, that's yeah, that's right. Because we provide just.

2:59:12.910 --> 2:59:16.700  
Arnaud Grüss  
You know one one single value for those, but I think you know there have been.

2:59:17.790 --> 2:59:20.800  
Arnaud Grüss  
Pretty sure that have been like sensitivity analysis done.

2:59:21.140 --> 2:59:26.690  
Arnaud Grüss  
And early on, you know, was when to switch assessments were, you know initiated.

2:59:27.400 --> 2:59:37.450  
Arnaud Grüss  
Just to evaluate the consequences of, you know, alternative values for those parameters, and I think you know just the current deterministic values that we use are.

2:59:38.140 --> 2:59:39.130  
Arnaud Grüss  
Just like.

2:59:40.110 --> 2:59:42.500  
Arnaud Grüss  
Based on those past analysis.

2:59:44.10 --> 2:59:46.940  
Jeremy McKenzie  
So in the operating model dies were.

2:59:47.770 --> 2:59:48.120  
Jeremy McKenzie  
So.

2:59:48.930 --> 2:59:53.540  
Jeremy McKenzie  
Next, I mean, no, those those features we're in the operating model and it generated data.

2:59:54.900 --> 2:59:55.530  
Jeremy McKenzie  
0.

2:59:56.740 --> 3:0:20.710  
Arnaud Grüss  
So no, So what we are discussing right now in terms of tag loss actually in everything that's in the actual assessment, the operating model didn't provide any of those control quantities. And for that particular reason, I didn't represent, you know, tag mortality, tag shedding and so on in the assessment model specifically developed for the workshop.

3:0:21.700 --> 3:0:25.930  
Jeremy McKenzie  
OK, so you ignored those factors because we weren't provided with them and.

3:0:27.690 --> 3:0:35.70  
Jeremy McKenzie  
In the in the in your assessment in your, in your somehow in your yeah simulation. See smoke.

3:0:35.500 --> 3:0:48.440  
Arnaud Grüss  
Yeah, but even if I ignore them just for the workshop modelling exercises, I think it's very great that you rises this issues because that's how you know, those are extremely important.

3:0:49.960 --> 3:0:53.880  
Arnaud Grüss  
Issues in our real world special stock assessments so.

3:0:54.640 --> 3:0:58.270  
Arnaud Grüss  
That's an opportunity just to raise those issues.

3:0:59.970 --> 3:1:6.120  
Jeremy McKenzie  
I think the fundamental one is the what point that you've shown is that in the in the operating model.

3:1:7.40 --> 3:1:11.650  
Jeremy McKenzie  
There were there were there were spatial heterogeneity in the way.

3:1:12.610 --> 3:1:21.660  
Jeremy McKenzie  
The tags went out because the certain areas you were tagging certain proportions of the population in in your estimated models you were kind of ignoring that.

3:1:22.540 --> 3:1:28.930  
Jeremy McKenzie  
Umm and implicit assumption was homogeneity of recoveries and it showed pretty dramatically that.

3:1:29.730 --> 3:1:37.380  
Jeremy McKenzie  
When they're assumption is not strongly met, you can get in your case of 50% underestimation of productivity.

3:1:40.40 --> 3:1:40.990  
Arnaud Grüss  
Uh, yeah.

3:1:42.790 --> 3:2:1.750  
Arnaud Grüss  
And as a result as well, you know number of parameters, I guess you know well that's the what the workshop participants can see, you know in the extra slides. So the diagnostics were good overall, but there were a bunch of parameters like selectivity at age for instance where you know the MCMC results were.

3:2:2.420 --> 3:2:4.340  
Arnaud Grüss  
Well, not that good and.

3:2:5.180 --> 3:2:7.390  
Arnaud Grüss  
It's, it's it. I think it's a.

3:2:7.460 --> 3:2:11.620  
Arnaud Grüss  
Yeah, largely because of like this, you know.

3:2:11.940 --> 3:2:14.190  
Arnaud Grüss  
And tag mixing assumption.

3:2:17.790 --> 3:2:29.740  
Aaron Berger  
Yeah, thank you. And that's one of the things that was a difficult component of creating the operating models and deciding you know what to provide.

3:2:30.600 --> 3:2:33.170  
Aaron Berger  
Umm you all with in terms of?

3:2:33.850 --> 3:2:36.810  
Aaron Berger  
Known things. Uh. Because obviously if you start with.

