Northwest Atlantic Fisheries Organization

Serial No. N7392 **NAFO SCR Doc. 23/006**

SCIENTIFIC COUNCIL MEETING – JUNE 2023

Examining inconsistencies in the NAFO Scientific Council traffic light approach used to provide science advice, and the development of consistent rules within a Shiny Application.

Rideout, R.M., Regular, P.M.

Northwest Atlantic Fisheries Centre
Fisheries and Oceans Canada, 80 East White Hills Road
St. John's, Newfoundland and Labrador, A1C 5X1, Canada

NAFO Scientific Council (SC) uses a traffic light approach as a simple and effective way to communicate the most important details pertaining to fisheries, stock status, and ecosystem considerations to the Commission. However, a review of past advisory sheets suggests a high degree of inconsistency and contradiction in the way that traffic lights have been assigned. Here we describe the development of a Shiny application that helps to identify past inconsistencies in the assignment of traffic lights and which could ensure consistency going forward by presenting a set of standardized selections under each NAFO Convention objective and using predetermined rules for assigning traffic light colours. The colour allocation rules operate in the background of the application but are described in detail here. The application creates a summary table with corresponding traffic lights that can be exported as an image file and can then easily be inserted into SC advisory summary sheets.

Background

NAFO Scientific Council (SC) adopted the use of the traffic light summary table as an integral component of the advisory sheet (a.k.a. summary sheet) in 2013 (NAFO 2013). The traffic lights are intended to be a simple and effective way to communicate the most important details pertaining to stock status, ecosystem considerations and fisheries aspects to managers (i.e. NAFO Commission).

Although the general intentions of the new traffic light approach were evident, SC did not produce guidelines for filling out the table, or text explaining what is the precise intent of each of the objectives. After noting some inconsistencies in how the tables were being filled out (Couture & Rideout 2014) some suggestions were made about how SC might want to standardize what goes into the tables. However, workload issues created by an increase in the number of requests to SC (assessments, management strategy evaluations, special requests) have resulted in insufficient time and capacity to monitor consistency and insufficient oversight to ensure a common approach over time and across stocks in how the traffic light summary tables are completed.

Here, a decade after SC first started using the traffic light summary table, we look back at how consistent we have been with the assignment of traffic light colours and provide a Shiny HTML Application to ensure consistency going forward. The intent is for the app to be simple enough to use during SC plenary and that, when completed, each table would be exported as an image file that can then be inserted directly into the advisory sheets, either manually or via NAFOdown (Regular et al. 2021). Hence the application would serve a secondary function of preventing the need for table edits by the NAFO Secretariat after the advice has been drafted.

Methods

The summary table traffic light application is an HTML program created with R (R Core Team 2022), Rstudio (RStudio Team 2022), and Rshiny (Chang et al. 2022). The general features of the application were first presented to SC during the 2022 September SC meeting. Details remain to be resolved regarding where the application would be hosted, responsibility for updating the data, etc. For now, during the testing phase, the application will be run locally on a personal computer in order to easily perform fixes and updates.

Attempts were made to keep the appearance of the application as simple and as user friendly as possible. The general layout is described in the Results/Discussion but requested modification should still be able to be easily accommodated. Here the focus is primarily on the establishment of the list of options available for selection under each objective and on the formation of rules for assigning traffic light colours based on those selections.

The process began by gathering traffic light information from all previous advisory sheets going back to 2014. This information (stock, objective, colour, comment) was compiled into a .csv datafile that could be read into R. Deciding on the options to be available for each objective within the application began with viewing all previous decisions made for each objective across all stocks. This focused initially on the 'comment' that accompanied the traffic light colour. The first step was to group comments with the same meaning but slightly different text (e.g. 'stock size is very low', 'stock is in a depleted state') to eventually end up with a unique set of all previously used arguments. Then consideration was given to what SC should be trying to achieve under each objective in order to come up with a final list of selection options. The Results/Discussion section highlights previous inconsistencies and the rationale for the proposed rules. The approach of basing selection options and colour rules on past decisions means that there is perhaps potential for future situations to fall outside of the lists compiled here, but some consideration was given to that and the risk is considered minimal. Any required changes can be accommodated in future versions of the application.

Results and Discussion

Summary of how the application works

The Summary Table Application is intended to be simple enough to use during SC plenary sessions. It has a set of standardized selections to ensure that decisions are made based on consistent criteria and has rules operating in the background to ensure that traffic light colours are assigned consistently (i.e. the same argument is not used to justify different traffic light colours). The application is laid out in three general sections: a left-hand panel where all of the selections are made, an upper right-hand section where the summary table is created based on those selections,

and a lower right-hand panel where previous summary table entries are listed for the selected stock as well as other stocks (Fig. 1).

The first step in creating the summary table is to select the appropriate stock from the drop down menu and then select the appropriate NAFO Convention objective from the second drop down menu. Note that there are five NAFO Convention objectives in the drop down menu, each corresponding to a row in the summary table. In order to complete the summary table, the user must choose one of the prescribed options under each of the objectives. When the user clicks the option that best describes the status of the selected objective for the selected stock, it prompts the application to do two things. First, the application populates an editable text box based on the selection that was made. Second, the selection automatically determines the traffic light colour in the summary table based on a predetermined set of rules that run in the background. The contents of the text box are also replicated in the summary table in the 'comment' section. The contents of the text box are editable and any changes made in the text box are reflected in the table but do not influence the traffic light. This allows comments to be customized if desired/necessary. For example, sometimes when a stock is below Blim it is appropriate and sufficient for the table comment to be the default 'B < Blim'. But in other instances SC has preferred to use comments very specific to the stock assessment, such as 'B in 2023 < Blim with high probability (X%)'. SC can debate if such highly specific comments are necessary, but this example highlights the need to maintain the flexibility to customize comments.

