

REVIEW OF THE BIOLOGICAL DATA, STOCKS SPATIAL DISTRIBUTION, THE
ECOLOGICAL CONNECTIVITY BETWEEN ABNJ/HIGH SEA AND EEZ/COASTAL
WATERS AND STATISTICAL SYSTEMS IN THE WECAFC REGION

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TRANSBOUNDARY STOCKS
KEY REGIONAL SPECIES

WECAFC Transboundary and Straddling Resources

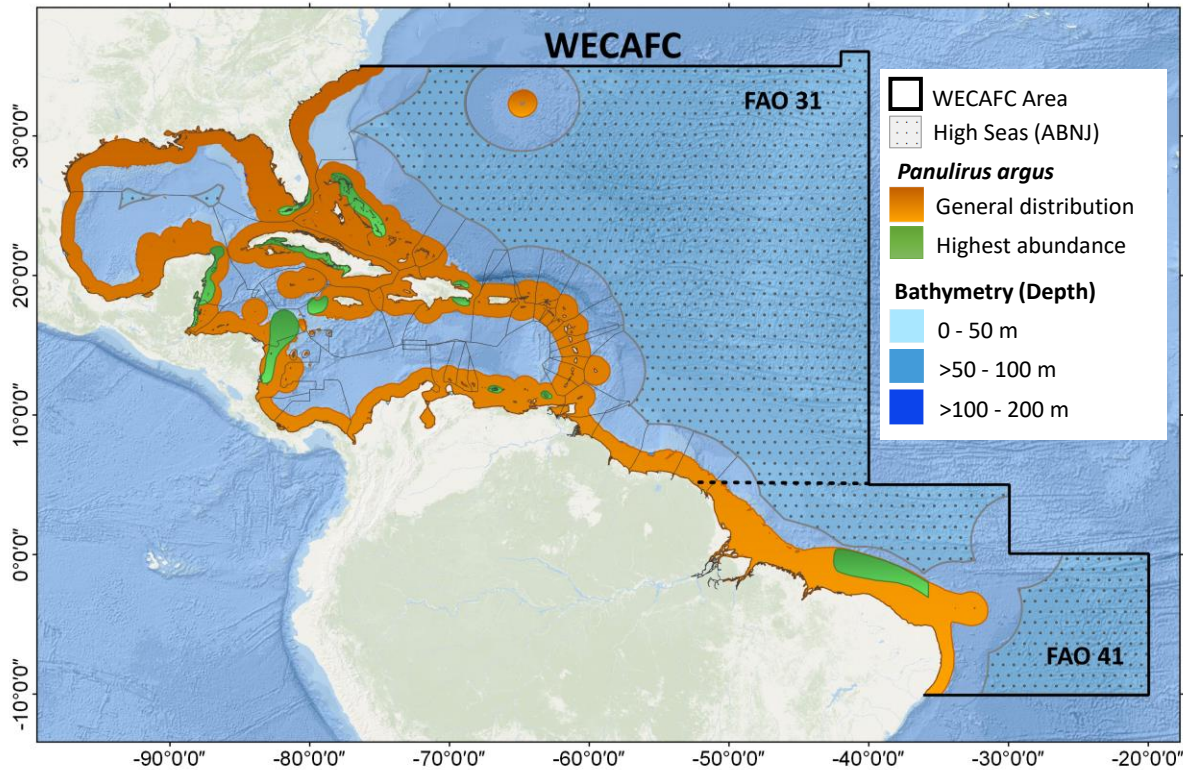


Figure 3.1. Caribbean spiny lobster (*Panulirus argus*, SLC) general distribution in the WECAFC region.

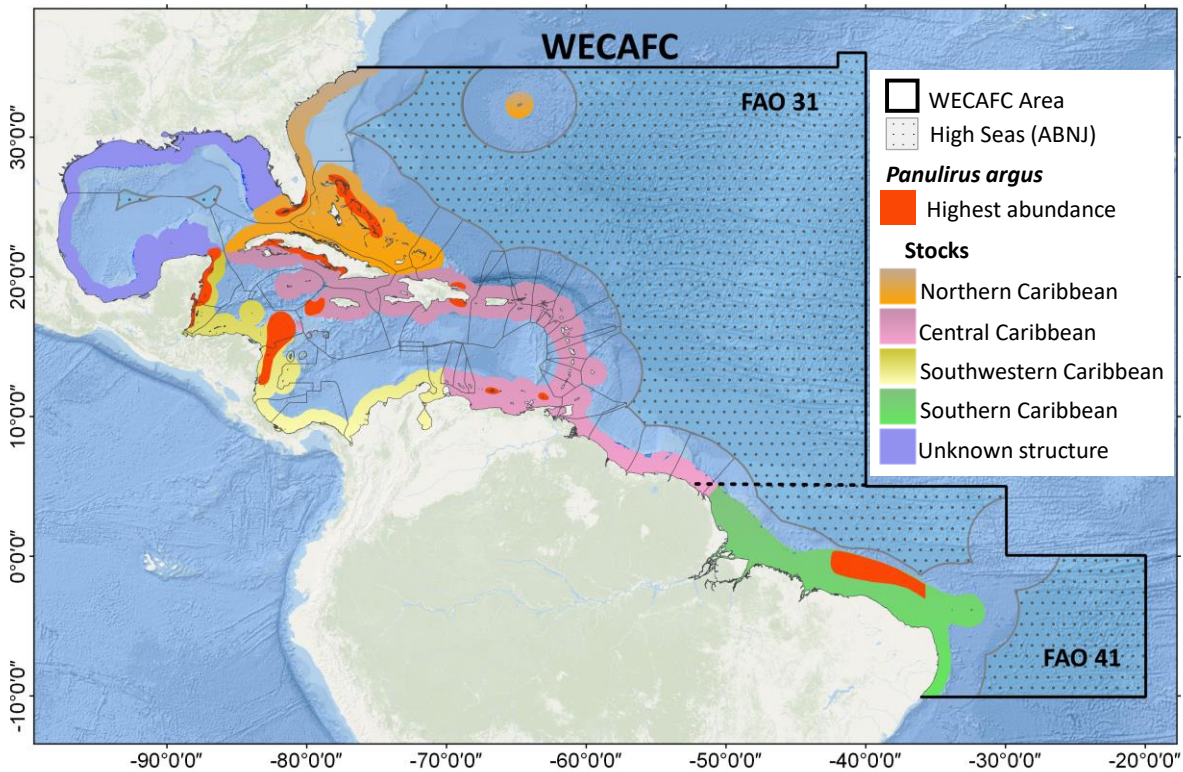


Figure 3.2. Caribbean spiny lobster (*Panulirus argus*, SLC) known stocks in the WECAFC region.

WECAFC Transboundary and Straddling Resources

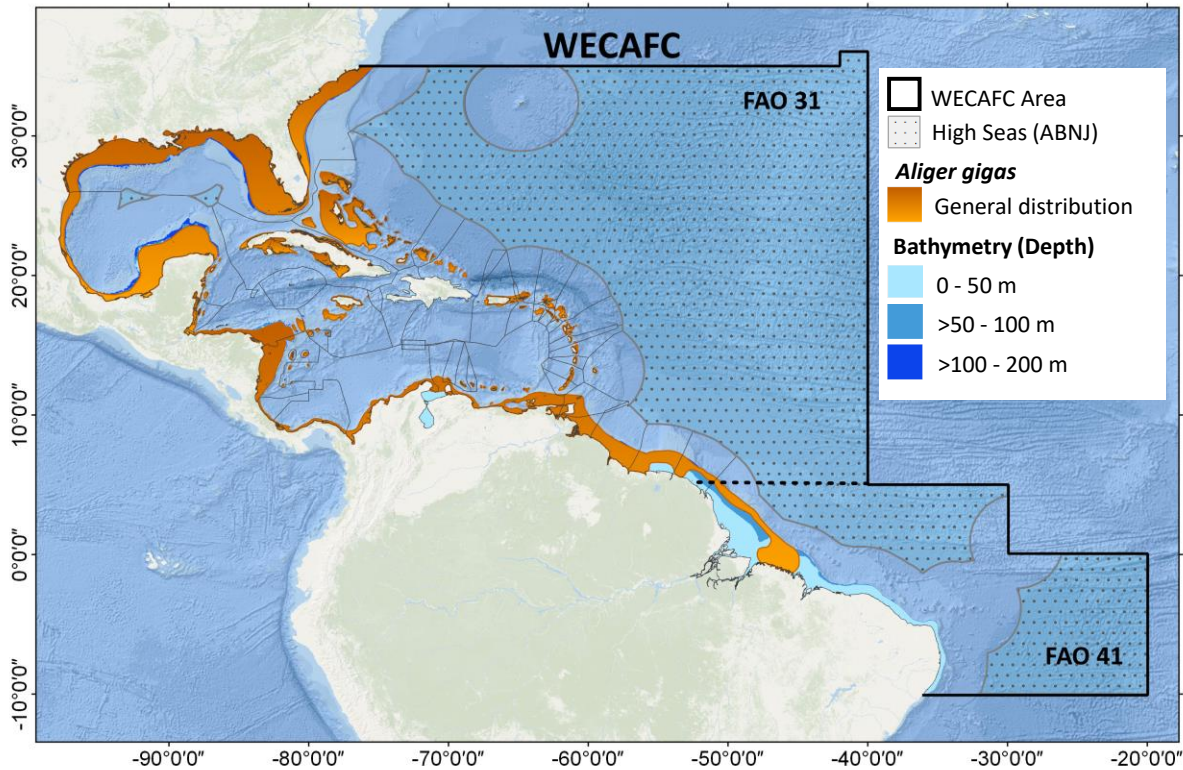


Figure 3.3. Queen conch (*Aliger gigas*, formerly known as *Lobatus* and *Strombus*, COO) general distribution in the WECAFC region.

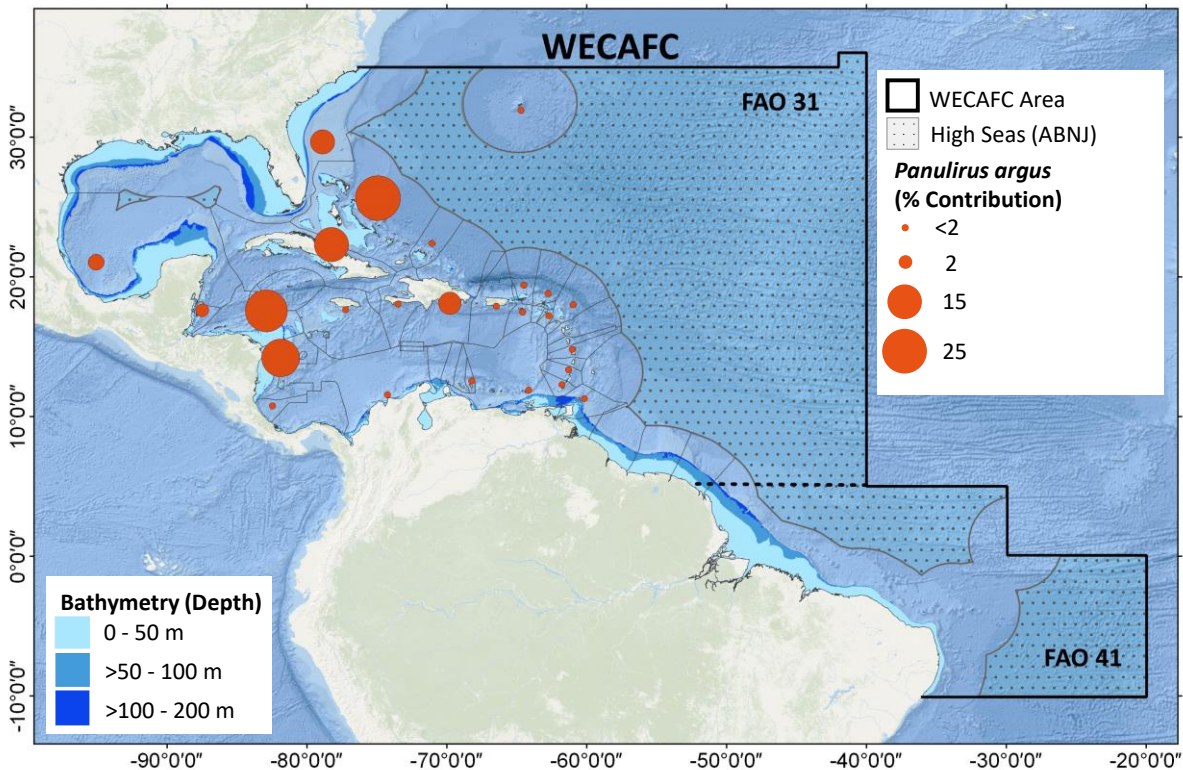


Figure 3.4. Caribbean spiny lobster (*Panulirus argus*, SLC) percentage contribution of total accumulated catch for the period 2015-2019.

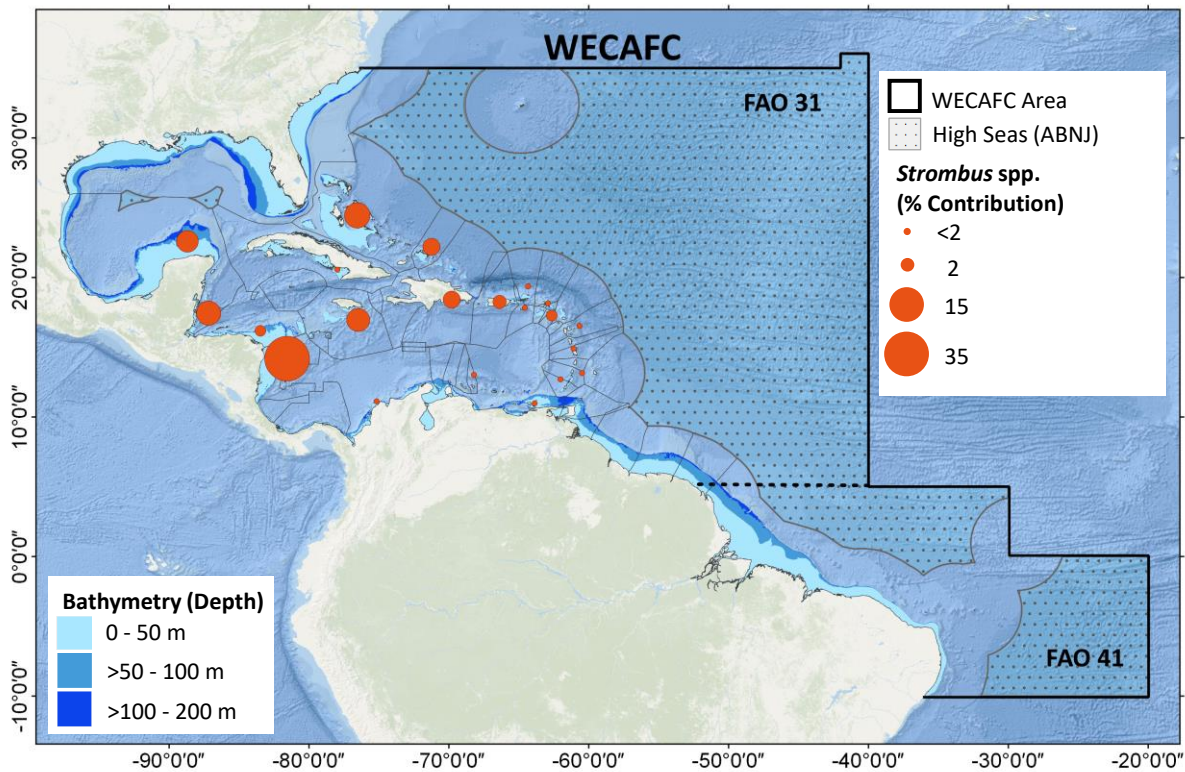


Figure 3.5. *Strombus* spp. (*Stromboid conchs nei*) percentage contribution of total accumulated catch for the period 2015-2019.

TRANSBOUNDARY STOCKS

GROUND FISH

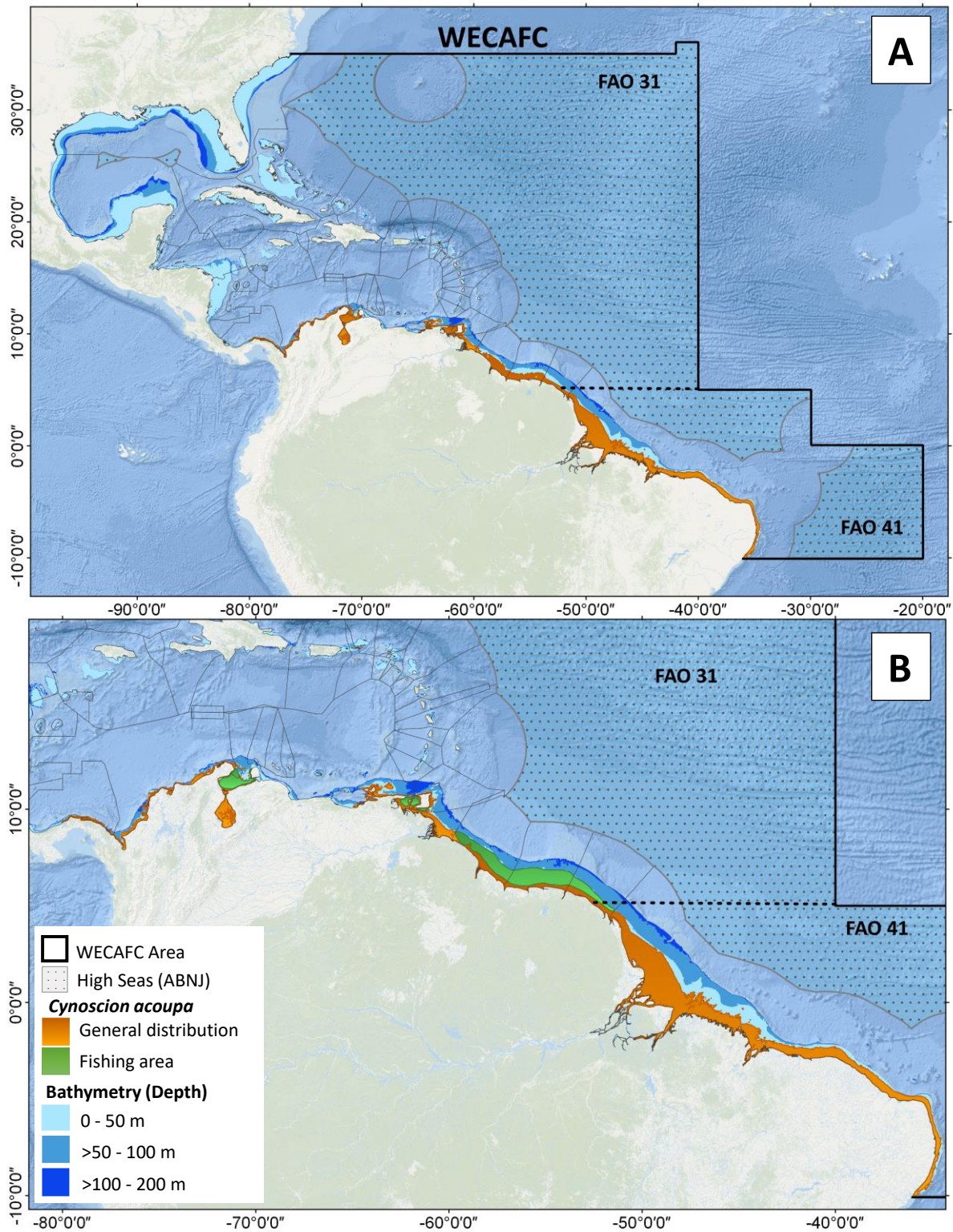


Figure 3.6. *Cynoscion acoupa* (Acoupa weakfish, YNA) general distribution (A) and fishing area (B) in the WECAFC region.

