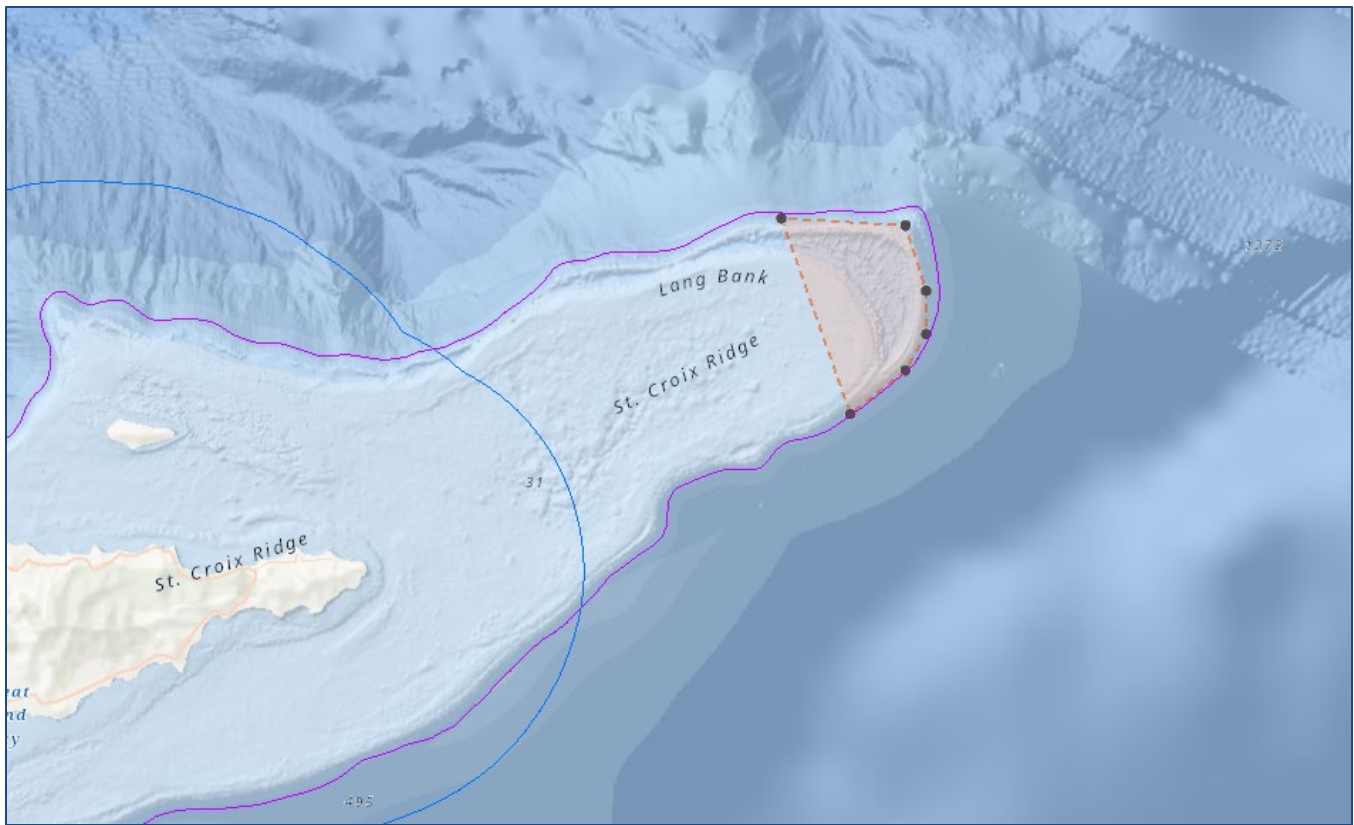


# Draft Options Paper on a Proposed Modification to the Red Hind Seasonal Closure in St. Croix to Address Fishing for Pelagic Species

## Management History of the Red Hind Grouper Spawning Aggregation Area East of St. Croix (Lang Bank), U.S. Virgin Islands

The red hind spawning aggregation area closure east of St. Croix, U.S. Virgin Islands (USVI) was established in 1993 under the final rule for [Amendment 2](#) to the Reef Fish Fishery Management Plan (FMP) of Puerto Rico and the USVI ([58 FR 53145](#); effective November 15, 1993). The area is located at the extreme eastern end of Lang Bank (Figure 1). Because aggregating fish are highly susceptible to capture by a wide range of gear types (hook and line, trap, spears, etc.), the Caribbean Fishery Management Council (CFMC) recommended the National Marine Fisheries Service (NMFS) implement a total ban on fishing in the area from December 1 to the last day of February, each year, to protect spawning aggregations of the red hind grouper. The original area proposed for the closure extended to the 100 fathom (600 feet, 183 meters) contour, but based on comments received at that time from members of the St. Croix Fisheries Advisory Committee, the area for closure was reduced to waters less than 50 fathoms (300 feet, 91 meters) in depth to reduce impacts on fisheries for large pelagics (tuna, dolphin, wahoo, and marlin) and deepwater snapper (Figure 1).



