The History of Fisheries Management of Western Atlantic Bluefin Tuna in the Canadian Maritimes Gulf Region

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ABSTRACT

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The Atlantic Canadian Catch and Release Charter Fishery has been in existence for 10 years (since 2009) and has sufficient data on which to base a relative index of Bluefin Tuna abundance that can be used for stock assessment purposes. This fishery is less limited by season and daily effort controls than the commercial fishery and the relative index produced will provide a useful contrast to the current standard indicator of Bluefin Tuna abundance. Central to the catch rate standardization exercise is understanding the past management strategies of the fishery which have been compiled to inform on the Catch Per Unit Effort (CPUE) modelling decision making. The history of the fishery described here can be divided into three management regimes that resulted in changes to the fishery's fishing effort and which need to be considered in the CPUE standardization process.

RÉSUMÉ

Deonarine, D., and Dalton, A. 2019. The history of fisheries management of Western Atlantic Bluefin Tuna in the Canadian Maritimes Gulf Region. Can. Tech. Rep. Fish. Aquat. Sci. 3307: iv + 12 p.

La pêche nolisée avec remise à l'eau existe depuis 10 ans (depuis 2009) au Canada atlantique, et on dispose de suffisamment de données pour établir un indice relatif de l'abondance du thon rouge de l'Atlantique pouvant être utilisé aux fins de l'évaluation des stocks. Cette pêche est moins limitée par les contrôles saisonniers et quotidiens de l'effort de pêche que la pêche commerciale, et l'indice relatif établi fournira un contraste utile avec l'indicateur normalisé actuel de l'abondance du thon rouge de l'Atlantique. La compréhension des stratégies antérieures de gestion de la pêche qui ont été compilées pour orienter la prise de décisions en matière de modélisation de la capture par unité d'effort est au cœur de l'exercice de normalisation des taux de prise. L'historique de la pêche décrit ici peut être divisé en trois régimes de gestion qui ont entraîné des changements dans l'effort de pêche et qui doivent être pris en compte dans le processus de normalisation de la capture par unité d'effort.

INTRODUCTION

The Canadian Western Atlantic Bluefin Tuna (*Thunnus thynnus*) Catch and Release Charter fishery has become a well established industry that attracts tourists from around the world. From 2015 to 2018, the fishery averaged 812 day trips per year. The charter fishery is limited to licensed commercial Bluefin Tuna fishers and typically runs from the late summer (mid-July, August) to early fall (late September, October). Given the length of the fishing season and less limiting effort controls compared to the commercial fishery (which can restrict some fishermen to only one landed fish per season), this fishery provides a unique opportunity to produce a comparatively more fishery independent relative index of Bluefin Tuna abundance for stock assessment purposes.

Traditionally, Canada has provided separate indices of abundance based on the fishing data from the commercial Rod and Reel (RR) fisheries in the southern Gulf of Saint Lawrence (sGSL) and Southwest Nova Scotia (SWNS). The most recent international stock assessment of western Atlantic Bluefin Tuna, conducted by the International Commission for the Conservation of Atlantic Tunas (ICCAT; 2017), included a combined catch-per-unit-of-effort (CPUE) index of abundance for the commercial RR fisheries from these two Canadian regions (ICCAT SCRS 2017). The sGSL index is affected by the limited quota available to the fishermen and is potentially affected by economic factors (eg. waiting on favourable market conditions or targeting fish of a desirable size). The most recent stock assessment also included an acoustic fishery independent index for the sGSL (ICCAT SCRS 2017). A new index based on the Charter fishery will provide a useful contrast to both sGSL indices and may help confirm the observed trends.

An essential first step when establishing a new index is to understand the characteristics of the fishery, in particular the management actions that may introduce changes in catchability over the duration of the time series. It is recognized that CPUE is an indirect measure of abundance and is used in fisheries management for the assessment of stock status (Hinton and Maunder 2004). However, for a CPUE index to accurately reflect the relative abundance of a fish stock, it must be standardized with respect to all of the factors that affect catchability (Hinton and Maunder 2004), including changes in regulations and management actions.

