Brief to the Senate Standing Committee on Fisheries and Oceans
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In *Changing Course*, we research fishery policy and advocate for change. We focus on the federal level because it is federal government policies that underlie and regulate most of the activities involved in fish harvesting. Your Committee can help to get those policies right, looking at fishery management through a new window, studying the roots of the ongoing problems with the current system and considering an alternative basis for policy.

We propose an alternative framework for Canada's fishery policies, one that will be more truly sustainable and benefit all involved. This represents a paradigm shift in policy direction that will dramatically change the system currently in place. And change is urgently needed, because Canada's existing fishery management policies have not led to sustainable fisheries.

Our brief is organized as follows:

Rationale for the Change

A main goal of all fishery policy should be **sustainability**. That word has three essential aspects – ***environmental*** sustainability, ***social*** sustainability, and ***economic*** sustainability. And like a three-legged stool, sustainability needs all three legs and a good foundation in order to stand. If any leg is missing or weak, too short or too long, the whole thing will overbalance and collapse. And if the foundation is weak, it can't support the stool.

Likewise, good fishery policy must rest on all three legs and a solid foundation. It must be firmly based in current scientific reality, and must optimize the ecological, social and economic benefits, present and future, for all involved – humans and "all our relations" in the natural ecosystem.

As we shall explain, our proposed alternative policy framework meets this high bar.

More than a century ago, the poet Thomas Hardy wrote: "*If way to the Better there be, it exacts a full look at the Worst*." Hardy may not have realized that his maxim would apply so perfectly to fishery management. But it does. Canada needs a "way to the Better" for managing our fisheries – so first we have to look at the Worst.

The current fishery management system has not fostered sustainability. On the contrary. Evidence shows clearly that for the past many decades we've been getting fishery management wrong. Look at that evidence: the northern cod Moratorium – 30 years now and counting. The decline of salmon on all our coasts. The shrinking of herring, capelin, shrimp, and mackerel stocks. The continuing struggle of harvesters just to make a living on the water. The ongoing decimation of coastal communities. And overall, as Daniel Pauly has been telling us for decades, we're fishing further and further down the food web, eroding the structure of the ocean's ecosystems.

Why does the current system not foster sustainability? The federal Department of Fisheries and Oceans bases their management system on the quotas and allocations of a calculated "Total Allowable Catch" (TAC). In other words, their focus is on defining the tonnage of fish biomass they project can be safely caught. This quota-based system is DFO's "Precautionary Approach Framework," or "PA Framework."

And it's not working. Again, the evidence shows that DFO's supposedly "precautionary" policy framework is <u>not</u> protecting the ecosystem, and it is <u>not</u> maximizing benefits for harvesters or coastal communities either. Based on our research, we think we know why, and we believe we can offer a better way.

Proposing a "Way to the Better"

What we present here is a new way of looking at the challenge – a paradigm shift in thinking, policy and practice. ***The task of fishery management is to prevent overfishing and foster ecosystem health, and we* propose an alternative management framework *– one based on regulating inputs rather than outputs.*** Instead of attempting to estimate and allocate in advance the number of kilotonnes of fish to be caught, we should regulate the activities of the fishing itself so as to foster sustainability.

This is done by implementing Input-Based Management (IBM). The inputs – the fishing effort, the "who, how, what, where and when" of harvesting – are regulated on the basis of scientific evidence, traditional knowledge and continuous real-time feedback. By properly regulating the fishing effort, we can reduce the pressure on the stocks and on the ecosystem in ways that will actually build sustainability for both fish and fisheries.

This Input-Based Management (IBM) may seem a radical idea, but it works. The traditional Atlantic cod fishery had no quotas, and the stocks survived more than four centuries of harvesting until modern industrial methods and the indiscriminate use of high-power technology led to devastation in a few short decades in the last half of the 1900s.