**Figure 1.** Boundary points and connecting lines of the red hind spawning aggregation off St. Croix , USVI (orange shared area), the 100 fathom depth boundary line (purple line), and the state/federal boundary line (blue line). (Source: [NOAA Charts](#))

In 2005, under the final rule for [Amendment 3](#) to the Reef Fish FMP, additional management measures were specified for the red hind spawning aggregation area (in addition to other existing seasonally closed areas) to minimize adverse effects or fishing on essential fish habitat (EFH) in federal waters ([70 FR 62073](#); effective November 28, 2005). Specifically, the amendment and its final rule prohibited fishing with pots, traps, bottom longlines, gillnets or trammel nets year-round in the closed areas, including the red hind spawning aggregation area off Lang Bank St. Croix.

Shortly thereafter, NMFS implemented management measures for Atlantic Highly Migratory Species (HMS), consistent with Amendment 3 to the Reef Fish FMP. The measures prohibited vessels issued HMS permits with bottom longline gear onboard from fishing in six distinct areas off the USVI and Puerto Rico, year-round, including the red hind spawning aggregation area off Lang Bank, St. Croix during the seasonal closure period ([72 FR 5633](#); effective March 9, 2007).<sup>1</sup>

When fisheries management in the U.S. Caribbean exclusive economic zone transitioned from U.S. Caribbean-wide FMPs to the Island-based FMPs (effective October 13, 2022; [87 FR 56204](#)), management measures concerning the red hind spawning aggregation area closure off Lang Bank, St.

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<sup>1</sup> 50 CFR 635.21(d)

Croix remained unchanged (as described under Amendments 2 and 3 to the Reef Fish FMP) and were included in the St. Croix FMP ([50 CFR 622.479\(a\)\(2\)](#)). Current regulations for the area include:

- (i) From December 1 through the last day of February, each year, fishing is prohibited in the red hind spawning aggregation area east of St. Croix.
- (ii) Fishing with pots, traps, bottom longlines, gillnets or trammel nets is prohibited year-round in the red hind spawning aggregation area east of St. Croix.

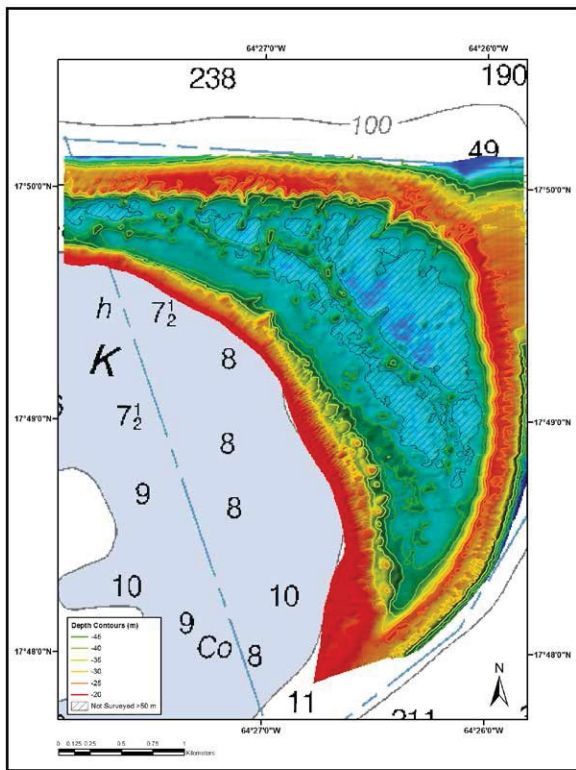
Under the [St. Croix FMP](#), the pelagic species dolphin and wahoo were added to the list of species to be managed in federal waters. Until the Island-based FMPs were implemented in 2022, no pelagic species were managed by the CMFC. Recent discussions at CFMC meetings (April 2022, April 2023, and August 2023; see Appendix A) have centered around the interest to modify the seasonal closure for the red hind spawning aggregation area off Lang Bank, St. Croix to allow fishers to catch pelagic species (e.g., dolphin and wahoo) during the seasonal closure, which is currently prohibited. This draft document describes options for modifying the red hind area closure as requested by the CFMC.