In order to help with making appropriate and consistent decisions, two tabs are provided in the application which list previous summary table entries. The first tab gives a list of previous entries for the stock and objective that were selected in the left-hand panel and serves as a consistency check within the selected stock. The second tab gives a list of other stocks where the same selection to describe the status of the objective was made (e.g. B < Blim). This serves as a consistency check across stocks (i.e., does the selection of 'B < Blim' result in the same traffic light colour for all stocks/years). In both tabs there are hyperlinks where the user can jump to the appropriate page of the appropriate SC report if there is a desire to look into further details of the advice.

Clicking the 'export summary table' button will grab the summary table as it appears on the computer screen and saves it as an image file that can easily be included in the Summary Sheet (Fig. 2).

Standardization of rules

<u>Objective: Restore to or maintain at Bmsy</u>

This objective has been variously interpreted by SC, depending on the stock in question. While the Convention suggests that the goal should be to maintain or restore stocks to Bmsy, here it is suggested that the response to this objective should be a more general summary of stock status. If Bmsy is known then stock status should be expressed relative to Bmsy. However, in the absence of Bmsy it is still considered important to relay as much information as possible regarding stock status. This can be achieved by relating stock size to Blim if it has been defined, or based on stock trends and expert opinion if neither Bmsy nor Blim are defined.

Within the application, if Bmsy is defined and the stock is at or above Bmsy then the traffic light is green (Fig. 3). If the stock is below Bmsy but above Blim then the traffic light is yellow. If the stock is below Blim then the traffic light is red. In a situation where Bmsy is undefined and the stock is above Blim then the traffic light is yellow. If neither Bmsy nor Blim are defined, there are options to

select whether the stock is believed to be at a low level/depleted (in which case the traffic light would be red), or the stock level is 'not a concern' (in which case the traffic light should be yellow). The option regarding the stock level not being a concern is meant to be a generic statement that can be replaced in the text box with any desired specific text (e.g. in the past SC has used statements like 'considered to be at high level', 'above historical average', 'stock varying without trend', etc.). Lastly, there are options for situations where stock status cannot be evaluated or for which judging a stock relative to Bmsy is not appropriate given the life history of the species (e.g. squid). These options results in a grey traffic light.

One of the primary goals in the development of this application is to standardize the criteria used to determine traffic light colours and to ensure that the same criteria apply to all stocks (i.e. avoiding situations where the same arguments have been used to justify different traffic lights for different stocks). This has been an issue in the past. Figures 4-6 demonstrate inconsistencies in past traffic light colours for various status scenarios.

Objective: Eliminate Overfishing (Stock)

In response to requests to provide advice related to total EPU catches in the stock summary sheets, the Eliminate Overfishing objective used in previous years has been renamed 'Eliminate Overfishing (Stock)' and an additional row has been added to the table for 'Eliminate Overfishing (Ecosystem) – see below.

A review of past traffic light decisions under this objective reveals a highly variable approach to completing the summary table, involving a mixture of considering whether or not there is a directed fishery, whether or not Flim is known, whether or not F is known, the value of F relative to Flim, an opinion about whether F is considered high (when Flim is not known), an opinion about whether catches are considered high (when F is not known), statements about F being unknown, etc. The large number of previously used rationales made the standardization of options for the summary table application difficult. It is also noted that SC has variably used Flim or Fmsy in the summary table, depending on the stock. The summary table application uses Flim for the sake of consistency.

The approach here was to focus on options to determine and communicate if current levels of removals are considered sustainable. We suggest a hierarchical approach, where it is always preferable to provide an analytical evaluation of F relative to Flim if that information is available. However, it is also suggested that sometimes advice can be provided in the absence of Flim, and sometimes even in the absence of estimates of F, based on the cumulative expert knowledge and opinion within SC (e.g. excessively high catch levels may be considered unsustainable). In the past, SC has sometimes been willing/able to provide advice based on expert opinion and sometimes it has not, perhaps depending on the stock in question and the information available. An option of 'unknown' is also available if insufficient information is available to come to a consensus conclusion regarding the sustainability of exploitation levels.

The first available selections in the application under this objective are to compare F relative to Flim (Fig. 3). It is considered here that these are always the preferred selections if both F and Flim are defined (i.e. F is either above or below Flim). There have been instances in the past where, despite both F and Flim being defined, these things were not mentioned or compared in the summary table. For example, the most recent summary table entry for this objective for 3LNO American plaice was 'no directed fishery, current bycatch delaying recovery'. However, given that

both F and Flim were known for that stock it is suggested here that a comparative statement of F relative to Flim should be the focal point of the advice. If Flim is considered valid for the stock (presumably it is if it is still accepted by SC) then comparing F to Flim should provide an evaluation of whether removals are too high, no matter if those removals are from directed catch or bycatch. The text box feature in the application can be used (see above) to add additional value statements to the comments in the table (e.g. concern over bycatch levels, etc.). For instances where Flim is undefined, it may still be possible to provide advice based on estimates of F or total catch levels. For the former, the options of 'Flim undefined, F level is not a concern' and 'Flim undefined, F level is a concern' are provided and translate into yellow and red traffic lights, respectively. Of course the 'concern' and 'lack of concern' statements are meant to be generic in nature and can be modified within the text box in the application. If the only information that we have regarding exploitation levels are catch estimates then it may still be possible to provide advice based on whether the catch levels are a concern or not a concern. And finally, if there is no suitable information to make a statement regarding the sustainability of recent exploitation levels then the 'Unknown' option should be selected in the application. This will assign a grey traffic light.

It is perhaps noteworthy that 'no directed fishing' does not appear in any of the selection options for this objective, even though it has been included as a primary criteria in the past, and at least for one stock was given as the only justification for the traffic light being green. However, for some stocks there have been concerns that bycatch levels were an issue so it is suggested that focusing this objective on actual exploitation rates and/or catch levels may be a more suitable approach. With that being said, the potential still exists to add a comment of 'no directed fishing' via the application text box, and this would probably be a useful approach to remind readers that the fishery in question is not a directed one.