The purpose of this report is to describe the history of the Atlantic Bluefin Tuna Catch and Release Charter (C & R) fishery in Canada and how it has been managed in order to minimize potential biases that might occur during the CPUE standardization exercise. The resultant index will be compared with existing indices in the same area and contribute to our understanding of the status of the Bluefin Tuna population.

METHODS

A literature review was conducted to find any information available regarding Catch and Release fishing of Atlantic Bluefin Tuna (*Thynnus thunnus*) in Canada and its associated management. This material was gathered from Conservation Harvesting Plans (CHP), licence conditions from Section 52 Scientific and Experimental Licences (sec. 52) and internal documents produced by both the Department of Fisheries and Oceans and the Bluefin Tuna Catch and Release Fishermen's Association (DFO: Brian Lester, and Alex Hanke, and Fishermen's Association: Troy Bruce, Kevin MacDougall and Jared Crawford).

RESULTS

Tuna charter fishing in the Canadian Maritimes Region first appeared in Wedgeport, NS around the 1930's, due to the plentiful number of fish in its surrounding waters (Unknown 2019). At this time, clients would charter tuna fishing boats, the tuna would be retained, and the client would receive a portion of the profits from the tuna (Bruce and MacDougall 2019, Crawford 2018). The popularity of tuna and its

economic value grew significantly in the 1970s and 80s with the emergence of the Japanese market and culture on the international stage (Bruce and MacDougall 2019, Crawford 2018). As a result, fishermen focused their efforts primarily on commercial fishing. In 1974, Canada joined the International Commission for the Conservation of Atlantic Tunas (ICCAT). The contracting parties of ICCAT agreed that year to take the necessary measures to limit Bluefin Tuna mortality to that of recent levels for one year (ICCAT 1974). However, realizing an alarming decrease in the abundance of western Bluefin Tuna (BFT), the 1980s saw the introduction of further management measures by ICCAT for commercial Bluefin Tuna. Starting in 1981, a national total allowable catch (TAC) was imposed with a TAC of 800 metric tons (MT) per country; which was quickly followed by a western BFT stock TAC of 2,660 MT in 1982 (ICCAT 1981; 1982). This resulted in shorter seasons and increased competition between boats (Bruce and MacDougall 2019, Crawford 2018). By 2007, the western BFT stock TAC had been reduced to 2,100 MT (ICCAT 2006). The Canadian government had also initiated the shift to an equal distribution of quota per licenced vessel, which severely limited the revenue a vessel could bring in (Bruce and MacDougall 2019, Crawford 2018). Therefore, to add value to their fishing, fishermen proposed re-establishing charter fishing operations.

The first signs of this “new” era of charter fishing appeared in Prince Edward Island (PEI) in 2004 for scientific purposes. A US Scientist (Dr. Molly Lutcavage, University of New Hampshire) wanted to collect information on tuna migratory patterns and was supported by the Department of Fisheries and Oceans Canada (DFO; Dr. John Neilson), but because of a lack of technicians available, the project was postponed (DFO 2011). From 2005 to 2008, there were limited opportunities for charter fishing and the fish caught on those trips were retained (DFO 2011). The charter catch and release fishery that exists today first took hold initially among the commercial tuna fleet fishermen in PEI in 2009 and a year later in the Gulf of Nova Scotia (GNS) in 2010 (DFO 2011). The catch and release fishery provided an additional economic opportunity to participating commercial fishermen and additionally provides an opportunity to both tourists and new comers to the fishery the chance to view how Atlantic Bluefin tuna are caught and released with minimal harm (GNS 2010, PEI 2010).