## Summary of Red Hind Grouper Research in the Lang Bank Area, St. Croix

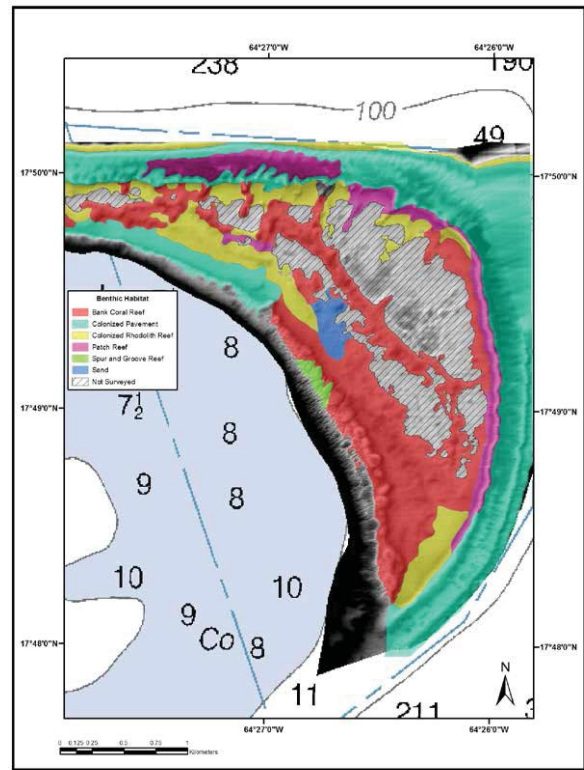
The red hind spawning aggregation site at Lang Bank has been well described in previous studies (Nemeth et al. 2006; Nemeth et al. 2007). The site is located 16 kilometers east of St. Croix (17°49 N, 64°27 W) on a 30–35 meter deep spur and groove reef located several kilometers from the shelf edge. The spawning aggregation site is at the tip of a coral spur that projects into a deep-water basin (50–60 meters deep), which separates the inner and the outer coral ridges.

A study sponsored by the CFMC characterizing essential fish habitats and associated reef communities produced a bathymetry map (Figure 2) and a georeferenced benthic habitat map (Figure 3) of Lang Bank (Garcia-Sais et al. 2014). Garcia-Sais et al. (2014) observed very low numbers of large groupers and snappers at Lang Bank, and theorized that the lack of physical and biological complexity among some of the habitats within the area may limit the occurrence of large demersal fish because of the absence of prey and residential structures. Red hind were observed at Bank Coral Reef, Spur and Groove Reef, and Colonized Pavement mesophotic habitats (Figure 3), with higher densities surveyed from the Bank Coral Reef (Garcia-Sais et al. 2014). Densities of red hind at Lang Bank were within the range estimated from visual surveys at other mesophotic habitats within U.S. Caribbean federal waters.

The size distribution of red hind at Lang Bank was skewed to the larger size classes, suggesting that the population present at mesophotic habitats of Lang Bank contains mostly adults (Garcia-Sais et al. 2014). Juvenile red hind (10–15 centimeter [cm] total length) were observed at the Colonized Rhodolith Reef habitat (Figure 3) at Lang Bank, suggesting that this habitat functions as a recruitment habitat for red hind.



**Figure 2.** Bathymetry map of Lang Bank, ST. Croix USVI. The blue dashed line represents the boundary of the red hind spawning aggregation area closure managed by the Caribbean Fishery Management Council. Source: Garcia-Sais et al. 2014



**Figure 3.** Benthic habitat map of Lang Bank, ST. Croix USVI. The blue dashed line represents the boundary of the red hind spawning aggregation area closure managed by the Caribbean Fishery Management Council. Source: Garcia-Sais et al. 2014

Nemeth et al. (2006) indicated red hind (*Epinephelus guttatus*) is protogynous and changes from female to male at about 32 to 38 cm total length. Red hind can live as long as 11 to 22 years and reach maximum length around 50 to 55 cm (though individuals up to 72 cm have been recorded). Several weeks before the annual spawning season (December-February) red hind migrate up to 33 kilometers (km) to their spawning aggregation sites and spawning usually occurs 0-4 days before the full moon, typically peaking in January and ending following the February full moon (Nemeth et al. 2006). Nemeth et al. (2007) discussed that (1) spawning of red hind typically occurs during periods of declining seawater temperature and slackening currents, (2) aggregations consist of small harem groups with one male defending three to five females, (3) spawning occurs in pairs 1-2 meters (m) above the reef, (4) females spawn more than once during the annual spawning season, (5) the spawning aggregation can occupy an area up to 0.35 km<sup>2</sup>, and (6) typically occurs on the top of deep coral reef ridges that are located on or near the shelf edge.