In addition to the wide range of arguments that have been used to justify various traffic light colours under this objective, SC has also sometimes used the same argument to justify different traffic light colours. This inconsistency can be demonstrated for the situation where Flim was undefined and F was considered to be low, an argument that has previously been used to justify yellow, green, and grey traffic lights (Fig. 7). It is suggested here that these scenarios should all result in a yellow traffic light by selecting the 'Flim undefined, F level is not a concern' option.

Objective: Eliminate Overfishing (Ecosystem)

An evaluation of this objective was considered in the stock summary sheets for the first time in 2023. SC discussion on this objective suggest that we currently only consider whether an EPU is being exploited at or above 2TCI (red traffic light), or below 2TCI (green traffic light). The potential need for a yellow traffic light option as a warning when approaching 2TCI was discussed by SC but not agreed upon at this time. In the future it may also be necessary to include a grey traffic light option for instances where 2TCI may not have been calculated.

Objective: Apply Precautionary Approach

Under this objective, SC should report on any PA reference points that have been established. In some cases, SC has previously also included indicators of stock status (e.g. where the stock is relative to any established reference points). It is suggested that from now on this section of the summary table is used only to indicate the presence/absence of PA reference points. Any considerations regarding stock size relative to Blim should be included under the 'Restore to or

Maintain at Bmsy' section, and exploitation level relative to F should be included under the 'Eliminate Overfishing' section.

Under this objective, the application contains options ranging from 'no PA reference points defined' to both Blim and Flim being defined (Fig. 3). There is also an option to select 'No suitable PA for life history strategy' - a very specific selection that is only relevant for semelparous species such as squid. This option will result in a red traffic light.

SC has been very inconsistent regarding traffic lights for instances where Blim is defined, but Flim is not. The traffic light for this scenario has previously been reported as 'yellow' or 'green', depending on the stock (Fig. 8). Here it is suggested that this scenario be assigned a 'yellow' traffic light and that the 'green' traffic light be reserved only for stocks where both Blim and Flim have been defined. SC has also been inconsistent in terms of traffic light colour for instances where no reference points are known (Fig. 9). The application applies a red traffic light to all such scenarios.

Objective: Minimize Harmful Impacts on Living Marine Resources and Ecosystems

One of the largest inconsistencies in how traffic light colours under this objective have been assigned pertains to situations where there is no directed fishery. The proposal here is to assign a 'green' traffic light to this scenario (Fig. 3), i.e. the fishery cannot be impacting living marine resources and ecosystems if there is no directed fishery. Previous advice has not always focused on the presence/absence of a directed fishery, which has resulted in inconsistencies in the assignment of traffic light colours. For example, American plaice stocks have used 'VME closures in effect, no specific measures' as justification to assign a yellow traffic light (Fig. 10). However, these stocks also had no directed fishery and therefore we suggest a modified approach where these stocks should have been assigned a green traffic light. It may be that the yellow traffic light was considered appropriate because there was concern that the amount of American plaice bycatch in other directed fisheries was enough to be impacting plaice recovery. However, we consider this to be an issue to be covered in the summary table for those stocks for which the directed fishing is occurring rather than the plaice stocks. For example, in the case of 3LNO American plaice, if it is believed that bycatch in the yellowtail flounder fishery is impacting recovery then this should be stated in the yellowtail flounder summary sheet (in the Minimize Harmful Impacts section) rather than the American plaice summary sheet since there is currently no directed fishery for American plaice. And while it is known that fishing vessels will sometimes look to catch the maximum allowed bycatch of some species (targeting bycatch), this is only an issue if the allowable bycatch levels are set too high. Again, we consider this an issue of the directed fishery rather than bycatch species.

There are several options to select from for directed fisheries. If the fishery uses a gear that does not contact bottom and there is also essentially no bycatch in the fishery (i.e. a "clean" fishery) then the traffic light should be 'green'. To date, this would only be applicable for the squid jig fishery. Other selections are intended to focus on whether the measures in place to minimize bycatch are effective. Options include 'bycatch regulations considered effective' (green traffic light), 'effectiveness of bycatch regulations unknown' (yellow traffic light), and 'bycatch regulations considered ineffective' (red traffic light).

Objective: Preserve Marine Biodiversity

More discussion is needed to better understand how SC should be evaluating and reporting on progress against this objective (Couture & Rideout 2014). Until further explanation is available, the only option available in the application is a grey traffic light (Fig. 3).

Comparison to Previous Advice

In order to understand how these new rules might influence advice, we revisited the most recent assessment for each NAFO stock and reproduced traffic light colours based on interpretation of the information presented during those assessments and the rules presented herein (Fig. 11). Note that these re-evaluated traffic lights represent the opinions of the authors only and not necessarily those of NAFO Scientific Council.

References

Chang, W., Cheng, J., Allaire, J., Sievert, C., Schloerke, B., Xie, Y., Allen, J., McPherson, J., Dipert, A., Borges, B. (2022) _shiny: Web Application Framework for R_. R package version 1.7.4. **https://CRAN.R-project.org/package=shiny**

Couture, E., Rideout, R. (2014) Standardizing the traffic light approach for reporting on convention objectives. NAFO SCR Doc 14/045.

NAFO (2013) Report of the Scientific Council Meeting 7-20 June 2013. NAFO SCS Doc 13/17.

R Core Team (2022) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria., **https://www.R-project.org/**

Regular, P.M., Rogers, B., Wheeland, L., Anderson, S.C. (2021) NAFOdown: An R Markdown template for producing NAFO Scientific Council Documents. NAFO SCR Doc 21/016.

