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Chair

Mr. Scott Simms

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• (1540)

[English]

The Chair (Mr. Scott Simms (Coast of Bays—Central—Notre Dame, Lib.)): Good afternoon, everybody.

I am sorry for the delay. We had a very moving tribute by our party leaders in the House of Commons, and that is why we are delayed by about 10 minutes. I don't expect us to go on too long.

This is just a reminder to the committee that we are putting aside 15 minutes at the end, in camera, to go over yesterday's subcommittee meeting. We managed to put together a schedule, and we will be asking for the committee's acceptance of that.

Just one little note that I would like to meet very quickly after we adjourn with those of us travelling next week for this study—Mr. Doherty, Mr. Arnold, and Mr. Finnigan. I know Mr. Johns isn't here, but you can pass along the message.

This is the start of our study, a motion put forward by Mr. McDonald, from the beautiful riding of Avalon. We are looking at a study of the northern cod stock today. As we normally do, we start out with a departmental briefing.

I want to welcome Philippe Morel, assistant deputy minister, ecosystems and fisheries management; Brian Lester, assistant director, integrated resource management; and Trevor Swerdfager.

Trevor, I am beginning to think you are an associate member of this committee and not just a witness; you have been here so often. As always, it is good to see you and get your expertise.

Last, but by no means least—from our home province, Mr. McDonald—we have Mr. John Bratney, research scientist, Newfoundland and Labrador region.

I thank you, sir, for travelling and being with us here today.

Trevor, I understand you are doing one presentation. If you want to exceed the 10 minutes, by all means, go ahead for up to 15-20 minutes if you wish, since there is only one of you doing that. Go ahead, sir, with your opening statement.

Mr. Trevor Swerdfager (Assistant Deputy Minister, Ecosystems and Oceans Science, Department of Fisheries and Oceans): Thanks very much, Mr. Chair.

I have a couple of very brief introductory remarks, and then Dr. Bratney will take over the floor.

I will begin by saying thanks very much to the committee: (a) for undertaking this study and (b) for having us here before you today to

look at northern cod, in particular off the coast of Newfoundland and Labrador.

Obviously, cod holds an immense economic, social, and cultural value for all Canadian communities, but particularly in the eastern part of our country, and as you know, DFO is heavily engaged in its management.

We felt that, as a way of starting the conversation around this table, it was very important to ground the discussion on northern cod with a short overview of what types of information we collect and what that information is telling us about the state of the stock.

Just by way of context-setting, I should note that the knowledge, expertise, and activities of the science sector provide the evidence base for the department's work and our operational decision-making. We are now about 1,500 people in the science sector across the country, in 14 major centres, and our expertise spans quite a number of disciplines, some of which you will hear from today. When you are in St. John's next week, I believe you will have an opportunity to hear from Dr. Pepin, who is one of our key experts in this area.

Our recent investments in ocean science are being put to good use. We have quite an extensive hiring process under way right now. We have engaged about 50 new staff in the last couple of months, with more to follow in that process. We had 11,000 applicants. We are going to interview about 3,500 over the next three weeks to come up with quite a talented pool of people to work in fisheries and ocean science, and we think this is just the beginning.

This allows us to improve our understanding of ocean ecosystems, and Dr. Bratney will talk to you a bit about northern cod in that context. We really feel that the work that is engaged in the broad sectoral links is critical to setting the evidence base for our decision-making.

You have been good enough, Mr. Chair, to introduce my colleagues who are here with us today, so I won't go any further in that regard, other than to say that Dr. Bratney—who has come to Ottawa because he knows that it is just a fantastic place to come to, and also for business—is one of our leading research scientists in the cod area. He is, by nature, a fairly modest person and certainly won't read his resumé to you. I can tell you that he has very deep and broad expertise. He has been in this field for quite some time and very much knows his stuff.

He will take you through a bit of an overview, and then we would certainly invite any questions or comments, either on the science or more broadly if need be, with my colleagues here at the table.

With that, I will turn it over to Dr. Bratney.

Mr. John Bratley (Research Scientist, Newfoundland and Labrador Region, Department of Fisheries and Oceans): Thank you, Trevor.

I'd also like to thank the honourable committee members for this opportunity to speak with you today about the status of northern cod and the science that we do on this important resource. I trust that all of you have a copy of the presentation, so I'll go through it fairly slowly, with not too much detail. It shouldn't take more than about ten minutes.

I'd like to begin by clearly defining what we mean by northern cod. There are in fact five managed stocks of cod off Newfoundland and Labrador, and northern cod occupies the area outlined in red on the map. It doesn't include the south and west coasts of Newfoundland or the southern Grand Banks. Northern cod occupies a huge stock area, and as we know, it once supported an enormous fishery. We harvested over 800,000 tonnes of cod in the 1960s in a single year. The average harvest was about 240,000 tonnes in the 1980s, and as we know, the stock collapsed and a moratorium was imposed in 1992. Small-scale inshore fisheries have operated since then intermittently, typically with landings between 4,000 and about 8,000 tonnes per year.

DFO has adopted what we call a precautionary approach framework as part of its policy for managing fisheries resources. Three zones are defined for each fish stock—critical, cautious, and healthy, depending on the resource status. Science provides advice on where the boundaries of these are and the current and past status relative to these boundaries. We use the long history of the stock to define where the boundaries are.

Today I'm going to focus mostly on the boundary between what we call the critical and cautious zones. We talk about the limit reference point. This defines the boundary between these two zones. When the stock is below this limit reference point and in the critical zone, it's considered to have suffered serious harm, and this is really a place we don't want our stocks to be.

If we look at the graph of the long history of northern cod, it goes back to about the 1960s. It was a huge stock back then but the stock declined steadily for many years after. It rebounded slightly after Canada got an extension of jurisdiction to 200 miles in the late 1970s. The stock then stabilized through the 1980s, and then it crashed very suddenly in the early 1990s.

When the stock fell below the level of the 1980s, we found that it no longer produced good recruitment; it didn't produce good numbers of young fish. It also had much lower productivity. In fact, it had suffered serious harm. Hence, the limit reference point has been defined as the average spawning stock biomass observed by the stock through the 1980s. This spawning stock biomass, or SSB as we call it, can be derived in a number of different ways. In this chart on slide 4, the blue line is derived from a complex stock assessment model, but it can also be derived somewhat more simply using some other metrics in which we measure the spawning biomass. The black bars indicate DFO's research vessel survey spawning biomass index. You can also use that to define your limit reference point and calculate it. It's simply the average value through the 1980s.

Turning to the next slide, "Scientific Data on Northern Cod", what sources of information do we scientists have to assess stock status? We have a long history on northern cod, and a lot of information has been collected, but for us, really the most important things are time series data collected in a consistent manner. These are what really count when we're assessing fisheries resources.

Before the moratorium, we had four main pieces of information about northern cod. We had catch information, which I would argue was quite poorly monitored. We also had research vessel surveys conducted by DFO, mainly from 1983 onwards. We also had commercial catch rate information, but this came only from large offshore vessels fishing well away from the coast. We didn't have information from the inshore fisherman about their catch rate trends in the inshore. That issue was addressed quite heavily around the time of the moratorium. We also had information from cod-tagging studies, and these are ongoing today.

In the post-moratorium period we have several new sources of information. We have more catch information and I think we have much better monitoring of our fishery, principally through the dockside monitoring program. We also have an extended time series of DFO research vessel surveys going right up to 2016; these are done annually. We also have an expanded tagging program and we're also using the latest technology for tracking fish migrations and movements—that's acoustic telemetry.

● (1545)

We've also developed logbooks for inshore harvesters to record their catch rate information, and we've put in place a sentinel fishery. Both of these provide us with time series information about catch rate trends from inshore fishermen.

The fishermen also fill out annual questionnaires, which they provide to us at our assessment meetings.

We have other initiatives like acoustic surveys, and we do beach seine surveys of small cod in the nearshore zone. We also have ecosystem science, and the department has an ecosystem-based management approach, much more important in decision-making now.

For northern cod, in an ecosystem context, we really focus on two issues: what are the key predators of cod, and what are the key prey?