## Status of Red Hind Population at Lang Bank

Nemeth et al. (2006) found that during the spawning season, red hind from the Lang Bank St. Croix spawning aggregation migrated 5 – 18 km, covering an area of 60 square km. Between spawning peaks the density of fish changed, indicating that red hind moved away from the primary spawning aggregation site for several weeks then returned to spawn weeks later. Nemeth et al. (2006) reported that after 9 years of the seasonal closure of Lang Bank, the average length, density, and biomass of red hind had failed to increase and that the number of red hind within the spawning aggregation (around 3,000) and the area occupied (around 0.015 km<sup>2</sup>) were similar to those of heavily fished red hind spawning aggregations.

Nemeth et al. (2006) stated that several factors may be preventing the recovery of the Lang Bank spawning aggregation and contributing to the continual decline in average length of red hind in St. Croix. First, during the study, Nemeth et al. (2006) observed fishing boats poaching in the Lang Bank area during the seasonal closure. They suggested that since the western boundary of the closure area follows a southeastern bearing instead of a north-south line of longitude (Figure 1), this makes it harder for enforcement officials to determine if a vessel is inside or outside the closure area and the remoteness of Lang Bank and the orientation of the boundary line make it difficult to properly enforce the three month seasonal closure. Secondly, the spawning aggregation was less than 600 m away from the western boundary line. Therefore, there is a high probability that red hind from the Lang Bank spawning aggregation move to areas outside the closure area between full moon spawning events. If fishermen concentrate their fishing activity on the edges of the closure area, then these movements may increase the likelihood that a portion of the spawning red hind population are caught between the spawning peaks.

## Fishermen Perception of Seasonal Closure at Lang Bank

Karras and Agar (2009) interviewed seasoned fishermen (average fishing experience of 24 years) on St. Croix to determine their thoughts on the biological performance (e.g., protection of spawning aggregations and abundance inside and adjacent to the protected area) and socio-economic performance (e.g., ability to provide for the family, increased hardships, employment opportunities) of the red hind seasonal closure at Lang Bank. Their study found that the majority of commercial fishermen believe that the red hind seasonal closure effectively protects the spawning aggregation, increases abundance inside and adjacent to the closure area, and maintains or increases habitat quality (Karras and Agar 2009; Table 3). Conversely, most commercial fishermen surveyed disagreed with the statement that the seasonal closure protected the sensitive site, which is likely because the seasonal closure only offers protection three months of the year. For the social and economic questions, the majority of the commercial fishermen agreed with the statement that the red hind seasonal closure adversely affected their ability to support their families and generated hardships for the local fishing community, but disagreed that the closure created alternative sources of employment (Karras and Agar 2009; Table 5). Generally, the loss of productive fishing grounds forces them to fish longer and farther away or to