RStudio Team (2022) RStudio: Integrated Development Environment for R. Rstudio, PBC Boston, MA, **http://www.rstudio.com/**

Figures

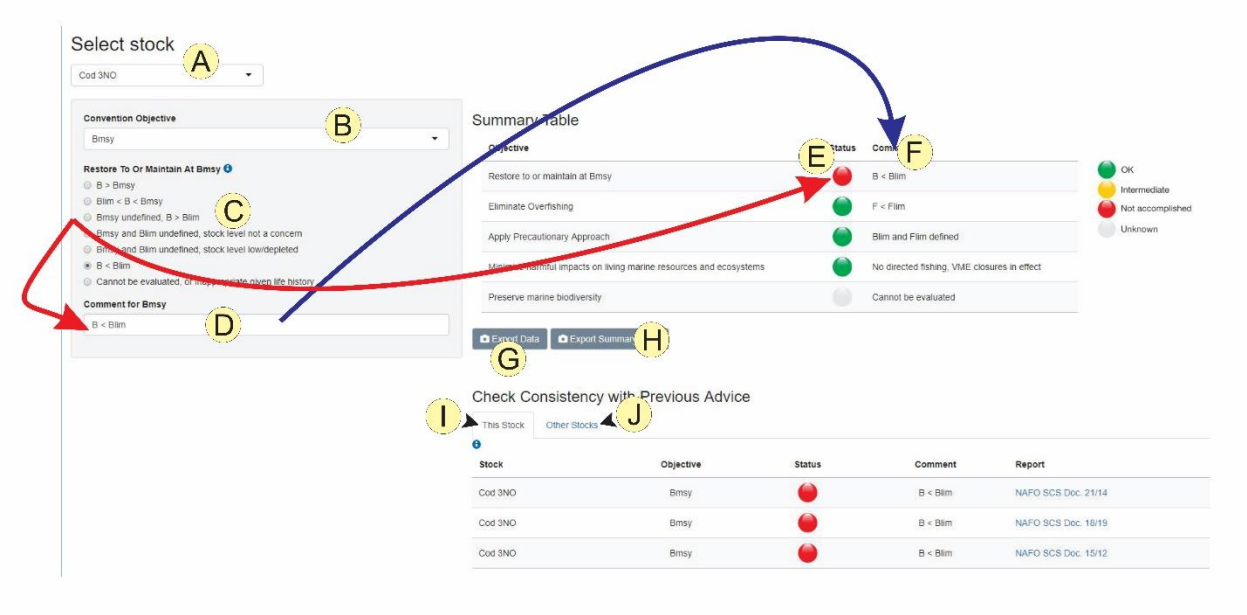


Figure 1. General appearance of the proposed Summary Sheet Traffic Light Application. The first step is to select the appropriate stock from the drop down menu (A) and then select the appropriate Convention objective from the second drop down menu (B). Under each objective there are a number of selection buttons with standardized options (C). Clicking one of these options populates an editable text box (D) and determines the traffic light colour in the summary table for the objective that was selected (E). The text box is editable and any changes made in the text box are reflected in the table but do not influence the traffic light. There is a button (G) to save the summary table data (i.e. merge it with a datafile containing information from previous summary tables) and to export the table (H) as an image file to be included in the Summary Sheet. There are also tabs to view past traffic light entries for the stock and objective that are selected (I) as well as entries from other stocks where the same advice was provided (J).

Convention Principle	Status	Comment
Restore to or maintain at Bmsy		B >= Bmsy
Eliminate Overfishing (Stock)		F < Flim
Eliminate Overfishing (Ecosystem)		Total EPU catches < 2TCI
Apply Precautionary Approach		Blim and Flim defined
Minimize harmful impacts on living marine resources and ecosystems		Directed fishery, VME closures in effect, effectiveness of bycatch regulations uncertain
Preserve marine biodiversity		Cannot be evaluated

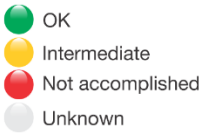


Figure 2. Example of the general appearance of the summary table produced by the application.