As many of you will know, for northern cod, capelin is a key prey. It's very important in sustaining the stock.

The latest northern cod assessment was conducted in March 2016, about six months ago. The participation was by DFO scientists and managers, academia, various representatives from industry sectors, first nations, and NGOs. These are open meetings with wide participation. The agreement and the conclusions of these meetings is now by consensus. This is not a bunch of scientists in a room coming up with a stock assessment. There's broad participation, and everyone has to agree with the meeting conclusions before they're written down.

Another significant development occurred in March 2016. We have a new stock assessment model that integrates a lot of information from several different sources. It does a much better job of accounting for uncertainty in stock assessments, and it's considered a huge advancement in methodology. This has been contributed mainly by academic colleagues. It's able to integrate an extensive range of biological information about the stock.

If we look at some of the more recent assessment results, these charts show two scaled catches of cod from our DFO autumn research vessel survey. Typically, we go out and do 350 or so tows with the research trawl, tow them for 15 minutes along the ocean floor, and record everything that's captured. This takes about two and a half months, with two vessels fishing 24 hours a day.

The left panel shows the catches from about a decade ago. As you can see from the scale, they're very small. There were no big catches at all. Most catches have less than 10 fish in the trawl. This was the picture for more than a decade, but after 2005, and as we move forward to 2015, you can see there's a substantial increase. Now we have many sizeable catches of cod, large ones in some areas, and there's considerable improvement over much of the stock area. The only exception seems to be the southern portion of the stock range, in the southern part of what we call NAFO division 3L.

These two graphs summarize some of the latest assessment results. They show trends in stock size from 1983 onwards. There are two metrics shown here. On the left we have the numbers or the stock abundance, and on the right, the total weights, the stock biomass. This is further subdivided into the biomass of all fish and then the spawning stock biomass, which is just the total weight of all the spawning individuals in the population.

Both show similar trends. They are high in the 1980s, crash in the early 1990s, are low for a least a decade, and are now increasing, especially in the last decade. In fact, the numbers have increased 4.5-fold in the last decade, and the biomass has increased twelvefold in the last decade.

Our assessments produce estimates of the numbers of young fish each year. These are key to stock rebuilding—what we refer to as recruitment. These show similar overall trends to the abundance and biomass I've just shown you. These were highly variable in the 1980s but at a generally high level. Then there was consistently very low production of young fish for many years, about two decades, but now it's improving.

The last two groups of young fish we have seen in our surveys are now considerably improved, and these represent about 25% of what we saw for those ages in the 1980s. As I mentioned at the beginning, we have to put our assessment results in the context of a precautionary approach framework. Where is the stock relative to this limit reference point I talked about, this average spawning biomass of the 1980s? We use our assessment estimates for each year.

• (1550)

We divide each one by the average for the 1980s and then we can simply re-graph the results and express each annual value as a percentage of what we saw in the 1980s, or as a proportion. This

allows us to graph out where the stock is, relative to our limit reference point.

If you look at the chart, you'll see the line of dashes. That's the limit reference point that defines the boundary between the critical and cautious zones, and the solid line is where the stock is. Clearly, you can see the stock improvements in the last decade. This quantifies them with respect to the limit reference point. The stock has improved from 3% in 2005 to 34% in 2015. The central take-home message from this chart is that we do have good growth in the stock in recent years, but it's not fully recovered. It still has a considerable way to go, but certainly we seem to be in a period of optimism.

The last slide is on the next steps for science on northern cod. As my colleague mentioned in his introductory remarks, new investments in ocean science are under way, with new staffing and funding, some of it directed towards northern cod directly. We'll also be continuing and enhancing our stock and ecosystem monitoring initiatives and will be using the latest technologies. We also have several new partnerships and collaborations with academia that are about to begin. Many of you will have heard about the recent announcement of funding that went to Dalhousie, Memorial University, and, in fact, UPEI. A portion of those funds will be directed towards research on northern cod, and the same is true for the other two issues I've mentioned there. With all these initiatives in place, we hope that northern cod will continue to grow in the coming years and once again become one of our important and valuable fisheries resources.

Thank you, Mr. Chairman, for the opportunity to present this information.

Thank you, members of the committee. That concludes my presentation.

• (1555)

The Chair: Thank you, Dr. Bratley. We really appreciate this. Of course, we'll be hearing more as we go on.

Just for the sake of our panel and those not familiar with how the committee works, we have four questions in the first round and five questions in the second round, at seven and five minutes respectively. At the end of the second round, we'll take a look at the clock. We'll see what kind of flexibility we have, and I'll look to the committee for some direction as to how we proceed from there. Again, I remind you that at 5:15 we have to get into some committee business. We'll probably adjourn around 5:10 for the sake of the break.

Dr. Bratley, thanks again, and thanks to our panel.

We're going to start with the government.

Mr. McDonald, the mover of this motion, you have the first seven minutes.

Mr. Ken McDonald (Avalon, Lib.): Thank you, Mr. Chair.

Thank you to the four gentlemen for visiting us here today. We are delighted that they have made themselves available for this study.

I'll start by saying that I think we can all appreciate the diligent work of the DFO scientists and the job at hand to determine the biomass in a vast ocean, specifically in the northern cod area of 2J3KL.

Can you explain to me a typical year of research and what surveys, technologies, and methods are used by DFO scientists to determine the biomass for northern cod? What dependence do you place on external groups and/or individuals such as fishers, the marine institute, and the FFAW?

Mr. John Brattey: We use a whole variety of things to come up with our estimates of biomass.

As I mentioned, one of the key ones is certainly our research vessel survey time series. In the run of a year, taking about two and a half months in the autumn fishing, we typically organize and conduct this survey with a standardized trawl that's used the same way every single year, with very large coverage of the stock area, in which the net catches fish of a broad range of sizes. They're all measured; age is determined; and many are brought back to the laboratory. From that survey, at the end of each year we come up with an index of what the stock is doing.

When we put that annual value into a time series, it gives us a measure of where the biomass is. Then we bring in the information from the catch. We have a whole range of people out measuring fish from the catch, quantifying how much is caught, and what numbers of each age group are caught in the fishery each year and removed from the fishery. Then the assessment model reconciles the information and puts it together to come up with the estimates of biomass. We also use a lot of information about recruitment, which is what I mentioned: the numbers of young fish coming in.

Really, what we're doing is a study of population dynamics. We look at the factors that will increase the stock over time and then we look at the factors that will reduce it. We put them all together to come up with our estimates of biomass over time.

The other participants at the meeting contribute actively to the assessment. We have a lot of debate about the results. We have individual presentations from the FFAW. We sometimes have presentations from individual fishermen. Other academics from Memorial University come in and present their research findings. They're all considered in the preparation of the summary document from that meeting.

At the end of the meeting, there has to be agreement on what the assessment says about the biomass of the stock, and the agreement has to come not just from DFO scientists but from academia, from the non-governmental organizations, from the industry members themselves, and from the union. It's quite a broad-scale approach to it and very different from what it was before the time of the moratorium.

• (1600)

Mr. Ken McDonald: On that note, how accurate would you say your evaluations are and what margin of error do you use in coming up with the number?

Mr. John Brattey: The graphs are showing you the trends in the stock. There's a solid line with two grey lines, one on either side. So those represent what we call the 95% confidence intervals around the

estimates. The closer those lines are to the value, the more certain we are that we have things right. I think you can see in the recent period that the confidence bands are fairly narrow, so we're quite confident that we have good information on the status of the resource today.

Mr. Ken McDonald: Thank you.

DFO stock assessments and other scientists described the northern cod stock as having rebounded or seen positive growth. However we read that the resource is not yet out of the critical zone. It's well below the limit resource point. We're aware that in prime years in the northern cod fishery, over 200,000 tonnes was being harvested annually by inshore and offshore fishers and it landed at Newfoundland and Labrador processing plants. As we all know, there is much less today.

I have a couple of questions on this. I'll read them out first and then you can answer them in order.