3:2:37.940 --> 3:2:58.360  
Aaron Berger  
A blank slate. UM, you can very easily become, you know, from an experimental standpoint. Not very tractable. And so that was one of the points that we discussed quite a bit on what to provide as as inputs so that, you know, we could keep the experiment a little bit on track, but but nonetheless, that's a really good point that.

3:2:59.710 --> 3:3:6.560  
Aaron Berger  
You know, spatially tango tagging data in general has a bunch of assumptions associated with it, right and and?

3:3:7.580 --> 3:3:18.510  
Aaron Berger  
Let not just recapture, but you know tag related mortality recovery rates, differences in those by fleets. For example in the elephant model etcetera. And so those are things that.

3:3:19.210 --> 3:3:29.30  
Aaron Berger  
That uh underpin a lot of what we're doing here, but are certainly important. Let let me move to I see Dan has his hand up. Let's go. Yeah, go ahead Dan.

3:3:30.240 --> 3:3:59.950  
Dan Goethel  
Yep. So I had two kind of related questions. The first one was along the lines of what kind of led you guys to choose the fleets's areas model over a more fully spatially explicit, was there anything in the data or like some data analysis that kind of led you down that that reasoning and rationale? And then the related one was do you think that given the kind of complex fishery dynamics mostly those?

3:4:0.80 --> 3:4:2.120  
Dan Goethel  
Alright, basically closed areas of fishing.

3:4:3.360 --> 3:4:22.870  
Dan Goethel  
Do you think that kind of had a do you think the Dome shapes selectivity and A fleets's areas is adequate to deal with that kind of complexity and might that also be something that you know having tagged fish move into closed areas and not being susceptible to phishing you know might that be part of the problem not just tag mixing itself?

3:4:23.810 --> 3:4:25.700  
Dan Goethel  
Sorry, it's a long complicated question.

3:4:27.700 --> 3:4:29.740  
Arnaud Grüss  
I don't know it's it's pretty clear. Done. Thank you.

3:4:32.120 --> 3:4:34.870  
Arnaud Grüss  
Well, we chose a fleet cells areas because.

3:4:36.150 --> 3:4:47.440  
Arnaud Grüss  
I think when you want to develop the special assessment model, you will start with this kind of models that is more simple than especially explicit model with movement between regions.

3:4:49.220 --> 3:4:58.960  
Arnaud Grüss  
And that seemed to be like a very good choice to to deal with a, you know, with a a fish tuck that under under takes this.

3:4:59.40 --> 3:5:14.830  
Arnaud Grüss  
Then it's alternate automatic migrations where the fleets will be related to the management areas, but also to the ontogenetic spatial distributions. And so we would account.

3:5:15.630 --> 3:5:25.680  
Arnaud Grüss  
A visa fleets and therefore with selectivity attached functions that are estimated for different fleets. We could just account for those ontogenetic.

3:5:25.790 --> 3:5:31.310  
Arnaud Grüss  
And you know, I be that shifts in the assessment models.

3:5:35.610 --> 3:5:37.240  
Arnaud Grüss  
Now in terms of with.

3:5:39.990 --> 3:5:47.300  
Arnaud Grüss  
We will do a better job with different selectivity at age functions and just moving away from fleets as Arias.

3:5:50.820 --> 3:5:55.670  
Arnaud Grüss  
Well, clearly for the N 70 fleet, you know we.

3:5:57.410 --> 3:6:2.200  
Arnaud Grüss  
We get a flat top shape that's I think more accurately reflect.

3:6:3.460 --> 3:6:7.510  
Arnaud Grüss  
I'll fishing select individuals there. You know, based on feature that found there.

3:6:8.240 --> 3:6:8.800  
Arnaud Grüss  
Umm.

3:6:9.490 --> 3:6:16.870  
Arnaud Grüss  
But with a Dome shape are here with a Dome Dome Dome shape like selectivity functions that we get for the other fleets.

3:6:20.770 --> 3:6:25.680  
Arnaud Grüss  
Yeah, I'm. I'm. I'm not entirely sure because you know.

3:6:27.680 --> 3:6:30.470  
Arnaud Grüss  
Clearly you don't want to select like the.

3:6:31.330 --> 3:6:34.960  
Arnaud Grüss  
So oldest the the largest and oldest fish but.

3:6:37.140 --> 3:6:39.150  
Arnaud Grüss  
Some of those fleets probably.