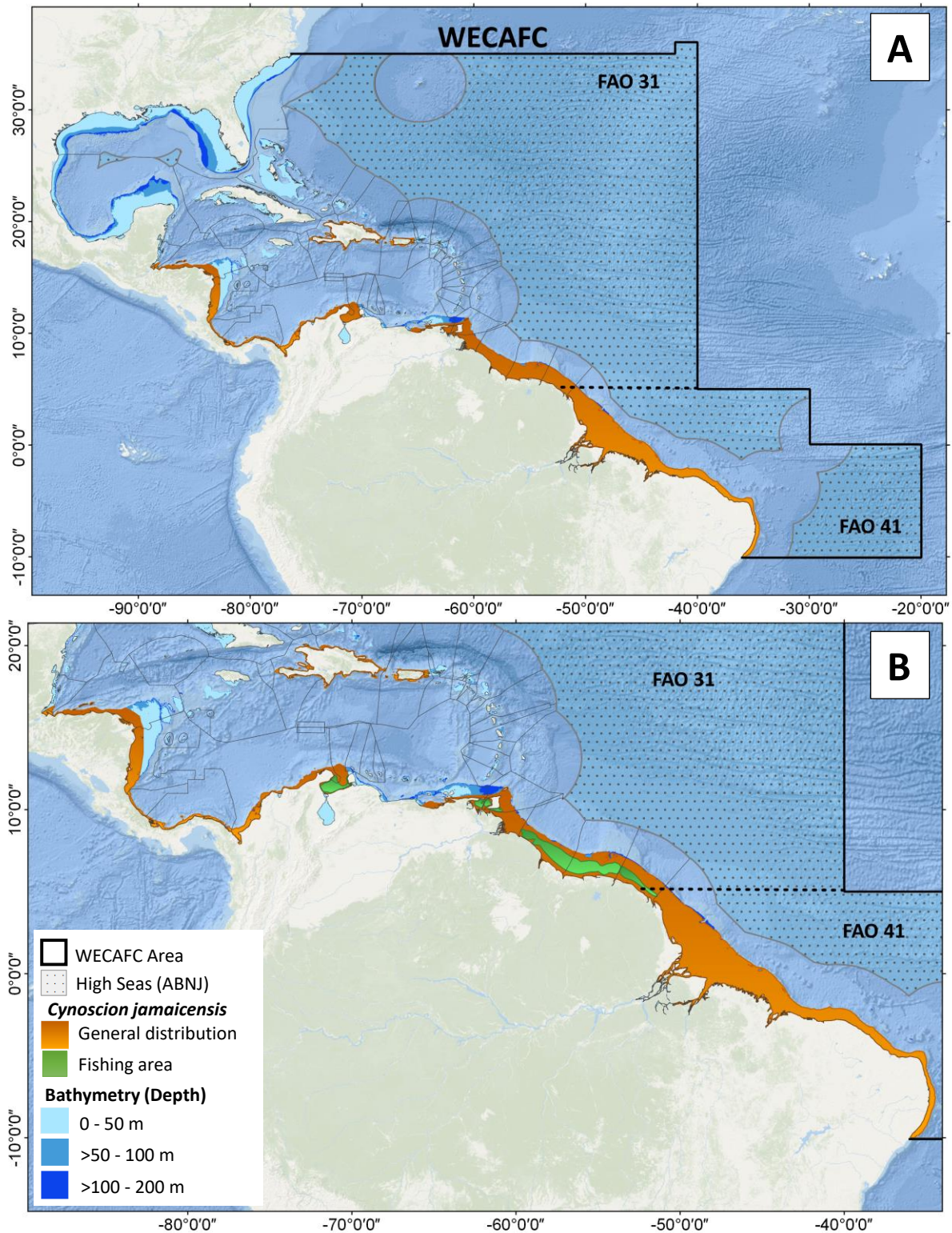


Figure 3.7. *Cynoscion jamaicensis* (Jamaica weakfish, YNJ) general distribution (A) and fishing area (B) in the WECAFC region.

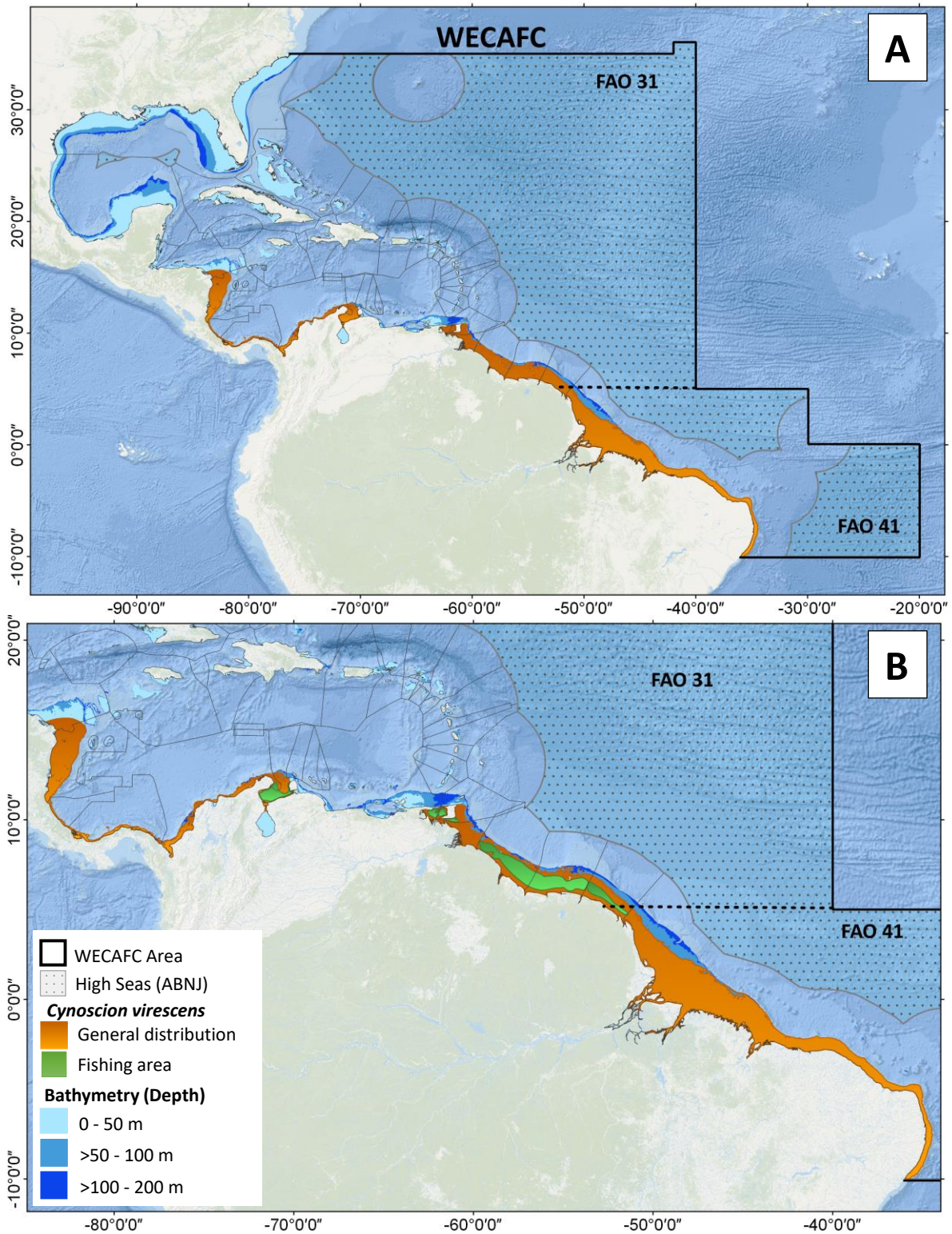


Figure 3.8. *Cynoscion virescens* (Green weakfish, YNV) general distribution (A) and fishing area (B) in the WECAFC region.

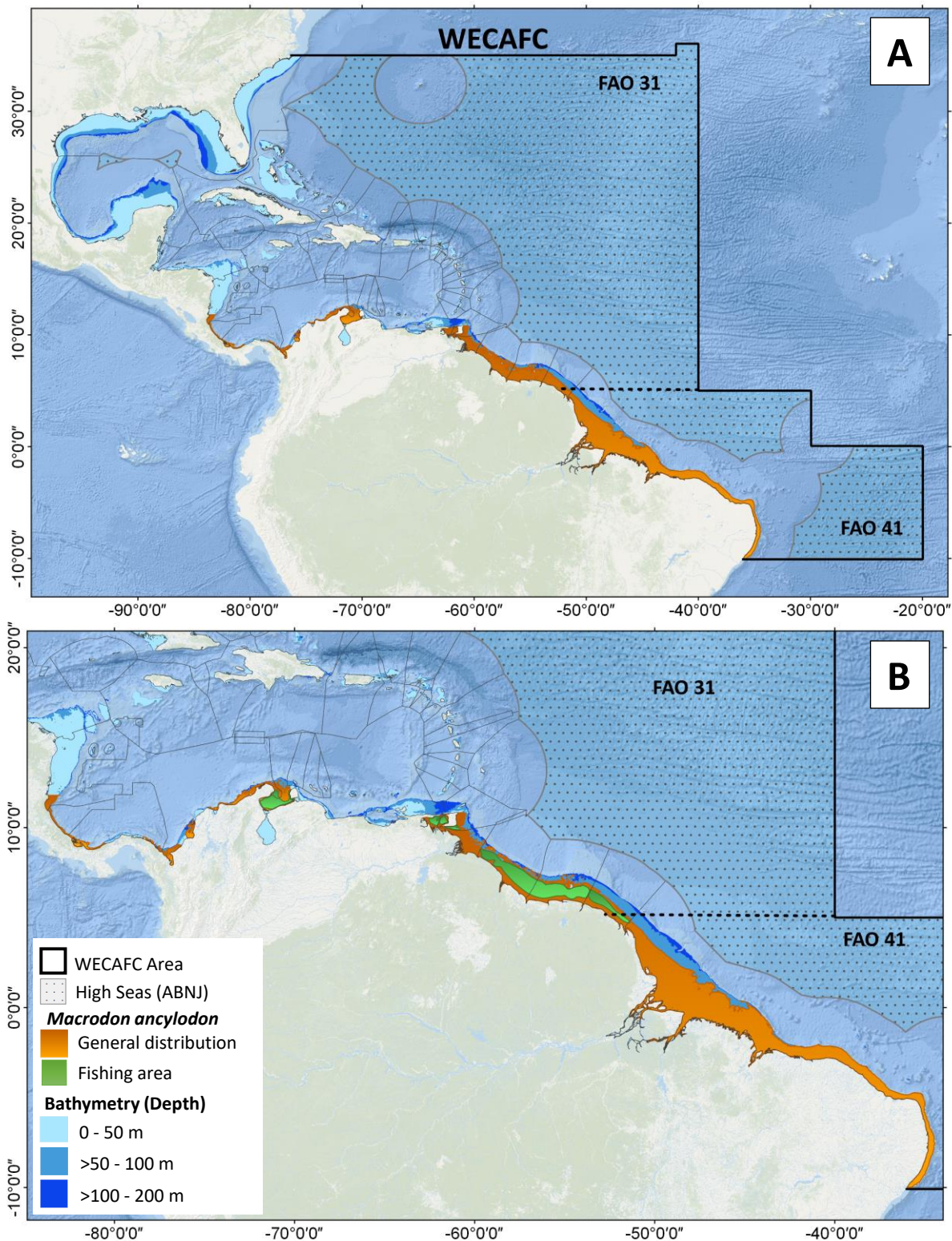


Figure 3.9. *Macrodon ancylodon* (King weakfish, WKK) general distribution (A) and fishing area (B) in the WECAFC region.

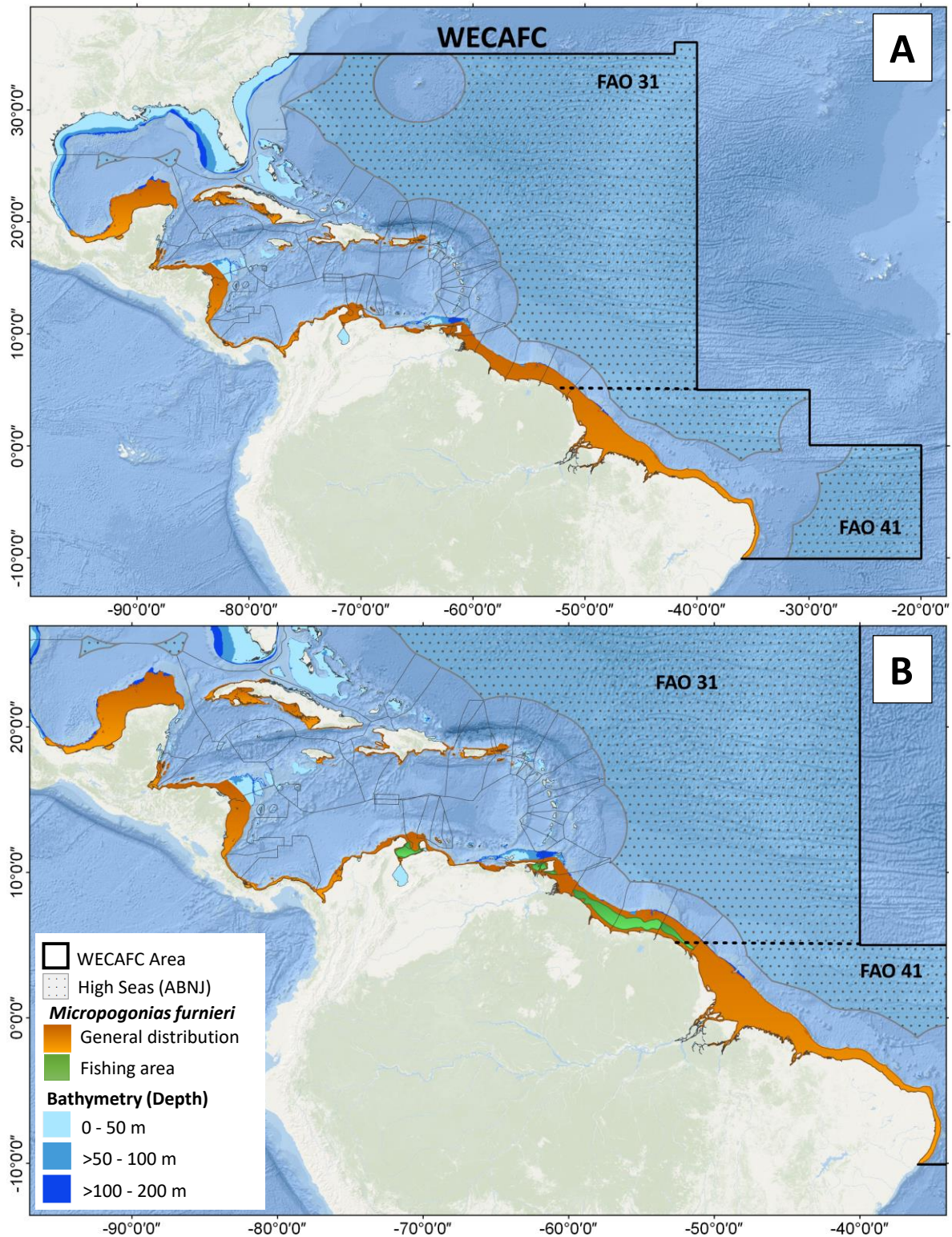


Figure 3.10. *Micropogonias furnieri* (Whitemouth croaker, CKM) general distribution (A) and fishing area (B) in the WECAFC region.

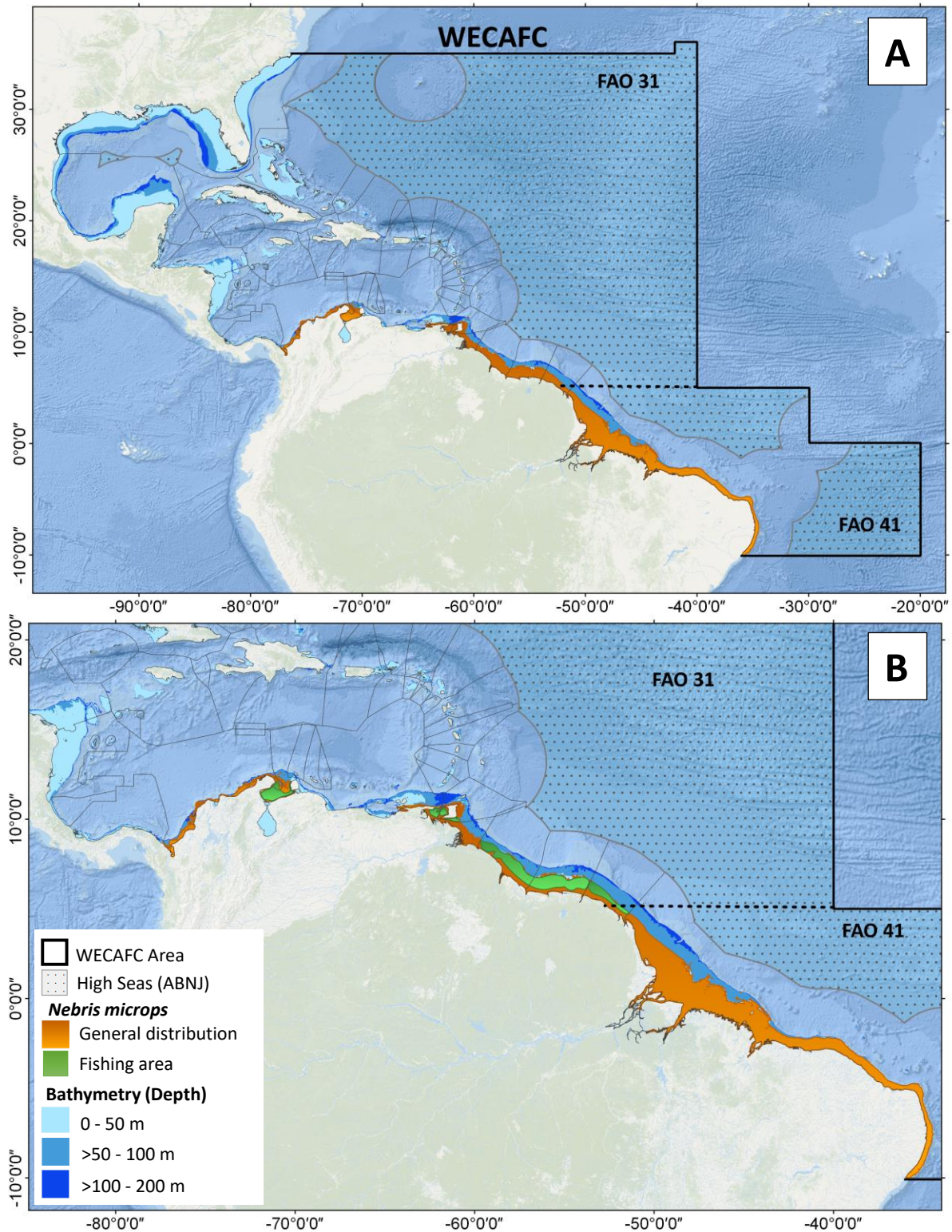


Figure 3.11. *Nebris microps* (Smalleye croaker, NBM) general distribution (A) and fishing area (B) in the WECAFC region.

TRANSBOUNDARY STOCKS GROUPERS

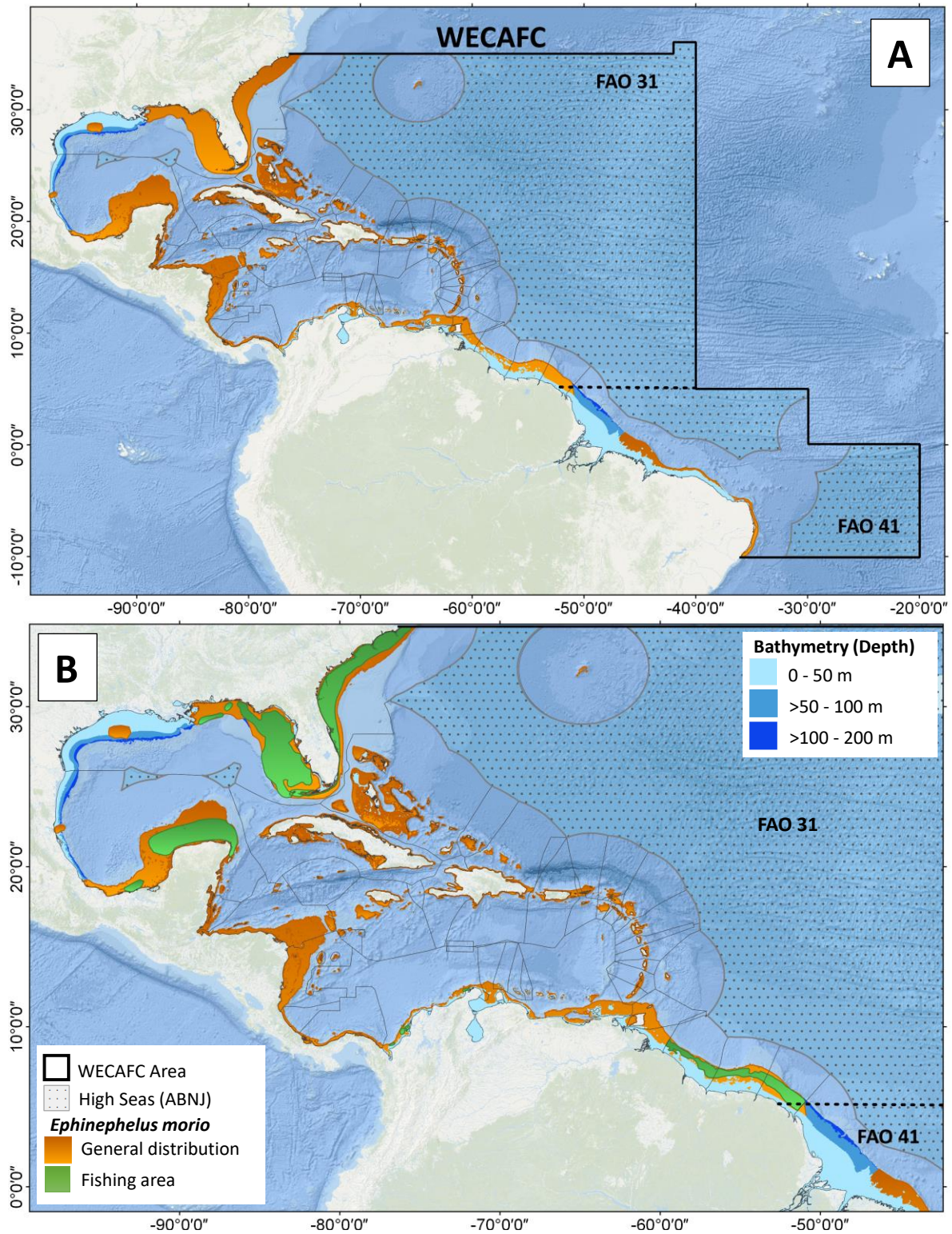


Figure 3.12. *Epinephelus morio* (Red grouper, GPR) general distribution (A) and fishing area (B) the WECAFC region.