What is the specific amount you talk about when you talk about the limit reference point? If the stock assessments continue to show growth, eventually someone will have to make the decision to bridge from a stewardship fishery that we see today to a commercial level harvest. Can you tell me what the resource threshold is that you're looking for before we start referencing a commercial fishery? I'd like to hear a specific amount. Do you have any idea how far out we might be from achieving those levels?

Mr. John Brattey: The reference point at the moment is around 900,000 metric tonnes of spawning biomass and the stock at the moment is at 300,000. So we're about a third of the way toward the reference point. When we reach that reference point, the way the precautionary approach works is it's not a trigger to instantly have a full-scale commercial fishery; it means you can begin to exploit the stock, and if it continues to grow, you can increase your harvest gradually as it moves up through the cautious zone. That's how it works.

When do we think we will get there? It's very difficult to say. We were asked in the assessment to project our results forward for five years, and we considered this request very carefully. We decided that we're not at the point where we can predict five years in advance where the stock will be, but we felt we could give some information as to where the stock might be in three years. But again, as you move forward in time, the uncertainty increases and increases just like the weather forecast. You know what it's going to be tomorrow, but you're not so sure about the day after. So it gets more uncertain as you move out.

We reckoned that if the current productivity conditions of the stock persisted the way they are today, after three years we'd be about two-thirds of the way up to the limit reference point. But beyond that, we would not like to say. We felt the results were just too uncertain to formulate any kind of scientific advice that we could pass on.

As I mentioned, that's contingent on the current productivity of the stock staying the way it is, and as we know, the ocean can be a very variable place. This is not a prediction of what will happen in the future; it's more a projection. It's a look at what could happen if things stay pretty much the same as we've seen for the last few years.

The Chair: Thank you, Mr. McDonald.

For the next question, we have Mr. Sopuck for seven minutes.

• (1605)

Mr. Robert Sopuck (Dauphin—Swan River—Neepawa, CPC): Thank you.

When did the industrial fishing for cod begin? When did it switch from a horizontal fishery to an industrial fishery?

Mr. John Bratley: If you call it industrial, it's really when the technology appeared, when the trawlers were developed. So that would be in the 1930s, 1940s, and 1950s.

Mr. Robert Sopuck: You said 800,000 tonnes were caught in 1960. Was that an increase every decade or was that a level catch of 800,000 tons on an annual basis or was that the maximum that kept increasing?

Mr. John Bratley: That was a spike. That was the highest one seen.

Mr. Robert Sopuck: Okay.

In your view, what would have been the optimal harvest from when industrial fishing began to now if 800,000 tons was obviously too much?

Mr. John Bratley: There are publications that reference catches going back to the 1800s. It seems as if the stock could have sustained somewhere in the order of 200,000.

Mr. Robert Sopuck: So you're saying if we had stayed at 200,000 over that long period of time, this would not have happened. I know this is a guess on your part but that's roughly accurate?

Mr. John Bratley: I don't know that we could say that with certainty because other issues came into play with the collapse, particularly with the environmental conditions and the collapse of capelin.

Mr. Robert Sopuck: What's the age of first reproduction of male and female cod?

Mr. John Bratley: For females it's about age five, and for males it's a year younger, around age four for northern cod.

Mr. Robert Sopuck: When they're exploited, does the age of first reproduction go down as the older year classes are eliminated?

Mr. John Bratley: It has gone down, indeed. Through the 1980s the age of maturity declined, and so now we see cod are maturing and spawning at a younger age than they did historically. That's stayed pretty much the same all through the moratorium.

Mr. Robert Sopuck: Is the age of first reproduction starting to increase as the stock improves?

Mr. John Bratley: The very last spawning year for which we have that information does show an increase, but it's too soon to say whether we're reverting to that older age of maturity or not.

Mr. Robert Sopuck: Okay. What are the factors that determine year class strength in cod?

Mr. John Bratley: It's very difficult to pin them all down. Clearly, one of the most important is the size of the spawning biomass. If you don't have a lot of spawning biomass, you're not going to get a lot of recruitment. There are other things like productivity at the low end of the ecosystem, primary productivity that produces plankton and small copepods, which are food for

young cod. These are very important in predicting what year class strength might be, and then we have to see good survival from the very young ages through to ages two and three. Much of that happens when the fish are feeding on small plankton, so these are critical as well.

Mr. Robert Sopuck: What's the natural mortality rate of cod, outside of fishing?

Mr. John Bratley: For many years it was assumed to be around 0.2. In historical assessment models, for lack of better information, an assumed value of 0.2 was used, so this means that roughly 20% of the fish died from natural causes every year and just disappeared from the population, due to predation and disease and things like that.

Mr. Robert Sopuck: Did that figure of 0.2 go down as the commercial exploitation increased?

Mr. John Bratley: No, it didn't.

Mr. Robert Sopuck: Was the 0.2 fairly stable?

Mr. John Bratley: The most recent assessment suggests that this 0.2 value is a bit low. The most recent assessment, which we have with this new model, is able to estimate what the level of natural mortality is. This is a new feature, and it's a very important one. It suggests that natural mortality is quite variable annually, so it takes this into account. We think that natural mortality may be a little bit higher, and it's also much higher in younger fish than it is in older ones.

Mr. Robert Sopuck: That makes sense.

I'm going to dredge up my memories of my population ecology class. Would cod be an r-selected species or a K-selected species? Obviously, if they're K-selected, it makes it a little more difficult for them to recover. What are they?

Mr. John Bratley: They're not so much K, where it's boom and bust. They're more r-selected.

Mr. Robert Sopuck: Okay. An r-selected species would be one that can handle a bit more, so it would recover.

Mr. John Bratley: Yes, capelin and small, fast-reproducing short-life-history species are what we call K-selected.

Mr. Robert Sopuck: Why has the recovery been so slow? There was a moratorium on walleye fishing in Lake Winnipeg in the mid-1970s. Within three years the population had come back significantly, almost to the same level it was. Why is it so slow? We're talking decades here.

•(1610)

Mr. John Bratney: I don't believe science has a good explanation, but I think the fundamental reason is that the natural mortality level stayed very high. For more than a decade we would go out to do our surveys. We'd see young fish produced each year but in fairly small numbers. The next year, when they were one year old, there would be a lot fewer; at two years old, there would be a lot fewer. They didn't survive beyond age six. The level of mortality for more than a decade was so high that it was simply eliminating very quickly what was produced each year. None of them was surviving much beyond age six or seven.

Mr. Robert Sopuck: That's astonishing.

Mr. John Bratney: It is.

Mr. Robert Sopuck: In an unfished population of cod, what would the maximum age be?

Mr. John Bratney: It would easily be 25 years.

Mr. Robert Sopuck: Okay.

Does every female spawn annually, or do they skip a year or two?

Mr. John Bratney: They can skip a year when feeding conditions are not good, but if the feeding conditions are good, they can spawn every year.

Mr. Robert Sopuck: Okay. Are you seeing older fish now in the population?

Mr. John Bratney: We are. I referred to the biomass plot going up 12.5 times, much higher than the abundance. The reason the weights are going up is that we have bigger, older fish, and the oldest fish we see of any abundance are extending by one year each year.

Mr. Robert Sopuck: So you're seeing a dampening in the fluctuations, then, of your class strength? Things are kind of becoming a little bit more stable?

Mr. John Bratney: Certainly we're seeing a broader age structure in the population, and that's a good thing.

Mr. Robert Sopuck: It sure is.

I think my time is up. Thank you very much.

The Chair: You're right on time.

I know we use the word "population" quite a bit, as well as biomass and whatnot. For the sake of the human population, and a point of clarification, could you very quickly tell us—and perhaps you can weigh in on this—what the difference is between an r and a K population?

Mr. John Bratney: I'm getting really grilled on first year biology now.

K-selected populations tend to be short-lived species that reproduce rapidly. They can build their populations up very quickly, and they can also die off very quickly. Things like cod and some of the other big flat fish like Atlantic halibut and redfish are much slower growing. They're very long-lived. They persist for a long time, and their population dynamics are more damped. They don't go through these big annual ups and downs; there tend to be smoother ups and downs or they are stretched out over a longer time frame.

The Chair: The other would be the opposite of that?