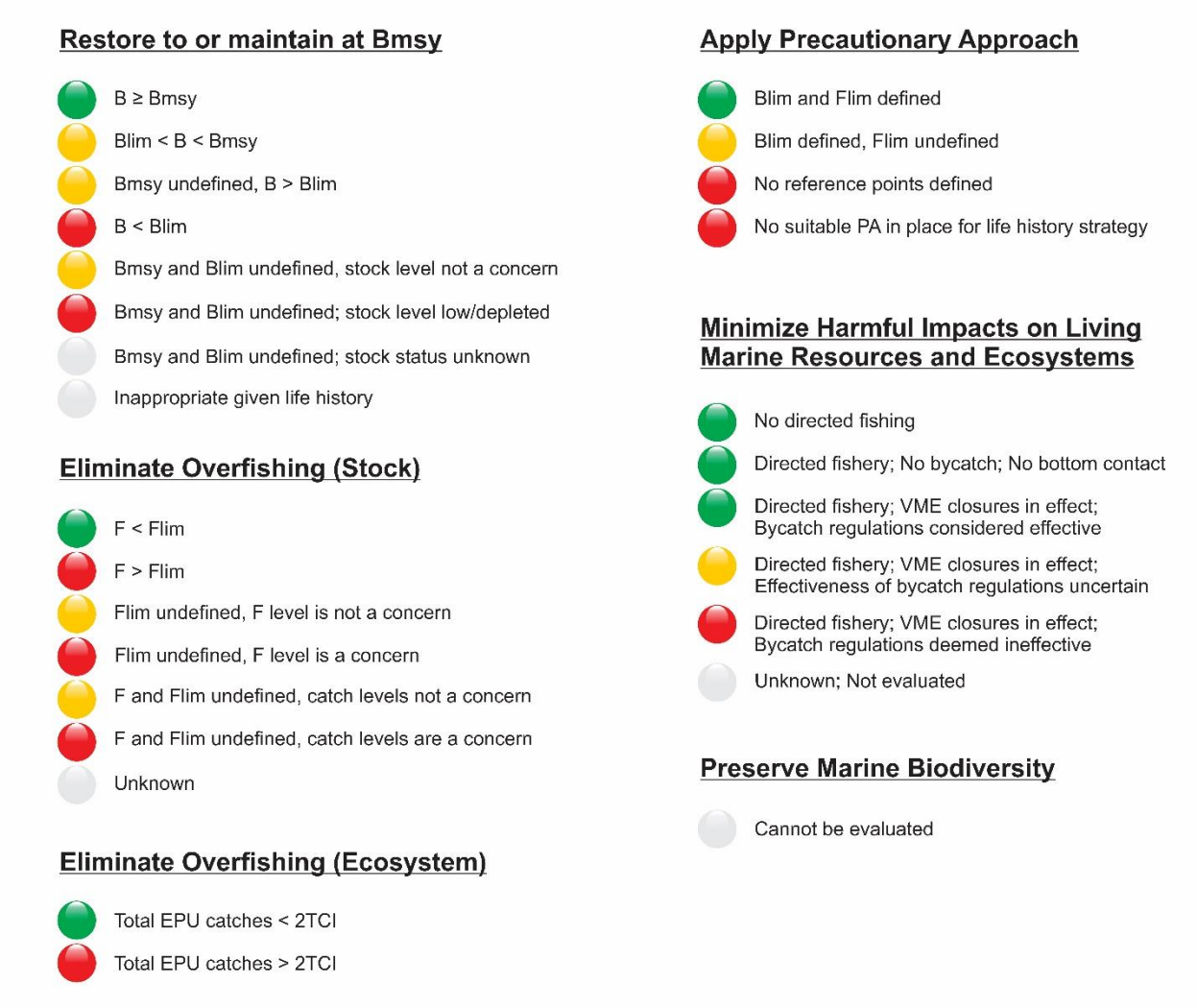


Figure 3. Options available in the Summary Table App for the five NAFO Convention Objectives, along with the associated suggested traffic light colours.

This Stock | Other Stocks

Stock	Objective	Status	Comment	Report
Redfish 3O	Bmsy	🔴	Stock is below an interim survey-based proxy for Bmsy	NAFO SCS Doc. 22/18
Witch Flounder 3NO	Bmsy	🔴	Probability of B2022 < Bmsy = 94%	NAFO SCS Doc. 22/18
Witch Flounder 3NO	Bmsy	🔴	Probability of B2020 < Bmsy = 97%	NAFO SCS Doc. 20/14
Witch Flounder 3NO	Bmsy	🔴	Probability of B2019 < Bmsy = 97%	NAFO SCS Doc. 19/20
Witch Flounder 3NO	Bmsy	🔴	B2018 < Bmsy	NAFO SCS Doc. 18/19
Witch Flounder 3NO	Bmsy	🟡	B decreasing, Blim < B2016 < Bmsy	NAFO SCS Doc. 17/16
Witch Flounder 3NO	Bmsy	🟡	B increasing, Blim < B2016 < Bmsy	NAFO SCS Doc. 15/12
Witch Flounder 3NO	Bmsy	🟡	B > Blim with high uncertainty	NAFO SCS Doc. 14/17

Figure 4. Screenshot from SC Summary Table Application demonstrating how the assignment of traffic light colours for the objective of 'Restoring to or Maintaining at Bmsy' have been inconsistent for stocks for which Blim < B < Bmsy. The suggestion is to standardize so that the traffic light would be yellow for any stock meeting these criteria.

This Stock | Other Stocks

Stock	Objective	Status	Comment	Report
Cod 3M	Bmsy		Stock above Blim in 2022, Bmsy is unknown	NAFO SCS Doc. 22/18
Cod 3M	Bmsy		Stock above Blim in 2021, Bmsy unknown	NAFO SCS Doc. 21/14
Cod 3M	Bmsy		Stock above Blim in 2020, Bmsy is unknown	NAFO SCS Doc. 20/14
Cod 3M	Bmsy		Stock well above Blim, Bmsy is unknown	NAFO SCS Doc. 19/20
Cod 3M	Bmsy		Stock well above Blim, Bmsy unknown	NAFO SCS Doc. 18/19
Cod 3M	Bmsy		Stock well above Blim, Bmsy is unknown	NAFO SCS Doc. 17/16
Cod 3M	Bmsy		Stock increasing	NAFO SCS Doc. 15/12
Cod 3M	Bmsy		Stock increasing	NAFO SCS Doc. 14/17
Northern Shrimp 3M	Bmsy		Stock above Blim, Bmsy is unknown	NAFO SCS Doc. 20/22
Redfish 3LN	Bmsy		Status relative to Bmsy is unknown	NAFO SCS Doc. 22/18