A current example of Input-Based Management in operation is Newfoundland's lobster fishery. It is one of our most successful and sustainable fisheries, and it has been managed by input controls – without quotas – for the past 97 years. Instead of setting quotas or limiting the landed biomass, lobster fishery rules specify the season, the type of gear and the number and design of traps, and prevent the harvest of egg-bearing females. This selective harvesting explicitly targets the middle segment of the harvestable biomass, leaving both the very young and the mature reproducers in the water to replenish the stock. It thus mimics the natural system of predation in the wild, something Chris Darimont of the University of Victoria recommends if we want to harvest sustainably. Moreover, it enables larger harvests when the animals are plentiful, and smaller, non-damaging harvests when they are scarce – a key characteristic of a sustainable management approach.

Input-Based Management also meshes with Indigenous understandings and traditional practices, grounded in the recognition that humans are *part of* the natural world, not separate from it. As Climate Change and Covid have shown us, *we humans are simply not in charge.* That realization is appropriately humbling, and opens the door to changing failed approaches.

A corollary is that fishery management does not and cannot manage the fish or the ocean. It manages the *fishery* – that is, our human activity as predators in the marine ecosystem. In trying to optimize that management system, we would do well to incorporate the Indigenous concept of the “Honourable Harvest” with its unwritten rules based, as Potawatomi scientist-poet Robin Wall Kimmerer explains, on respect and reciprocity with “all our relations.” *Take only that which is given. Harvest in ways that minimize harm. Never take more than half. Never waste.* Our society is slowly starting to pay attention to those profound understandings, but we're still just taking baby steps.

Essential Principles

The following principles underlie our "Changing Course" proposal for a better way:

- The ocean’s ecosystems are of inherent value and must be kept healthy, so harvesting must be done selectively in sustainable ways;
- The ocean is a commons, and, as recommended by the FAO, harvesters have “use rights” to harvest that commons sustainably;
- The fishery management system must provide optimum net economic returns to harvesters and coastal communities;
- The system must be equitable, inclusive and participatory, with implementation and management kept as simple and effective as possible.
- The system must be based on verifiable real-time information and feedback, avoiding reliance on inherently uncertain theoretical predictions, and implementing practical measures for sustainable fishing.

Our overall policy direction should incentivize small scale fisheries where these principles can be reliably implemented, rather than encouraging and subsidizing large, corporate, industrialized fishing, where that is not the case.

Tools for Fishery Management – Input and Output Controls

We think of DFO's fishery managers as having a toolbox with a set of tools. Fishery management involves choosing which tools to use and how to best combine them for the purposes of sustainability. The six main tools in the toolbox can be listed as six questions – the "Who," the "What," the "How," the "When" the "Where," and the "How Much" of harvesting.

The FAO's *Fishery Manager's Guidebook* describes the two main management approaches used in the fisheries of different countries: output controls and input controls. In both approaches, most of the same tools are used to some extent, but they are prioritized and employed very differently. This is because of the difference between the goals of the two systems – the main task that the tools are being used for in each case.

> *Output control* systems focus on restricting the amount of fish biomass to be caught so that it will not exceed a calculated limit. They primarily regulate output, calculating in advance "How much" should get harvested, and relying heavily on advance estimates and calculations of Total Allowable Catches and resulting quota allocations. The "Who, What, How, When and Where" are partially addressed through licenses, seasons and zones, but the overriding and determining factor is the output - the "How much." Output control is DFO's current management system, their "PA Framework", which we refer to as "Quota-Based Management."
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> *Input control* systems focus on ensuring that the fishing activities themselves foster sustainability and do no harm. These systems regulate fishing effort, using the first five tools in combination – detailing the "Who, What, How, When, and Where" of harvesting. *The sixth tool, the "How much," is monitored and measured, but it is not estimated or set in advance, and it does not dominate the harvesting plan or determine the eventual catch.* The input control system, in which harvesting is managed by regulating fishing effort, is the alternative framework we propose in *Changing Course*.

Let's take a closer look at the six tools as questions for management in regard to commercial fish harvesting. Before outlining our proposed input-based approach, we want first to describe how DFO currently uses those tools to accomplish the task set by their quota-based management system.