Since 2015, the fishery has been classified as an ICCAT scientific fishery as the charter fishermen deploy conventional (spaghetti) tags, part of the ICCAT tagging program (https://www.iccat.int/GBYP/en/tagging.asp), when releasing their Atlantic Bluefin Tuna. The two consistently active fleets remain the GNS and PEI fleets, though occasionally some fishing has occurred from New Brunswick in the past and is anticipated for Quebec based vessels going forward.

In the early years of the C&R fishery, fish were reported to experience a post release mortality rate of 17% (DFO 2011). Conversely in 2011, a study by Stokesbury et al. (2011) concluded a C&R mortality estimate of only 3.4%. In an effort to ensure lower mortality rates, DFO Fisheries Management has imposed strict guidelines on the C&R fishery. This has included controls on effort tied to the total amount of allowable fishing associated with the incidental mortality estimate and the 10 MT maximum mortality provided by the existing science quota (GNS 2010, PEI 2010). National guidelines were written into effect in 2012 and 2016, however the GNS and PEI fleets have experienced different management practices at various points through the years, due to the fishery’s origin in the commercial fishery (Canada 2012; 2016). Tables 1 and 2 are summaries of the fishery openings by fleet and year for reference. Tables 3 and 4 are summaries of the changes to the regulations by fleet and year for reference.

PRINCE EDWARD ISLAND FLEET

The first Atlantic Bluefin Tuna catch and release fishing season was established when a separate (from the commercial fishery) CHP was submitted (and accepted by DFO) by the PEI Charter Boat Operators in 2009 (DFO 2011). The first season had 9 participants identified on the application, who fished a 10 week season from July 20th – Sept 25th, under a Section 52 Scientific and Experimental Licence (DFO 2011). The DFO accepted separate CHPs from PEI again in 2010 with a commercial quota of 132.15 MT and

0.7455 MT reserved for mortalities in the C&R fisheries calculated at an estimated rate of 17% (DFO 2011). The C&R season ran from July 19th – Sept 25th in 2010 (DFO 2011).

The first licence conditions released in PEI were limited, but similar to the GNS, included the use of a maximum of 4 Rod and Reel units for fishing, each with 1 barbless hook per rod, and all lines had to be tended (Canada 2010a; 2010b, GNS 2010, PEI 2010). There was a limit of 1 Bluefin Tuna catch per fishing trip, and a summary report was required at the end of the season with the associated details on each fishing trip (Canada 2010a, PEI 2010).

In 2011, the third season, additional management measures were put in place which restricted fishermen to a maximum fight time of 90 minutes, a maximum of 4 strikes per day (no definition of what a "strike" was could be found by the authors), and a minimum of 130 lbs test line on all tackle onboard the vessels (Canada 2011a, PEI 2011). This year also saw a new approach to fishing monitoring as mandatory vessel monitoring systems (Black Box device) were required in an effort to increase tracking (Canada 2011a). This measure was not renewed in 2012 (Canada 2012). Fishermen also had to ensure a minimum of 5% fleet wide at-sea observer coverage and submit daily logbooks to their fleet representatives for weekly summary reports (Canada 2011a, PEI 2011).

In 2012, the Conservation Harvesting Plans for the Commercial and Catch and Release Bluefin Tuna Fisheries were integrated into a single CHP (PEI 2012). The new regulations introduced in the 2012 season were designed to help minimize harm to tuna through improved handling guidelines for catch and release methods. The minimum line strength was increased from 130 to 180 pounds test strength. When a Bluefin Tuna was hooked, all other lines had to be removed from the water. The fish had to be swam continuously beside the boat, due to the tuna's ram ventilation respiratory system, which requires constant water flow over the gills in order for the individual to respire. To mitigate injuries to the fish, vessels have to remain in motion in the direction that the fish was swimming and the gills and mouth of the tuna have to remain underwater when hooked. This season was the first to define the terms "hook-up" and "strike". A hook-up was a fight time that lasted between 45 and 60 minutes or when the fish was brought alongside the vessel. A strike was defined as a fight time between 5 and 45 minutes and the fish was lost before being brought alongside the boat. Only 2 strikes were permitted per trip. A fishing trip was defined as beginning when a fishing vessel left a port until it returned to port or once it achieved its single permitted hook-up. In 2012, a new regulation permitted 2 fishing trips per calendar day. Though there was no mention of 2 fishing trips per calendar day prior to 2012, there are notes in the log book database referencing two trips in the same day so it is unclear whether there were regulations on the number of trips per day between 2009 and 2011 (Canada 2012, PEI 2012).