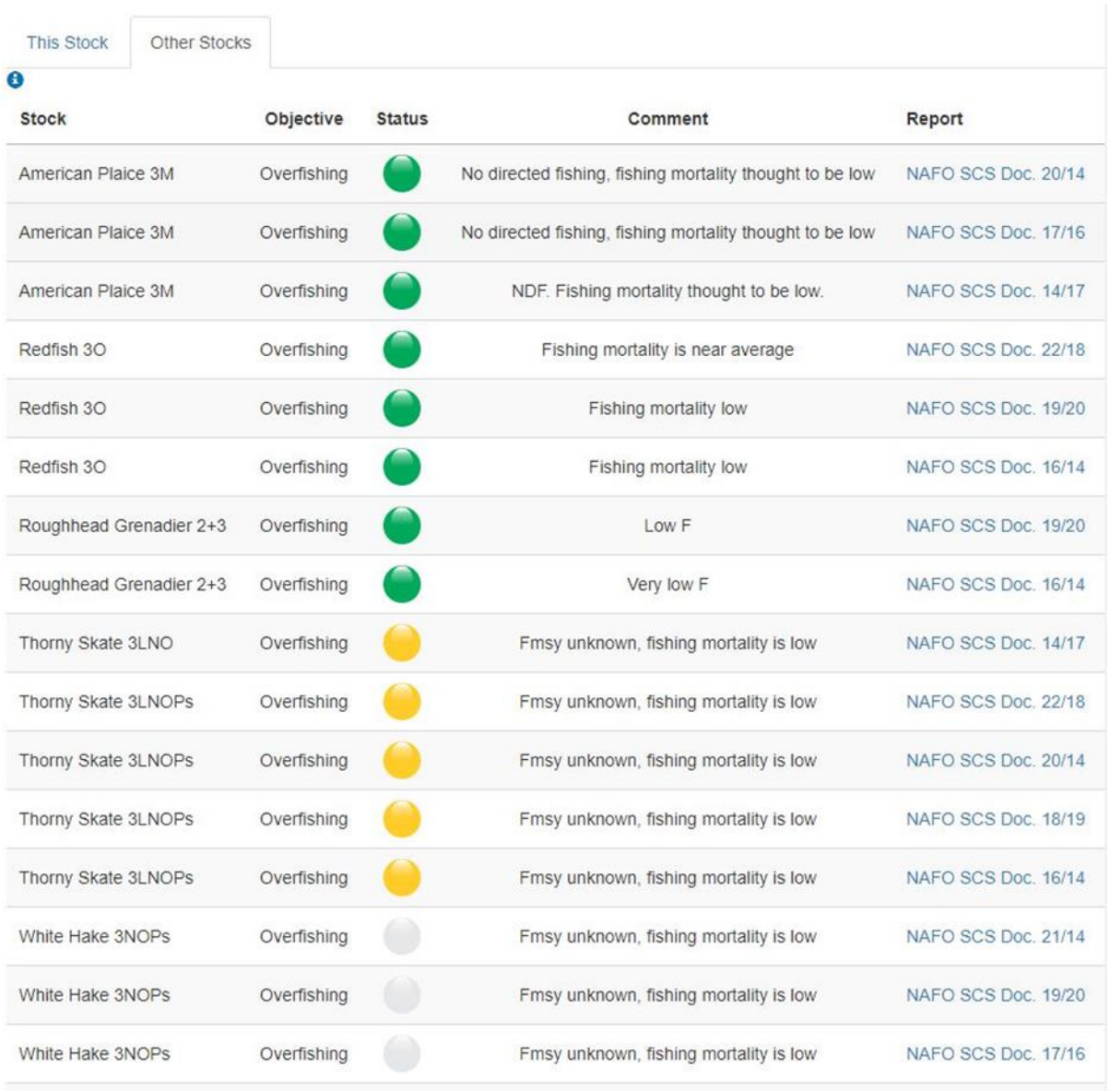
Figure 5. Screenshot from SC Summary Table Application demonstrating how the assignment of traffic light colours for the objective of 'Restoring to or Maintaining at Bmsy' have been inconsistent for stocks for which Bmsy is unknown but the stock is above Blim. The suggestion is to standardize so that the traffic light would be yellow for any stock meeting these criteria.

Check Consistency with Previous Advice

This Stock | Other Stocks

Stock	Objective	Status	Comment	Report
Alfonsino 6G	Bmsy		Bmsy unknown, stock appears depleted	NAFO SCS Doc. 19/20
American Plaice 3M	Bmsy		Bmsy unknown, stock at a low level	NAFO SCS Doc. 20/14
American Plaice 3M	Bmsy		Bmsy unknown, stock at a low level	NAFO SCS Doc. 17/16
American Plaice 3M	Bmsy		Bmsy unknown, stock at a low level	NAFO SCS Doc. 14/17
Capelin 3NO	Bmsy		Bmsy unknown, stock at low level	NAFO SCS Doc. 21/14
Capelin 3NO	Bmsy		Bmsy unknown, stock at low level	NAFO SCS Doc. 18/19
Thorny Skate 3LNOPs	Bmsy		Bmsy unknown, stock at low level	NAFO SCS Doc. 22/18
Thorny Skate 3LNOPs	Bmsy		Bmsy unknown, stock at low level	NAFO SCS Doc. 20/14
Thorny Skate 3LNOPs	Bmsy		Bmsy unknown, stock at low level	NAFO SCS Doc. 18/19
Thorny Skate 3LNOPs	Bmsy		Bmsy unknown, stock at low level	NAFO SCS Doc. 16/14
White Hake 3NOPs	Bmsy		Bmsy unknown, stock at low level	NAFO SCS Doc. 21/14
White Hake 3NOPs	Bmsy		Bmsy unknown, stock at low level	NAFO SCS Doc. 19/20
White Hake 3NOPs	Bmsy		Bmsy unknown, stock at low level	NAFO SCS Doc. 17/16
White Hake 3NOPs	Bmsy		Bmsy unknown, stock at a low level	NAFO SCS Doc. 15/12

Figure 6. Screenshot from SC Summary Table Application demonstrating how the assignment of traffic light colours for the objective of 'Restoring to or Maintaining at Bmsy' have been inconsistent for stocks for which Bmsy is unknown but the stock is considered to be at a low or depleted level. The suggestion is to standardize so that the traffic light would be yellow for any stock meeting these criteria.



This Stock | Other Stocks

Stock	Objective	Status	Comment	Report
American Plaice 3M	Overfishing		No directed fishing, fishing mortality thought to be low	NAFO SCS Doc. 20/14
American Plaice 3M	Overfishing		No directed fishing, fishing mortality thought to be low	NAFO SCS Doc. 17/16
American Plaice 3M	Overfishing		NDF. Fishing mortality thought to be low.	NAFO SCS Doc. 14/17
Redfish 3O	Overfishing		Fishing mortality is near average	NAFO SCS Doc. 22/18
Redfish 3O	Overfishing		Fishing mortality low	NAFO SCS Doc. 19/20
Redfish 3O	Overfishing		Fishing mortality low	NAFO SCS Doc. 16/14
Roughhead Grenadier 2+3	Overfishing		Low F	NAFO SCS Doc. 19/20
Roughhead Grenadier 2+3	Overfishing		Very low F	NAFO SCS Doc. 16/14
Thorny Skate 3LNO	Overfishing		Fmsy unknown, fishing mortality is low	NAFO SCS Doc. 14/17
Thorny Skate 3LNOPs	Overfishing		Fmsy unknown, fishing mortality is low	NAFO SCS Doc. 22/18
Thorny Skate 3LNOPs	Overfishing		Fmsy unknown, fishing mortality is low	NAFO SCS Doc. 20/14
Thorny Skate 3LNOPs	Overfishing		Fmsy unknown, fishing mortality is low	NAFO SCS Doc. 18/19
Thorny Skate 3LNOPs	Overfishing		Fmsy unknown, fishing mortality is low	NAFO SCS Doc. 16/14
White Hake 3NOPs	Overfishing		Fmsy unknown, fishing mortality is low	NAFO SCS Doc. 21/14
White Hake 3NOPs	Overfishing		Fmsy unknown, fishing mortality is low	NAFO SCS Doc. 19/20
White Hake 3NOPs	Overfishing		Fmsy unknown, fishing mortality is low	NAFO SCS Doc. 17/16