> The Task for DFO's output-based system: to restrict the catch so that the amount of biomass removed will not exceed a pre-set limit.
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> 1. "*Who* can fish?" Currently, harvesters may be owners/skippers or crew, based locally or elsewhere, trained and experienced or simply hired at the wharf. Other professionals such as registered nurses or people in the skilled trades need to meet specific qualification requirements in order to practise, but under the present system this is not so for harvesting crews. Nor do young people currently have any clear avenue to follow in order to become harvesters. Some work has already been done at provincial levels on certification and training, but it is still incomplete.
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> 2. "*What* is being fished?" DFO's quota-based system attempts to deal with each species in a separate theoretical silo. Since the ocean is not divided into silos, that fragmented approach is out of touch with the complex scientific reality of predators, prey, competition and other factors. The single-species approach also leads to serious problems of bycatch, where large quantities of non-target species are dumped unrecorded and unutilized. Although DFO is planning to move towards an ecosystem-based approach eventually, they are still managing mainly species-by-species, stock by stock, with all the attendant problems around bycatch, habitat and ecosystem balance.
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> 3. "*How* is fishing being done?" This refers to harvesting methods and gear, which are of crucial importance to ecological and economic sustainability. But this factor is largely invisible in DFO's current system, (beyond a misplaced and risky emphasis on the length of vessels.) Under the Department's quota-based management, huge quantities of biomass are harvested by otter trawls, which fish indiscriminately, hauling in massive quantities of whatever life forms they can scoop from the sea floor and destroying the habitat in the process. Gillnets also harvest non-selectively, though they do less damage, and regulating mesh sizes and soak times can help. Hook and line fishing does little harm (except to the individual fish caught!) Despite these crucial distinctions, DFO's management system fails to focus on the "how" of fishing, with the result that the bulk of the TAC (Total Allowable Catch) biomass of most stocks is harvested by large-scale non-selective industrial methods, mainly in the offshore.

4. "*When* can we fish?" Seasons are set – too often at the last minute – for each species in each area, based mainly on science and on observed patterns of fish reproduction, migration and behaviour. DFO sometimes also makes rules specifying times of day, frequency of hauling, etc, and there may be daily or weekly trip limits. In general, though, once a season opens, harvesters fish until they have caught their quota, which may or may not correspond to market factors, weather conditions, processing capacity, etc.

5. "*Where* can we fish?" Geographical fishing zones or areas for each target species are set by DFO within the larger zones defined by NAFO and other international agreements. DFO uses zones, together with seasons, primarily for administrative purposes.

Note: Beware of potential confusion between these actual geographical zones of the ocean (eg. 2J3KL), and DFO's disconcerting use of the same word, "zone", to refer to the presumed state or status of a stock (eg. "capelin is in the critical zone.") Those non-geographical "zones" – "healthy," "cautious" or "critical" – are defined by theoretical "reference points" calculated by mathematical models based on statistical estimates.

6. "*How much* can we catch?" The main harvest management tool in DFO's current quota-based system is the sixth one – "How Much." It attempts to determine how many kilograms of biomass we should harvest from a given stock in a given year. Here's how it's done: DFO scientists use survey data – seldom up to date – to estimate the biomass of a given stock. These data, which have high margins of error and uncertainty, are then fed into computers, along with reference points calculated from historical data, all of which also involve a large range of variables, uncertainties and unknowns. The computers then model future scenarios as best they can, plotting projected biomass numbers and fishery removals on a graph. This eventually leads to the calculation of the TAC, the Total Allowable Catch, which is then allocated and distributed as marketable quotas of biomass.

This single output tool – "How much" – forms the fundamental basis for DFO's harvest management planning. It largely drives what kind of science the Department undertakes and how that science is interpreted and applied. Some input tools are used as well, involving regulations for licensing, gear, seasons and zones, but input considerations are overridden by the top priority – setting TACs and quotas. "How much" is thus the final arbiter in determining harvest policies in DFO's output-based system.