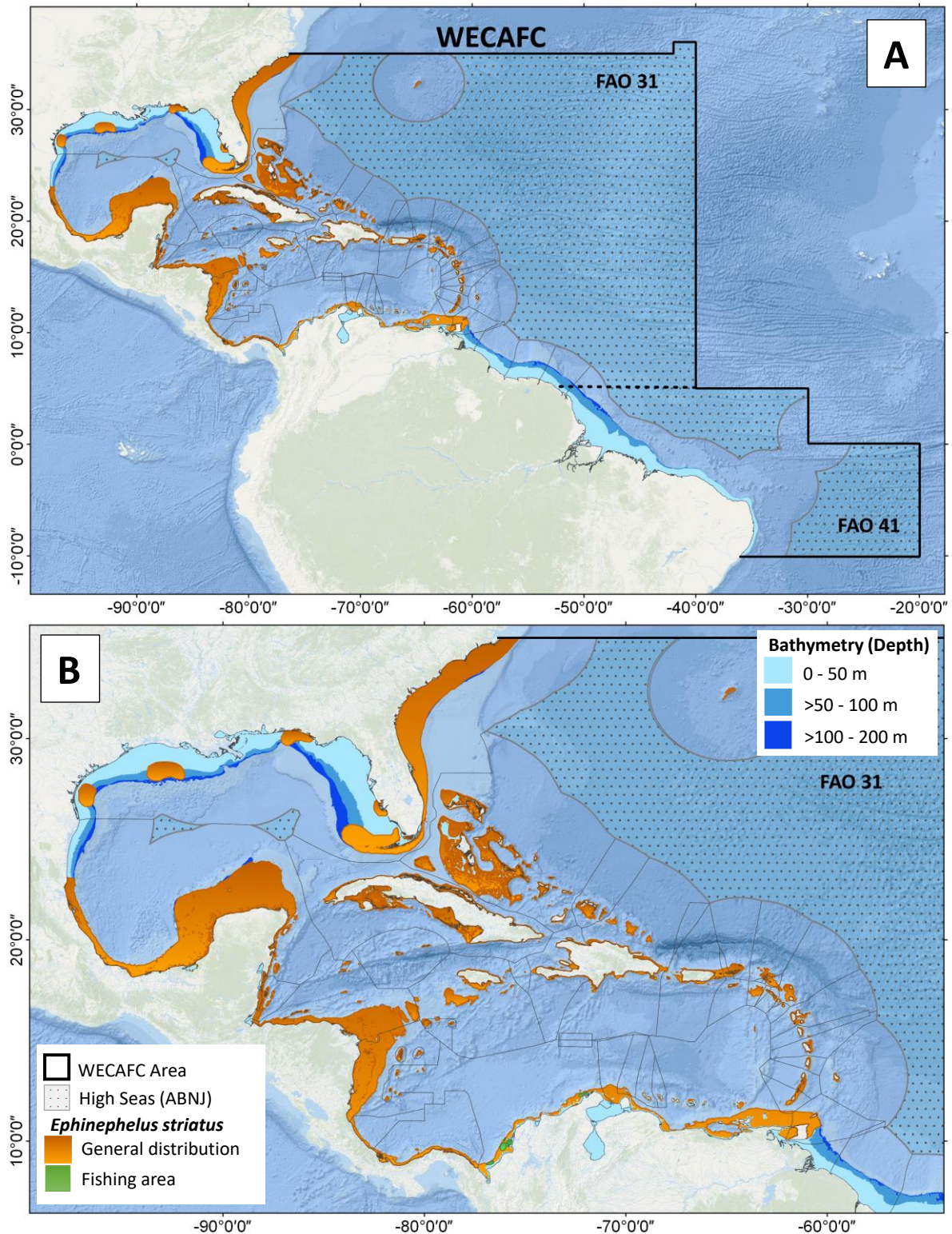


Figure 3.13. *Epinephelus striatus* (Nassau grouper, GPN) general distribution (A) and fishing area (B) the WECAFC region.

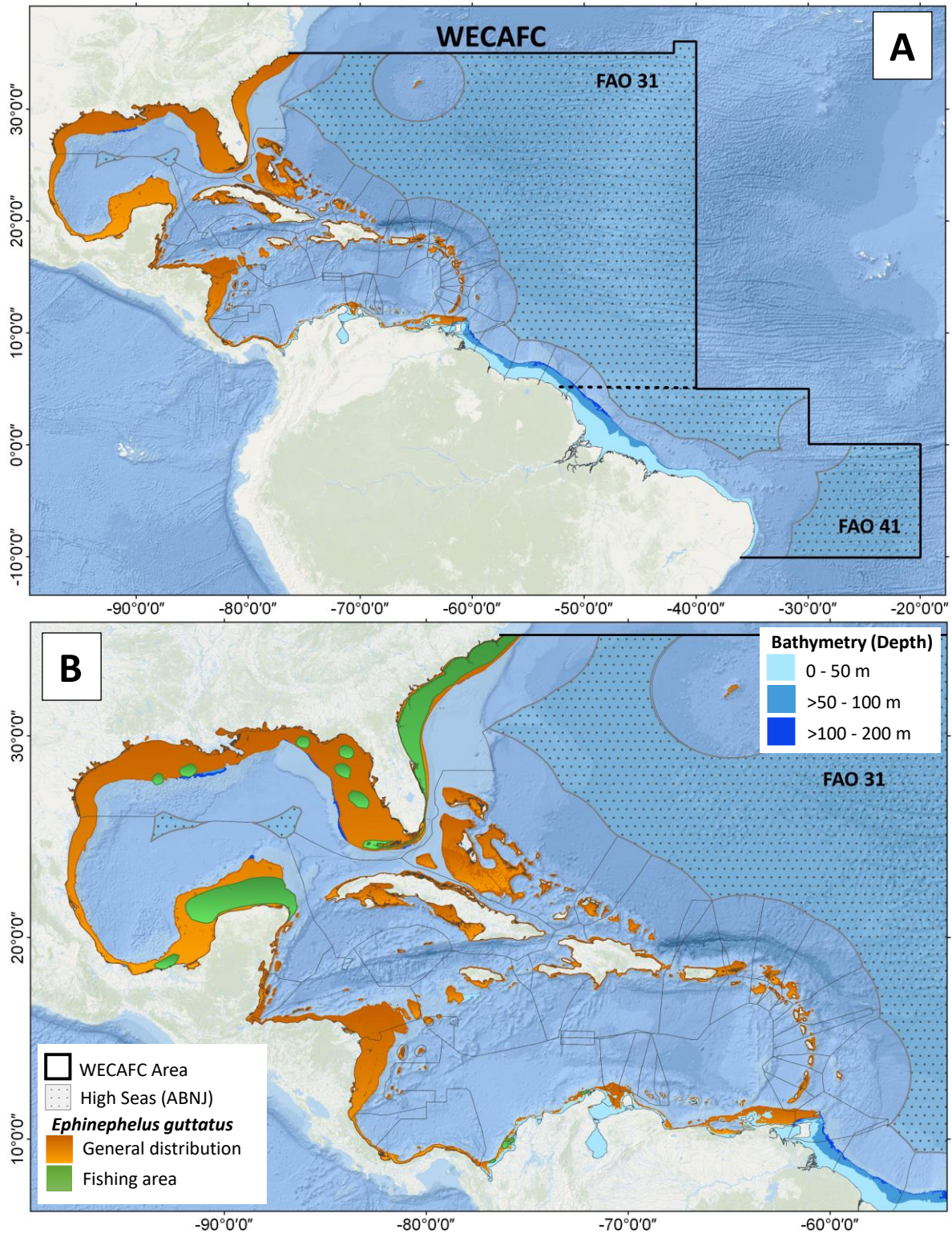


Figure 3.14. *Epinephelus guttatus* (Red hind, EEU) general distribution (A) and fishing area (B) the WECAFC region.

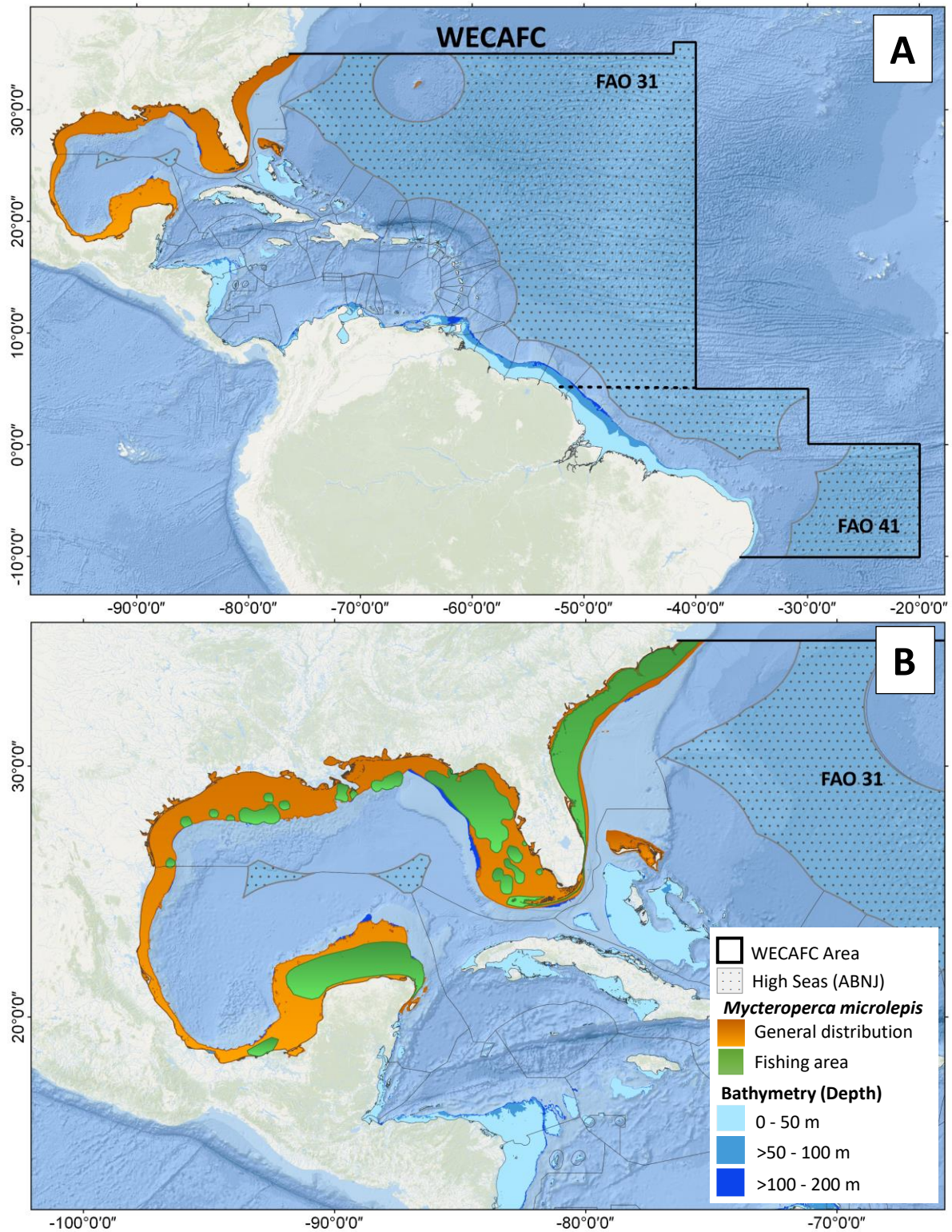


Figure 3.15. *Mycteroperca microlepis* (Gag grouper, MKM) general distribution (A) and fishing area (B) in the WECAFC region.

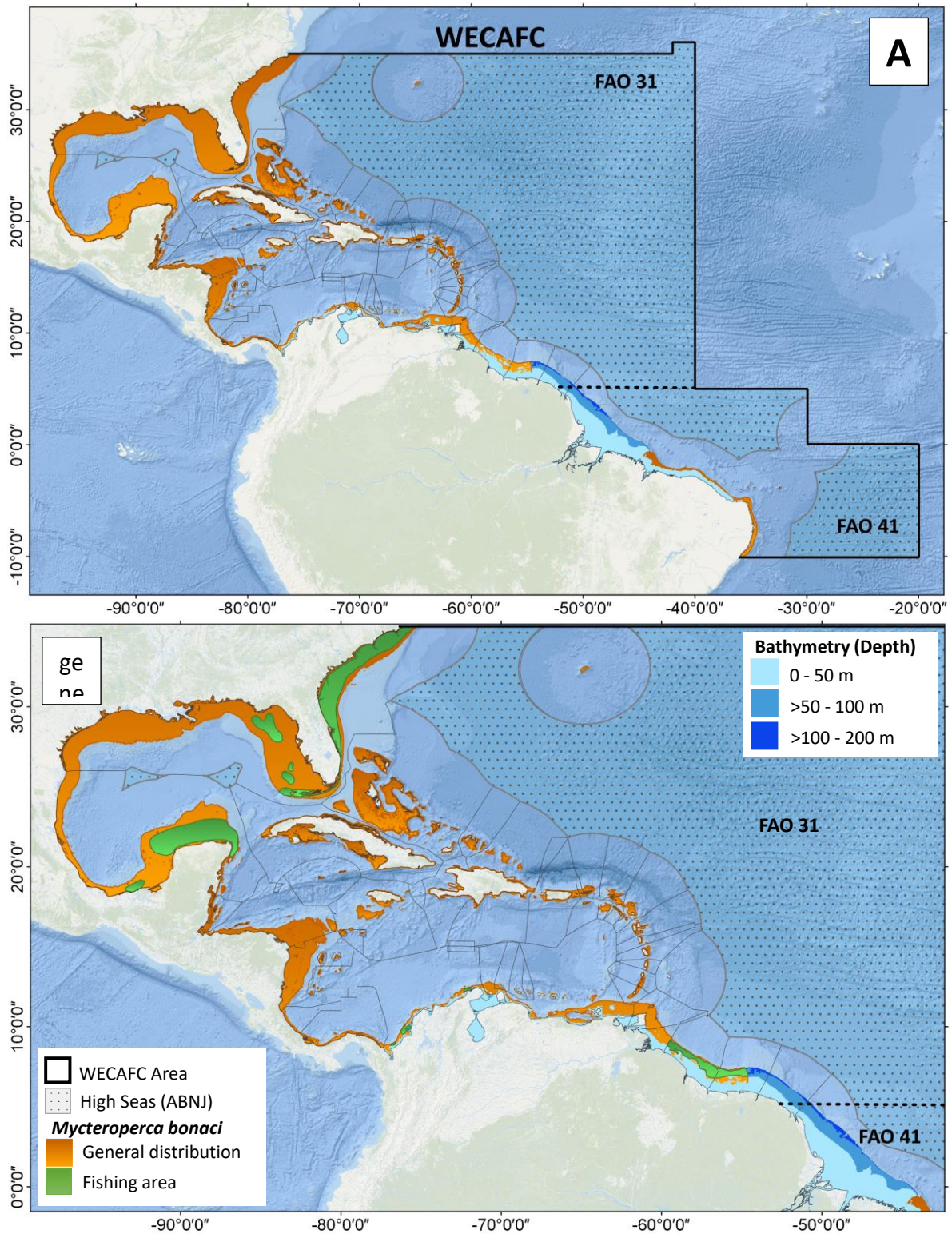


Figure 3.16. *Mycteroperca bonaci* (Black grouper, MAB) general distribution (A) and fishing area (B) in the WECAFC region.

TRANSBOUNDARY STOCKS

SNAPPERS

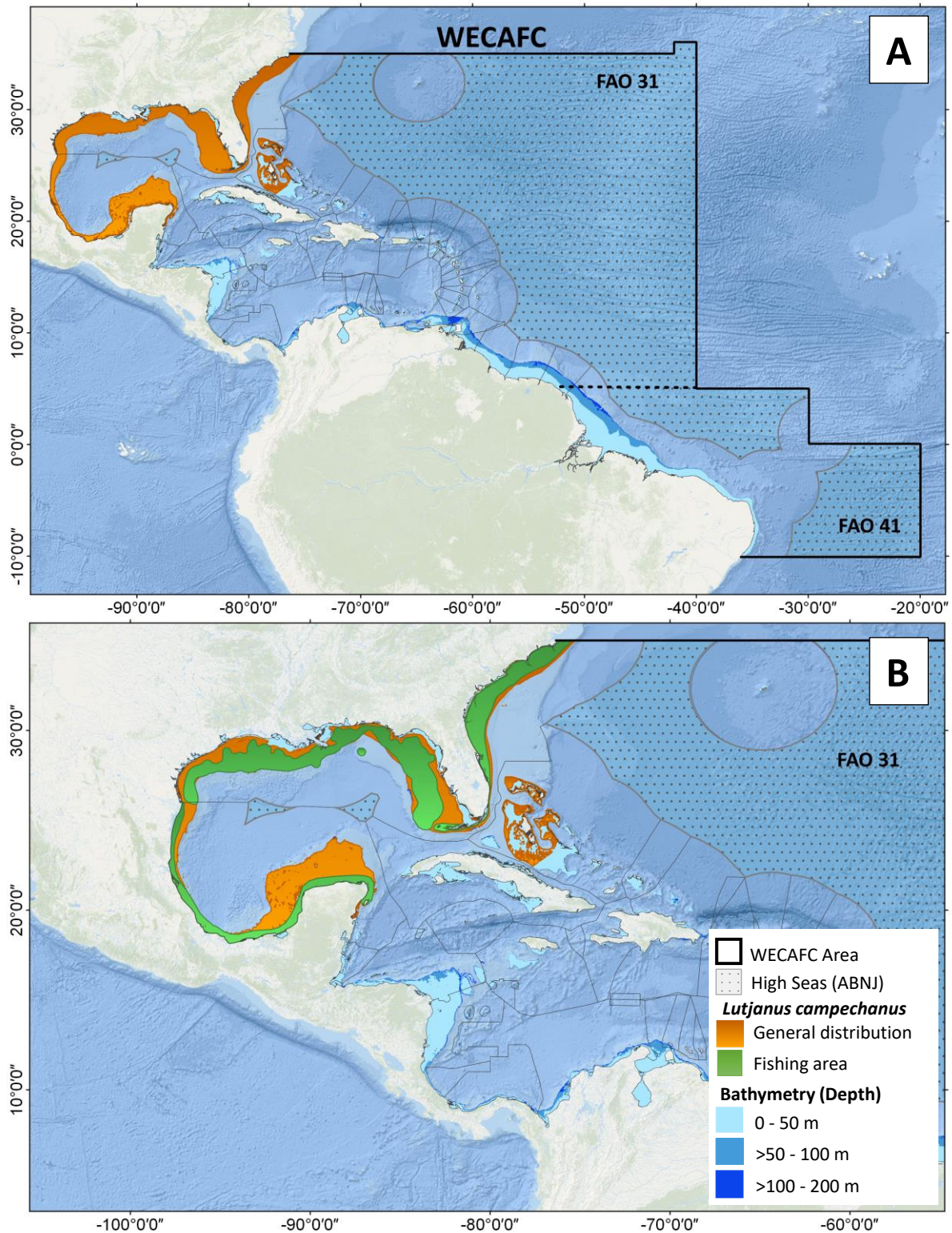


Figure 3.17. *Lutjanus campechanus* (Northern red snapper, SNR) general distribution (A) and fishing area (B) in the WECAFC region.