Regulations in 2013 remained largely unchanged except for an adjustment in strikes to simply permit 4 strikes per day. Mandatory hail outs also became a requirement. Mandatory hail outs provide an accurate accounting (including null trips) of the fishing activity being undertaken on the water (Canada 2013a, PEI 2013).

The number of fishing trips permitted per day decreased in 2014, moving from 2 trips a day down to 1 trip a day but DFO increased the amount of allowable hook-ups from 1 hook-up to 2 (Canada 2014, PEI 2014).

In 2015, the only regulation change made was the introduction of the collaborative ICCAT/DFO scientific dart tagging program. Under this program, when safe to do so and where the survivability of the fish was not impacted, an ICCAT conventional (spaghetti) tag was applied behind the first dorsal fin. One crew member was required to have taken the appropriate DFO training and 2 dart tags were required on board the vessel prior to departure from port (Canada 2015, PEI 2015).

At the start of the 2016 season, new regulations were enacted with regards to fishing restrictions and management measures. New fishing restrictions required a main line strength of at least 130 lb/59 kg and a minimum leader strength of 180 lb/82 kg. The definition of a hook-up was changed to a fight time that

exceeded 10 minutes for a Bluefin Tuna or any by-catch species (e.g. sharks and seals) or if a Bluefin Tuna was brought alongside the vessel in less than 10 minutes. The use of the term strike was discontinued. The number of hook-ups was increased to 3 fish and all tuna interactions had to be recorded regardless of the time the fish spent on the hook. Electronic Monitoring Systems (EMS) were also required to be allowed to be placed on a vessel where Bluefin tuna fishing takes place at the discretion of fishery officers (Canada 2016, PEI 2016).

No significant changes were made to the management of fishery in 2017 or 2018 with the minor exception of the introduction of a mandatory catch and release training course prior to the 2017 fishing season. The training course highlighted proper fish handling techniques and how to properly complete the log books (Canada 2017a; 2018a; 2018b, PEI 2017; 2018).

GULF NOVA SCOTIA FLEET

The first Catch and Release licence for the GNS fleet was issued in 2010 for the Northwest Atlantic Fisheries Organization (NAFO) 4T area (Figure 1; DFO 2011). In this first year, licence holders were restricted to 4 lines per vessel, had a set catch limit of one fish caught per fishing trip and followed the rules of the International Game Fish Association (IGFA; as proposed by the fleet; Canada 2010b, GNS 2010). The IGFA permitted only circle barbless hooks. Under the IGFA “Angling Regulations” a fish is caught once the leader is brought within the grasp of the fishing crew, or the end of the leader is wound to the rod tip (IGFA 2019). Hook-ups had to be reported on a daily basis to DFO (Canada 2010b). All fishing had to be summarized in a log and reported to DFO within 4 weeks of the licence expiring; with information on the size, condition of each fish caught, and the time the fish spent hooked (Canada 2010b, GNS 2010).

In 2011, new fishing regulations were implemented: fishermen were permitted 1 hook-up or 4 fish strikes per fishing trip and were required to have a minimum of 5% at-sea observer coverage. At this time, a hook-up referred to a fight time of at least 45 minutes or if the fish was brought alongside the vessel. A strike was deemed as a fish hooked with a fight time of between 0 and 45 minutes and where the fish was not brought alongside the vessel. The maximum time a fish could be hooked was 90 minutes, at which point the line had to be cut. Instead of daily reports on hook-ups, the fleet representative was now required to provide a weekly summary report on all activities including the number of strikes and hook-ups (Canada 2011b, GNS 2011).