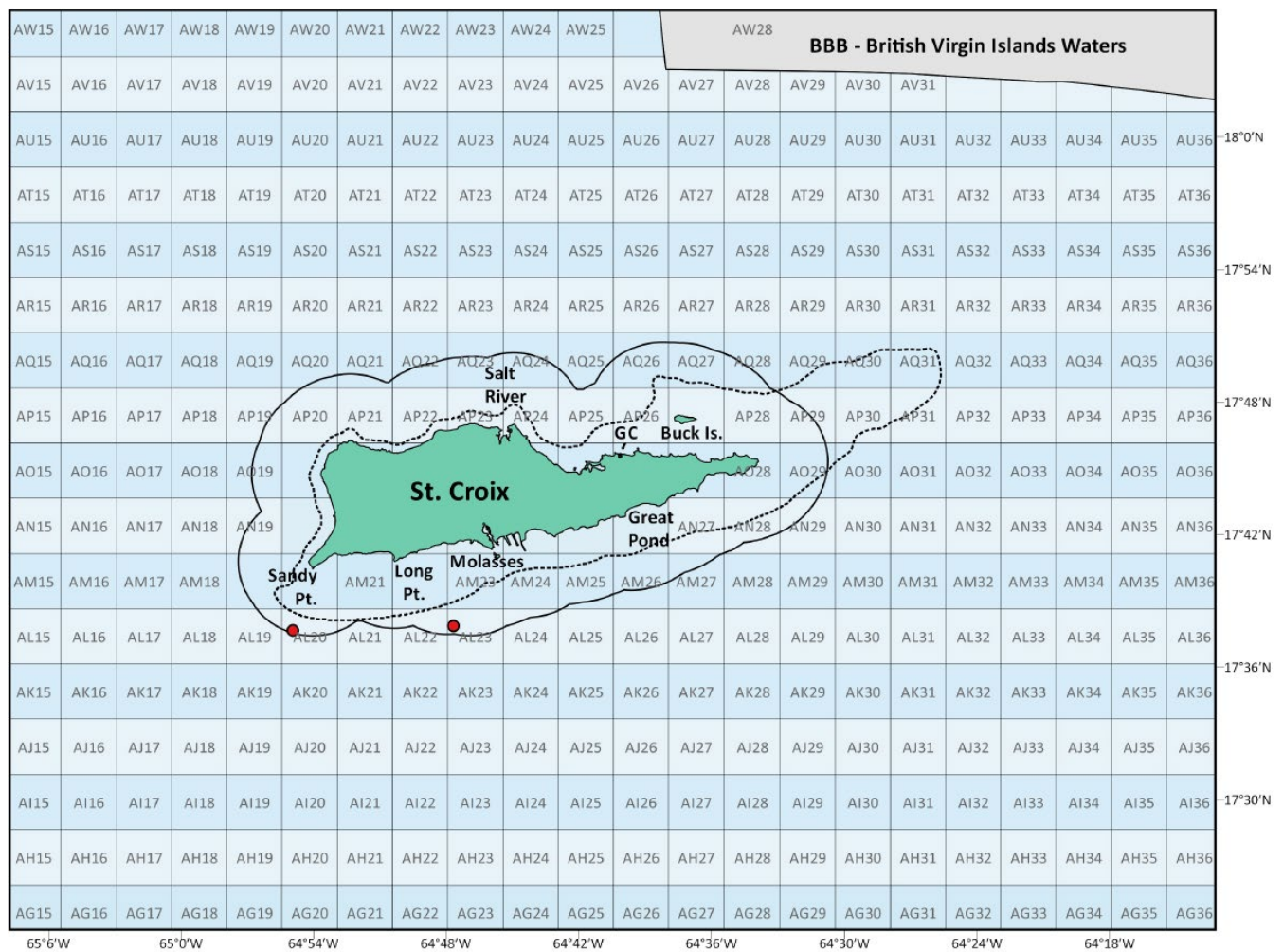
harvest fish in waters that are exposed to industrial and sewage effluent. Karras and Agar (2009) suggested that policymakers and fishery managers should recognize that (1) there is considerable uncertainty associated with seasonal and area closures and should set reasonable expectations and timelines for evaluation, (2) fishermen do not oppose the use of closures, but feel that their local ecological knowledge could be better used in the decision making process and that cooperative research could be used to educate fishermen, resource managers, and policymakers while reducing uncertainty and providing a basis for revising fishery management plans, and (3) relying on biological metrics alone can lead to biased assessments because short-term biological gains may come at the expense of socio-economic costs.

## Vertical Zoning in Marine Protected Areas (MPA) - an Overview

Vertical zoning is a management tool that allows for certain human uses, such as surface trolling for pelagic species, within a specific depth zone of the water column in a MPA. Managers and stakeholders can discuss the issue of vertical zoning to consider if an MPA should be a no-take area, or if some fishing could occur that would not impact the reason why the MPA was established (e.g., to protect the benthic habitat). [Grober-Dunsmore et al. \(2008\)](#) discussed linkages between pelagic and benthic linkages and identified ecological conditions where pelagic fishing may not be compatible with benthic conservation including (1) high relief habitats, (2) depths shallower than 50–100 meters, (3) major topographic and oceanographic features, and (4) spawning areas.

## Fishing Activities at Lang Bank

In 2011, the USVI Division of Fish and Wildlife revised their commercial catch report forms for St. Thomas/St. John and St. Croix. When reporting their catch, commercial fishermen use an associated grid map with 2.5 by 2.5 square mile alphanumeric fishing zones (Figure 4). The red hind spawning aggregation area is contained within fishing zones AP30, AP31, AQ30, and AQ31.



**Figure 4.** St. Croix grid map used by St. Croix commercial fishermen when reporting the location where they fish.

The [St. Croix FMP](#) provides a description of the commercial and recreational fishermen in federal waters around St. Croix. Gear and methods used in the commercial fishery in St. Croix include hook and lines<sup>2</sup>, traps, nets, and hand or spear collection via SCUBA or skin diving. In territorial waters, recreational fishermen cannot use pots, traps, haul seines, and set-nets as they are considered commercial fishing gear. The most common gear used by the recreational sector are hook-and-line and SCUBA. Gear types authorized for federal waters under the St. Croix FMP are specific to sector (commercial or recreational) and to managed (FMP) and non-managed (non-FMP) species groups (Table 1). Gear types authorized for federal waters under the Atlantic HMS FMP are listed in Table 2.