3:6:42.120 --> 3:6:43.50  
Arnaud Grüss  
Targets.

3:6:44.720 --> 3:6:47.570  
Arnaud Grüss  
More of the younger as individuals as.

3:6:48.770 --> 3:6:52.100  
Arnaud Grüss  
He's currently estimated by the by the models.

3:6:53.540 --> 3:7:1.470  
Arnaud Grüss  
So I I guess that would be like, curious to hear any suggestions like any alternative you would have in mind to the Dome shape function.

3:7:11.910 --> 3:7:13.640  
Dan Goethel  
I don't have any suggestions personally.

3:7:15.440 --> 3:7:22.220  
Dan Goethel  
But yeah that I mean that all makes makes sense to me, especially starting simpler and working your way to more complex.

3:7:24.270 --> 3:7:29.180  
Arnaud Grüss  
And I think, uh, that the partner so that the software platform because Castle.

3:7:30.280 --> 3:7:45.560  
Arnaud Grüss  
Casoni has become quite old and we've had like a lot of issues, computational issue even you know with a fleets as Arias models and we had concerns that moving to especially explicit assessment models.

3:7:45.640 --> 3:7:52.310  
Arnaud Grüss  
Uh, just, uh, like the model will crash because that would be too much focus. So. So I think it would be.

3:7:53.220 --> 3:8:2.210  
Arnaud Grüss  
You know, implementing a spatially explicit assessment model will be for Rusty region, and 32 fish will be much more doable with Casal 2.

3:8:11.80 --> 3:8:22.540  
Aaron Berger  
Thanks are no. I do wanna note that we've moved into the discussion period. So I wanna open it up. Rick, I see your hand will get to you in just a second. But I do want to make sure we open it up. And if there's any questions for any of our.

3:8:23.120 --> 3:8:32.180  
Aaron Berger  
Uh teams that presented today, those were removing to that period. So we can do that. But let's Rick, you got your hands up and maybe it's on the toothfish presentation. Go ahead.

3:8:33.200 --> 3:9:3.750  
Rick Methot (Guest)  
Well, it's really leverages off of that presentation. There was just discussion about, you know starting simpler than moving to more complex and I think the caution in it, it's a mistake that I've seen made. So I just want to put the caution on the table. If if you start with a simpler model, you need to start with simpler data too. You can't give a simple model data that could only be fit if you have a complex model. So because the complexities of this additional data may have features.

3:9:3.930 --> 3:9:26.390  
Rick Methot (Guest)  
That you need to invoke the the more complex features that are in the complete model. So scaling back the data so that you really are looking at a simple situation with only simple data. I think that is a very important thing to do, but scaling up data in concert with the model is what I think we don't have good protocols for doing that.

3:9:38.150 --> 3:9:40.600  
Aaron Berger  
Yes. Thanks Rick. Uh good segue to.

3:9:42.320 --> 3:9:44.310  
Aaron Berger  
All the models we've been discussing really.

3:9:47.650 --> 3:9:54.340  
Aaron Berger  
OK. Opening it up to a general discussion observations or comments, similarities, differences that you see anything?

3:9:55.350 --> 3:9:56.400  
Aaron Berger  
Feel free to raise your hand.

3:9:58.750 --> 3:10:13.590  
Dan Goethel  
This is Dan again. I'm in just adding to Rick's comment, I mean, I think that really ties into what the Gadget Group presented there with, you know, being able to scale from aggregated to disaggregated to aggregated and having different.

3:10:14.60 --> 3:10:42.210  
Dan Goethel  
Aggregation levels and like having that ability to move easily and flexibly between, you know aggregation spatially, temporally things like that like those kind of data tools might be the most complex and most important part of actually developing kind of these spatial models is you really need to analyze the data disaggregated and then have that ability to move to different resolutions flexibly and easily easily I think.

3:10:51.240 --> 3:10:52.850  
Bjarki Elvarsson - HAFRO  
Yeah. I would tend to agree with you on that.

3:10:53.970 --> 3:11:10.990  
Bjarki Elvarsson - HAFRO  
In general, I think this is a. This is a recurrent theme to to many workshops that we have seen. It's I I can think of an ecosystem model modelling workshop that ISIS is trying to work towards where they simulated simulation model is Atlantis and they are trying to.

3:11:11.210 --> 3:11:25.840  
Bjarki Elvarsson - HAFRO  
To to try you're testing quite a lot of different modern frameworks, and then at the crux of that problem is the work towards aggregating data, and that's sort of the one of the key issues that we have to deal with that I think they are dealing with.