Figure 7. Screenshot from SC Summary Table Application demonstrating how the assignment of traffic light colours for the objective of Eliminate Overfishing (Stock) have been inconsistent for stocks where Flim (Fmsy) was undefined and fishing mortality was not considered to be at a concerning level. The suggestion is to standardize so that the traffic light would be yellow for any stock under this scenario.

This Stock | Other Stocks

Stock	Objective	Status	Comment	Report
Greenland Halibut 0+1 offshore	Apply PA		Blim valid to 2017	NAFO SCS Doc. 22/18
Greenland Halibut 0+1 offshore	Apply PA		Stock well above Blim	NAFO SCS Doc. 20/14
Northern Shrimp 3LNO	Apply PA		Blim is defined. No fishing mortality reference point defined	NAFO SCS Doc. 21/18
Northern Shrimp 3LNO	Apply PA		Blim is defined. No fishing mortality reference point defined	NAFO SCS Doc. 19/21
Northern Shrimp 3M	Apply PA		Blim defined. No fishing mortality reference point defined	NAFO SCS Doc. 22/21
Northern Shrimp 3M	Apply PA		Blim defined. No fishing mortality reference point defined	NAFO SCS Doc. 21/18
Northern Shrimp 3M	Apply PA		Blim defined. No fishing mortality reference point defined	NAFO SCS Doc. 20/22
Northern Shrimp 3M	Apply PA		Blim defined. No fishing mortality reference point defined	NAFO SCS Doc. 19/21
Redfish 3LN	Apply PA		Blim defined	NAFO SCS Doc. 22/18
Redfish 3O	Apply PA		Interim Blim defined at 0.3 Bmsy-proxy	NAFO SCS Doc. 22/18
Thorny Skate 3LNOPs	Apply PA		Blim defined from survey indices	NAFO SCS Doc. 22/18
Thorny Skate 3LNOPs	Apply PA		Blim defined from survey indices	NAFO SCS Doc. 20/14
Thorny Skate 3LNOPs	Apply PA		Blim defined from survey indices	NAFO SCS Doc. 18/19
Thorny Skate 3LNOPs	Apply PA		Blim defined from survey indices	NAFO SCS Doc. 16/14
Witch Flounder 2J3KL	Apply PA		Blim established, no directed fishing	NAFO SCS Doc. 16/14
Witch Flounder 3NO	Apply PA		Increased risk of B < Blim	NAFO SCS Doc. 18/19

Figure 8. Screenshot from SC Summary Table Application demonstrating how the assignment of traffic light colours for the objective of Apply Precautionary Approach have been inconsistent for stocks with Blim defined but Flim not defined. The suggestion is to standardize so that the traffic light would be yellow for any stock under this scenario and only assigned a green traffic light if both Blim and Flim are known.

This Stock | Other Stocks

Stock	Objective	Status	Comment	Report
Alfonsino 6G	Apply PA		Reference points not defined	NAFO SCS Doc. 19/20
Alfonsino 6G	Apply PA		Reference points not defined	NAFO SCS Doc. 18/19
American Plaice 3M	Apply PA		Reference points not defined, No HCRs	NAFO SCS Doc. 20/14
American Plaice 3M	Apply PA		Reference points not defined, No HCRs	NAFO SCS Doc. 17/16
American Plaice 3M	Apply PA		Reference points not defined, no HCRs	NAFO SCS Doc. 14/17
Capelin 3NO	Apply PA		Reference points not defined	NAFO SCS Doc. 21/14
Capelin 3NO	Apply PA		Reference points not defined	NAFO SCS Doc. 18/19
Redfish 3M	Apply PA		Reference points not defined	NAFO SCS Doc. 15/12
Redfish 3O	Apply PA		Reference points not defined	NAFO SCS Doc. 19/20
Redfish 3O	Apply PA		Reference points not defined	NAFO SCS Doc. 16/14
Roughhead Grenadier 2+3	Apply PA		Reference points not defined	NAFO SCS Doc. 19/20
Roughhead Grenadier 2+3	Apply PA		Reference points not defined	NAFO SCS Doc. 16/14
Thorny Skate 3LNO	Apply PA		Reference points not defined	NAFO SCS Doc. 14/17
White Hake 3NOPs	Apply PA		Reference points not defined	NAFO SCS Doc. 21/14
White Hake 3NOPs	Apply PA		Reference points not defined	NAFO SCS Doc. 19/20
White Hake 3NOPs	Apply PA		Stock in safe zone of PA framework	NAFO SCS Doc. 17/16
White Hake 3NOPs	Apply PA		Reference points not defined	NAFO SCS Doc. 15/12

Figure 9. Screenshot from SC Summary Table Application demonstrating how the assignment of traffic light colours for the objective of Apply Precautionary Approach have been inconsistent for stocks with no reference points defined. The suggestion is to standardize so that the traffic light would be yellow for any stock under this scenario and only assigned a green traffic light if both Blim and Flim are known.