In 2012, as the industry grew, there was a refinement on some of the 2011 fishing regulations, including: a maximum permissible fight time of 60 minutes for each fish. The captain/mate was responsible for ensuring that the tuna was brought as close as possible to the boat within the 60 minute maximum. The definition of a strike was also refined to be “Any hooking of a tuna with a minimum of five minutes fight time or identification of the species hooked.” Fishermen were permitted 1 hook-up or 4 fish strikes per day (Canada 2012, GNS 2012).

In 2013, a new regulation stated that 2 fishing trips per calendar day would be permitted and that a fishing trip was defined as the time from when a fishing vessel left port to fish to the time that the vessel returned to port or once a hook-up had been achieved. The maximum number of hook-ups returned to 1 per trip whereas the maximum number of strikes remained at 4 per day. Though there was no mention of 2 fishing trips per calendar day prior to 2013, there are notes in the log book database referencing two trips in the same day. It is unclear whether there were regulations on the number of trips per day in 2010, 2011, or 2012. Further new measures to mitigate mortality rates were introduced in 2013 that mirrored regulations enacted a year earlier for the PEI fleet. These new measures included pulling all other lines out of the water when a tuna was hooked, keeping the vessel in motion when the fish was at the side of the vessel and not removing the tuna from the water when it was alongside the vessel. The last change made in 2013 was instigating a mandatory hail out requirement (Canada 2013b, GNS 2013).

From the 2014 season onwards management regulation changes made were consistent between the two fleets. In 2014, the allotment of trips per day decreased to 1 trip per license per calendar day but the number of hook-ups increased to 2 hook-ups per trip. 2015; had the introduction of the collaborative ICCAT/DFO scientific dart tagging program. 2016; had the increase in the number of hook-ups permitted, (increasing from 2 hook-ups to 3 hook-ups per trip) and the removal of the limits on strikes per trip. Fish handling requirements were also introduced that permitted the tuna's gills to be only partially submerged at all times rather than fully submerged. The last change implemented in 2016 was the use of EMS when requested by a fisheries officer. Lastly, in 2017 a mandatory catch and release training course was introduced (Canada 2017b; 2018c, GNS 2014; 2015; 2016; 2018).

DISCUSSION

Over the past decade, new research and experience has influenced changes to the management measures that protect the Bluefin Tuna stocks within Canadian Atlantic waters. By grouping seasons together based on similar strategies, we can see three distinct management regimes emerge through the years, and how these regimes have shaped the fishing effort of the charter catch and release fishery today.

The first management period in the fishery is from 2009 to 2013. The early years (2009 through 2010) are marked by few regulations in regards to fish handling and no regulations in relation to strikes. This period is characterized by the one fish caught per trip effort control that was in place at the very beginning of the fishery. Changes in management measures do occur during the 2011 to 2013 fishing years. During those years, there was a greater focus on reducing post-release mortality through the introduction of maximum permissible fight times, and regulating how fishermen operated their vessel while a tuna was hooked. A decrease in post-release mortality would permit a greater effort in the fishery before the quota to cover the mortality is filled. The concept of strikes was also introduced, which could put a constraint on how many times a fisherman could attempt to achieve their fish limit per day. Nevertheless, the key management determining factor remained the 1 hook-up limit.

The reduction of fishing trips from 2 per calendar day down to 1 per calendar day marked the management regime from 2014 to 2015. This decision potentially increased fishing effort in this period, as a fisherman could hook more fish per client and had the opportunity to fish during hours that might have been lost shuttling clients to and from ports. There was also a potential for a decrease in fishing effort during this time. Decreasing the number of clients that a fishermen could take on in a season could reduce their ability to attempt a second fishing trip on a day when their first trip of the day did not go as anticipated (ill client reducing fishing time, young children on the vessel, etc).