<sup>2</sup> Hook and line gear means any handline, rod, reel, or any pole to which hook and line are attached, as well as any bob, float, weight, lure, plug, spoon, or standard bait attached thereto, with a total of ten or fewer hooks.

**Table 1.** List of gear types authorized in federal waters around St. Croix, managed by the Caribbean Fishery Management Council.

<b>Fishery</b>	<b>Authorized Gear - Commercial</b>	<b>Authorized Gear - Recreational</b>
St. Croix Reef Fish Fishery (FMP)	Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, trap, pot, spear.	Dip net, handline, rod and reel, slurp gun, spear, trap, pot.
St. Croix Pelagic Fishery (FMP):	Gillnet*, automatic reel, bandit gear, buoy gear, handline, longline, rod and reel.	Spear, handline, longline, rod and reel.
St. Croix Spiny Lobster Fishery (FMP)	Trap, pot, dip net, hand harvest, snare.	Trap, pot, dip net, hand harvest, snare.
St. Croix Coral Reef Resource Fishery (FMP)	No harvest or possession in the EEZ.	
St. Croix Queen Conch Fishery (FMP):	Hand harvest.	Hand harvest.
St. Croix Pelagic Fishery (Non-FMP):	Gillnet*, automatic reel, bandit gear, buoy gear, handline, longline, rod and reel.	Spear, handline, longline, rod and reel.
St. Croix Commercial Fishery (Non-FMP)	Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, <i>trawl</i> , gillnet*, cast net, spear.	-
St. Croix Recreational Fishery (Non-FMP)	-	Automatic reel, bandit gear, handline, longline, rod and reel, spear, powerhead, hand harvest, cast net.

Italicized gear types are proposed for removal under Amendment 2 to the St. Croix FMP.

\*For non-federally managed fish species, Amendment 2 proposes to limit the use of gillnets in federal waters around St. Croix.

## Recreational Landings

Although the Lang Bank area is an important fishing ground for the recreational sector, landings have not been monitored in this area, therefore are not available for analysis.

## Commercial Landings

To determine the fishing characteristics of the red hind spawning aggregation area of Lang Bank St. Croix, the reported commercial landings from various hook and line gear for years 2012-2022 by fishermen from rows AP and AQ and columns 30-31 in the St. Croix grid map (Figure 1) were summarized (Table 3). Wahoo and dolphinfish were in the top five landed species, by weight (pounds). Other pelagic species not managed by the CFMC or HMS that appeared in the commercial landings included rainbow runner, barracuda, little tunny, and king mackerel. From 2012-2022, 96% of dolphinfish reported by commercial fishermen in St. Croix were with handline gear, followed by rod and reel gear (2%). During the same period, 91% of wahoo were reported with handline gear, followed by rod and reel (6%).

**Table 3.** Approximate total commercial landings from the Lang Bank red hind spawning area reported using hook and line gear from 2012-2022. All landings data are preliminary.

Species	Total Pounds 2012-2022
Yellowtail snapper	4,503
Wahoo	4,446
Schoolmaster	2,016
Dolphinfish	1,263
Blackfin snapper	1,215
Silk snapper	1,210
Red Hind grouper	623
Rainbow Runner	418
Barracuda	402
Queen snapper	390
Coney grouper	383
Mutton snapper	288
Bar jack	251

Species	Total Pounds 2012-2022
Little Tunny	195
Horse-Eye jack	131
Queen triggerfish	109
King mackerel	100

## Options for Modifying the Red Hind Seasonal Closure off Lang Bank

Management measures that could be modified through an amendment to the St. Croix FMP include, but are not limited to:

- Identifying the species that can be harvested during the seasonal closure (e.g, managed, non-managed) - exceptions should be based on any potential impacts that fishing for those species could have on the red hind population aggregating in the area, and other species such as the ESA-protected Nassau grouper (i.e., bycatch).
- Identifying gear types or methods that can be used within the seasonally closed area (e.g., trolling)
- Adjusting the boundaries of the closure area - considering where fishing for other species takes place, such as the edge of the closed area or depth.
- Making others adjustments, such as the timing of the seasonal closure

The Council can also formally request NMFS to evaluate modifying regulations for the Atlantic HMS in the Lang Bank seasonally closed area.

### **Potential Options to Modify the Red Hind Spawning Aggregation Area East of St. Croix**

Note - At this time, the proposed options would not modify the gear prohibitions in the red hind closure area established in 2005 (i.e., fishing with pots, traps, bottom longlines, gillnets or trammel nets is prohibited year-round in the red hind spawning aggregation area east of St. Croix).