3:11:26.710 --> 3:11:35.210  
Bjarki Elvarsson - HAFRO  
Umm. And I can I can probably not to mention a couple of other it. So this this is where you you will run into this problem of how do you aggregate data and how you.

3:11:35.860 --> 3:11:41.230  
Bjarki Elvarsson - HAFRO  
How you work with them is in a sort of transparent and and reproducible ways is.

3:11:42.70 --> 3:11:45.580  
Bjarki Elvarsson - HAFRO  
It's definitely worth worthwhile having having having the right tools for that.

3:12:18.970 --> 3:12:20.440  
Aaron Berger  
The other questions or comments?

3:12:33.590 --> 3:12:45.370  
Aaron Berger  
Arrival. Perhaps. People are thinking I'm going to just ask one. It's a little bit more technical, so I wanted to just preface it by that a little bit. I was curious, this is for the toothfish example, our knows of.

3:12:46.20 --> 3:12:47.670  
Aaron Berger  
Umm I.

3:12:48.400 --> 3:12:51.220  
Aaron Berger  
Understood that you guys used MCMC.

3:12:52.250 --> 3:12:54.20  
Aaron Berger  
And I just was curious on your.

3:12:55.760 --> 3:13:7.790  
Aaron Berger  
And well, and you mentioned some constraints in terms of time to run those MCMC and and while there's you know methods now to significantly decrease that time.

3:13:9.110 --> 3:13:24.280  
Aaron Berger  
Is, you know, as we move to spatial models or in spatial modelling cases, that's gonna increase time. So we might counteract that those technological increases. So I was just curious if you had any thoughts on?

3:13:26.100 --> 3:13:28.590  
Aaron Berger  
Some of the insights that you might have gained by by.

3:13:29.400 --> 3:13:48.990  
Aaron Berger  
Conducting your assessment in the MCMC framework and maybe in particular I guess, where I'm coming from as I was very curious to see the variability within a single replicate via MCMC, which better captures uncertainty of course or in theory compared to.

3:13:49.760 --> 3:13:54.260  
Aaron Berger  
You know the mean estimates across replicates kind of that variability comparison.

3:13:55.170 --> 3:13:57.640  
Aaron Berger  
Umm, so if you had any comments on that?

3:13:59.260 --> 3:14:0.660  
Aaron Berger  
I was really curious about that. Thanks.

3:14:3.940 --> 3:14:25.830  
Arnaud Grüss  
Oh, so so regarding the computational demands for MCMC. So it's really related to Castle, which again you know is a pretty old software package compared to men user or the user, you know software packages that have been used for this workshop and.

3:14:28.60 --> 3:14:38.530  
Arnaud Grüss  
Among you know many things in play mission of MCMC is quite cumbersome and not efficient. And what we've noticed is that when we've moved to Castle 2.

3:14:39.320 --> 3:14:41.780  
Arnaud Grüss  
And you know when we.

3:14:42.570 --> 3:14:44.440  
Arnaud Grüss  
You know, run some test for.

3:14:45.150 --> 3:14:52.510  
Arnaud Grüss  
For for the assessment next year is that we've decreased likes the the time for MCMC by certain times, so it's.

3:14:53.450 --> 3:15:0.900  
Arnaud Grüss  
In our case it's. It's really, it's mainly related to the software. This being said, you know even with Casal 2.

3:15:1.590 --> 3:15:5.740  
Arnaud Grüss  
Think it will take quite some times to implement MCMC, but.

3:15:7.980 --> 3:15:8.910  
Arnaud Grüss  
I'm aware of.

3:15:11.540 --> 3:15:17.10  
Arnaud Grüss  
I'm aware of some research that has been done in Seattle.

3:15:18.430 --> 3:15:24.160  
Arnaud Grüss  
To find you know better I'd go items and the metropolis as as things.

3:15:25.840 --> 3:15:26.530  
Arnaud Grüss  
Knows that.

3:15:27.750 --> 3:15:31.900  
Arnaud Grüss  
You know both faster but also.

3:15:32.490 --> 3:15:33.160  
Arnaud Grüss  
Uh.

3:15:33.890 --> 3:15:42.20  
Arnaud Grüss  
Uh, more accurates since you tell method something like this like it's a, you know, some research by Coleman.