The biggest change to management regimes came in 2016 when the "strike" was removed from fishing regulations and a hook-up became any interaction greater than 10 minutes. This measure increased the fishing effort as fishermen were now allowed 3 hook-ups, allowing efficient fishermen to catch more tuna.

CONCLUSION

The effect of management on fishing effort can change over time depending on the approaches utilized by management. This material will inform future attempts to model trends in population abundance, help guide techniques used to standardise the data collected from the fishery, and produce an alternative perspective of the trends in abundance of Atlantic Bluefin Tuna population in Canadian waters.

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TABLES

Table 1. Opening and closing dates of the fishing season for the NAFO Division 4T for the Prince Edward Island fleet's Catch and Release Charter Fishery of Canadian Atlantic Bluefin Tuna. Note that until 2014, fishing was permitted in the NAFO Division 4RST.

Year	Season Open	Season Close	Season Open	Season Close
2009	July 20	September 25		
2010	July 19	September 25		
2011	July 11	October 28		
2012	July 16	September 30		
2013	July 15	October 1	October 2	December 31*
2014	July 15	September 30	October 1	October 31*
2015	July 15	October 3	October 4	December 31*
2016	July 15	October 3	October 4	December 31*
2017	July 15	October 1	October 2	October 15*
2018	July 15	October 31		

*Extension must be requested

Table 2. Opening and closing dates of the NAFO Division 4T and 4Wd for the Gulf of Nova Scotia Catch and Release Charter Fishery of Bluefin Tuna for 2010 – 2018.

Year	4T Season Open	4T Season Close	4WD Season Open	4WD Season Close
2010	August 26	September 26		
2011	August 1	October 29		
2012	August 1	November 30		
2013	August 1	October 31		
2014	August 1	October 15	September 1	November 15
2015	August 1	October 15	September 1	November 15
2016	August 2	October 28	September 1	November 18
2017	August 2	October 28	September 1	November 18
2018	August 1	October 27	September 1	November 18

Table 3. Summary of changes to the management of the Prince Edward Island's fleet Catch and Release Charter Canadian Atlantic Bluefin Tuna (BFT) fishery by year from 2010 - 2018.

Year	Revisions to Licence Conditions
2009/2010	- Rod and reel only - Maximum of 4 rod and reel units - Maximum of 1 barbless hook per line

	- 1 fish caught per fishing trip - End of season summarized report on all BFT fishing (fleet representative)
2011	- Minimum of 130 lbs of test line on all tackle and onboard vessel - Circle hooks required - Maximum of 1 hook-up per trip (alongside or 90 minute fight) - Maximum of 4 strikes per trip - Minimum of 5% at-sea-observer coverage - Vessel monitoring system required (Black Box device) - Weekly summarized report on all BFT fishing (fleet representative)
2012	- Non-offset hook recommended - Minimum line strength of 180 lb on all tackle and onboard vessel - A hook-up is defined as either a fish that is brought to the boat or a minimum fight time of 45 minutes - A strike is defined as any hooking of a BFT with a minimum of 5 minutes of fight time or identification of the species hooked - Maximum of 2 strikes per trip and 4 strikes per day - Maximum permissible fight time is 60 minutes and all tuna must be cut free once 60 minutes is reached. - When a tuna is hooked, all other lines must be removed from the water - Tuna or any by-catch species caught must be released in a manner that causes the least harm to the fish - Tuna are not permitted to be removed from the water - Tuna should not remain stationary beside the vessel, vessel must be in motion at all times when the tuna is beside the vessel - The tuna's gills and mouth should remain underwater at all times - Permitted 2 fishing trips per calendar day - Weekly log sheet submissions (Captains)
2013	- Maximum of 4 strikes per day - Mandatory hail-out
2014	- Permitted 1 fishing trip per calendar day - Maximum of 2 hook-ups per day - Maximum of 4 strikes per trip
2015	- Cannot leave port without at least 2 dart tags on board - When safe to do and not detrimental to survivability of the fish, a DFO scientific dart tag is to be applied behind the first dorsal fin. - After 60 minutes of total fight time, the license holder or registered crew member must take possession of rod and make every effort to bring the tuna alongside the vessel as quickly as possible
2016	- Main line strength must be 130 lb/59 kg - Minimum leader strength must be 180 lb/82 kg - A barbless circle hook is defined as a hook with its point orientated perpendicular to its shank, manufactured without its barb or has had its barb completely removed - Maximum of 3 hook-ups per day - A hook-up is a fight time that exceeds 10 minutes with BFT or any by-catch species or if the BFT is brought alongside the vessel - All tuna interactions recorded regardless of time spent on the hook - Electronic Monitoring System may be required - After 60 minutes of total fight time, the license holder or registered crew member must make every effort to bring the tuna alongside the vessel as quickly as possible
2017	- Mandatory catch and release training course
2018	