1. Maintaining the current regulations in the seasonal area closure: From December 1 through the last day of February, each year, (all) fishing would continue to be prohibited in the red hind spawning aggregation area east of St. Croix.
  - Evaluate effectiveness of the seasonal area closure for the red hind population
2. Allowing fishermen (commercial and/or recreational) to catch or possess Council-managed pelagic species (i.e., dolphin and wahoo) during the seasonal closure.
3. Allowing fishermen (commercial and/or recreational) to catch or possess Council-managed and non-managed pelagic fish during the seasonal closure.

- Based on commercial landings and testimony during Council meetings, non-managed pelagic species may include king mackerel, little tunny, rainbow runner, barracuda
4. Allowing fishermen (commercial and/or recreational) to catch or possess any species of fish (managed and non-managed), except for Council-managed reef fish during the seasonal closure.
  5. Allowing fishermen (commercial and/or recreational) to use only certain gear types and/or methods (e.g. trolling, drift fishing (vs anchoring)) to fish for certain species (e.g, Council-managed, non-managed, or both).
    - This option would benefit from input from the St. Croix DAP.
    - For this and previous options it is important to analyze information on bycatch (e.g., what other species have been harvested while fishing for pelagic species by trolling, hook and line, other, what is the potential to bring up reef fish from deeper waters)
  6. Modifying the boundaries of the seasonal area closure to exclude zones that have been historically used for pelagic and other fishing (e.g., HMS).
    - Based on spatial analysis of the area, including, but not limited to bathymetry, rugosity, habitat areas where spawning activities occur, areas where the presence of Nassau grouper has been documented, use of the water column (vertical structure of the fish community).

7. Other options

Comparison of Options 1-4

Option	Biological	Social/Economic	Administrative
Option 1 - no change	Greatest protection for red hind and other species. No bycatch expected because all fishing is prohibited.	Continued hardships and impacts to fishers during the 3-month closure	No admin effects, but enforcement issues (e.g., poaching) during closure could continue
Option 2 - allow fishers to catch dolphin and wahoo during the closure	Could increase the risk that red hind are caught during the spawning period as bycatch.  Could increase discards of Reef Fish and other species during the 3-month closure.	Could decrease socio-economic hardship (or increase benefits) to fishers that target dolphin and wahoo during the Dec-Feb closure.	Increased admin effects through amendment preparation and rulemaking.  Increase effects associated with need for additional public education and enforcement.  Same enforcement issues (poaching) could occur and more enforcement would be needed to determine what fishermen are catching in the

			area.
Option 3 - allow fishers to catch dolphin, wahoo, and non-managed pelagic species during the closure	<p>Since more species would be allowed compared to Options 1 and 2, Option 3 could increase the risk that red hind are caught during the spawning period as bycatch.</p> <p>Could increase discards compared to Option 1, though less than Option 2 because more species of fish could be kept.</p>	<p>Could decrease socio-economic hardship (or increase benefits) to fishers that target managed and non-managed pelagics during the Dec-Feb closure.</p> <p>The socio-economic benefits could be greater than under Options 1 and 2 because more species could be kept.</p>	<p>Increased admin effects through amendment preparation and rulemaking.</p> <p>Increase effects associated with additional public education and enforcement.</p> <p>Same enforcement issues (poaching) could occur and more enforcement would be needed to determine what fishermen are catching in the area.</p>
Option 4 - allow fishers to catch all species except reef fish	<p>Since more species would be allowed compared to Options 1, 2 and 3, Option 4 could increase the risk that red hind are caught during the spawning period as bycatch</p> <p>Could increase discards compared to Option 1, though less than Options 2 and 3 because more species of fish could be kept.</p>	<p>The socio-economic benefits could be greater than under Options 1-3 because more species could be kept.</p>	<p>Increased admin effects through amendment preparation and rulemaking.</p> <p>Increase effects associated with additional public education and enforcement.</p> <p>Same enforcement issues (poaching) could occur and more enforcement would be needed to determine what fishermen are catching in the area.</p>