3:15:43.150 --> 3:15:51.200  
Arnaud Grüss  
Uh James Lawson was also involved, and so probably it's it would be interested, uh, for special stock assessment modelers to.

3:15:51.740 --> 3:15:52.420  
Arnaud Grüss  
UM.

3:15:53.560 --> 3:16:3.530  
Arnaud Grüss  
To look what has been done recently in that space to see if those uh, better and faster are goatman could be implemented in the stock assessment software packages.

3:16:8.490 --> 3:16:14.80  
Aaron Berger  
Yeah, thanks. Are no. And I've got a follow up, but I'm gonna. I'm gonna hold off on that because I saw some other hands go up.

3:16:15.590 --> 3:16:18.570  
Aaron Berger  
Bjarki did I see your hand up or maybe took it down?

3:16:19.590 --> 3:16:25.640  
Bjarki Elvarsson - HAFRO  
I did take it down, but I just wondering about that that, that, that package that you're talking about is that?

3:16:26.340 --> 3:16:34.580  
Bjarki Elvarsson - HAFRO  
Is that the TMP stand package? Or remember seeing something about that a couple years ago? Sorry I haven't been following up on the the patient front of of things, but.

3:16:35.600 --> 3:16:38.670  
Bjarki Elvarsson - HAFRO  
Just wondering if that the the the package you're referring to.

3:16:39.290 --> 3:16:55.500  
Arnaud Grüss  
Ohh, the ATM is something different, but it's interesting that you mention it because I would have thought that some workshop participant would have picked the the ATM that James Lawson and Dan have developed, but that's something different. I was more talking about.

3:16:55.580 --> 3:17:0.610  
Arnaud Grüss  
Umm, I'll go items that are used in a in MCMC.

3:17:3.250 --> 3:17:4.540  
Arnaud Grüss  
I think probably.

3:17:5.410 --> 3:17:27.160  
Arnaud Grüss  
We should pay more attention about what has been done recently to, you know, produce. Uh, better, faster algorithms and and try if we could just replace, you know, the classical algorithm that we use in your stock assessment software packages like Metropolis as things with those faster and better algorithms.

3:17:28.820 --> 3:17:37.830  
Arnaud Grüss  
And I think, like uh, I'm, I'm thinking about the, uh, an algorithm that is called EU turn algorithm, but there may be others.

3:17:39.840 --> 3:17:43.770  
Arnaud Grüss  
So it's maybe worth digging and just like reflecting on this issue.

3:17:46.870 --> 3:17:50.80  
Aaron Berger  
Yeah, thanks. I know, Jeremy. And then Valerio.

3:17:51.170 --> 3:17:54.520  
Jeremy McKenzie  
Yeah, I just uh, just mentioning Castle too.

3:17:55.340 --> 3:18:24.740  
Jeremy McKenzie  
And it's just saying Craig Marsh and Alistair and here, which is really doing a lot of driving in terms of improvements in Castle too, but that's that's been a a big focus for them and us and Castle too is to looking at and improvements particularly in the MCMC improvement and performance, some of the things that we are looking at, I know that the, the, the, No U turns approach else there's been implementing that in in the code base for Castle two and other ways to improve.

3:18:25.210 --> 3:18:33.650  
Jeremy McKenzie  
So spices and the MCMC algorithms. The other thing that Castle 2's got a lot of input into now is transformations of parameters.

3:18:34.460 --> 3:18:38.590  
Jeremy McKenzie  
So to to of try to avoid auto correlation correlation between.

3:18:39.830 --> 3:18:46.500  
Jeremy McKenzie  
Parameter space, so there's a there's a whole feature in Castle to around transformation.

3:18:47.990 --> 3:18:50.710  
Jeremy McKenzie  
The parameterization around Istanbul parameters.

3:18:51.980 --> 3:18:56.910  
Jeremy McKenzie  
Yeah, that's that's been a feature in Casal 2 as to better better performance and MCMC.

3:19:5.930 --> 3:19:6.940  
Aaron Berger  
OK, there you go ahead.

3:19:9.520 --> 3:19:11.320  
Valerio Bartolino  
Can I? Can you hear me?

3:19:12.310 --> 3:19:13.440  
Aaron Berger  
Yes, I can hear you.