Mr. John Bratney: The other one is the opposite.

The Chair: I'll just leave it at that.

I'm not cutting into your time; I'm just prolonging the game here. My apologies.

Thank you, Doctor.

Mr. Donnelly, go ahead for seven minutes, please.

Mr. Fin Donnelly (Port Moody—Coquitlam, NDP): Thanks, Mr. Chairman.

Thank you to the officials for being here for this important study.

Twenty-four years after the moratorium in 1992, why is there still no recovery plan for cod?

Mr. Philippe Morel (Assistant Deputy Minister, Ecosystems and Fisheries Management, Department of Fisheries and Oceans): You're probably referring to a species at risk recovery plan. We're managing the resource through the Fisheries Act, not through the Species at Risk Act. That's why there's no recovery plan as per SARA. We have what is called under the Fisheries Act a rebuilding plan, which achieves the same goal of reinstating and making sure the resource is more abundant every year with targets. So it's more about controlling the fishing than it is a plan under SARA.

Mr. Fin Donnelly: So you don't have a recovery plan, but you have a rebuilding plan.

Mr. Philippe Morel: It's rebuilding plan, because it's done under the Fisheries Act, not under the Species at Risk Act.

Mr. Fin Donnelly: Is that plan public?

Mr. Philippe Morel: Yes, I'm sure it is.

Mr. Brian Lester (Assistant Director, Integrated Resource Management, Department of Fisheries and Oceans): I'm not a member of the committee that's working on it, but there is a recovery plan. Much as they did in 3Ps cod, as you might be aware, the WWF, the Government of Canada, industry processors, and the Government of Newfoundland are all working together in development of this recovery plan. When the minister made his announcement this year, that's one of the things he asked for. He made a one-year announcement asking them to continue to work to try to complete it for future years to assist in making decisions. Part of that is the precautionary approach Dr. Bratney talked about. How do we get out of the zone we're in and into the next zone? Part of that will be the development of harvest control rules. Harvest control rules are developed in line with the limit reference point, where industry works with the department on goals and setting short-, medium- and long-term goals. That will help decide future harvest levels.

I don't know if that confuses the issue more, but it's to say that it's not a recovery plan under SARA, but it is a rebuilding plan of the department.

•(1615)

Mr. Fin Donnelly: I think you've answered this. There is a timeline then? The minister has set a one-year timeline? When does that conclude?

Mr. Brian Lester: The working group's been working on this one, I think, for almost two years, but the minister made a one-year decision this year. I'm asking that working group to continue its work and to try to complete it in advance to assist in making a decision for 2017.

Mr. Fin Donnelly: Can you give us the dates?

Mr. Brian Lester: Do you mean the date by which the decision will have to be made? Decisions for northern cod are normally made by May or June of the year. Decisions on recreational cod would normally have to be made in advance of that.

I think the timeline is there. It's a question of whether the group will be able to achieve consensus between now and May on what that process is, because it will dictate a fairly long run of what happens to the stock going forward. It's a matter of getting everyone on board. As Dr. Bratney said, we try to work on a consensus. We hope to make it.

Mr. Fin Donnelly: This committee would have to wait a year, or half a year, to May of 2017, before we see a draft report or some evidence of the study.

Mr. Brian Lester: I don't know if you would call it a study. I think we would call it "how do we implement the precautionary approach in the stock". I can't tell you what the chair is committed to, but I know the minister's hope was that they could achieve something and some consensus by the time he has to make a decision in 2017. I think that would be the timeline. We would hope to have something more public by then. It is public in a sense that participation on that working group is broad.

Mr. Fin Donnelly: Thank you.

The government has committed to greater transparency, and this is a critical time for the department to be fully transparent about management decisions on northern cod. Has the department made its decision-making pathway for northern cod public?

Mr. Philippe Morel: Yes, it is on the website.

Mr. Fin Donnelly: It's fully available then.

Mr. Philippe Morel: It's available and we also communicate it to fishermen through their association when we make a decision, which is usually a day or two after the minister approves his decision, just to build the communications package.

Mr. Fin Donnelly: Are they involved with the rebuilding plan?

Mr. Philippe Morel: Yes, the industry, in this case FFAW, is involved.

Mr. Fin Donnelly: Okay, thanks.

I want to ask for a little more information on this 2015 graph on page 8. It seems to concentrate in 3K. Maybe Dr. Bratney could explain a bit more about why there has been success in that area and not in the adjacent areas.

Mr. John Bratney: That's a good question.

When the improvement began, we saw the first signs in southern 3K just around the 3K-3L border. After a few years, it expanded slightly northwards into 3K, and it's only in the last couple of years we've seen it move up further north into 2J, which is the northern division there. The reason perhaps it's most prevalent in 3K is that

that's where it started, and 3K is also one of the biggest areas where the shelf is broader and—

Mr. Fin Donnelly: Do we know why? Do we know if there are ocean conditions that have changed?

Mr. John Bratney: I think part of the reason is that the remnant stock that was left after the collapse was in that region. The capelin also collapsed at the time of the northern cod, the large migratory component of capelin. There was a residual small inshore stock of capelin that persisted around the Trinity-Bonavista Bay area, and that seemed to support that small population that was left after the collapse. It was from there that the rebuilding seems to have emerged and spread further north. It hasn't gone south, which is quite perplexing, because before the moratorium, in the southern part of 3L, we would find large numbers of cod in this area that is still basically blank on the chart. That is a concern. That portion of the stock area hasn't rebuilt, and we're not clear why.

Mr. Fin Donnelly: Hopefully more science will be able to look at that. I know that on the west coast we're also concerned with ocean conditions. They are critical. We haven't had the amount of science we want and need, and the resources haven't been there to do that. Hopefully we will get more information.

Do I have more time?

• (1620)

The Chair: You just ran out.

Dr. Bratney, you want to give a quick response to that?

Mr. John Bratney: I don't have any response, no.

The Chair: Okay. Thank you for that.

We're going to move on now to Ms. Jordan for seven minutes.

Mrs. Bernadette Jordan (South Shore—St. Margarets, Lib.): Thank you, Mr. Chair.

If I get my questions answered, I'm going to turn it back to Mr. McDonald to ask a few more that he has.

Thank you very much for being here today and for the presentation. I'm going to start with the question about Area 6 with regard to the shrimp resources. You're probably aware of the extreme decline in the biomass in Area 6, and things aren't looking good for the crab resource either in 3K and 3L. Is this because of the rebound in the cod stock? Do you want to make a suggestion on that?

Mr. John Bratney: We're often asked that, and the fishermen do express concern about that. I think the answer is that changing ocean climate conditions are really driving the change. We do see cod preying on shrimp and they do prey to some extent on crab. The mortality they cause just from predation by cod is not enough to cause the declines we're seeing. There's mortality from other sources and there's poor recruitment, particularly in the crab resource. It's not producing the offspring that it should be to sustain itself at a high level. I don't think we can simply point a finger and say cod are eating them all and that's why they're going down, because it's just not that simple. Ecosystems are much more complex. There are a variety of things going on here at one time, and it's a bit too simplistic to consider cod to be the sole cause.

Mrs. Bernadette Jordan: That being said, are any studies being done with regard to climate change and the effects that warmer waters have on the stocks?

Mr. John Bratney: We do look at temperature effects on all of the stocks, and we are seeing some interesting things. And it's not just with cod; our ecosystem research program looks at that issue with respect to a whole variety of elements within the ecosystem. We do study this. We know that warmer temperatures, provided they're just on the warm side of the regional normal, are good for things like cod, but they tend not to be good for things like crab and shrimp, which like cooler water.

If the current climate warming continues and persists, in a general sense we think it would be more favourable for cod and less favourable for these other resources. If we look on a broader scale at the southern end of the range of cod as a species on our side of the Atlantic, it's really disappearing from down in New England because the argument there is it's simply getting too warm. Populations are not doing well at all. Indeed, anywhere south of Newfoundland, they're not doing well at all. There are many reasons. It's not just climate change with respect to Nova Scotia, but certainly it's one of the issues. It's affecting other species too. We're seeing things like salmon, which are affected by climate change too, and they're not doing well in the southern end of their range where the rivers are getting really warm.