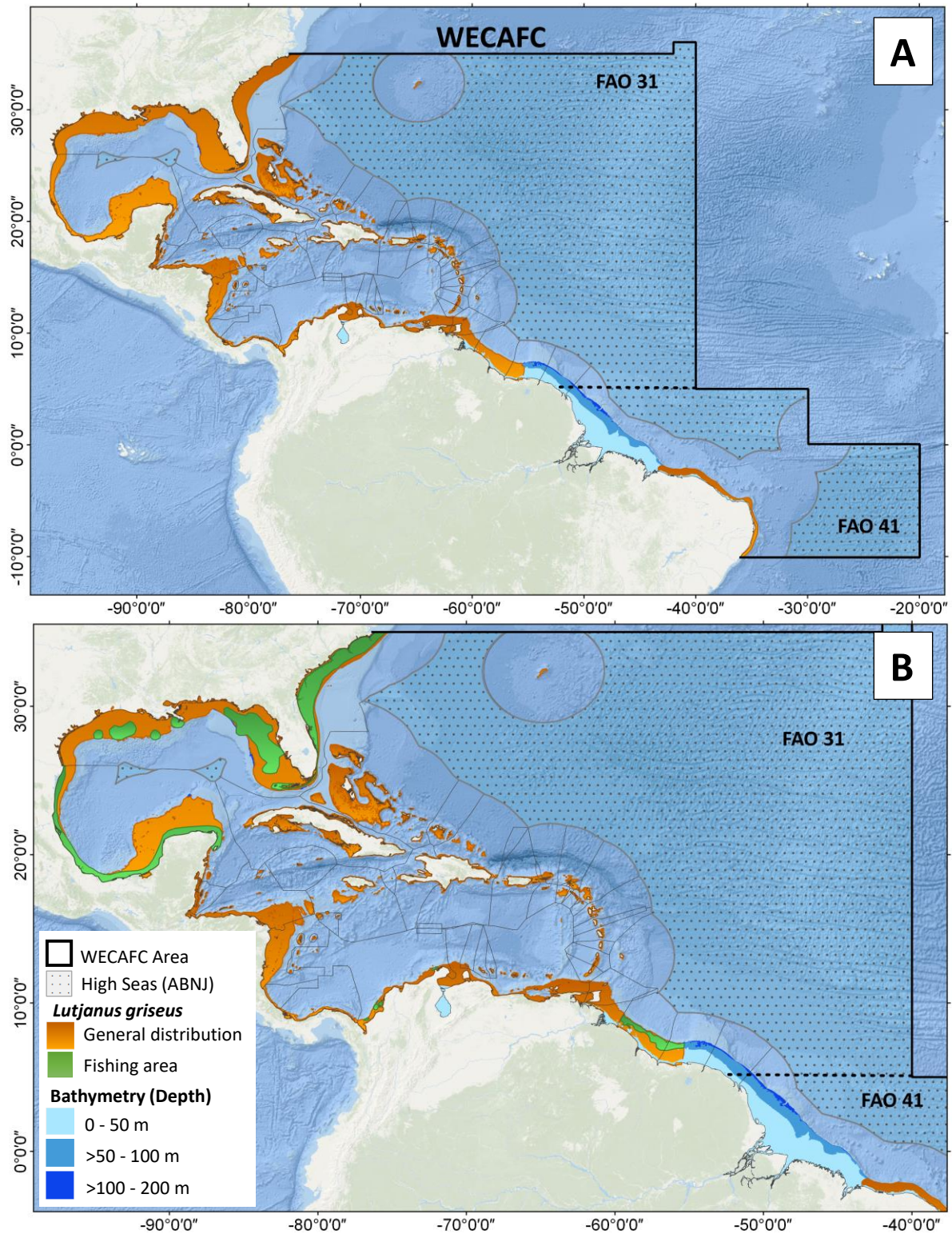


Figure 3.18. *Lutjanus griseus* (Gray snapper, LJI) general distribution (A) and fishing area (B) in the WECAFC region.

WECAFC Transboundary and Straddling Resources

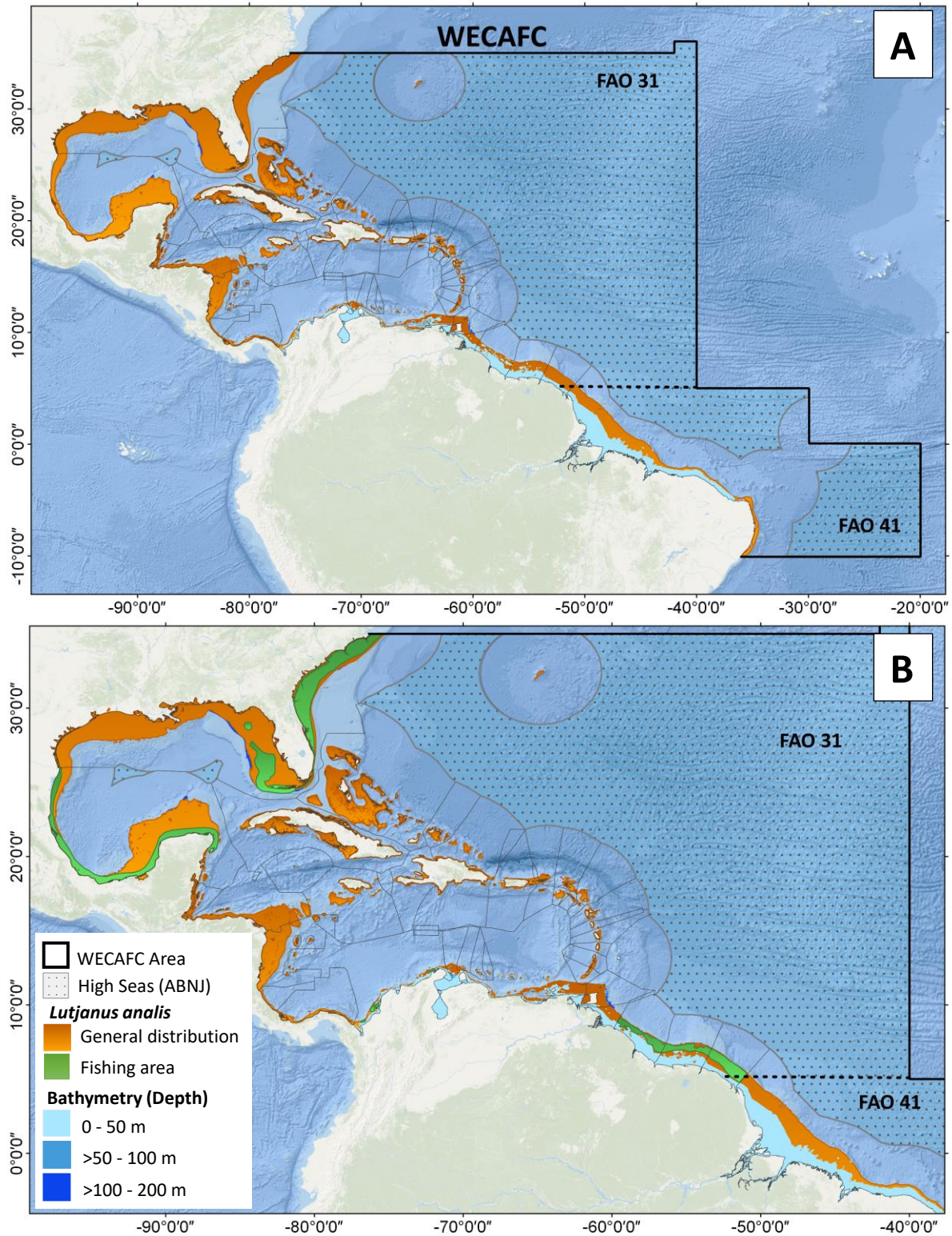


Figure 3.19. *Lutjanus analis* (Mutton snapper, LNJ) general distribution (A) and fishing area (B) in the WECAFC region.

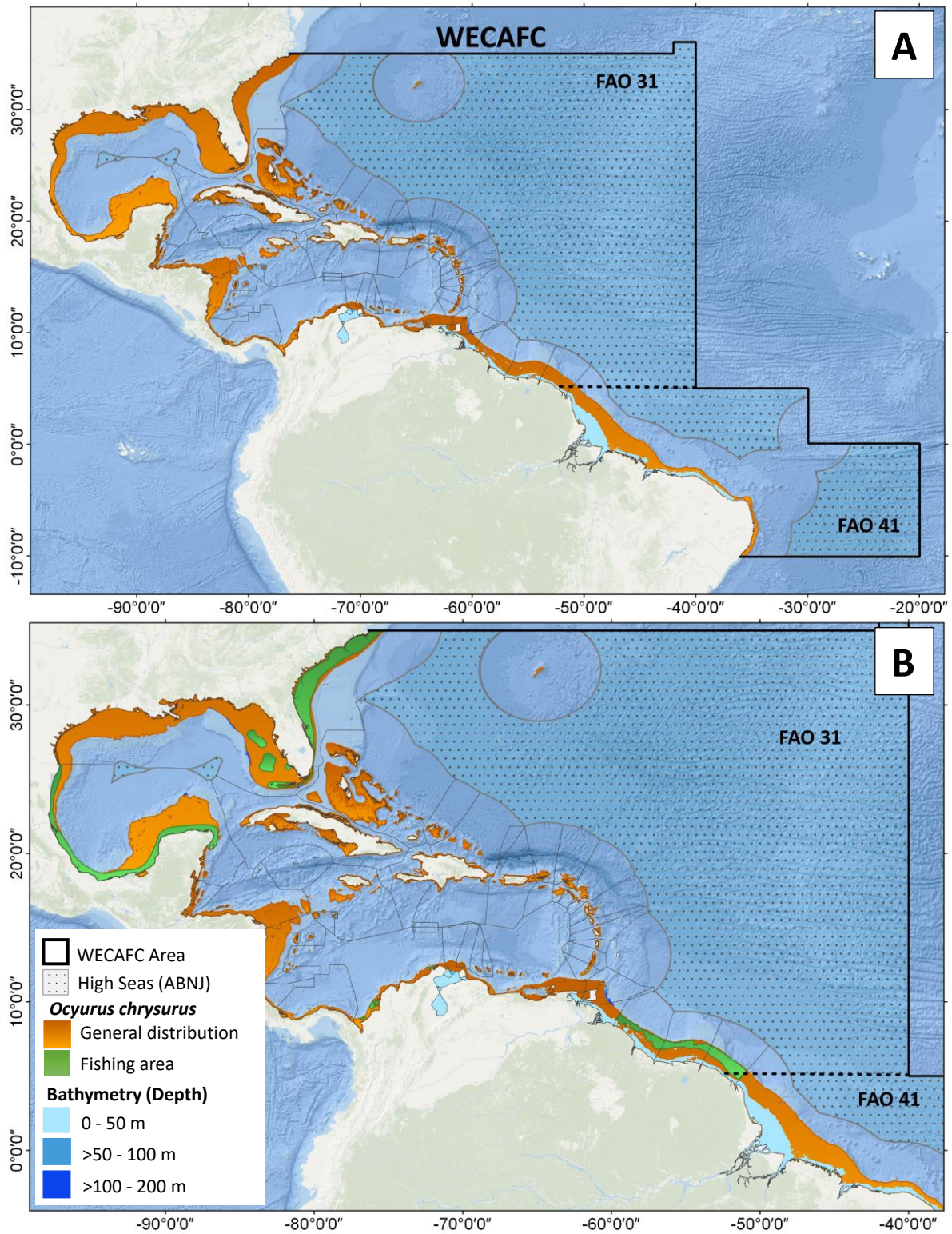


Figure 3.20. *Ocyurus chrysurus* (Yellowtail snapper, SNY) general distribution (A) and fishing area (B) in the WECAFC region.

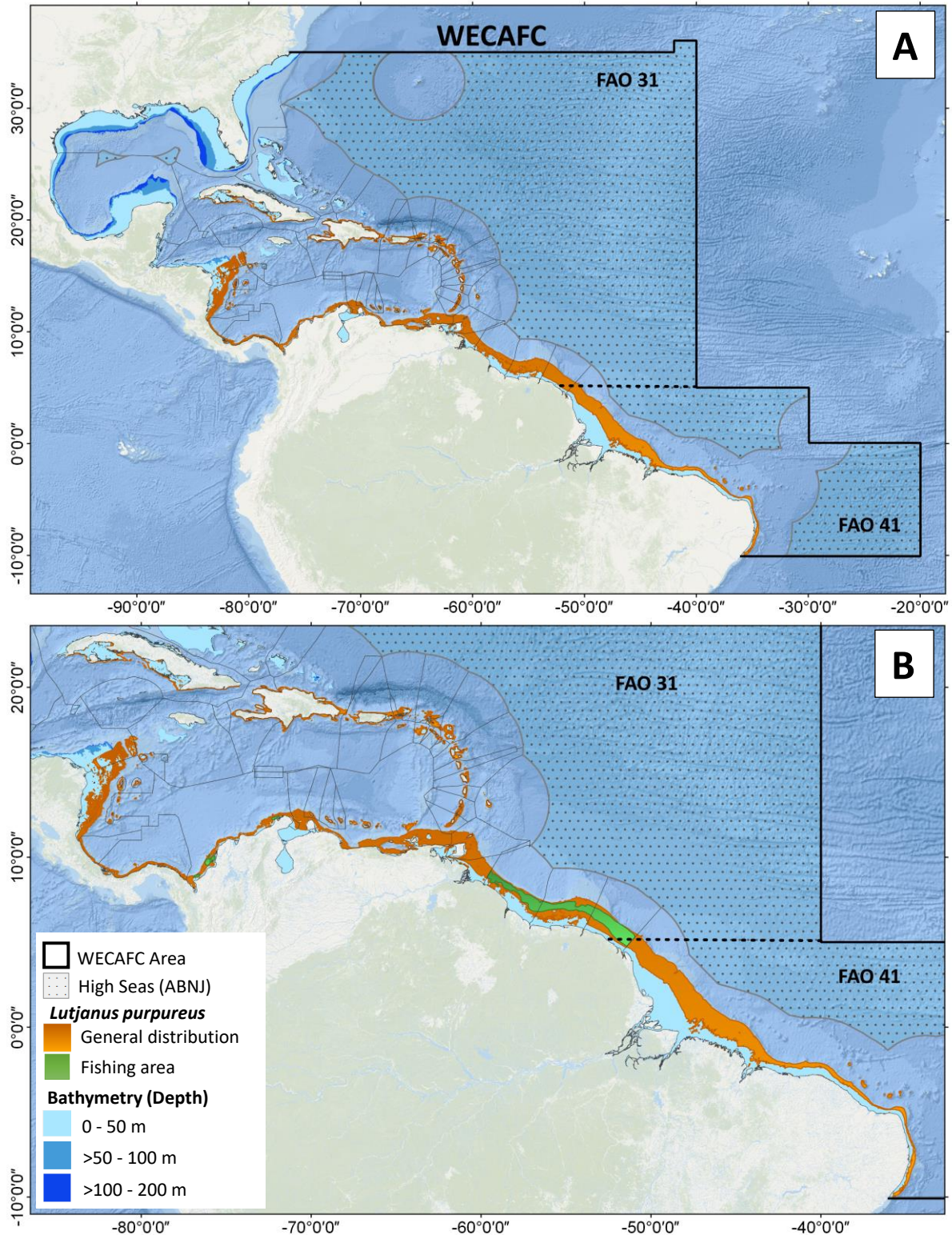


Figure 3.21. *Lutjanus purpureus* (Southern red snapper, SNC) general distribution (A) and fishing area (B) in the WECAFC region.

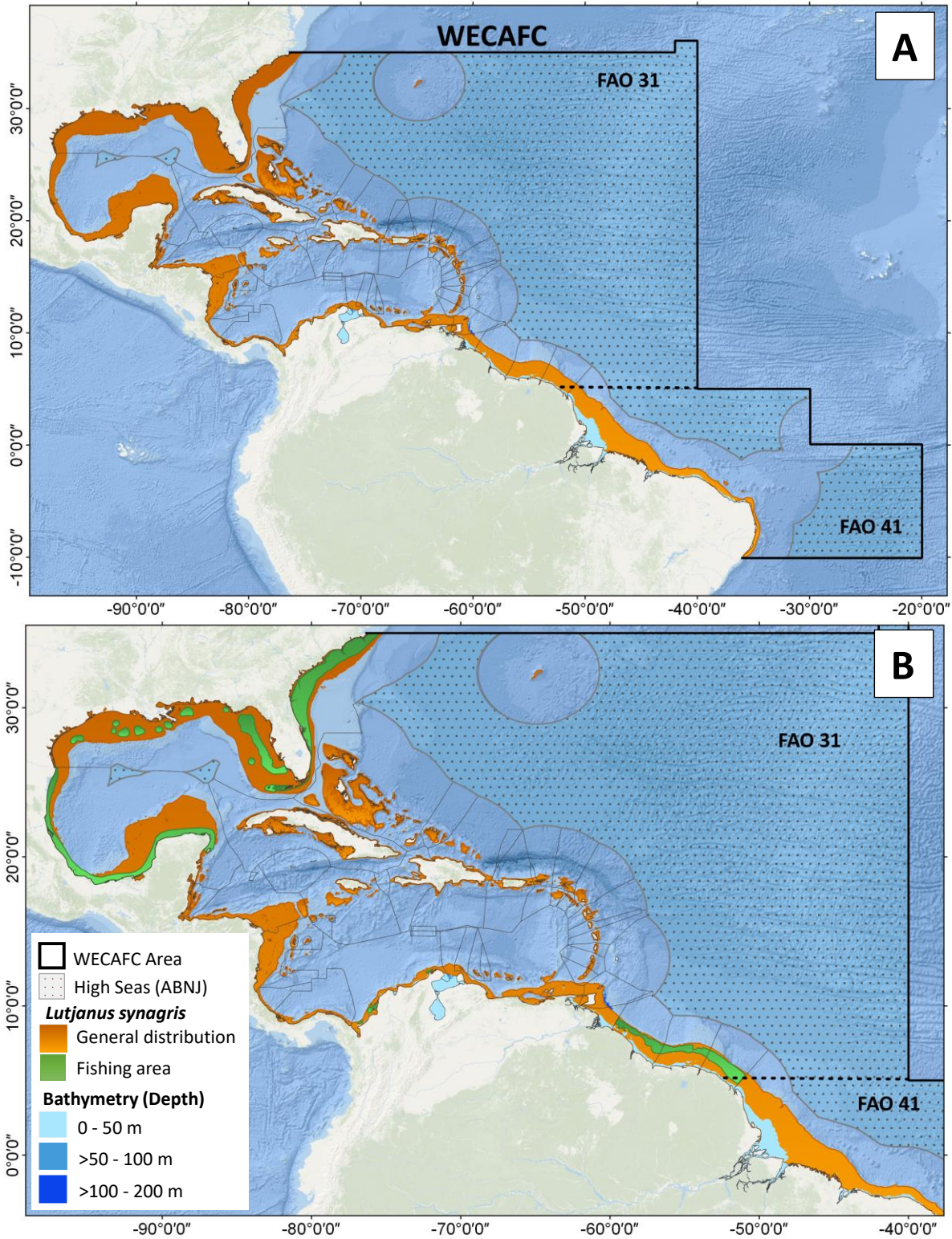


Figure 3.22. *Lutjanus synagris* (Lane snapper, SNL) general distribution (A) and fishing area (B) in the WECAFC region.

TRANSBOUNDARY STOCKS
SHELF SHRIMPS

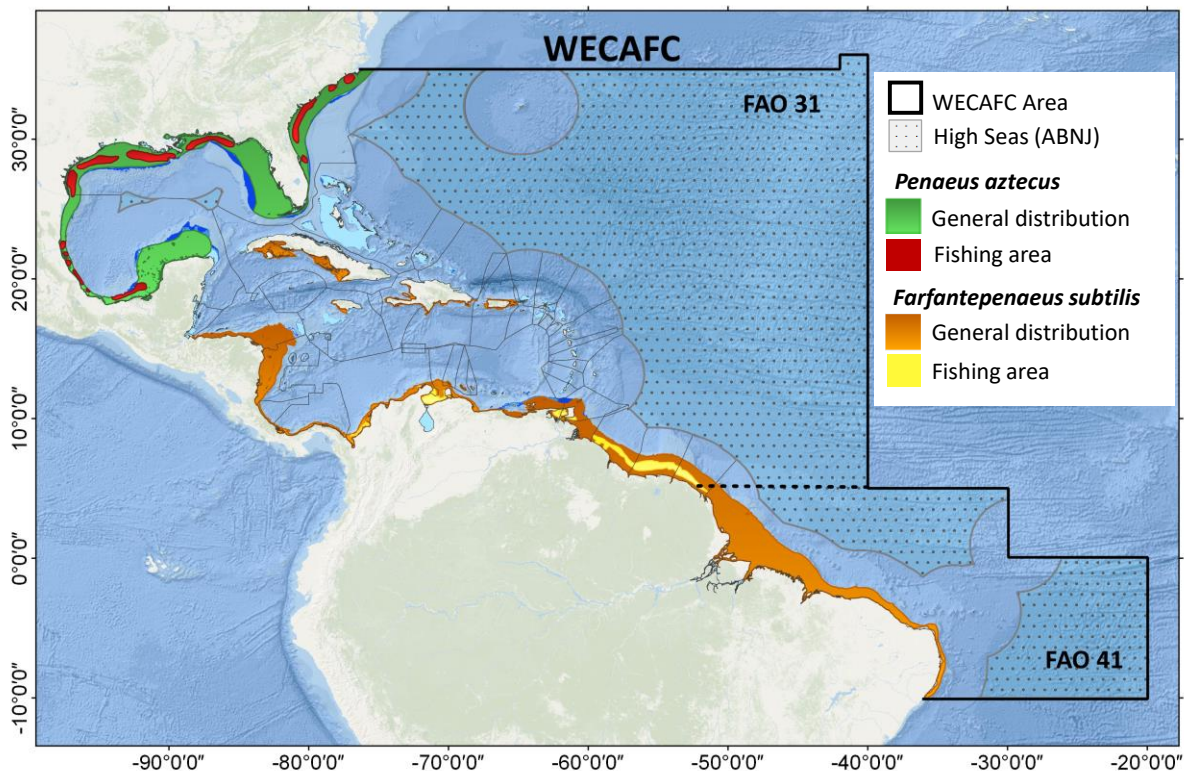


Figure 3.23. *Farfantepenaeus (Penaeus) aztecus* (Northern brown shrimp, ABS) and *F. subtilis* (Southern brown shrimp, species code: PNU) general distribution in the WECAFC region.