3:19:14.110 --> 3:19:45.260  
Valerio Bartolino  
I don't. I know my baby is a bit late, but at a very specific question. Maybe I should have raised before with the stock synthesis presentation. When I mean, I hope it's never too late. I think the yellow thing tool dataset, I think it's an interesting and very challenging example of sparse data. For instance, I think in the land distribution of commercial fisheries is probably one of the area where as with the gadget model, we have been struggling most so that aggregation in resolution of fitting becomes a crucial decision.

3:19:45.330 --> 3:20:12.870  
Valerio Bartolino  
The compromise among different axes of variability, for instance time steps aggregating across different land resolution that those provided native from the from the operative model. I was actually curious to know and I know there on me I should have asked before. I'm a bit slow but about the resolution of fitting that I stock synthesis group have decided for the land distribution because the fitting was extremely good.

3:20:13.980 --> 3:20:27.170  
Valerio Bartolino  
And the but it was presented at a aggregated at a I think over the old datasets, if I remember correctly, and there are me if I'm I've just misunderstood my question is, is that?

3:20:28.310 --> 3:20:40.240  
Valerio Bartolino  
Is the level of fitting of the land distribution presented over the old data set? Is is a byproduct of a fitting still at at a time step level?

3:20:41.140 --> 3:20:49.730  
Valerio Bartolino  
Or is actually the data on the land distribution aggregated first and then the fit thing is attempted on the aggregated land distribution?

3:20:52.920 --> 3:21:10.990  
Valerio Bartolino  
So in other words, is the fitting of the land distribution done for each quarter of the year for each time step, or are the data aggregated first within the model before that likely component if fitted to the to the land distribution data for the fishery?

3:21:13.230 --> 3:21:19.840  
Valerio Bartolino  
That doesn't make sense. I I hope it does, because the fitting was extremely good. He's extremely good, yeah.

3:21:22.180 --> 3:21:27.630  
Valerio Bartolino  
And I ask because, uh, yeah, hopefully we can learn and he can actually help us with the.

3:21:28.330 --> 3:21:42.620  
Valerio Bartolino  
We. Yeah, moving forward with the with the gadget fitting where fitting the land distribution for each time step in the model we data which are so sparse is extremely difficult I mean.

3:21:43.400 --> 3:21:51.140  
Valerio Bartolino  
Yeah, identifying those parameters for the for the selection curve, this is a yeah. Is a hell of a job for the model with those data.

3:21:57.70 --> 3:21:58.780  
Rick Methot (Guest)  
Yeah, yeah, I can answer.

3:21:53.550 --> 3:21:58.790  
Aaron Berger  
Yes, good observation. I was just going to open it up to anybody and Rick raised his hands to go far.

3:21:59.690 --> 3:22:8.410  
Rick Methot (Guest)  
Sure. Yes. In synthesis the fitting is to each observation, each quarterly observation, and indeed they were quite sparse.

3:22:9.500 --> 3:22:38.770  
Rick Methot (Guest)  
And that does pose challenges with a big interaction between sparse data giving spurious recruitment signals, as well as contributing to estimation of selectivity. But the fitting is, as you were doing with Gadget on the individuals and you know, I don't recall if there was any particular difficulty because it is averaged over a lot of observations and they were able to get a, a fit that was.

3:22:39.40 --> 3:22:45.720  
Rick Methot (Guest)  
Consisted on a. When you summarize over all the observations, you do achieve consistency.

3:22:50.200 --> 3:22:50.770  
Valerio Bartolino  
Thanks.

3:22:51.720 --> 3:22:52.360  
Valerio Bartolino  
Thanks.

3:22:56.430 --> 3:22:57.550  
Aaron Berger  
Yes, please, barkey.

3:22:59.630 --> 3:23:9.750  
Bjarki Elvarsson - HAFRO  
Ohh just a follow up question to to Rick or somebody knows thoughts in the says the the translation from from age to length. I'm assuming that there's a.

3:23:10.570 --> 3:23:19.520  
Bjarki Elvarsson - HAFRO  
Is that a log normal that's translates the the the the the mean length as well the attribution at at length and then you?

3:23:20.490 --> 3:23:27.290  
Bjarki Elvarsson - HAFRO  
Of that. But that log normal has a has a time as a time varying Sigma or something or how how to how how? How was the mechanics of this?

3:23:27.840 --> 3:23:40.0  
Rick Methot (Guest)  
Sure. Let me explain on that. First. The logged overall aspect there, there's an option to use a lognormal distribution of length at age. I don't think it was used in this case, but it is an option.