Note that the first five questions, which deal with inputs, all have answers that can be easily and accurately identified, measured, complied with and enforced in real time. They are "known knowns" – a necessity for effective management. In contrast, the current quota-based system deals with the projected output, relying heavily on the sixth question, and is thus full of *un*knowns and uncertainties, unmeasurable, and problematic to enforce. The answers to "How much" can only be roughly estimated at in advance, and any necessary corrections can only be made after the season is over, if at all.

How Input-Based Management (IBM) would Work

The Task for our proposed Input-Based Management system: to ensure that the fishing activities themselves foster sustainability and do no harm. There is not enough room here to cover all the details of implementation of our proposed IBM system, but a brief outline and a few examples will help explain the practicalities of our approach.

"Who" – This involves professional qualifications, training and safety, together with considerations of equity, inclusivity and participation. Under IBM, training and certification programs would be accessible to all, along with grandfathering for experienced harvesters. Commercial fishing would be the exclusive domain of certified professional harvesters – both owners and crew – who have registered their home port.

"What" – In fisheries circles internationally, there is now considerable agreement that fishery management should look at the whole marine ecosystem and work with it. With IBM, harvest policies and planning would take into account the multi-species nature of the ecosystem, predator-prey relationships, food supply and habitat. This would help minimize bycatch, and in any case all bycatch would be landed and recorded, with a system in place for utilizing it where possible.

"How" – This is a central element of Input-Based Management, a crucial one for preventing overfishing, maintaining ecosystem balance and healthy stocks. With IBM, fishery managers could regulate the choice, size and amount of gear, and set conditions for its use. For example:

- Each harvester could use up to 1200 baited hooks or a specified number of traps;
- Specific mesh sizes or escapement mechanisms for nets and traps could be set for each species to allow undersized juveniles to escape;
- Other size limits could be used to restrict how much fish a particular gear could catch: eg. length of a longline, length and depth of a net;
- Regulations could set maximum soak times for nets and longlines, number of tows per day for a trawl, etc.

Input-based systems foster selective fishing, specifying the types and amounts of gear being used in order to optimize the intended harvest, minimize bycatch and prevent damage to the habitat and ecosystem. Gear can be ranked according to a sustainability index, so that the most sustainable types (eg. handlines, pots and traps, and longlines) can be chosen wherever possible, and the most damaging (otter trawls, bottom gillnets and most seines) avoided. Using sustainable gear and harvesting selectively can actually increase the size of the harvest while simultaneously improving the state of the stock – a win-win proposition.

"When" and "Where" – Under IBM, seasons would be set well in advance for specific zones and areas, giving harvesters and processors time for advance planning and preparation. The "when" and "where" aspects of harvesting plans would take into account scientific and local knowledge of species distribution and migration, reproductive cycles, aggregation, feeding and other behaviour patterns. Decisions on seasons and zones would be guided by a massive increase in the use of Marine Spatial Planning, with many more zones and sub-zones than currently exist.

"How much" – Scientific monitoring, stock assessments, and measurement of catch rates, landed biomass, landed bycatch, and other outputs would of course continue under Input-Based Management, and would be improved and expanded with updated data collection and analytics technology, together with increased participation and feedback by harvesters and other citizen scientists. These data would be used for the regular stock assessments and in a wide range of scientific work to enhance understanding and improve management. However, in the quota-free system, the data would not be used for attempts to predict acceptable biomass removal or to set quotas. There might be some use of trip limits in certain circumstances, or a cap set on the total catch in a particularly vulnerable situation, as part of the ongoing process of adapting and fine-tuning the system in a rapidly changing world.

Possibilities and Impossibilities

With this overview of our proposed alternative sketched out, we now need to highlight some key points that differentiate the two systems. These points help explain why the output-based approach does not work, whereas IBM, the input-based alternative, will.