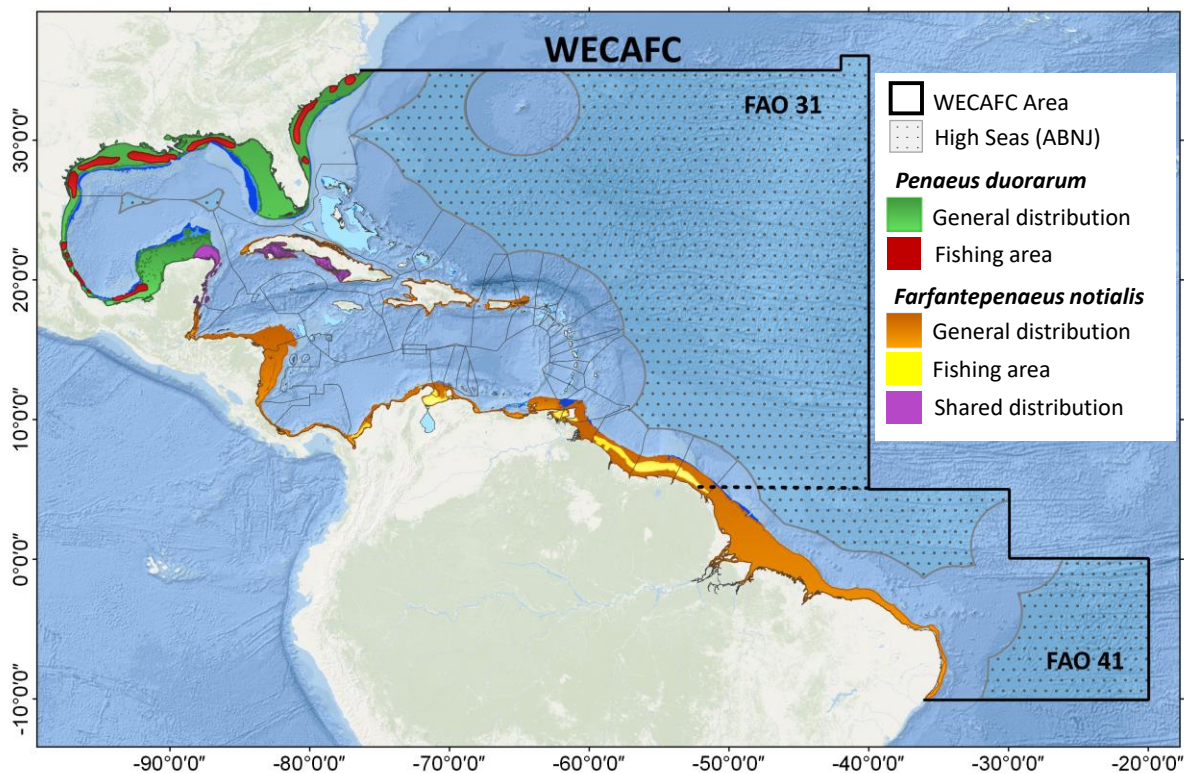


Figure 3.24. *Farfantepenaeus (Penaeus) duorarum* (Northern pink shrimp, APS) and *F. notialis* (Southern pink shrimp, SOP) general distribution and fishing areas in the WECAFC region.

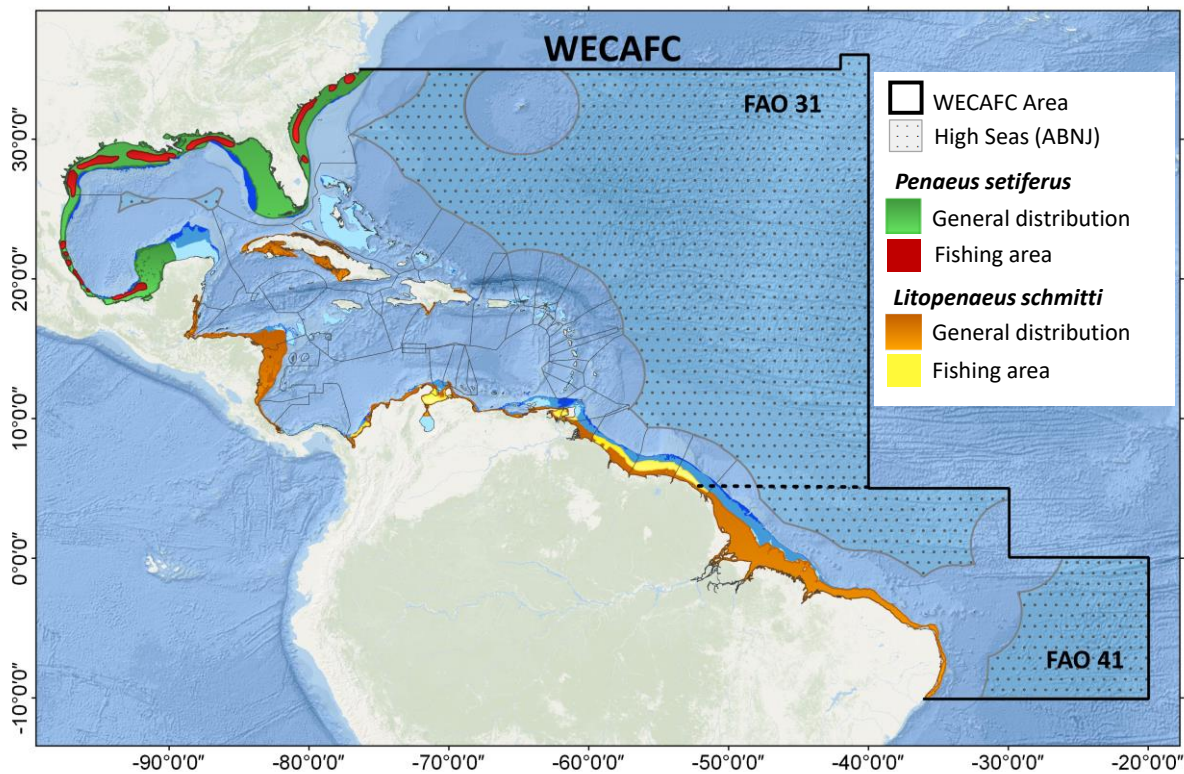


Figure 3.25. *Litopenaeus (Penaeus) setiferus* (Northern white shrimp, PST) and *Farfantepenaeus schmitti* (Southern white shrimp, PNT) general distribution and fishing areas in the WECAFC region.

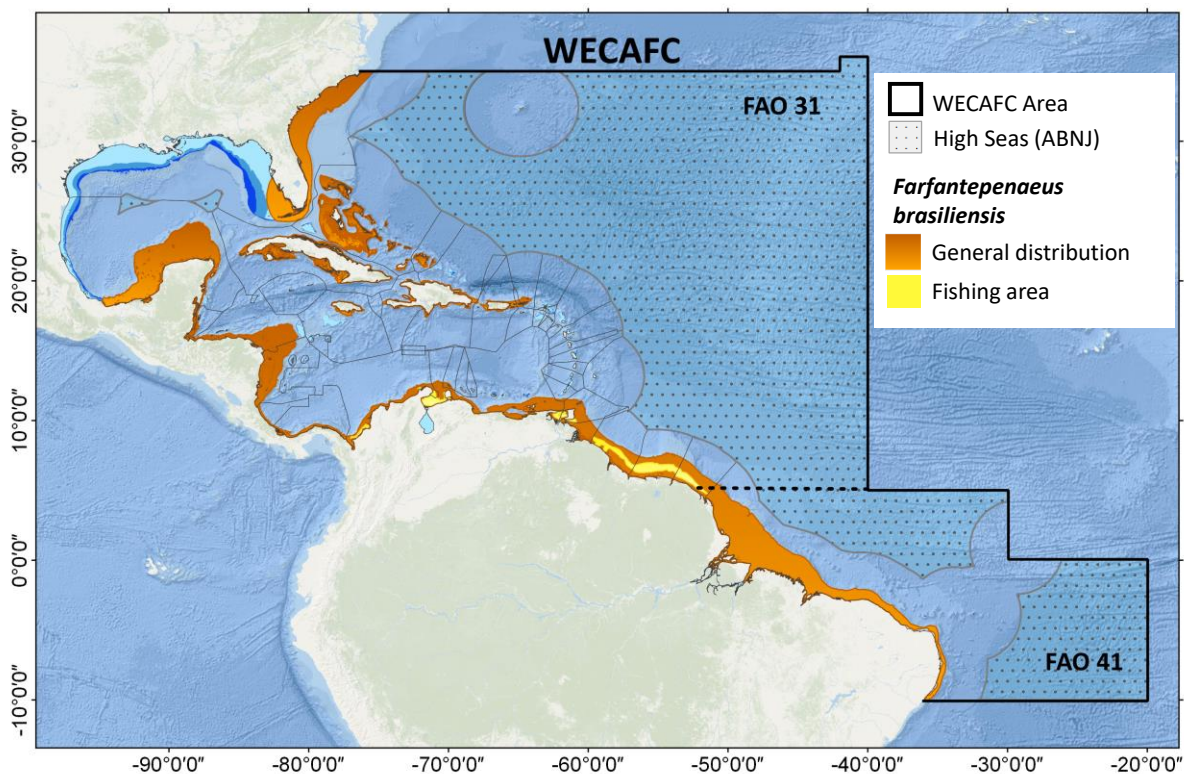


Figure 3.26. *Farfantepenaeus brasiliensis* (Pink spotted shrimp, PNB) general distribution and fishing areas in the WECAFC region.

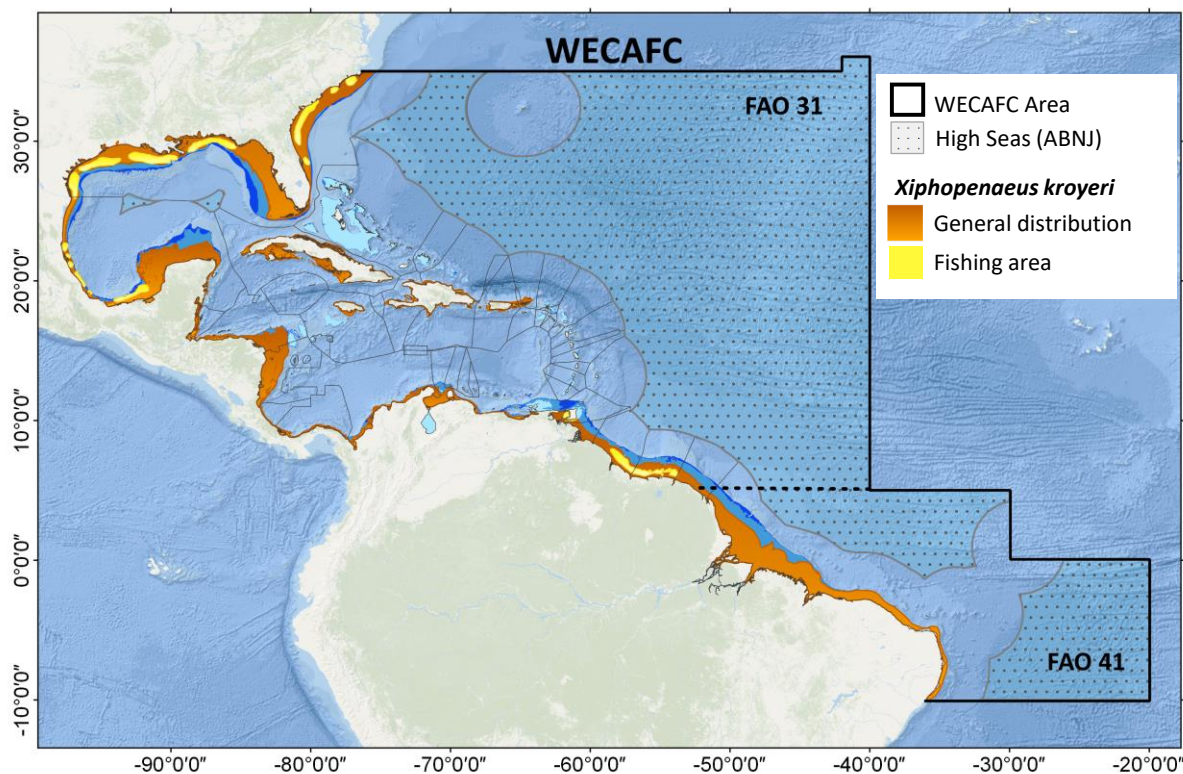


Figure 3.27. *Xiphopenaeus kroyeri* (Atlantic seabob, BOB) general distribution and fishing areas in the WECAFC region.

TRANSBOUNDARY STOCKS

PELAGIC SPECIES

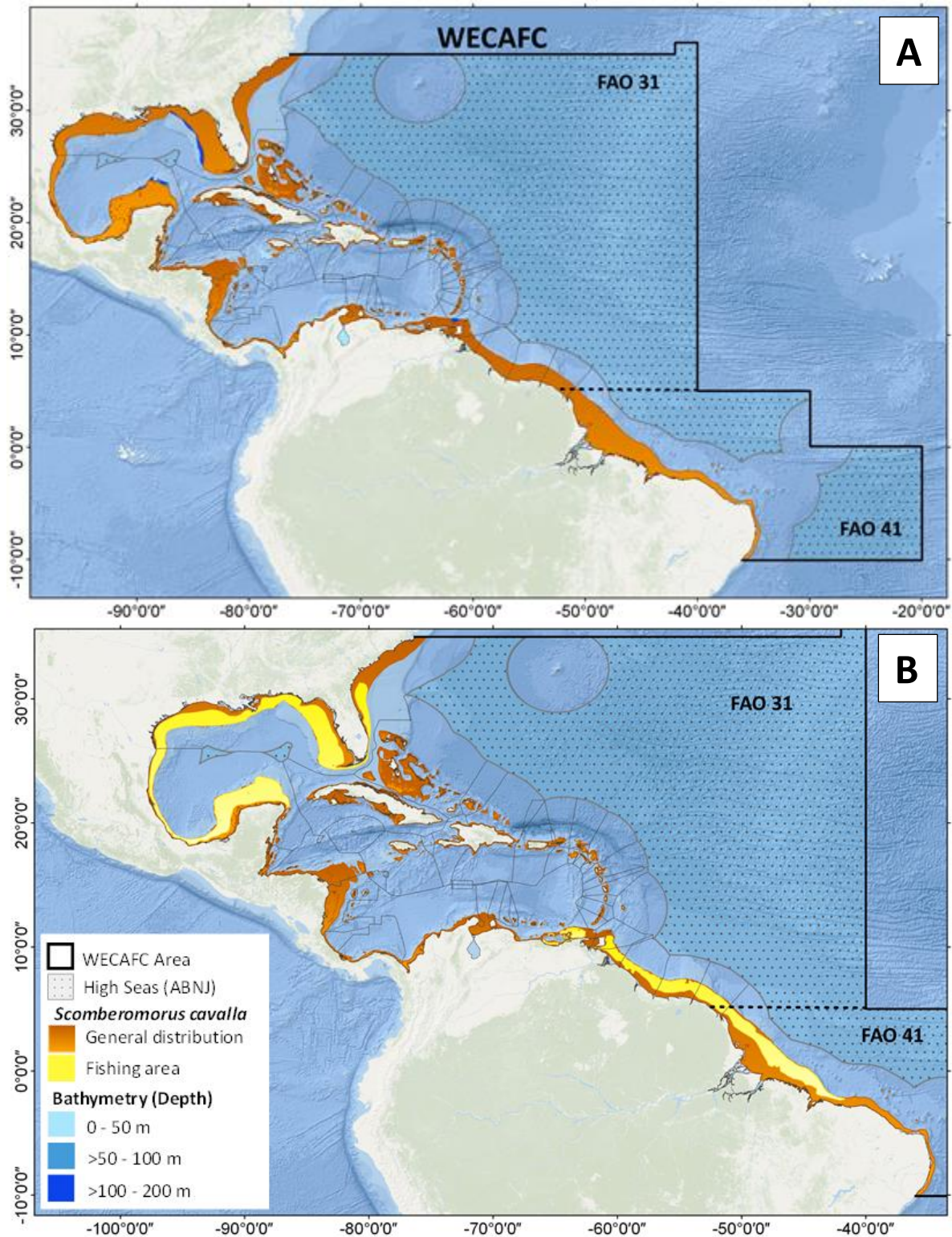


Figure 3.28. *Scomberomorus cavalla* (King mackerel, KGM) general distribution (A: general view; B: including fishing areas) in the WECAFC region.

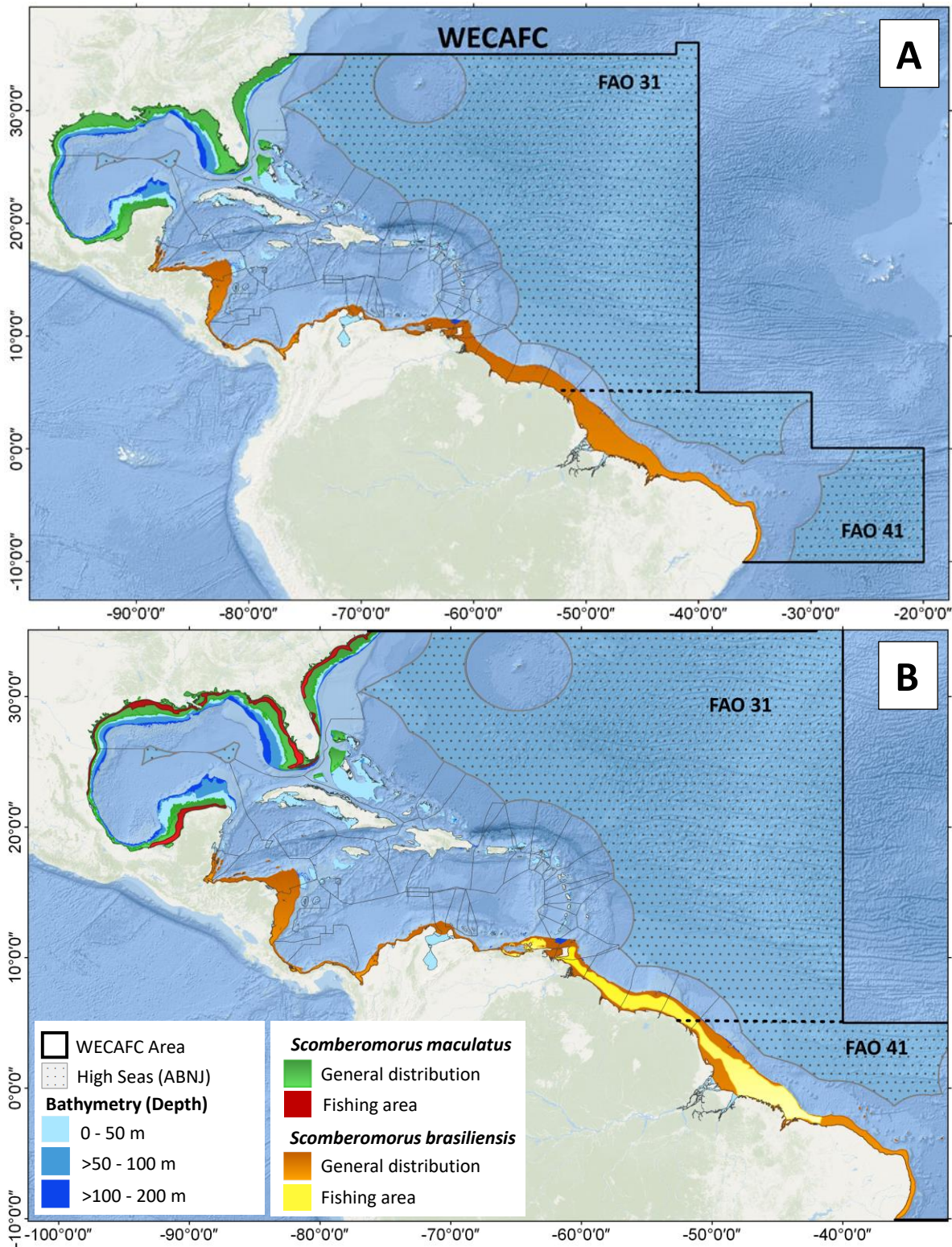


Figure 3.29. *Scomberomorus maculatus* (Spotted Spanish mackerel, SSM) and *S. brasiliensis* (Serra Spanish mackerel, BRS) general distribution (A: general view; B: including fishing areas) in the WECAFC area.