There are broad-ranging impacts from climate change across the whole ecosystem, and we are doing a lot of work to try to quantify this.

Mrs. Bernadette Jordan: Thank you.

My next question is with regard to gillnets. I know that there are a number of fishers in Newfoundland who have concerns with the use of gillnets, and I'm just wondering if that's something that DFO is willing to ban the use of, or would they consider that? Is it an area that's been looked at or studied in terms of how it affects the cod? Is there a go-forward plan with regard to gillnets?

Mr. John Bratney: I defer that question to Philippe.

Mr. Philippe Morel: I don't know exactly about the gillnets, but the reason we allow stewardship-fishing harvest levels is to develop more sustainable fisheries with cod. This is so that if and when we reopen the commercial fishing for cod, the quality of the fish will be better.

There is a project on fish quality. It's a project we fund and participate in. It's called the Cod Quality Project, which started in

2015. It's done by FFAW. Last year we allowed them to harvest 370 tonnes of fish, and this year 475 tonnes. They have a four- to eight-month period to harvest fish. There are 48 harvesters who are entitled, who have licences to harvest fish through that Cod Quality Project, and the objective is to demonstrate how we can improve the quality of fish that are being harvested. Of course, fish nets, and the use of gillnets or the type of gillnets, is certainly one of the concerns we have.

• (1625)

Mrs. Bernadette Jordan: That's going to lead to my next question, then, with regard to the data on the catches and the rates and things. It used to be that the commercial fishery vessels, particularly offshore, were the ones who did the science, and now you've expanded it. You talked about logbooks in your presentation. How often are those assessed? Is it mandatory or is it based on whether or not they want to keep accurate logs? What's the process for accessing the logbooks to make sure to get the data?

Mr. John Bratney: I can only speak to part of that. They're done annually. They were designed by the science area, surprisingly enough, since catch monitoring is not really our job, but we had a lot of input into this after the moratorium came about. They're used at the assessment every year, so the fishermen record the amount of fish and the amount of gear they use, and how long it's set for, so that we can convert the information into a catch rate.

We receive close to 2,000 logbooks every year, and we come up with catch rate trends from those for different areas. We look at those and we compare the catch rate trends with trends in the sentinel fishery, which is slightly different. We also compare the trends with trends in our research vessel survey. From about the late 1990s onwards, the trends agree very well, both in direction and in spatial differences.

The logbooks are a very important part of what we look at.

I can't answer your questions about whether they're mandatory or not. Perhaps one of my colleagues can do that.

Mr. Philippe Morel: The logbooks are part of the licence they receive. They have to fill in the logbooks and send them to us monthly. Then they go to science for analysis.

Mrs. Bernadette Jordan: Do I have any time left, Chair?

The Chair: I'm afraid not.

We'll go to Mr. Arnold for five minutes.

Mr. Mel Arnold (North Okanagan—Shuswap, CPC): Thank you, Mr. Chair.

I have three or four questions. I'll try to keep them short, and if we can keep the answers reasonable, then hopefully we'll get through them all.

I note that studies have determined that during the years 1985 to 2000 seal predation wasn't deemed to be significant. How was that determined, and has any study been done to determine if the seal diet changed during that time? We know that fish can be very food-specific. They'll feed on only one type of feed for certain periods of time. Do seals do the same thing? And what has been done to determine what the seal diet was prior to the moratorium?

Mr. John Bratney: There wasn't a huge amount of information going way back in time, but the basis for that conclusion was what was called a "bulk biomass" model. That was developed by some scientists at DFO. They considered three things that could influence cod: the fishery, capelin availability, and predation by seals. They considered these three things together. In their analysis, they couldn't find any indication that northern cod population dynamics were actually being driven by seal predation. It didn't seem to be having a major impact. Capelin availability and the fishery were far more important than seals were in driving the changes we were seeing in northern cod.

If you look at my presentation, you'll see the increase that we've seen in northern cod in the past decade. That has come about when the harp seal population—I emphasize the harp seal; this is not the grey seal—was close to an all-time high for the recent period. The stock has managed to improve considerably in the presence of a very large harp seal population. Again, that supports the idea that seal predation is not a major issue. The seal population was much lower back in the eighties, when this stock was very high.

I'm not the best person to ask about how much data we had back then. Seal diet is an extremely difficult thing to study in the open ocean. It's very hard to get samples of seal stomachs from seals out in the open ocean. It has always posed a very significant challenge to the scientists trying to estimate the impact of seal predation.

• (1630)

Mr. Mel Arnold: In British Columbia, I know they're doing studies of hair samples on wolves and coyotes to determine their prey. They've been very surprised by the amount of mountain goat in the wolf diet. I'm wondering if the same science could be used on previously harvested seals from the products prior to the moratorium to determine if there have been changes in the seal diet in that time.

Mr. John Bratney: I'm not sure whether that could be done or not. I know that certainly one of the primary things they use are the otoliths, the fish ear bones, in the stomachs, which allow them to reconstruct what the seal has consumed within the past 48 hours, say, because the ear bones are very slow to digest.

With regard to the historical information, I'm afraid I don't have the answer to that.

Mr. Mel Arnold: Staying on the subject of predator mortality, the natural mortality stayed high during the moratorium. Is there any evidence that predator swamping may have helped the cod stocks stay high, prior to the collapse? We know the effects of predator swamping with salmon smolts migrating. Has that been looked at?

Mr. John Bratney: I suspect that the huge capelin population sustained the harp seals. They simply didn't eat many cod, because capelin were so abundant, so available, and much higher in calories. They were probably one of the key prey back then. When capelin

were abundant, they sustained most of the large predators in the ecosystem off Newfoundland, the seabirds included.

Mr. Mel Arnold: I noticed a difference, and I think others did as well, in the recoveries of the northern regions versus the southern regions. Is there an impact from international fisheries in those northern regions? Is there any correlation there between those recoveries, non-recoveries, and other commercial catches?

Mr. John Bratney: No, there isn't with respect to northern cod because, of the three NAFO divisions within the northern cod population, the two northern ones don't extend out beyond the 200-mile limit. There is basically no fishing by foreign fleets in areas 2J and 3K on the shelf, where the cod are. There is some fishing in area 3L, on the nose of the Grand Banks.

Mr. Mel Arnold: That's what I was wondering.

Mr. John Bratney: For those catches, there are NAFO observers on those vessels, I believe. Perhaps my colleagues can expand on this, but the catches by foreign fleets have been quite low, generally less than a couple of hundred tonnes—80 tonnes, things like that—so I don't think they are of major significance at the moment.

The Chair: Okay, we'll have to leave it at that. I'm sorry.

Thank you, Mr. Arnold.

We're going to go to Mr. Finnigan, for five minutes, please.

Mr. Pat Finnigan (Miramichi—Grand Lake, Lib.): I read a report somewhere that the samples, especially this year, are a lot leaner than they were in the past. If that is true, is that a cyclic occurrence, or is it just an anomaly this year?

Mr. John Bratney: No. You're obviously well up on the latest information on northern cod, because this is something we've just been hearing in the last month or so. Fishermen have been calling us.

It started in southern Labrador when the fishermen called and said: "The cod are really skinny this year. What's going on? Also, there's no capelin here this summer, whereas last year there were many capelin and the cod were fat."

After that call was reported in the media, more calls started to come in to us, and I was asked to comment on it on CBC's *Fisheries Broadcast*.

We've had several reports of cod this year in the fishery around the coast being a bit thin. Some of them are not looking very healthy, and the fishermen are also commenting that there don't seem to be as many capelin around this year as there were last year.

We're not totally surprised to hear this, because the last capelin assessment said that there were a couple of year classes of capelin coming in that looked quite weak. Those would be into the sizes that cod eat, so we weren't overly surprised to hear this. But it is a little bit of a concern, because when cod don't have good feeding, that situation tends to affect their reproduction, and it can affect their survival as well.