Fishing vs Catching: "Fishing" is not the same thing as "catching", and using the two terms interchangeably is misleading. Fishing is what people do to try to harvest fish; catching is about the result they get (or hope for.) Sometimes we may fish all day, or all season, without catching very much; other times we catch a lot of fish in an hour, or get our whole quota in the first day or two of the season (which can also cause problems.) Moreover, some fishing methods are ecosystem-friendly whereas others are extremely harmful, regardless of the amount caught. Catching can be measured in kilograms of biomass; fishing cannot. Yet the quota-based system fails to take these crucial distinctions into account, making them invisible and thus unavailable for use in management.

Look at the term "overfishing." Obviously, it is bad to remove more fish than biological reproduction can replace. But we see overfishing as *fishing unsustainably,* not just *catching too much.* For example, 20 industrial trawlers with otter trawls dragging the same area of seafloor for months constitutes overfishing, whether they catch a lot or a little.

This point is actually key to understanding one of the foundational flaws in DFO's quota-based management system. Operationally, harvest managers under any system must set limits that will prevent overfishing. Our view is that we should place the limits mainly on the fishing itself, the effort, and continually monitor the results. This input-based approach, unlike a quota system, enables us to accurately establish, quantify, adhere to, monitor and

enforce all the elements involved in harvesting our oceans. In this way, IBM proactively prevents both overfishing and overcatching.

TACs: An Impossible Task: Another fundamental problem with quota-based management is that it is impossible to calculate, with any degree of accuracy, a Total Allowable Catch, on which the whole quota system depends. To illustrate, take DFO's stock assessments for 2J3KL cod over the past decade, which show estimated spawning stock biomass around 400 kilotonnes, with a margin of error of plus or minus 25%, i.e. 100 kt either way. (Estimates of other stocks are even more uncertain.) In regard to the sustainable yield, historically as well as today, humans have consistently harvested 10% to 30% of this and similar cod stocks without depleting them.

Putting this information together as two scenarios at either end of the probability spectrum, we get:

Estimated Spawning Stock Biomass (SSB)	300 kt	to	500 kt
Potential annual stock growth (sustainable yield)	10%	to	30%
Multiply the above figures			
Biomass that could be safely harvested (TAC)	30 kt	to	150 kt

As the example shows, trying to calculate a Total Allowable Catch based on those widely ranging estimated numbers results in a huge range of answers. If the initial biomass was actually at the lower end of the range, and the stock growth only 10%, the maximum sustainable harvest figure would be just 30 kt. However, if both higher figures were correct, the theoretically allowable catch might be as much as 150 kt. A TAC by definition has to be a specific number, and once chosen it is enforced by law. Yet any number chosen is simply an estimate – almost certainly wrong, quite likely seriously wrong. Sustainability requires getting things right. TACs are necessarily based on estimates, and that just doesn't cut it.

Underfishing and Foregone Harvests: Since TACs are based on highly uncertain assumptions and calculations, the quota-based system often limits us to much smaller harvests than what could be caught sustainably, or even to full fishery closures, as with Pacific herring and Atlantic mackerel in recent years. This type of unnecessary loss, referred to as "foregone harvests," represent major economic losses for harvesters, processors, communities and the Canadian economy as a whole. Catching too little can also be bad for the fish stock itself when it leaves too many fish in the water. If there are more hungry fish than the available food supply can support, those fish will be in poor condition and there will be starvation. In such cases, the arbitrary and highly uncertain output-based regulations limiting the harvest are actually counter-productive ecologically as well as economically and socially.

This may well be the situation now with redfish and shrimp in the Gulf and with cod and capelin in 2J3KL. Whereas the response by DFO and some other observers is too often a call to "Keep removals to a minimum," that may only make matters worse. The real solution may be to manage the fishing effort by fishing selectively so as to catch a larger proportion of the hungry predator fish and leave more prey for the remaining ones to eat. Those remaining predator fish will then be in better condition and can grow, reproduce and more effectively replenish the stock. The simplistic mantra of "keeping removals to a minimum" can be appropriate in some circumstances, but in others it is exactly the wrong way to go.