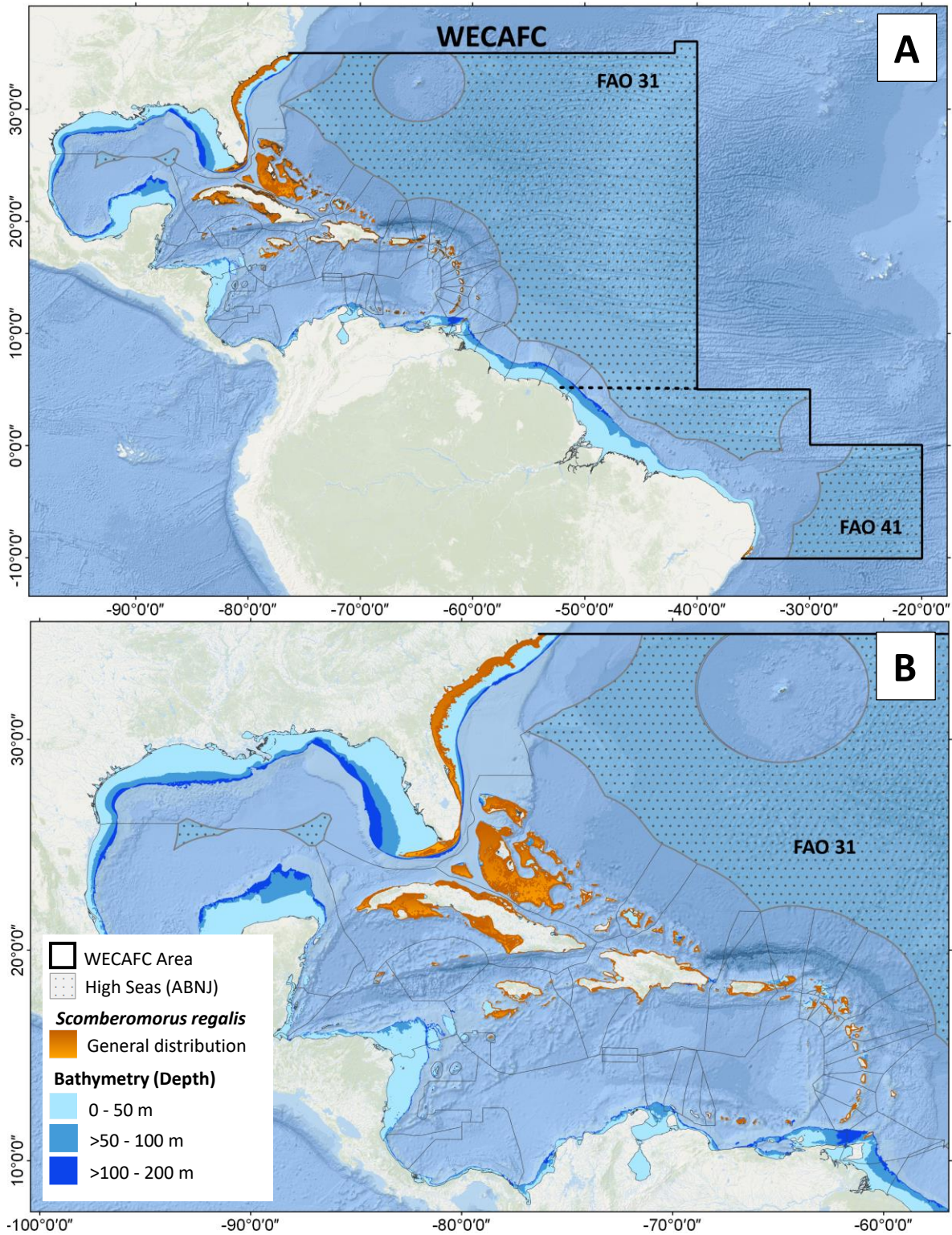


Figure 3.30. *Scomberomorus regalis* (Cero mackerel, CER) general distribution (A: general view; B: detailed view) in the WECAFC region.

TRANSBOUNDARY STOCKS
ELASMOBRANCHS

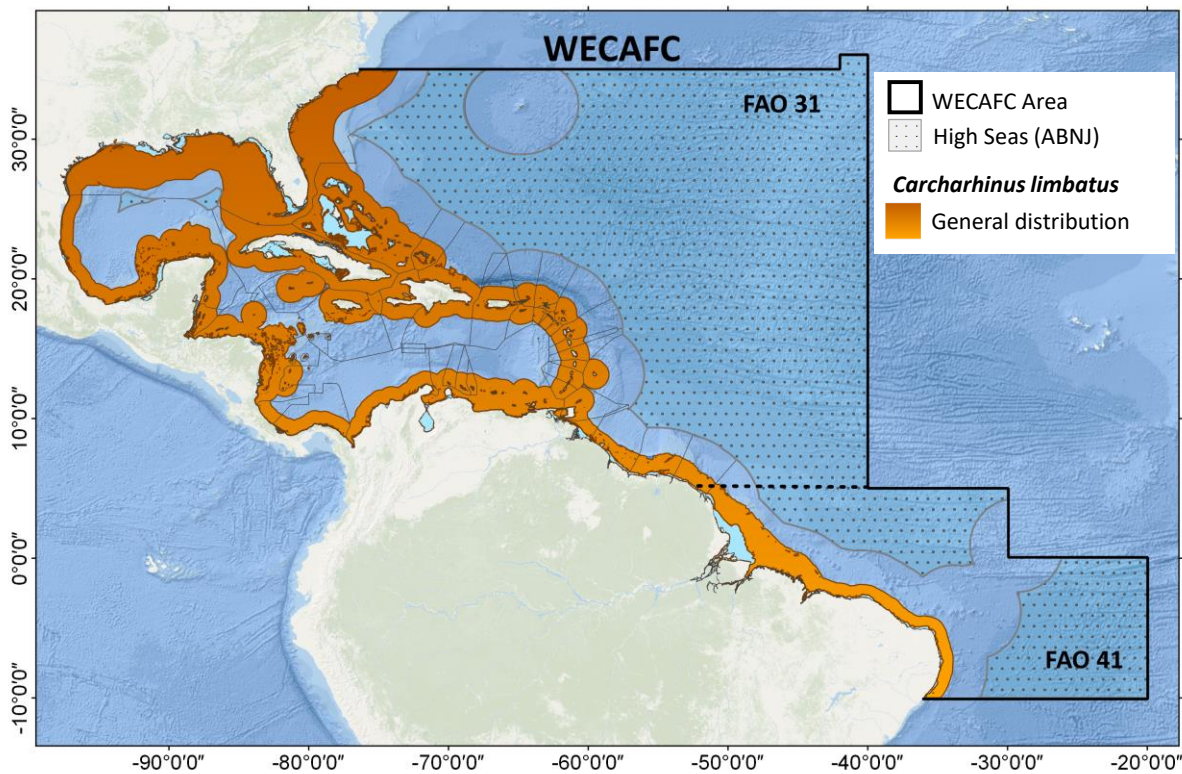


Figure 3.31. *Carcharhinus limbatus* (Blacktip shark, CCL) general distribution in the WECAFC region.

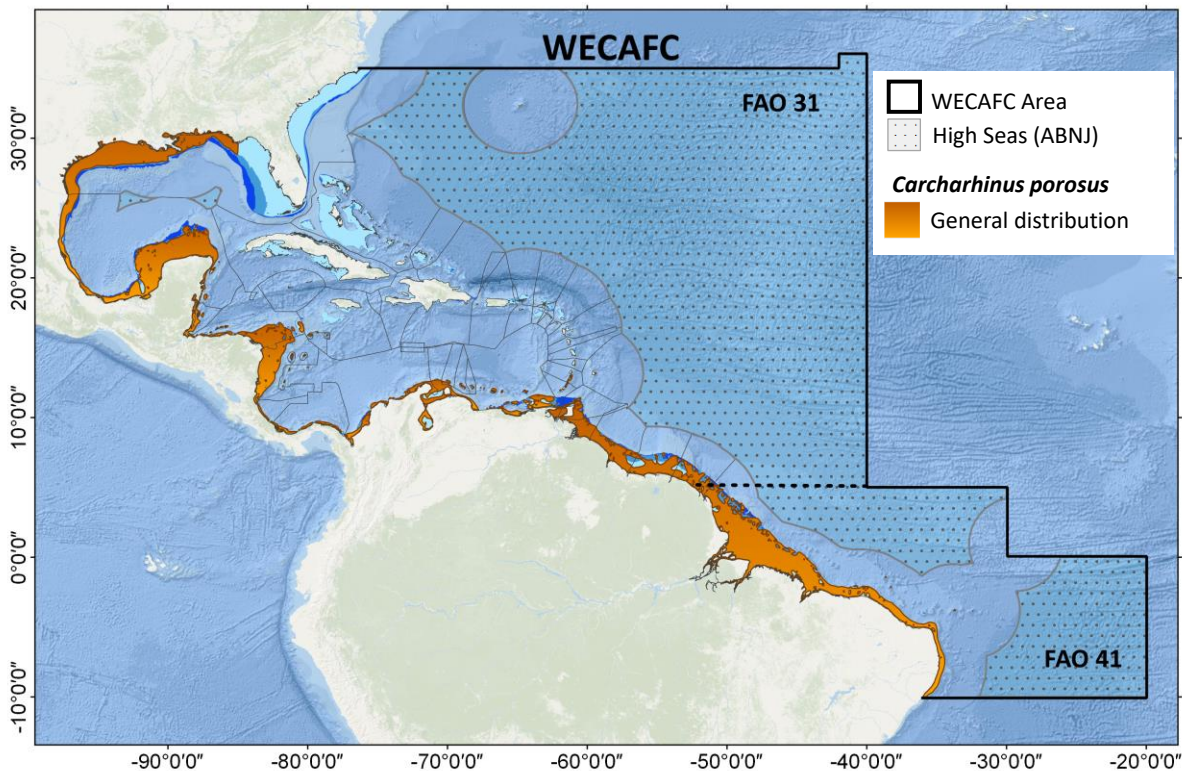


Figure 3.32. *Carcharhinus porosus* (Smalltail shark, CCR) general distribution in the WECAFC region.

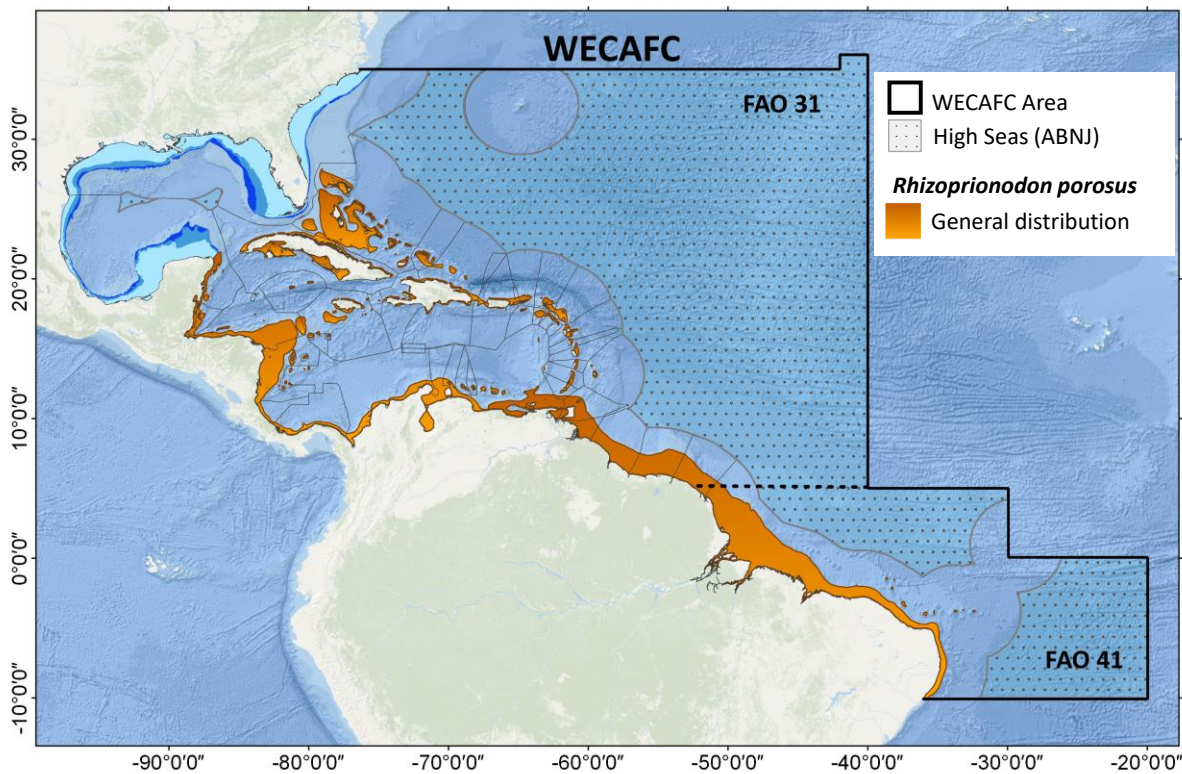


Figure 3.33. *Rhizoprionodon porosus* (Caribbean sharpnose shark, RHR) general distribution in the WECAFC region.

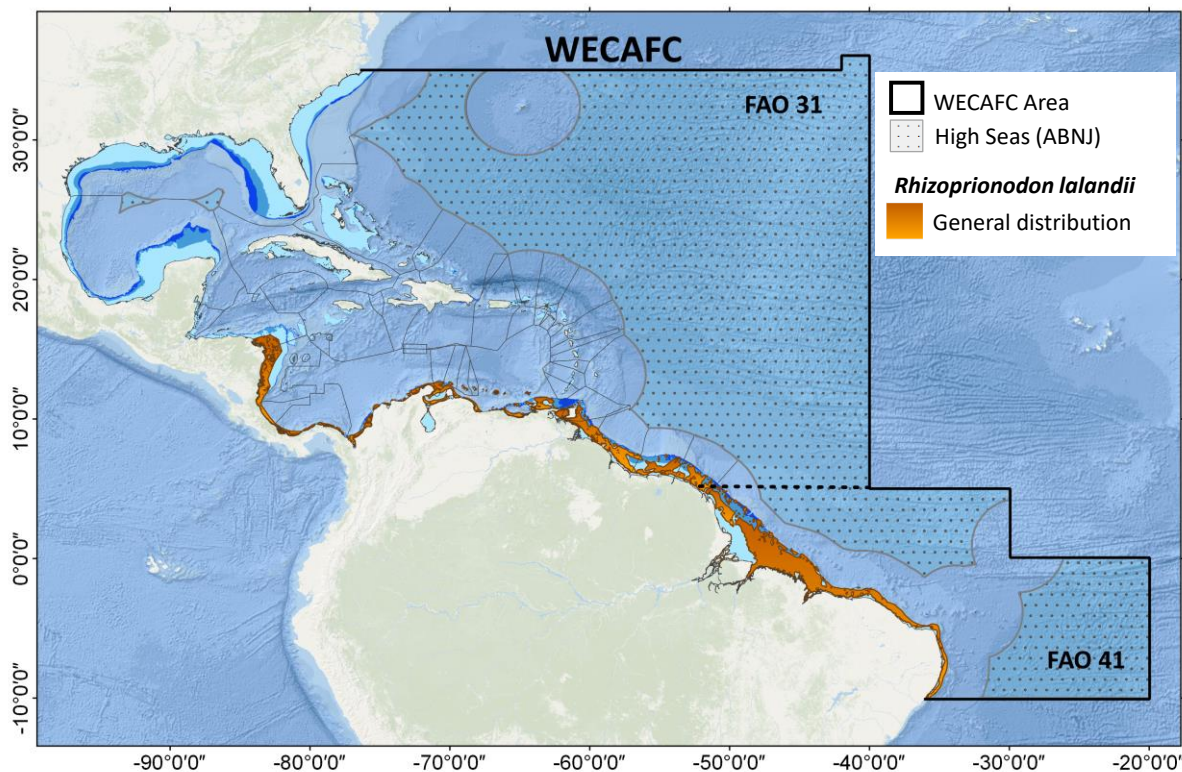


Figure 3.34. *Rhizoprionodon lalandii* (Brazilian sharpnose shark, RHL) general distribution in the WECAFC region.

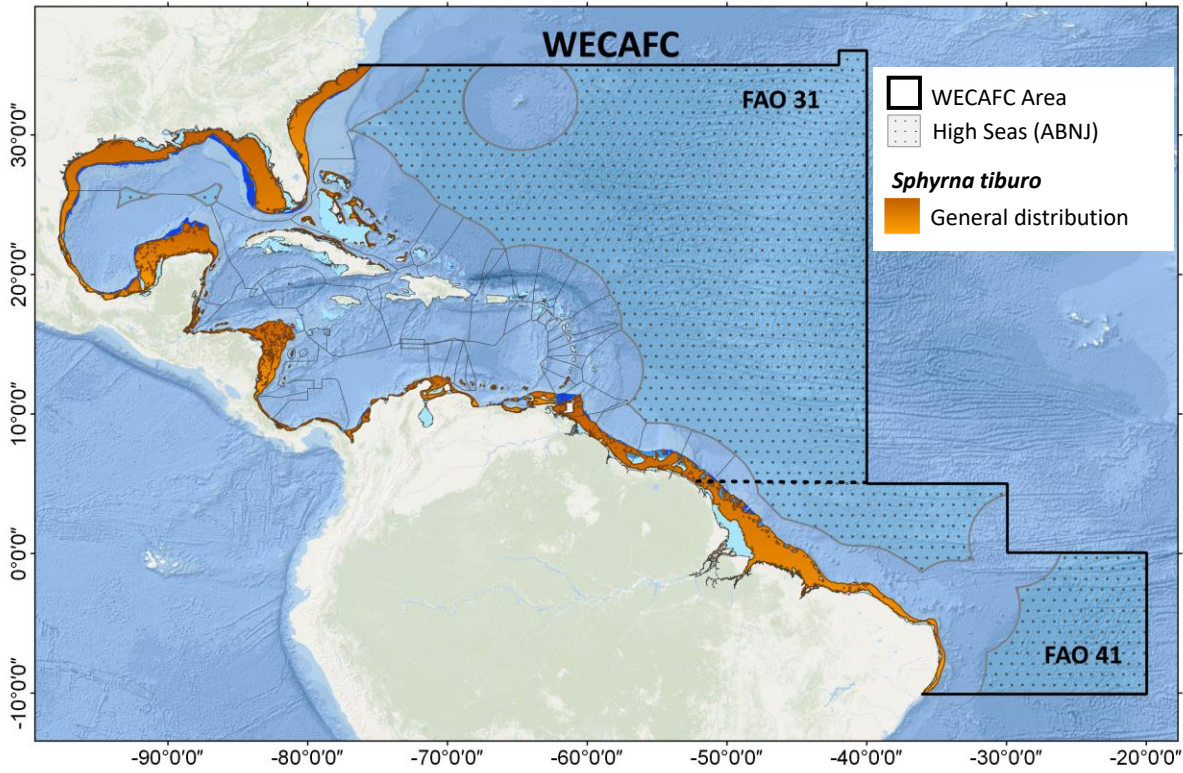


Figure 3.35. *Sphyrna tiburo* (Bonnethead shark, SPJ) general distribution in the WECAFC region.

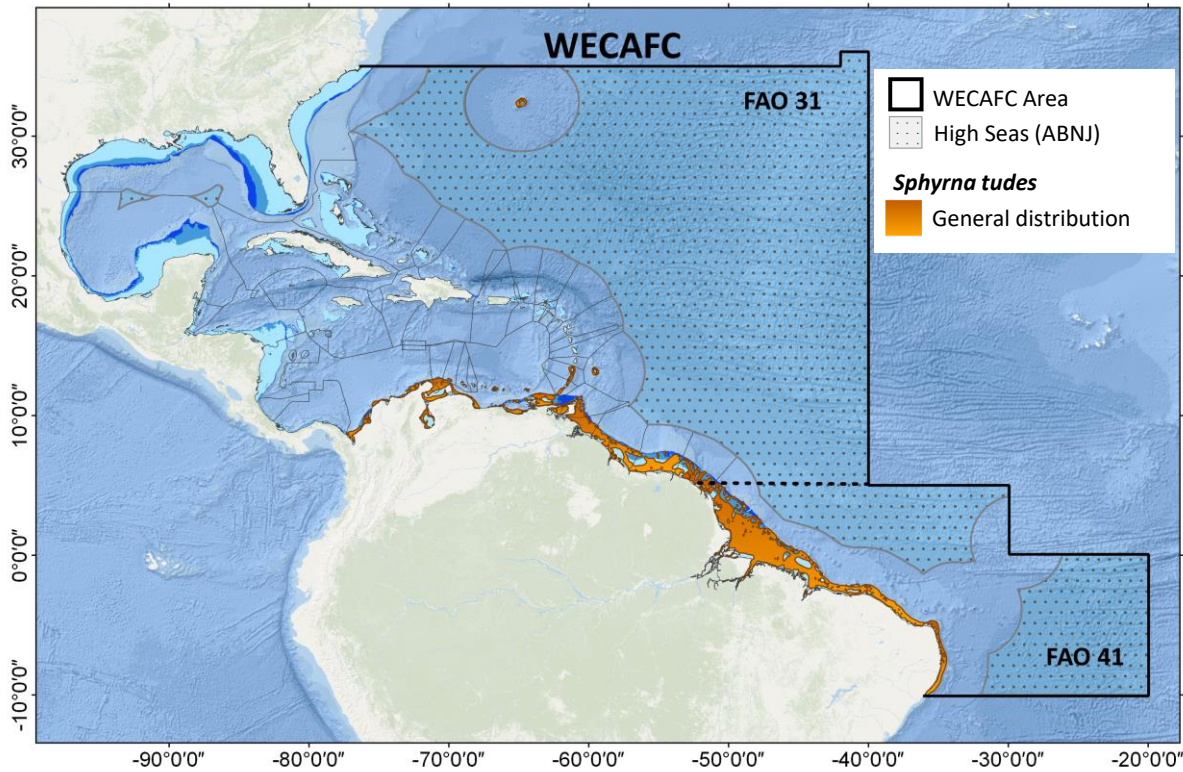


Figure 3.36. *Sphyrna tudes* (Smalleye hammerhead, SPQ) general distribution in the WECAFC region.