We're certainly very aware of these comments, and we are sampling the fish this year. Our research vessel survey has just begun—the big survey in the autumn. The sentinel fishermen have been collecting and freezing samples of cod for us throughout the summer. We'll be looking at all of that information to see whether there are any indications that the condition of the cod this year is of concern or not. Maybe they are just a little bit thin, but if they are extremely thin, then it would be a hint of a concern that we'd have to look at very carefully, because it could affect recovery down the road.

• (1635)

Mr. Pat Finnigan: Would that be its only food? What else would it feed on?

Mr. John Bratney: They feed on a wide variety of organisms on the bottom, but capelin seems to be the key with respect to their growth and spawning potential. It's so high in calories; it comes right in to the coast to spawn; it's so aggregated that it is easy for cod to catch. It is certainly one of the most important things for the northern cod in particular, especially to sustain a large population.

Mr. Pat Finnigan: I'm not too familiar with the migration of the cod itself. Are there commercial fisheries occurring beyond the 200-mile limit? Of course, the cod doesn't know that there is a limit. Can you tell us whether there are commercial fisheries? Do you have the numbers on those?

Mr. John Bratney: Yes, there are some fisheries beyond the 200-mile limit, but the only portion of the northern cod stock area where the water is at a depth at which cod would reside is in the nose of the Grand Banks. That's in southern area 3L, which is the lower division in the chart.

There still is foreign activity there: they have allocations of other species. They have some bycatch of cod, but the values we're presented with show typically, as I mentioned, around 80 to 100 tonnes—something like that—of cod being reported.

I don't know whether my colleagues can substantiate that.

Mr. Pat Finnigan: You said there was also cod in the Boston area in the U.S., but did I understand that the cod is starting to disappear in that—?

Mr. John Bratney: Yes, in the southern end of the range of the species, right down to Cape Cod, they are really not doing well at all. They are really struggling to persist down there. As I mentioned, there could be many reasons. Grey seals have been implicated, but also climate change and warming. That's the southern end of the range of the species, where the waters in the Gulf of Maine and that

area have become extremely warm and simply may be unfavourable for cod.

Mr. Pat Finnigan: We talked about logbooks a little while ago. Those are for commercial fishers. What about the recreational? Do you have any numbers as to how much cod is caught by recreational fisheries, and would those be effective?

Mr. John Bratney: We do have some information, and there's a program coming into play next year that will address that further. At the moment, we do have some estimates of the recreational catch, which comes from our work with tagging. We release large numbers of live cod with numbered plastic tags, which the recreational fishers know all about, and if they catch one with a tag they send it back to us for a reward.

When we look at the commercial fishery and the proportion of the total tags that the commercial fishermen send back to us, we know what the commercial fishermen are catching. Then we can look at the number of tags we get from recreational fishers, and it gives us a comparison to get some idea of the recreational catch. It has been fairly substantial, in the order of maybe 1,500 tonnes in the last few years.

There's a new program coming into play now.

Mr. Philippe Morel: Yes, there's a new program starting next year under which licences and tags will be allocated, and then we'll be able to have better monitoring. We estimate that there is between 1,500 and 2,000 tonnes caught by the recreational fishery annually. Obviously, with tags and licences next year, we'll be able to control that, and also have a better reporting mechanism to know about the impact of recreational fishing. That will be starting in 2017.

The Chair: Sorry, Mr. Finnigan, you'll have to leave it at that.

Mr. Sopuck, go ahead for five minutes, please.

• (1640)

Mr. Robert Sopuck: Dr. Bratney, did I hear you say earlier in your testimony that you don't think seal predation is that significant in terms of the cod stock decline or recovery?

Mr. John Bratney: With respect to northern cod and the harp seals, yes, but I would not say that about other cod stocks and the grey seal.

Mr. Robert Sopuck: Good, because I just found the report from your department. It's called, Grey seals and cod, and it says

While much research remains to be done, the lack of cod recovery in the southern Gulf of St. Lawrence appears to be due to high mortality among larger cod. Predation by grey seals make account for up to 50 percent of this natural mortality, making them a major factor limiting the recovery of this cod stock.

I'm very well aware of different regions, and things happen in different places, but I think that perhaps you're being overly cautious in terms of the effect of seals on cod. I would hope that political correctness doesn't play any role in the conclusions of the work that the department is doing.

It is possible that seals, in terms of northern cod, could be a significant factor. When a species is driven down to such a level, even if the number of prey species taken is the same but they're a much higher percentage of the total stock, obviously the effect of predation can be a dampening factor on any recovery.

Is that a fair comment?

Mr. John Bratley: Presumably.

Mr. Robert Sopuck: Again, the seal issue is one that we're going to be looking at very carefully.

I've read and heard that the cod stocks off Iceland are in quite good shape. Is that correct?

Mr. John Bratley: Yes.

Mr. Robert Sopuck: What is Iceland doing that is different from what Canada is doing? Why did this collapse not occur in Iceland and it did happen here?

Mr. John Bratley: The Icelandic stocks are doing well, and so are the ones off northern Norway. I think the fundamental reasons are that they did go through a period of decline, but they didn't decline anywhere near as much as ours did. There was a much greater, I guess you'd call it, spawning biomass still in the water to generate a recovery.

They also had very favourable environmental conditions in those two areas, and both of these factors together generated good recovery of those stocks.

Mr. Robert Sopuck: So the warming ocean, which is affecting the southern stocks of cod, is not happening at the same rate up there, or it's not happening at all in Iceland, so the water is cool enough and the stock is doing well partly because of that.

Mr. John Bratley: Yes.

Mr. Robert Sopuck: Is it fair to say, too, that the severe decline in northern cod stocks is clearly a result of overfishing?

Mr. John Bratley: It's certainly a very important factor.

Around the time of the moratorium, much of the publication work that came out from science was very strong that it was all overfishing and it wasn't environmental. Since then, we've gone through two decades and done lots more research. I think the significance of the environmental component to decline is much stronger now than it was back then.

Mr. Robert Sopuck: Okay, great.

I'll go back to the 200,000 metric tonne fishing level that we referenced earlier.

Is it your best guess that when all the dust settles, we'll be looking at a commercial fishery of 200,000 metric tonnes? I wouldn't hold you to it; whether it's 180,000 or 220,000, is that the right order of magnitude? Is it in the ballpark? I'll equivocate as much as anybody.

Mr. John Bratley: My colleagues who work in the ecosystems have said it this way. There are no guarantees that the cod stock will rebuild the way it was, nor that the ecosystem off Newfoundland will rebuild as it was. At this point it's very unclear how it will rebuild. It could be bigger or it could be smaller.

Mr. Robert Sopuck: This is the last point, as I don't have much time.

The notes we were given refer to a project called the fisheries improvement project. The Fish, Food and Allied Workers are partnering with World Wildlife Fund and the department to undertake this fisheries improvement project.

That concerns me greatly. The World Wildlife Fund has been an activist group against the seal hunt, and has, quite frankly, done harm to rural Canada right across the country. On the one hand, I guess it's okay to get the funding and expertise where you can. On the other hand, World Wildlife Fund, in my view, would probably want to play it both ways. It might want to be part of this project, but when it comes to the final recommendations, whether it be a seal suppression program or an expanded fishery and so on, one wonders whether it will expect to be a lobby group at the same time.

As a final comment, that participation by that activist group with your department on this project I think raises some alarm bells.

Thank you very much, Mr. Chair.

• (1645)

The Chair: Would you care to respond?

Mr. John Bratley: I have no comment.

The Chair: All right. I have to offer the opportunity.

Mr. Sopuck, thank you very much.

Mr. McDonald, we are back to you for five minutes, please.

Mr. Ken McDonald: Thank you, Mr. Chair.

I have just a couple of things.

First, we mentioned there is a small sentinel or stewardship fishery on the go. I've heard from some fishermen who are taking part in that. I think for some of them the catch limit is 2,000 pounds each week for a number of weeks, to probably 12,000 or 13,000 pounds of fish. However, I have fishermen—and they are still using the gillnets, as my colleague referenced—telling me that the fish are so big this year that they are actually tearing up the nets. It wasn't that way last year or the year before. That was on the southern shore, up towards Calvert and the Ferryland area, which I am sure you'd be familiar with. At the same time, even where I live, in Conception Bay, people who go out in the recreational fishery are catching fish that are of a size they haven't seen for years. We've heard reports of people getting 60-odd-pound cod fish or 70-odd-pound cod fish.