Table 4. Summary of changes to the management of the Gulf of Nova Scotia's fleet Catch and Release Charter Canadian Atlantic Bluefin tuna (BFT) fishery by year from 2010 - 2018.

Year	Revisions to Licence Conditions
2010	- Fishing conducted under International Game Fish Association rules - Maximum of 4 rod and reel units - Maximum of 1 barbless hook per line - Fighting chair - 1 fish caught per fishing trip - Hook-ups have to be reported on a daily basis End of season summarized report on all BFT fishing (Captain)
2011	- Maximum of 1 hook-up per day - A hook-up is defined as a fish that is either landing a fish alongside the vessel or a minimum fight time of 45 minutes, to a maximum of 90 minutes - Maximum of 4 strikes per trip A strike is defined as a fish hooked from 0 to 45 minutes - Minimum of 5% at-sea-observer coverage - Weekly summarized report on all BFT fishing (fleet representative)
2012	- Maximum permissible fight time of 60 minutes - Maximum of 4 strikes per trip - A strike is re-defined as a fish hooked for a minimum of 5 minutes or identification of the species hooked
2013	- Minimum line strength of 180 lb on all tackle and onboard vessel - When a tuna is hooked, all other lines must be removed from the water - Tuna or any by-catch species caught must be released in a manner that causes the least harm to the fish - Tuna are not permitted to be removed from the water - Tuna should not remain stationary beside the vessel, vessel must be in motion at all times when the tuna is beside the vessel - The tuna's gills and mouth should remain underwater at all times - Permitted 2 fishing trips per calendar day - Maximum of 1 hook-up per trip - Mandatory hail-out
2014	- Maximum of 2 hook-ups per fishing trip - Maximum of 4 strikes per trip - Permitted 1 fishing trip per calendar day
2015	- Cannot leave port without at least 2 dart tags on board - When safe to do and not detrimental to survivability of the fish, a DFO scientific dart tag is to be applied behind the first dorsal fin. - After 60 minutes of total fight time, the license holder or registered crew member must take possession of rod and make every effort to bring the tuna alongside the vessel as quickly as possible
2016	- Main line strength must be 130 lb/59 kg - Minimum leader strength must be 180 lb/82 kg - Maximum of 3 hook-ups per day - A hook-up is defined as a fish that is either brought to the boat or a minimum fight time of 10 minutes - Electronic Monitoring System may be required - All tuna interactions must be recorded regardless of time spent on the hook - After 60 minutes of total fight time, the license holder or registered crew member must make every effort to bring the tuna alongside the vessel as quickly as possible
2017	- Mandatory catch and release training course
2018	