Input-based management (IBM) prevents both over-fishing and under-fishing. It has built-in feedback loops, like poor condition of the fish or declining catch rates, which enable harvesting to be largely self-adjusting: if there are a lot of hungry fish around, more will be caught, whereas if there aren't, harvesters will do less fishing. In both cases, the result is to reduce the pressure on fish stocks and the ecosystem – the most effective way to enable them to rebuild. That can even mean fishing less and catching more.

Positive Inefficiencies: With modern discoveries and technologies, humans now have the ability to fish out most species in a few years. We no longer need to "improve" gear efficiency; in fact, "slow fishing" is better for the ecosystem, for product quality, and often for the harvester's net income as well. But with the current system, the focus on catching a quota creates conditions where harvesters use the gear and methods that appear to be the most efficient, in order to make a living. And quota-based management does little or nothing to regulate gear.

In contrast, IBM encourages a degree of *in*-efficiency in our gear, which helps to increase sustainability by ensuring that enough fish are left in the water to maintain the stock and the ecosystem balance for the coming years. Some gear has a *natural* degree of positive inefficiency. For example, baited hooks only remain effective for a few hours; traps catch mainly smaller fish; small seines can not encircle an entire school of fish. Other types of gear need to be *adapted* to a lesser degree of efficiency, usually by specifying mesh size or limiting overall length and depth so

as to allow certain sizes and species of fish to avoid capture. All those aspects of gear can be accurately specified, measured and managed, and such "positive inefficiencies" constitute an important and practical element of an input-based system.

Biomass and BOFFFs – Big, Old, Fat, Fecund Females: Quota-based management relies heavily on biomass figures – estimates of the total weight of fish in a given stock. But a stock is not homogeneous, and when crucial policy decisions are based on an undifferentiated total, some key factors of scientific relevance to sustainability are missed.

For example, there's the phenomenon of "reproductive hyperallometry." That refers to the fact that in many fish species, the Big, Old, Fat, Fecund Females – "BOFFFs" – produce many more eggs and more surviving larvae than the equivalent weight of smaller individuals – perhaps as much as an order of magnitude more. But TACs are defined in terms of biomass – a kilo of fish is simply a kilo of fish, regardless of age, fecundity, or the condition of the fish making up the total. So the quota-based system is unable to properly take into account the multi-dimensional complexity of the scientific reality. Our proposed input-based management system is able to address this and other significant factors that are lacking in the current approach.

Benefits of shifting to Input-Based Management

Taking another look at both of the management approaches we've described here, we can summarize the benefits of shifting from the current quota-based system to one of input-based management (IBM.)

With the clear decline of major marine species over the past seven decades, respected fisheries scientists and advocates like Daniel Pauly have rightly called for a precautionary approach. DFO's quota-based management system is an attempt to implement precaution, but it has failed and continues to fail. Our analysis shows that the flaws are in the approach itself, and trying harder or making piecemeal adjustments will not solve those inherent problems.

Basing fisheries management on quotas, as is currently done, actually works *against* sustainability. The quota-based system tacitly allows all fishing methods and gears. As long as you catch your quota, you can mostly use whatever gear you want, the main limit being the number of tonnes of fish you can catch. This means most harvesters will use gear that catches as much as possible as quickly as possible – which is also the gear that is least sustainable. Moreover, in our capitalist, market-driven economy, those with capital go big – larger boats, bigger trawls, etc. Those large-scale gear types are often incompatible with the slower, more economical and less destructive gear. So small-scale fishers using hooks, pots or traps are effectively barred from the ocean or have only limited access. In practice, then, DFO's quota-based policies and regulations favour large-scale, inefficient and destructive industrial fisheries, and this needs to be changed.

Among the other negatives associated with DFO's quota-based PA framework are: High carbon emissions. Biodiversity loss. Habitat destruction. Plastic pollution. Low-quality products. Waste of protein. Exploitation of labour. Privatizing the ocean commons. Outmigration and flight of wealth from coastal communities … The list goes on. These problems can be resolved or significantly reduced by shifting to the input-based management policy framework that we are proposing.