What do you make of the increase in that this year, compared to other years? We didn't hear those stories in past years, especially in the recreational fishery.

Mr. John Bratley: The average sizes we are seeing in the fish catches have generally been increasing steadily in the past few years. I mentioned earlier how the age structure of the fish population is expanding every year. They are surviving to an older and older age, and we are seeing fish that are 14 years old now in the stock. Ten years ago, we didn't see anything like that at all.

The fish that are 60 and 70 pounds are there. We see the photographs on social media. We know they exist, but they are actually a very small proportion of what is caught in total. We have fisheries officers who go out on the vessels and measure fish that the recreational fishers catch. When they do it every year, they measure thousands, and all that information comes to us. We also measure something like 10,000 or more fish that are caught by the sentinel fishermen, and the percentage of fish we see that are over, say, a metre long is actually really small. They are there, but the proportion is actually quite small. The fishermen tend to use gillnets, which are very selective for a mid-size range of fish. They do get these very large ones, which roll up in the nets. They get caught by the lips, and they roll the nets up. Then the rest of the net doesn't fish very well because it is all bundled around them.

We do see some of those fish, but they are not a huge proportion of the catch. Sometimes you'll see a bunch of them in one area, and it will cause problems, as you said, but they are not as abundant as we would like them to be. We would like to see more of them.

Mr. Ken McDonald: I guess it is a good complaint to hear when we are talking about the rebuilding of the stock.

I know my colleague referenced what cod prey on, and you mentioned the capelin. I've had fishermen send me pictures of cod they caught, and when they opened up the cod, there was an enormous amount of female crab in their stomachs, probably about the size of a toonie or a bit bigger. They are going for the really small crab at a time when we are seeing our crab actually decrease in population. I think a crab has a lifespan of probably 13 years or something.

Mr. John Bratney: Yes. They can live to be quite old.

They will feed on crabs at a time when there are no other things around. They're certainly not their preferred prey. I'm sure they're quite crunchy to sink your teeth into, but we do get photographs sent to us because fishermen are obviously concerned when they see that.

I think it gives us a bit of a selective picture of what they're eating. It's not a balanced sample of what cod in general eat. Fishermen are concerned when they see crabs in the cod's stomach, and so they send the pictures to us and they put them on social media. It's not as prevalent as those bits of information might indicate. It's not trivial, and I don't mean to trivialize it, but it certainly gives it a bit more of a representation than perhaps is evident within the whole stock.

Mr. Ken McDonald: Thank you.

Lastly, I think I'll reiterate what a colleague across the floor said about the seal population and its predation on cod. We see seal now. I grew up on Conception Bay and I'm still there. We see seal where we never saw seal before. I live right across from a small pond, and I see seal in the spring up on the pond ice feeding on something, whatever they're taking, whether it be sea trout or whatever.

We hear tell of the seal population and how large it is. Will there come a time when we finally say that we know we want cod to get to a point in terms of biomass, and we know the seals are at this point in biomass? Are they too big now that the department sooner rather than later will have to determine that it has to find a way, whether it's through selective harvesting or whatever, to lower the seal

population to give a chance for the cod to rebound even more quickly than what it's doing over the past five or six years?

• (1650)

Mr. John Bratney: I think the answer is that the seal population is close to an all-time high, so it's no surprise that you are seeing them even in the wintertime, especially in the estuaries where, as you say, there may be sea trout around.

The science indicates that the growth we've seen in the stock in the last 10 years is good, and that's taking place in the presence of this large seal population.

The latest information on harp seals suggests, if I recall correctly, that the seal population seems to be levelling off. This is not grey seals now. This is harp seals. It seems to have levelled off and is perhaps a bit lower than it was a few years ago. At the moment it doesn't look as if it's going to continue to increase, whereas cod is in an upward track.

The Chair: Thank you, Dr. Bratney. I'll have to cut it there.

Mr. Donnelly, go ahead for three minutes, please.

Mr. Fin Donnelly: Thanks.

I wanted to go back to the recreational fishery for a moment and ask what the plans are to effectively manage the recreational fishery given that there are no reliable estimates of landings and the DFO science recommends all removals be at the lowest possible level and all sources of uncertainty be reduced.

Mr. Philippe Morel: You're talking about the plan for next year and how we will manage? I'm sorry, I'm just not sure.

Mr. Fin Donnelly: Yes. I'm asking if you have plans and what they are.

Mr. Philippe Morel: We have a plan to issue licences and tags next year for around the same level of 2,000 tonnes for recreational fishing. The system we're building right now is a system to manage that with stakeholders and to see how we can issue the tags to the fishermen.

Mr. Fin Donnelly: That system is available online?

Mr. Philippe Morel: It's not available now. We're developing it. This year there's no system.

Mr. Fin Donnelly: There will be one?

Mr. Philippe Morel: Yes. We have a system on the west coast, and we will migrate that system for the—

Mr. Fin Donnelly: When do you expect that to be public?

Mr. Philippe Morel: I don't have an exact date, but certainly a few weeks prior to the opening of the season.

Mr. Fin Donnelly: In the remaining time, Dr. Bratney, regarding this chart on the latest assessment results, could you talk about how you get to the limit reference point? With it fluctuating so much over years, how do you determine where the cautious and critical zones are?

Mr. John Brattey: The key measure you're looking for is where this stock shows evidence of having suffered serious harm. To look for the evidence of serious harm, we looked at things like the age structure of the population and where the large fish are disappearing. We looked at how effective the population was at producing recruitment, and we found that after the 1980s, both of those things plummeted and the population of cod was not able to produce good recruitment after it got below the levels we saw in the 1980s.

We had evidence of harm, and that's why we set the limit reference point as being the average spawning biomass of the 1980s. That point could be revised if we get more information, because the stock went down so quickly we have few data points between the limit reference point and down near zero.

If we get more information of when the stock is at an intermediate level, then that shows us that the stock can be productive. Then we would be advised to revisit the reference point issue, but at the moment we don't see that yet.

The Chair: Sorry, Mr. Donnelly.

I may have some news for you because we do have time. We're going to run a little bit tight, but what I propose, if I can get the unanimous consent of everybody, is that we return to the top of the board. Instead of doing seven minutes, let's do five minutes each, so you'll get a chance to finish that thought.

Is everybody okay with that? We're going to run a little bit tight, so I'm going to be a little more strict about that five minutes, given that we have business to do at 5:15.

Mr. McDonald and Mr. Finnigan, are you going to split your time?

•(1655)

Mr. Pat Finnigan: Yes, we can split our time.

The Chair: Go ahead, Mr. McDonald.

Mr. Ken McDonald: I noted that the common theme within the 2016 stock assessment is uncertainty. Why do you think there are so many gaps in the data and other information we have in regard to the current state of the stock, and what resources will the department require to fill those gaps?

Mr. John Brattey: Uncertainty is a word that you see used quite often in the assessment documents. As I mentioned in my presentation, we have a new assessment model, and one of the key things we have to address in a far better way than anything we've had in the past is the issue of uncertainty.

I can give you an example. In the past, we had to assume things. We didn't have enough information back before the moratorium on cod to say what the level of natural mortality was. In the models at that time, you had to put in an assumed value, so we put in a fixed value of 0.2. There was no measure of uncertainty around that at all. If we got that wrong, that could have a big impact on the assessment. Now we have a way to include uncertainty around estimates of natural mortality.

We also had to assume that the catch information that we provided was without error, that the number of tonnes of cod that we were told were removed was exact, and that it wasn't an underestimate. Those were the numbers that we had to use in assessment models back in the 1980s.

This model we have now doesn't require an exact measure of catch as one of its inputs. It requires what we call bounds in the catch. We need a lower and an upper bound, within which we will capture what the true catch was, including things we don't know much about like discarding, unreported fishing, and any of these issues that could be going on. We put in bounds, and the model will figure out where the catch—the most likely total catch—was within those bounds. It just gives it a constraint.