3:23:41.180 --> 3:24:14.210  
Rick Methot (Guest)  
The mean length at age is interpolated seasonally from growth parameters, and so actually there is a feature to interpolate the mean size at age to a particular fractional date of the year. So if you have fast growing fish and you wanna get us us expected value for May 7th, you can do that even though it's within a season. So there is that generic capability that adds a good bit of complexity interior.

3:24:14.540 --> 3:24:24.820  
Rick Methot (Guest)  
To the interior of the code, but in general it's gonna be fitting to the age length key that is at the midpoint of a season.

3:24:25.500 --> 3:24:35.780  
Rick Methot (Guest)  
Uh it unless you invoke going to specific dates, which causes a lot more calculation of HLF keys and definitely a slower model execution.

3:24:41.940 --> 3:24:46.100  
Bjarki Elvarsson - HAFRO  
OK, so essentially there's, uh, I'm just wondering how how you get the uh?

3:24:47.130 --> 3:24:52.250  
Bjarki Elvarsson - HAFRO  
The the bin sort of with so, because I'm guessing you how you're feeling tonight. Length, length.

3:25:3.290 --> 3:25:4.30  
Rick Methot (Guest)  
Distribution.

3:24:53.240 --> 3:25:9.280  
Bjarki Elvarsson - HAFRO  
Key sorry this bit late in the day, so when you're hitting the key then you have this. You have have a have a uncertainty around that or sort of you have you have a variation of the distribution around that and that distribution is that I'm assume that's time varying.

3:25:10.460 --> 3:25:11.190  
Bjarki Elvarsson - HAFRO  
Or is that?

3:25:12.250 --> 3:25:13.0  
Rick Methot (Guest)  
Well the the.

3:25:12.250 --> 3:25:24.20  
Bjarki Elvarsson - HAFRO  
Also thank you by by by year, I mean I'm just wondering how how, how, how, why the the the model so easy cancel easily adapt to different sizes if there are classification in the data.

3:25:24.740 --> 3:25:31.80  
Rick Methot (Guest)  
Well, the parameters of the growth curve are not necessarily time varying.

3:25:31.830 --> 3:25:46.20  
Rick Methot (Guest)  
The the growth is following cohorts and the default is that all cohorts have the same growth parameters, but you certainly can have any of those growth parameters.

3:25:46.960 --> 3:25:47.990  
Rick Methot (Guest)  
The time varying.

3:25:49.540 --> 3:26:1.630  
Rick Methot (Guest)  
So that is certainly an option to have. But again, you know you then you're greatly adding the complexity because you're now requiring the model to have to recompute the age length key repeatedly.

3:26:2.830 --> 3:26:10.600  
Rick Methot (Guest)  
Especially, you know, you know, model formulation like this where you're basically simulating, so you need to recalculate all those keys.

3:26:13.700 --> 3:26:17.70  
Rick Methot (Guest)  
Maybe I'm not quite getting your question about this.

3:26:18.720 --> 3:26:19.740  
Rick Methot (Guest)  
Give it one more try.

3:26:18.500 --> 3:26:35.480  
Bjarki Elvarsson - HAFRO  
So I I'm coming on this from, from, from the gadget side of the. So in Gadget Day we have have the the growth formulation is is such that you have a form pattern of a curve or something like growth function that gives you the expected growth update per if you're for a given length group.

3:26:36.180 --> 3:26:36.610  
Rick Methot (Guest)  
OK.

3:26:36.930 --> 3:26:45.90  
Bjarki Elvarsson - HAFRO  
And then the the the this growth update, is this burst using a beta binomial distribution around that mean growth update?

3:26:46.320 --> 3:27:0.570  
Rick Methot (Guest)  
So you are you getting age from length or length from age and synthesis we're getting length from age. So we have a von bertalanffy or with age specific K in this case growth curve that is giving us mean length.

3:27:1.280 --> 3:27:19.970  
Rick Methot (Guest)  
At age, so at a particular point in time for that age, we could know the normal distribution of length at age, and then we can parse that normal distribution into the length bin structure that has been established for the model.

3:27:20.690 --> 3:27:25.40  
Rick Methot (Guest)  
So we're simply creating a histogram out of that distribution for length and age.

3:27:25.790 --> 3:27:30.640  
Rick Methot (Guest)  
And then comparing it bin by bin to the length data.

3:27:32.570 --> 3:27:37.660  
Bjarki Elvarsson - HAFRO  
Yeah, the, the the cats are more or less actually you have an 8 length matrix for every time step.