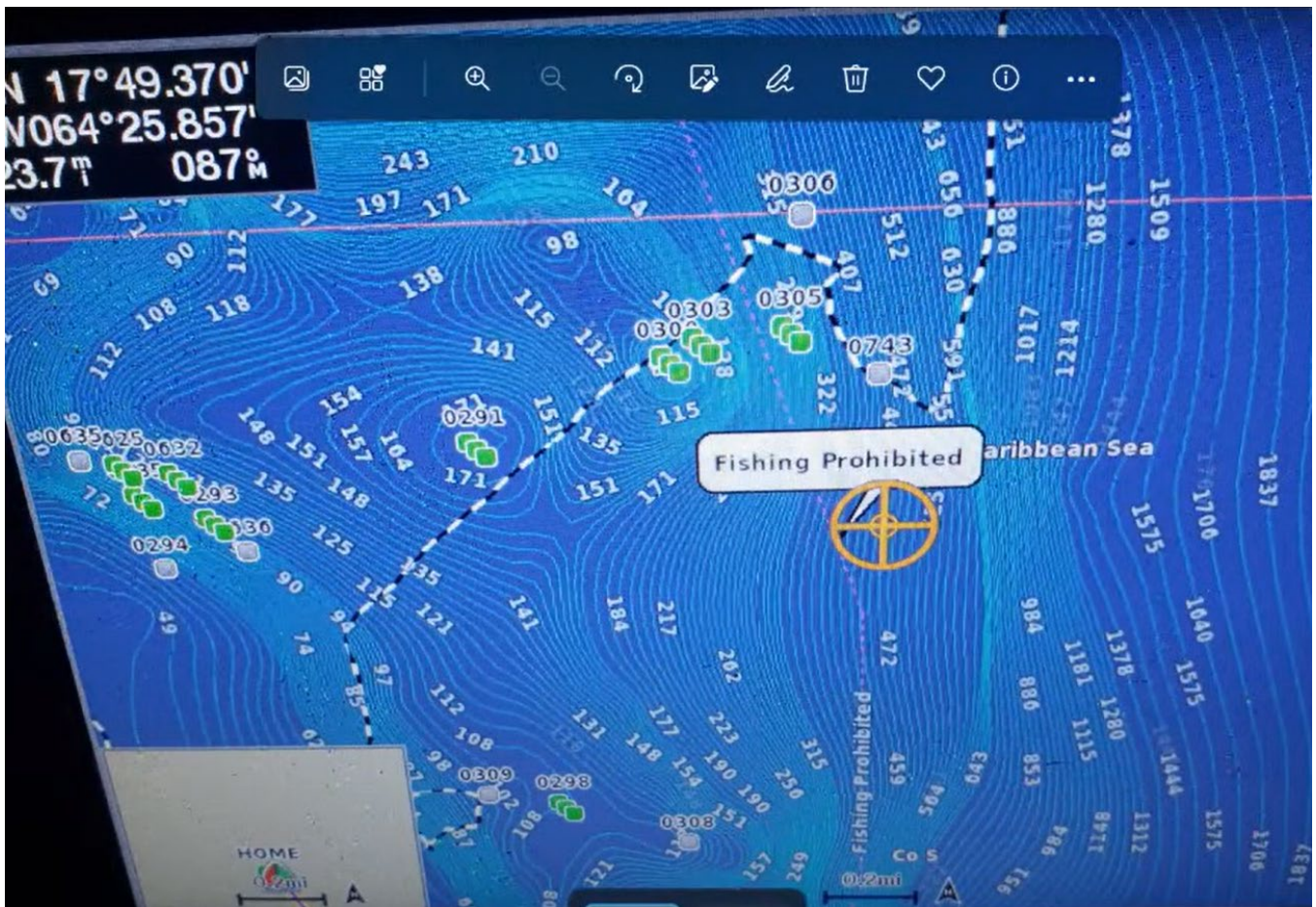
## Atlantic Highly Migratory Species Management and Fishing Activities in the Lang Bank Area

50 CFR 635.2 - *Highly migratory species (HMS)* means bluefin, bigeye, yellowfin, albacore, and skipjack tunas; swordfish; sharks (listed in Table 1 of appendix A to part 635); white marlin; blue marlin; sailfish; longbill spearfish; and roundscale spearfish.

Testimony at several Council Meetings mentioned the following tunas: yellowfin, bigeye, skipjack, and albacore; as well as swordfish, and billfish such as white marlin, blue marlin, sailfish, and longbill spearfish as species that inhabit the top of the water column and are typically fished in the Lang Bank area. Many of these species are active during the December through end of February closure.

To make changes to the management of HMS, the Council could formally request NMFS to evaluate modifying regulations for the Atlantic HMS in the Lang Bank seasonally closed area, as needed.

NMFS Atlantic HMS is currently developing [Amendment 15 to the 2006 Consolidated HMS FMP: Spatial Mangement and Electronic Monitoring](#). The proposed changes could have impacts to the management of HMS fishing activities in the U.S. Caribbean. For a list of authorized gear types in federal waters under the Atlantic HMS FMP, see the [HMS Compliance Guides](#).



**Figure A1.** Fishing map with depth contours (in feet) discussed during the April 2022 meeting to modify the seasonal closure of the red hind spawning aggregation area off St. Croix.