Now let's sum up the benefits of that solution. Input-based management works *with* Nature instead of making futile attempts to control it. IBM is designed to identify and respond to ever-changing ocean realities like natural predation, food supply, water temperature, disease and migration, all of which influence the sustainability of our fisheries. Its built-in feedback loops flag situations for our attention, and input controls enable us to respond in real time with selective harvesting methods. This inherent responsiveness allows us to catch more fish when fish are plentiful, and appropriately fewer when fish are scarce, helping to keep balance in the ecosystem. The use of more sustainable harvesting gear and methods means much less damage to the marine habitat and food chain, enhancing marine biodiversity. IBM also reduces bycatch, carbon emissions, and plastic pollution.

As input-based management becomes established, these ecological benefits will translate into economic and social benefits to coastal communities, and to the economy and society as a whole. Thanks to more sustainable fishing practices, fish will become more plentiful and enable larger harvests, benefitting both harvesting and processing sectors. Higher quality products and better prices, combined with lower expenses, will increase harvest efficiency, and result in increased net economic returns. The reduction in bycatch will reduce the associated waste and

economic losses. With sustainable harvesting supported and the quota-related problem of “foregone harvests” resolved, economic activity will increase at both the local level and more broadly.

As people realize the benefits accruing from input-based management, harvesters will increasingly opt for the greater efficiency of smaller boats and “slow fishing” practices. This will lower the fishery's carbon footprint, reduce the overcapitalization of the fleet, and make it easier for younger people to get into harvesting. The increased economic activity will strengthen local economies and help coastal communities survive and thrive.

Recommendation:

Our recommendation is a very inclusive one:

> The Department of Fisheries and Oceans should expedite a fundamental policy shift for managing Canada's fisheries, replacing the current output-based (quota) system with ***a comprehensive Input-Based Management (IBM) policy framework as described in this brief.*** That framework needs to include:
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> 1) implementing Input-Based Management, controlling fishing effort instead of setting quotas;
> 2) making it a formal policy goal to optimize net economic benefits;
> 3) certification and fishing rights for all qualified commercial harvesters;
> 4) requiring all dead bycatch to be landed and recorded;
> 5) improving and expanding the collection, analysis and use of data from a full range of sources;
> 6) harvester-processor independence, with regulated competition at the wharf's edge;
> 7) increased involvement of harvesters, communities and citizens in decision-making at all levels;
> 8) reorienting DFO's scientific work to support IBM and include other knowledge systems.

Conclusion:

In this brief, we have outlined our analysis of the ongoing failure of DFO's current output-based fisheries management framework, and presented in broad terms our proposal for a paradigm shift in approach. The Input-Based Management system we are putting forward for the Committee's consideration constitutes a very different and very promising alternative way of managing Canada's commercial fisheries. We recognize that it will raise many questions and present many challenges, and we see this as a welcome opportunity to initiate, here in our Parliament's Upper House, the necessary in-depth public discussion of this alternative.

We want to highlight a few key points about what we propose. First, Input-Based Management cannot be combined with DFO's current quota-based approach, precisely because the two systems are built on different foundations. It's fine to cherry-pick good ideas about sustainable gear or Marine Spatial Planning and insert them into the current system, but that would simply be putting bandaids on a broken leg. There are already some good ideas in DFO, but they are overridden by the finality – and impossibility – of TACs and quotas. That is why we call this a paradigm shift – what needs to change is the very basis of management policies and decisions.

Quota-based management has been in place for so long and is used so widely that a proposal to replace it will not be easily accepted. Because the fishery is now structured around this decades-old system, quotas are treated as a core element of the current regulatory, financial, institutional and physical structures governing our fisheries. Altering these established management practices will inevitably be challenging, and implementing the shift will require recognizing and mitigating temporary problems that may arise.

No system is perfect, of course, but some approaches to fishery management are better than others. This is the UN's "Ocean Decade," and the next few years will be a crucial time for our fisheries. We have the chance to replace the current year-to-year crisis management mode with a long-term approach that will benefit harvesters, coastal communities, and the nation in terms of both economics and sustainability.

Respectfully submitted,

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