FIGURES

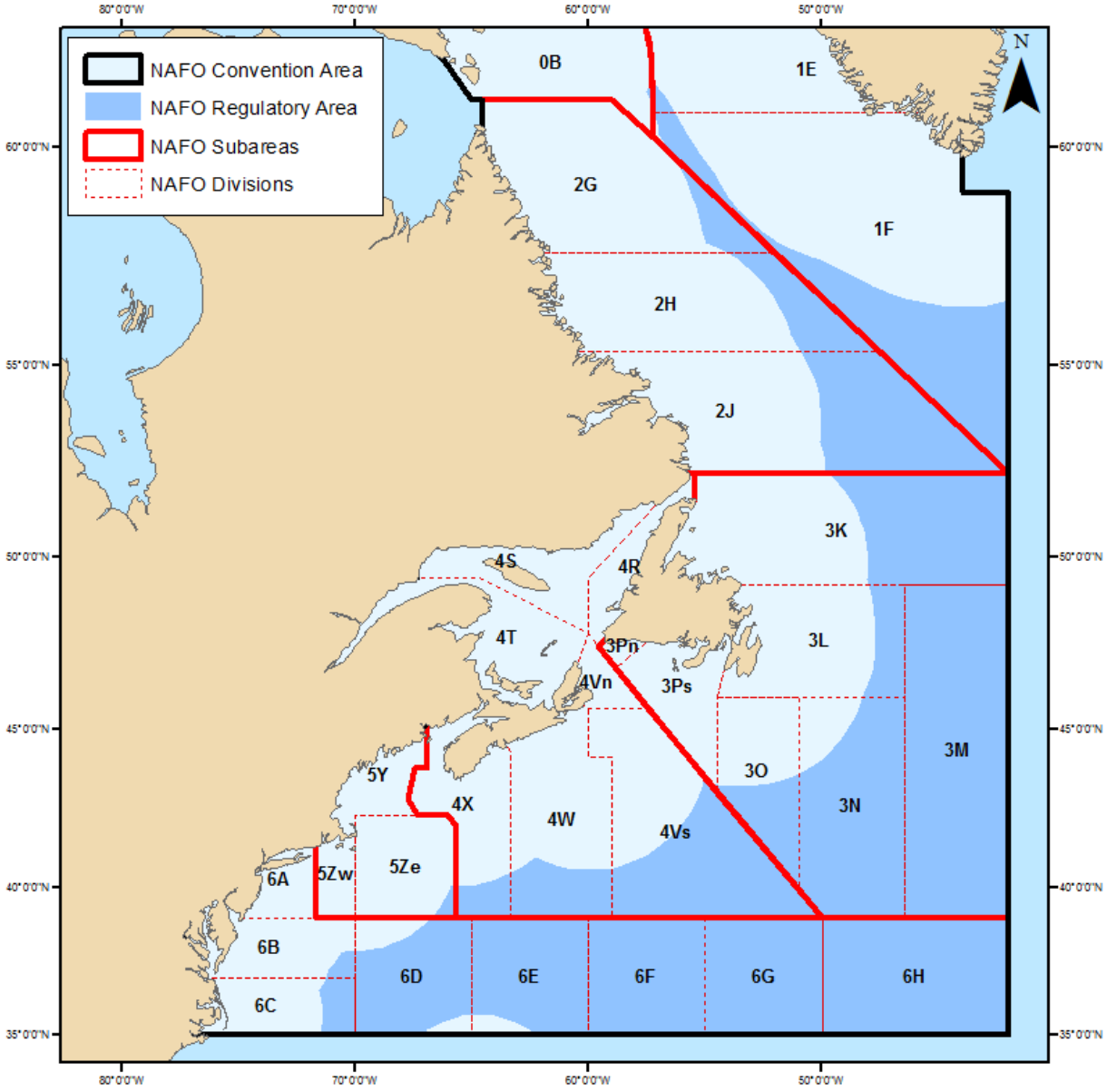

Figure 1. Northwest Atlantic Fisheries Organization (NAFO) regulatory area map. The first Catch and Release licence for the GNS fleet was issued in 2010 for the NAFO 4T area.