This Stock | Other Stocks

Stock	Objective	Status	Comment	Report
American Plaice 3LNO	Minimise Harm		VME closures in effect, no specific measures	NAFO SCS Doc. 21/14
American Plaice 3LNO	Minimise Harm		VME closures in effect, no specific measures	NAFO SCS Doc. 18/19
American Plaice 3LNO	Minimise Harm		VME closures in effect, no specific measures	NAFO SCS Doc. 16/14
American Plaice 3LNO	Minimise Harm		VME closures in effect, no specific measures	NAFO SCS Doc. 14/17
American Plaice 3M	Minimise Harm		VME closures in effect, no specific measures	NAFO SCS Doc. 20/14
American Plaice 3M	Minimise Harm		VME closures in effect, no specific measures	NAFO SCS Doc. 17/16
American Plaice 3M	Minimise Harm		VME closures in effect, no specific measures	NAFO SCS Doc. 14/17
Capelin 3NO	Minimise Harm		VME closures in effect, no directed fishing	NAFO SCS Doc. 21/14
Capelin 3NO	Minimise Harm		VME closures in effect, no directed fishing	NAFO SCS Doc. 18/19
Cod 3NO	Minimise Harm		No directed fishery	NAFO SCS Doc. 21/14
Cod 3NO	Minimise Harm		No directed fishery	NAFO SCS Doc. 18/19
Cod 3NO	Minimise Harm		No directed fishery	NAFO SCS Doc. 15/12
Northern Shrimp 3LNO	Minimise Harm		No directed fishery	NAFO SCS Doc. 21/18
Northern Shrimp 3LNO	Minimise Harm		No directed fishery	NAFO SCS Doc. 19/21
Northern Shrimp 3M	Minimise Harm		VME closures in effect, sorting grids mandatory	NAFO SCS Doc. 22/21
Witch Flounder 2J3KL	Minimise Harm		No directed fishing	NAFO SCS Doc. 16/14

Figure 10. Screenshot from SC Summary Table Application demonstrating how the assignment of traffic light colours for the objective of minimizing harm have been inconsistent for stocks with no directed fishery. The suggestion is to standardize so that the traffic light would be green for any stock under moratorium (i.e. no fishery = no fishery impact).

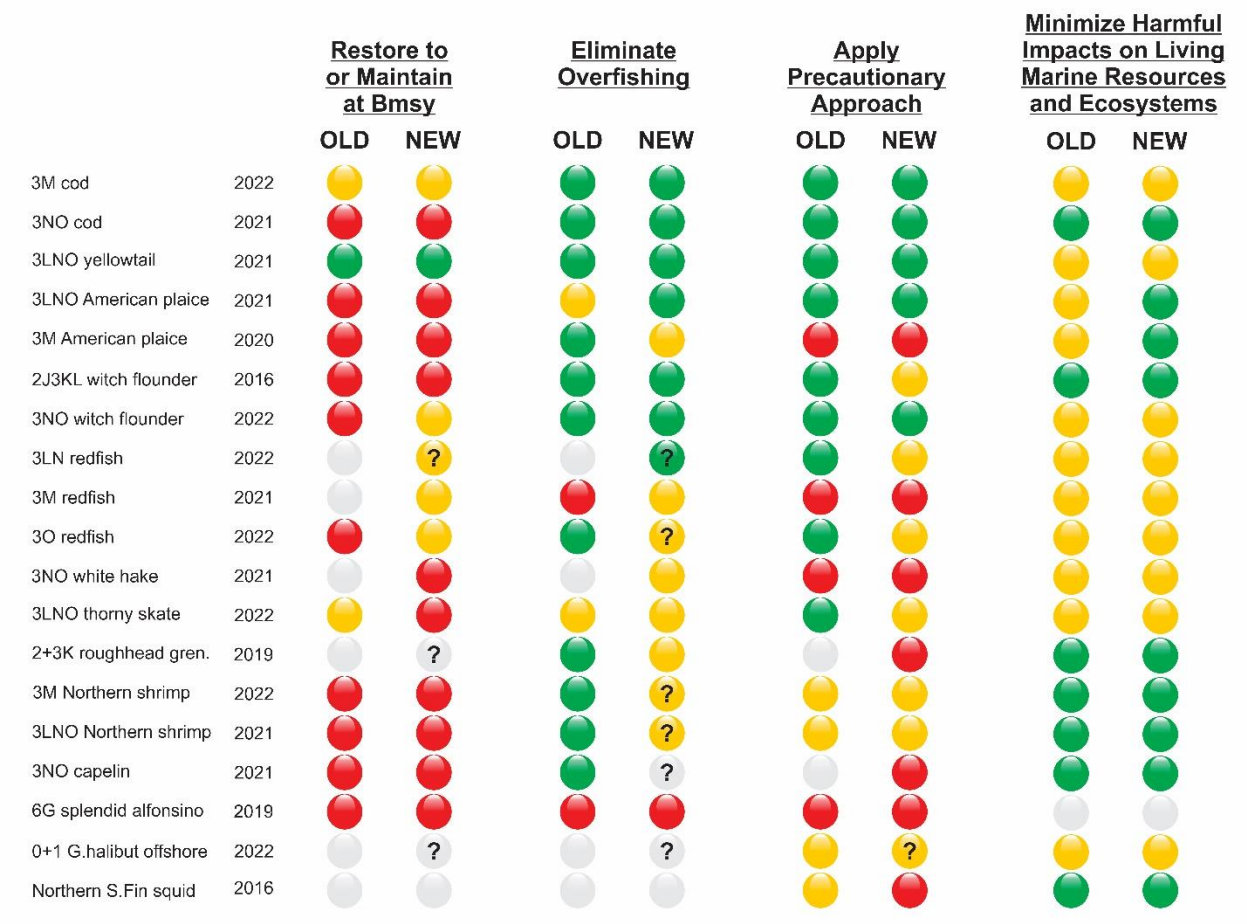


Figure 11. Comparison of previously-assigned traffic light colours (OLD) vs. how those colours would probably have been assigned under the colour-allocation rules in the summary table traffic light application (NEW). Traffic lights with a question mark were not clear-cut to interpret with the new set of rules and would require input from SC.