This issue of uncertainty is addressed much more rigorously in this new assessment model we have, which was custom written specifically for northern cod.

Mr. Pat Finnigan: If the theory is true that warmer water is part of the reason the fish are moving north—it looks as though we're losing the southern waters from Cape Cod up—what other species are we seeing increase? We should see some species that weren't here before that are now moving north.

I know the salmon has the same issue. The salmon is now apparently into Labrador and some of the northern waters, but we should see the species that were traditionally southern species move north. Would you say that's fair?

Mr. John Brattey: We are seeing some things. We're not seeing as much rebuilding in some of the other groundfish resources within the northern cod stock area as we are with the cod. Things like American plaice within that area are improving, but they're not rebuilding quite as quickly as cod did. They're also a slower growing species, so perhaps that's not surprising.

Some of the other things we're seeing are more sharks and more tuna in the waters around Newfoundland, and these are particularly warm water species. This summer alone we're hearing—and I'm sure you've heard—numerous reports of recreational fishers tangling with sharks when they're pulling their cod up to the surface.

There are some warm water species that are improving, coincident with this warming, but there are also some that we're a little surprised are not doing better than they are. It's a complex picture.

Mr. Pat Finnigan: It gives more meaning to the film *JAWS*. I guess we should be concerned that it might come to our shores.

That's all I have. Thank you.

The Chair: Thank you very much.

Mr. Doherty, you have five minutes.

Mr. Todd Doherty (Cariboo—Prince George, CPC): I want to say thank you to our guests today for their report. I found it very informative.

I have a question regarding capelin. When was the last capelin assessment completed?

Mr. John Brattey: I believe the last capelin assessment was in 2014. I stand to be corrected, but it might be done every second year.

Mr. Todd Doherty: Earlier in your testimony, you mentioned that some numbers are showing that there might be a decline in the capelin. Do you know the factors around that, or are there thoughts about that?

• (1700)

Mr. John Bratney: No, we don't know. Quite frankly, it's very difficult to say, as we mentioned. Small pelagic fish can be boom or bust; they can go up and down very quickly, in short timeframes. When they do go down, we're obviously concerned and we're looking very carefully and hoping the situation doesn't persist.

Mr. Todd Doherty: Also, my colleague mentioned seal predation. Is capelin part of the diet of seal as well?

Mr. John Bratney: It is very much so.

Mr. Todd Doherty: So while we might not see seal predation on our cod as having an impact, seal predation on our cod's preferred diet could definitely have an impact on our numbers.

Mr. John Bratney: Yes, possibly it could. I can't recall any detailed studies in which they have looked at the impact of seal predation on capelin. Everything feeds on capelin. This is the challenge: to figure out which of its many predators are having the biggest impact on it. All the whales eat them too, and all the seabirds.

Mr. Todd Doherty: Would it be your assessment, then, today that we could be looking at a drop in our numbers of northern cod for next year or the next reporting period?

Mr. John Bratney: The potential is certainly there with capelin having gone down. One year is not so much of an issue, but if they stay low for a couple of years, then you would expect to see some impact.

If you look at our graphs, you can see how the increase in northern cod is not linear upwards from 2005. It goes up a little bit and then it rather plateaus. In 2010, we saw quite a dip in capelin, and it seemed to be reflected in the cod numbers as well. Then the capelin improved, and so did cod.

We'll certainly be looking at capelin very carefully in the next short period.

Mr. Todd Doherty: Great. That's all I have.

Thank you.

The Chair: Mr. Donnelly, take five minutes, please.

Mr. Fin Donnelly: Thanks, Mr. Chair.

I want to go back to the limit reference point again.

I think, Dr. Bratney, you were talking about ocean conditions and said there could be other factors that come into play. Having changing ocean conditions such that stocks are moving would play a role, I assume, in determining what that reference point should be.

Mr. John Bratney: Yes. If we got into a very long period in which the stock didn't, say, go above 300,000 or 400,000 tonnes, we could be in for—I'm sure you've heard it mentioned—a regime shift in which the stock stabilizes at a much lower level than in the past. If that persisted for a long time, we would perhaps have to revisit the reference point issue and take into consideration that things such as this happen.

We are very aware of the possible importance of the environmental conditions in the long term and of how they can affect the reference point.

Mr. Fin Donnelly: I'm just looking at the next steps that you're suggesting for the science on northern cod. You've mentioned the increased funding to hire more scientists, the continuation of stock and ecosystem monitoring, and then you talked about the collaborations and the partnerships. Concerning the next full assessment, in March 2019, how important is it that, for instance, this committee or others wait to that point to determine management decisions?

Mr. John Bratney: I don't think you have to wait until 2019, because we do what's called interim stock updates. In the intervening years, we will do an update and there will be a science response report produced and placed on the CSAS website.

In those updates, we don't do a full rerun of all the modelling and all the information. What we do is look at the key stock indicators, and if those show something out of the ordinary, something that causes concern, that will trigger a full assessment in that year. We won't do just an update; we'll go to a full assessment in that year. That decision would typically be made around December or January, and then the assessment would be held in March.

Either way, you won't have to wait until 2019 to get more information about northern cod. There will be an update document in 2017 and 2018 at the very minimum.

Mr. Fin Donnelly: Are there any other steps that you recommend, other than those you've presented here today, that the committee should look at and consider for science or for others in the rebuilding process?

• (1705)

Mr. John Bratney: I can't think of anything in particular off the top of my head.

Can any of my colleagues?

Mr. Philippe Morel: When we look at harvest levels or opportunities, we also take into consideration the recreational fisheries and the quota for indigenous allocations before providing any commercial licences in the long term. We analyze that as part of the decision-making on whether we allow more catch opportunities or fewer, depending on the science report.

Mr. Fin Donnelly: Could you provide the committee with the catch levels for the three: the commercial, the recreational, and the first nation fishery?

Mr. Philippe Morel: Sure. I have it for last year and this year. This year, stewardship is 10,525 tonnes. That's an estimate, of course. Recreational is 2,000 tonnes; science is 275 tonnes; bycatch domestically is estimated at 25 tonnes; foreign bycatch is 150 tonnes; for food, social, and ceremonial it's about 50 tonnes, and for the Cod Quality projects I referred to earlier it's 475 tonnes.

Mr. Fin Donnelly: Thank you.

Mr. Philippe Morel: The stewardship is what was allocated as a maximum or an estimate, but the catch reports we have up to now show that by the end of the season, unless there is a big increase, they won't reach 10,000 tonnes.

Mr. Fin Donnelly: Where could we find the historic information on this? You've given us present or current.

Mr. Philippe Morel: Is it available on the web?

Mr. Brian Lester: It should be on the department's website as catch statistics over the years. I'm trying to remember if cod is broken down by the zones or if it's broken down individually. We easily could provide this committee the catches from the 1970s and later for where we have data, if that's the desire of the committee.

Mr. Fin Donnelly: If we went to the website, or if the public went to the website, and did a search of catch statistics, would it pop up?

Mr. Brian Lester: It would likely pop up first in the CSAS reports that science prepares, because they usually have their catch history in there. It would not be broken down by fleet. It would be broken down by Canadian catches and foreign catches, but if there is a desire for a greater breakdown going back to the 1970s, then we could provide that.

The Chair: Thank you, Mr. Donnelly, I appreciate it.

Thank you to everybody for this.

I want to thank Mr. Lester, Mr. Morel, and Mr. Swerdfager. It's good to see you again.

Finally, but certainly by no means least, Dr. Bratney, thank you very much. This was exceptional information you brought here today, and we truly appreciate it.

I think I can speak on behalf of everyone in saying thanks to you. We're a lot more knowledgeable as of today. I'm beginning to think you know more about this than Dr.—sorry—Mr. Sopuck over here.

Mr. Robert Sopuck: Don't call me doctor.

The Chair: I always call him doctor. He's a resident in biology, you could say.

Thank you very much. We're going to break for a few minutes so we can go in camera for members of the committee.

[Proceedings continue in camera]

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