3:27:39.190 --> 3:27:39.430  
Rick Methot (Guest)  
Hmm.

3:27:41.140 --> 3:27:41.480  
Rick Methot (Guest)  
Right.

3:27:43.180 --> 3:27:43.430  
Rick Methot (Guest)  
Yep.

3:27:39.30 --> 3:27:43.880  
Bjarki Elvarsson - HAFRO  
So you, you, you you subtract subtract numbers from.

3:27:47.330 --> 3:27:47.600  
Bjarki Elvarsson - HAFRO  
Yeah.

3:27:44.620 --> 3:27:54.920  
Rick Methot (Guest)  
Yeah. Yeah, yeah, that that's a difference. And so, you know, because there you are propagating from one age length key to the next age length key through some.

3:28:12.450 --> 3:28:12.760  
Bjarki Elvarsson - HAFRO  
Umm.

3:27:55.820 --> 3:28:25.590  
Rick Methot (Guest)  
Length based survivorship correct that is not something you can do inside of synthesis, but there is approximation in synthesis that I think gets you a large fraction of the way towards having that capability and that is by invoking a concept we we call platoons and it basically takes the growth curve and and subdivides that one normal distribution.

3:28:25.880 --> 3:28:46.200  
Rick Methot (Guest)  
Of length at age into, say, 5 distributions that would sum up to be, you know, a close approximation to that original single distribution, but you now essentially have a fast growing cohort, a middle growing cohort, slow growing cohort. And so each of them experiences their own.

3:28:48.480 --> 3:29:18.820  
Rick Methot (Guest)  
Their own fishing mortality based upon the size, selectivity of the fishery, so you can end up achieving a higher fishing mortality on the fast growing fish, lower survivorship of the fast growing fish. And so you get a large fraction of the way towards having that full age, length of survivorship capability, but you're only having the track, say 5 cohorts or you're tracking 5 cohorts rather than one cohort.

3:29:18.990 --> 3:29:48.130  
Rick Methot (Guest)  
So it definitely is more in it's slower, it's almost linear and how much slower it is. But you do achieve that length survivorship and then we have a a, a project going on that is looking at how well this works with data that were generated by a individual based model. And you know it's it's looking quite promising that even though the data clearly show that the.

3:29:48.860 --> 3:30:4.500  
Rick Methot (Guest)  
Largest fish are dying off the bottle by using platoons is able to recreate the the yell Infinity that is inherently there in the population, even though it's been masked largely by the length survivorship.

3:30:12.80 --> 3:30:12.860  
Rick Methot (Guest)  
New workshop.

3:30:7.400 --> 3:30:20.450  
Aaron Berger  
All right, I'm going to just jump in here, guys. If there's more of the good conversation, if there's more, if it just maybe get me. Yeah, we are at the the end here. We're at the ending point. So I just wanted to.

3:30:21.270 --> 3:30:23.980  
Aaron Berger  
Say thanks to everybody, especially the presenters.

3:30:24.300 --> 3:30:31.130  
Aaron Berger  
UM, as well as everybody today was our longest webinar, so I really appreciate it, but his patience and attention.

3:30:32.560 --> 3:30:43.800  
Aaron Berger  
Today I wanted to note that the presentations that were given today, as well as the recording will be on posted online or I'll send out an e-mail as well as posted on the GitHub, probably within a day or two.

3:30:45.720 --> 3:30:58.630  
Aaron Berger  
And I think that's about it for today. So everybody have a great rest of your week. The rest of your month and I hope to see everybody in early January for our 4th and final webinar.

3:30:59.430 --> 3:31:0.110  
Aaron Berger  
Thanks so much.

3:31:4.110 --> 3:31:5.290  
Valerio Bartolino  
Thanks. I don't and everyone.

3:31:3.730 --> 3:31:5.480  
Jeremy McKenzie  
Thanks everybody. Merry Christmas.

3:31:4.390 --> 3:31:5.800  
Francisco Izquierdo  
Like there. Thanks everyone.

3:31:5.100 --> 3:31:6.800  
Marta Cousido-Rocha  
Thank you. Bye.

3:31:6.560 --> 3:31:6.860  
Valerio Bartolino  
Bye.

3:31:6.410 --> 3:31:6.970  
Francisco Izquierdo  
Bye bye.

3:31:6.770 --> 3:31:7.840  
Arnaud Grüss  
Kerry, one that I.