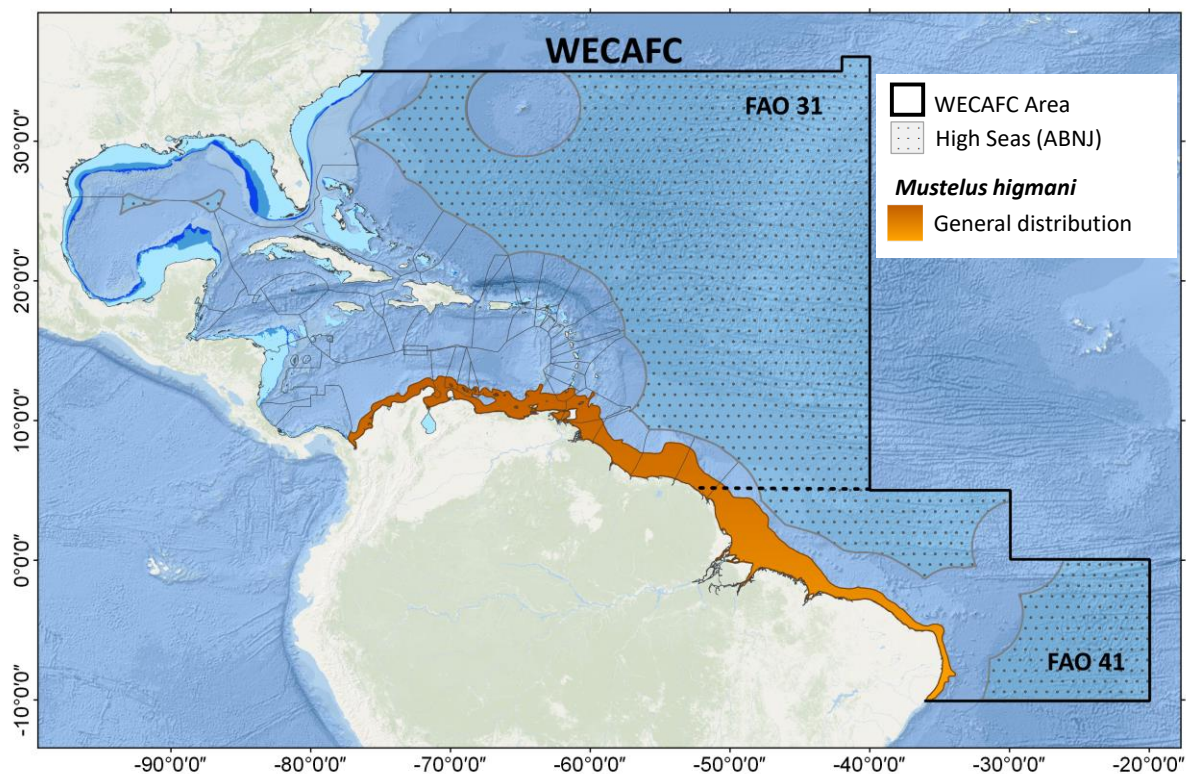


Figure 3.37. *Mustelus higmani* (Smalleye smoothhound, CTJ) general distribution in the WECAFC region.

STRADDLING STOCKS

**Key species:
Fourwing flyingfish**

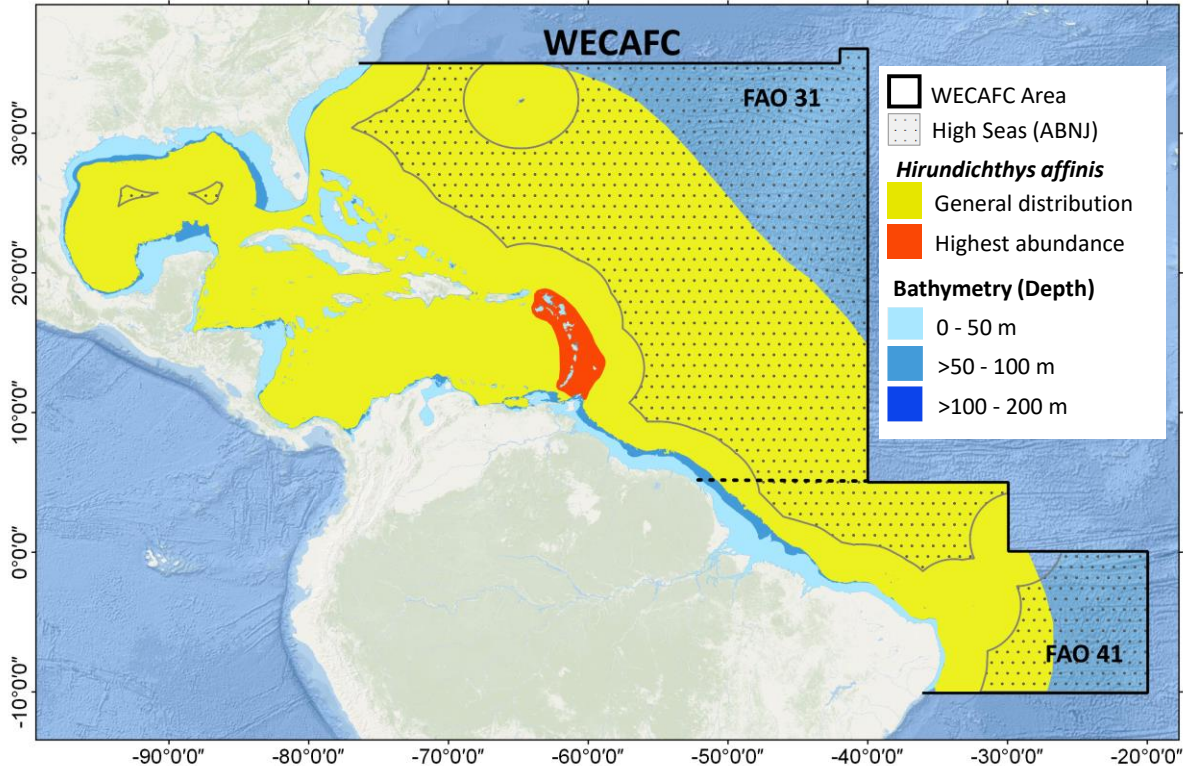


Figure 4.1. *Hirundichthys affinis* (Flying Fish, species code: FFV) general distribution in the WECAFC region.

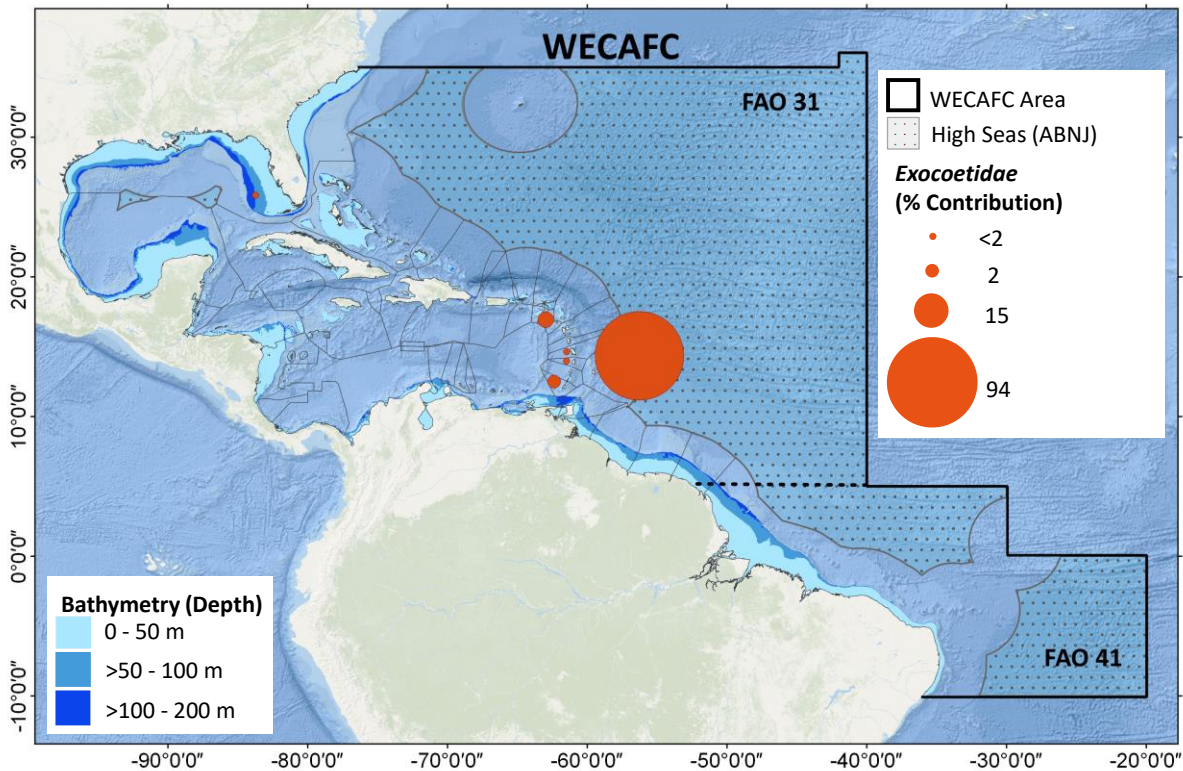


Figure 4.2. *Hirundichthys affinis* (Flying Fish, species code: FFV) percentage of contribution to total catch in the WECAFC region.

STRADDLING STOCKS

Tunas

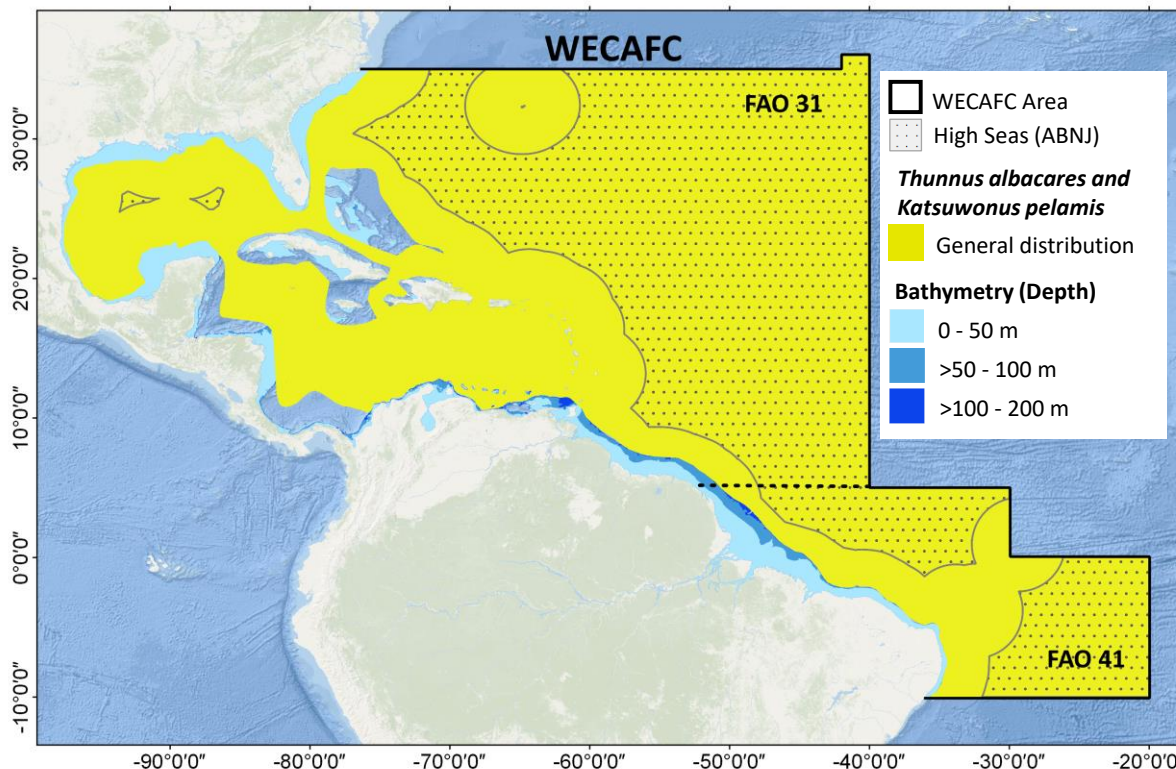


Figure 4.3. *Thunnus albacares* (Yellowfin tuna, species code: YFT) and *Katsuwonus pelamis* (Skipjack tuna, species code: SKJ) general distribution in the WECAFC region.

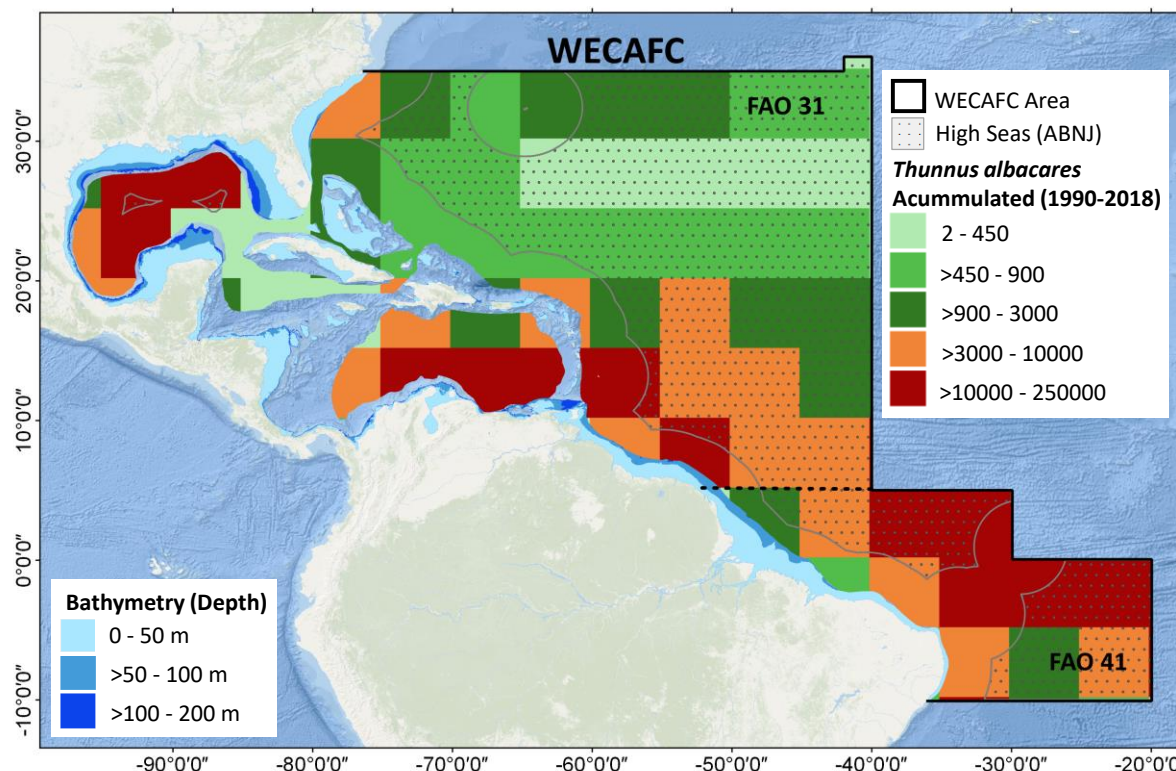


Figure 4.4. *Thunnus albacares* (Yellowfin tuna, species code: YFT) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

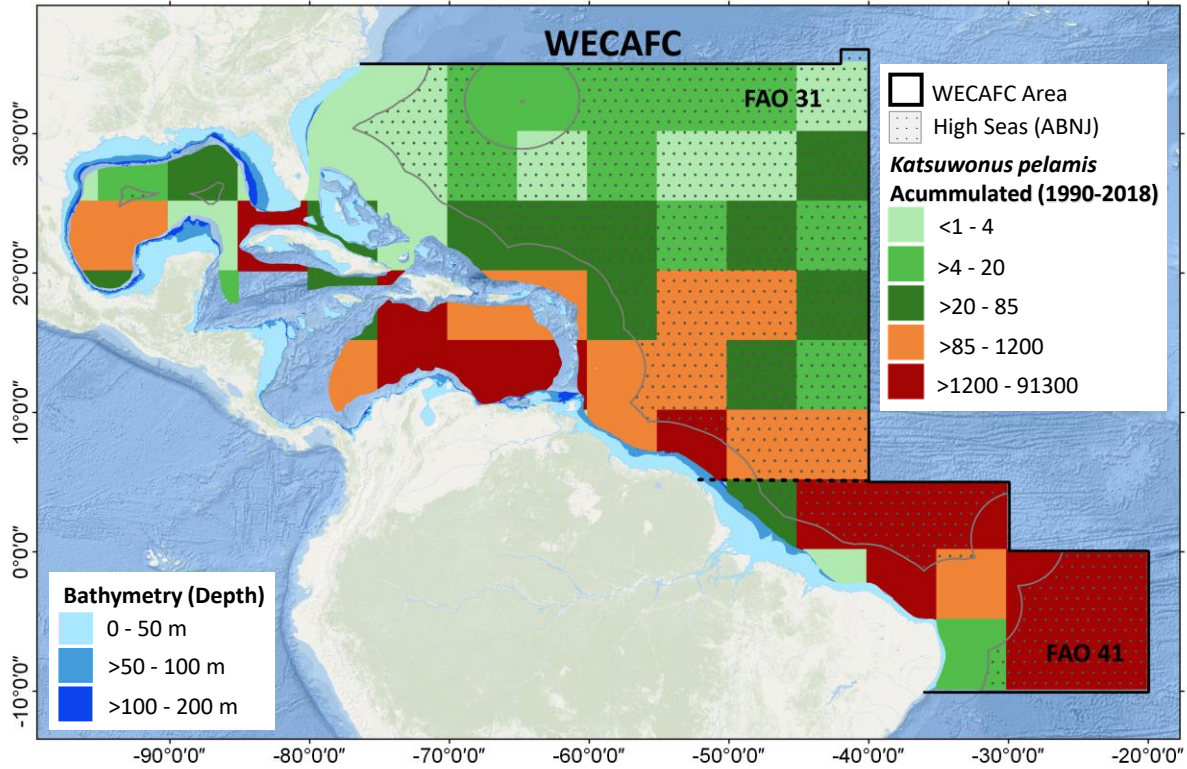


Figure 4.5. *Katsuwonus pelamis* (Skipjack tuna, species code: SKJ) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

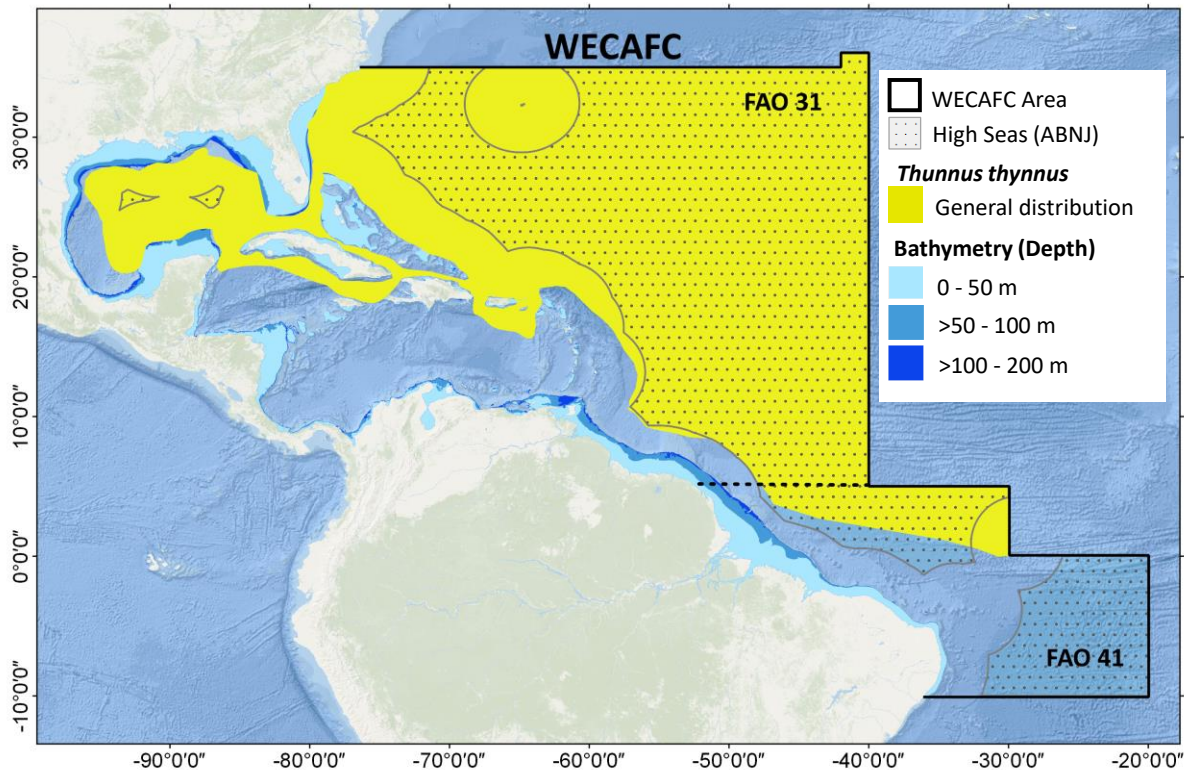


Figure 4.6. *Thunnus thynnus* (Northern bluefin tuna, species code: BFT) general distribution in the WECAFC region.

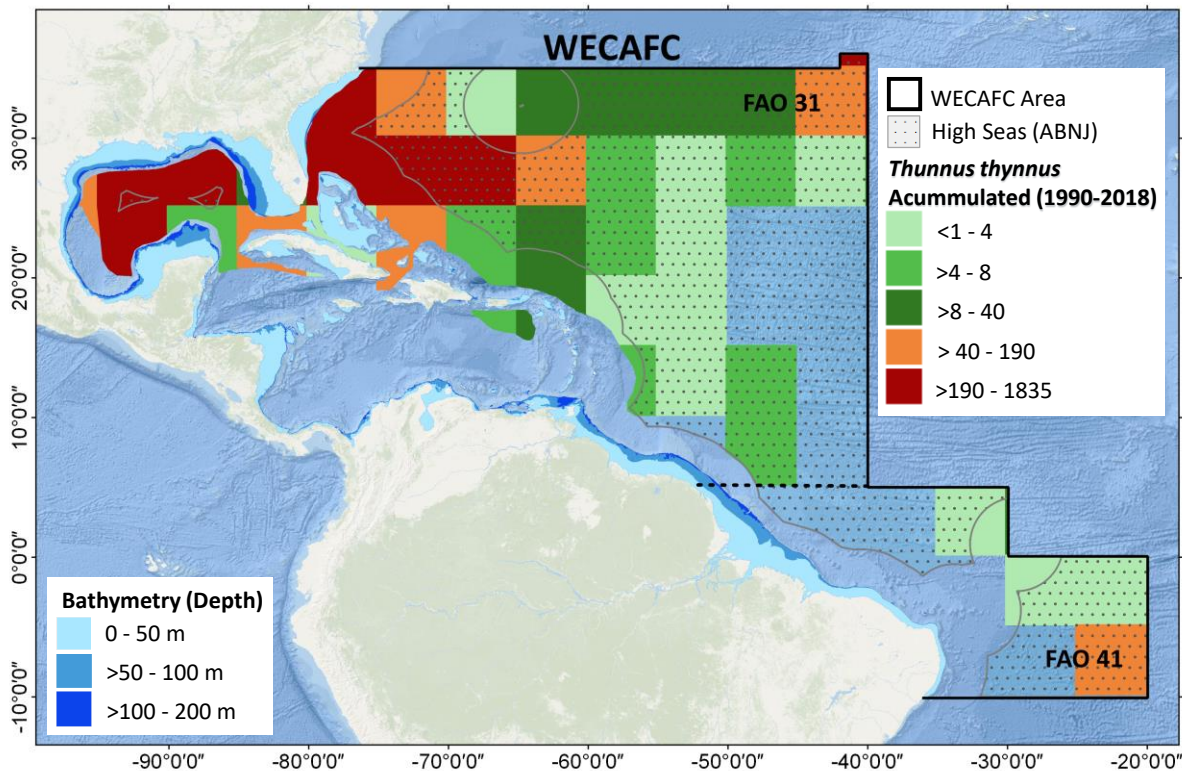


Figure 4.7. *Thunnus thynnus* (Northern bluefin tuna, species code: BFT) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

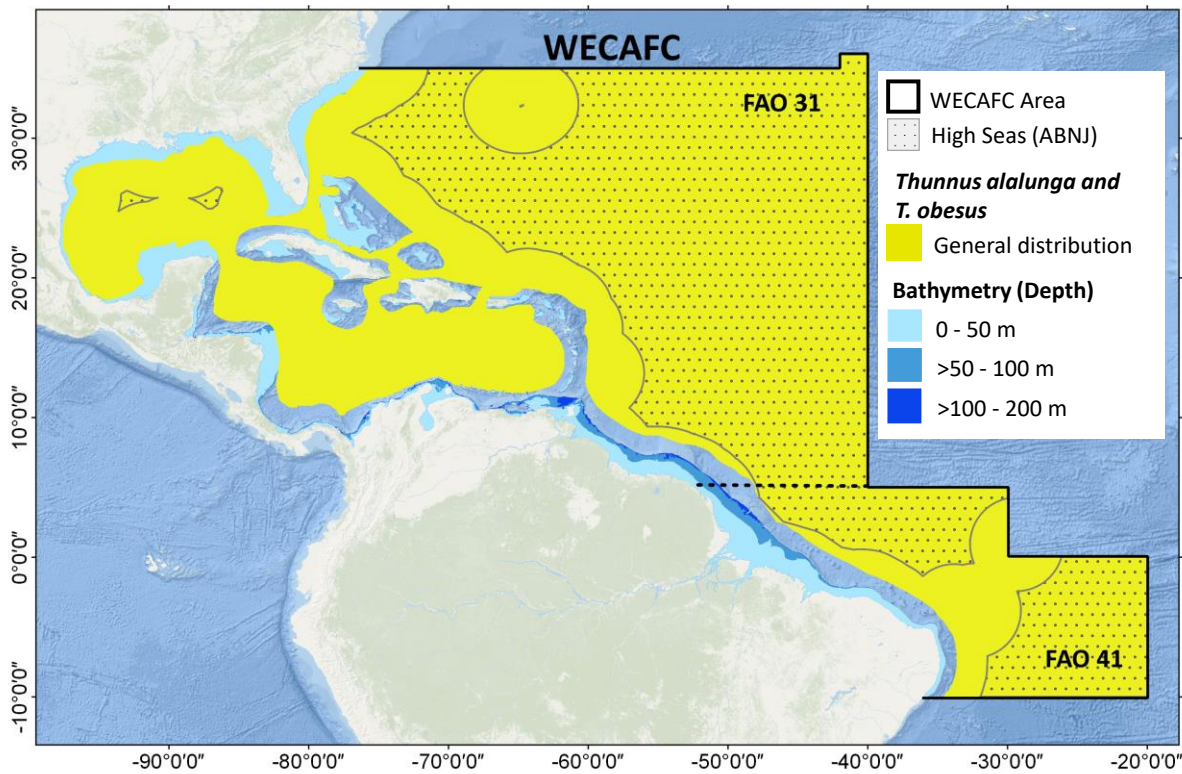


Figure 4.8. *Thunnus alalunga* (Albacore, species code: ALB) and *T. obesus* (Bigeye tuna, species code: BET) general distribution in the WECAFC region.

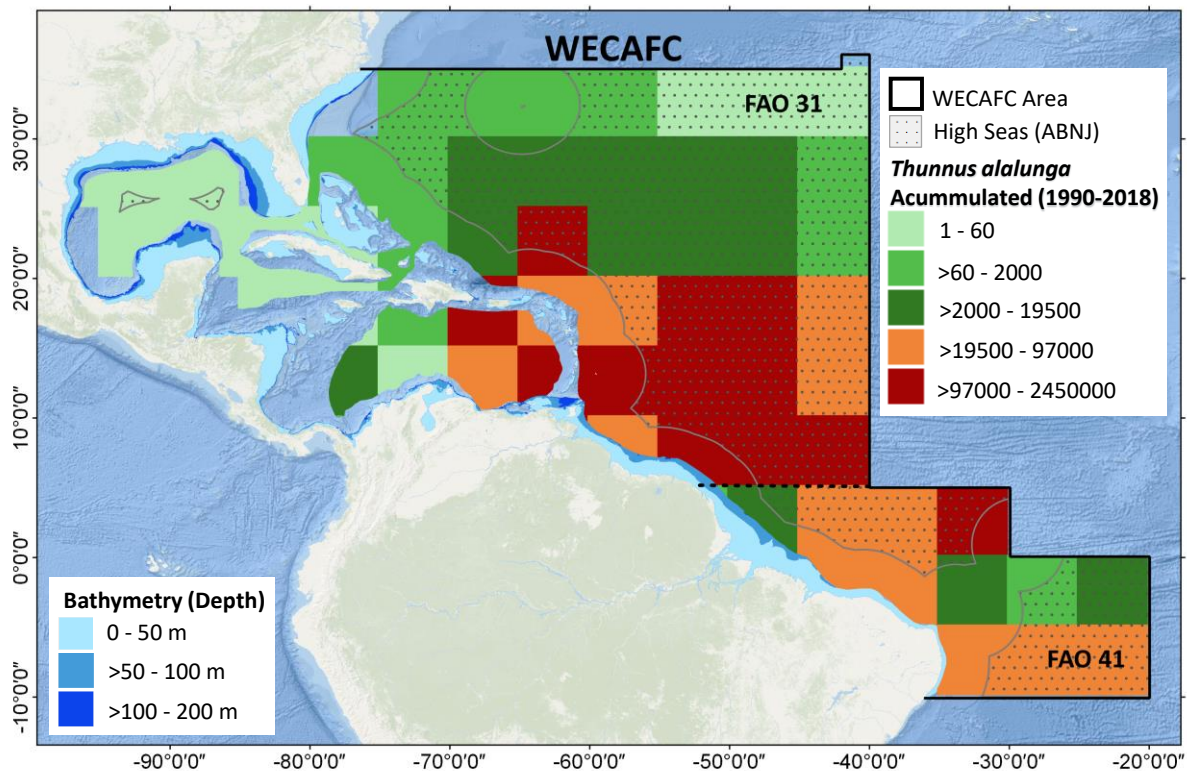


Figure 4.9. *Thunnus alalunga* (Albacore, species code: ALB) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

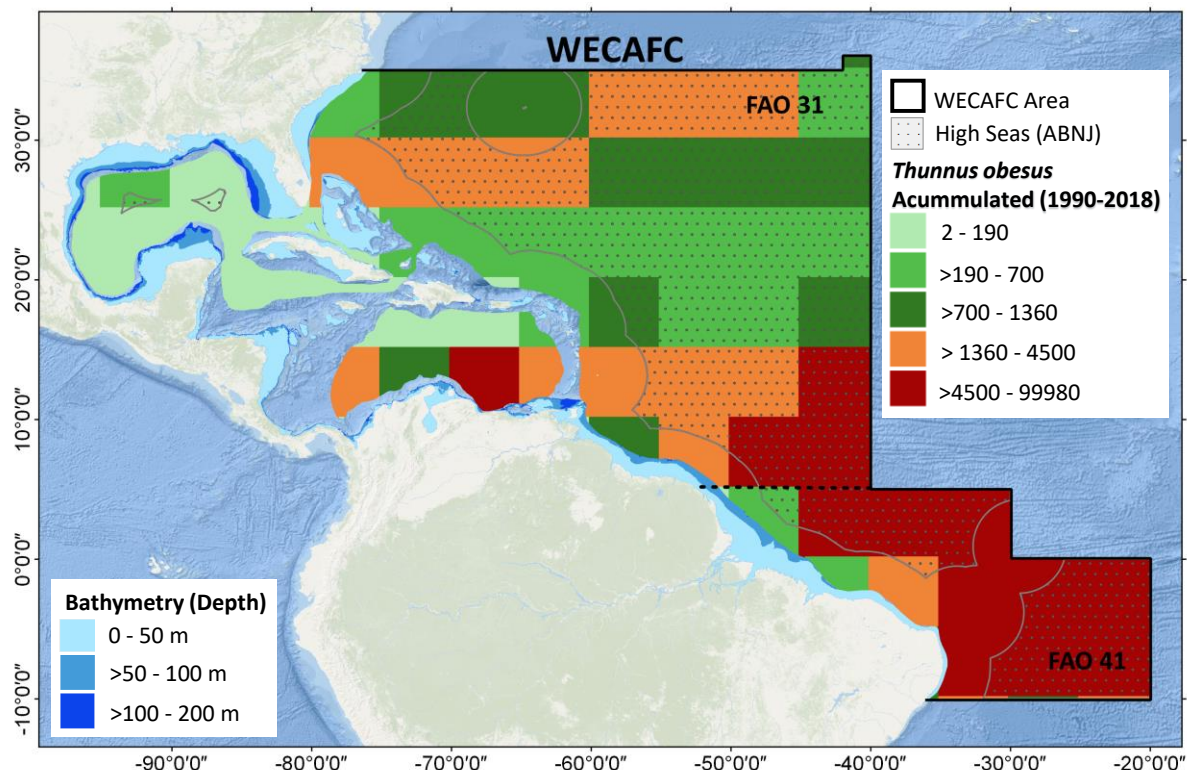


Figure 4.10. *Thunnus obesus* (Bigeye tuna, species code: BET) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

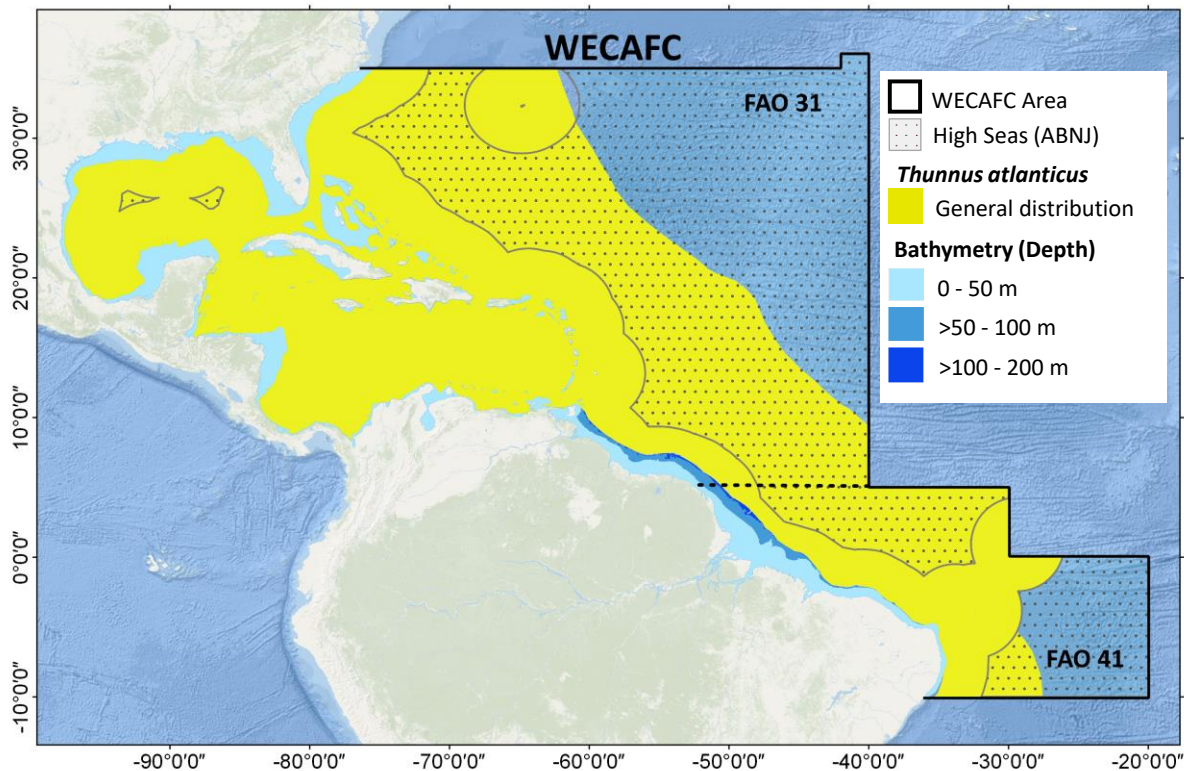


Figure 4.11. *Thunnus atlanticus* (Blackfin tuna, species code: BLF) general distribution in the WECAFC region.

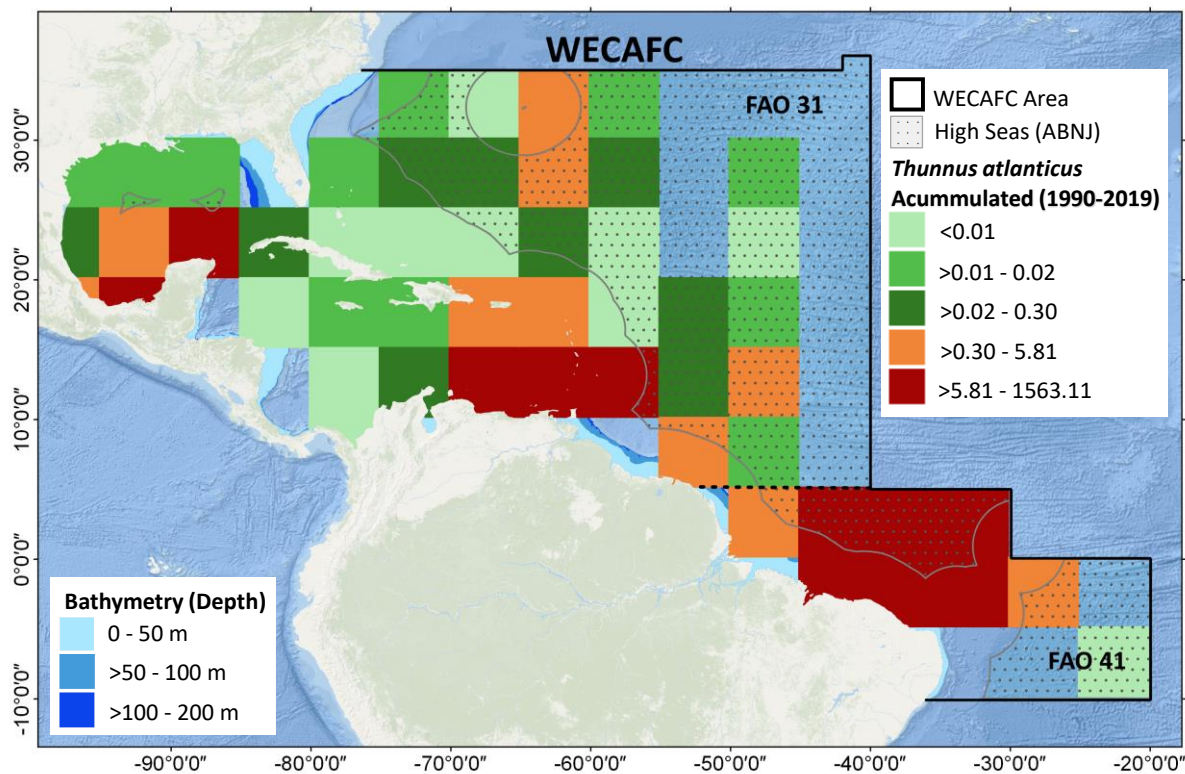


Figure 4.12. *Thunnus atlanticus* (Blackfin tuna, species code: BLF) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

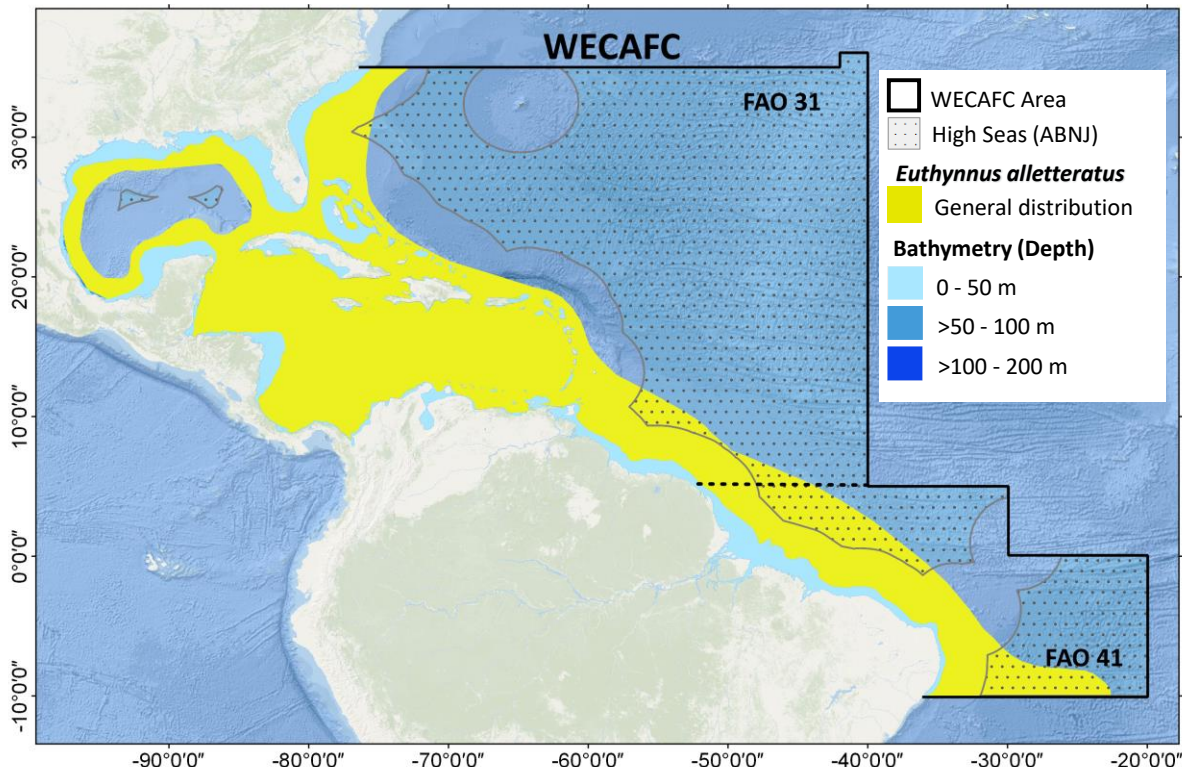


Figure 4.13. *Euthynnus alletteratus* (Little tunny, species code: LTA) general distribution in the WECAFC region.

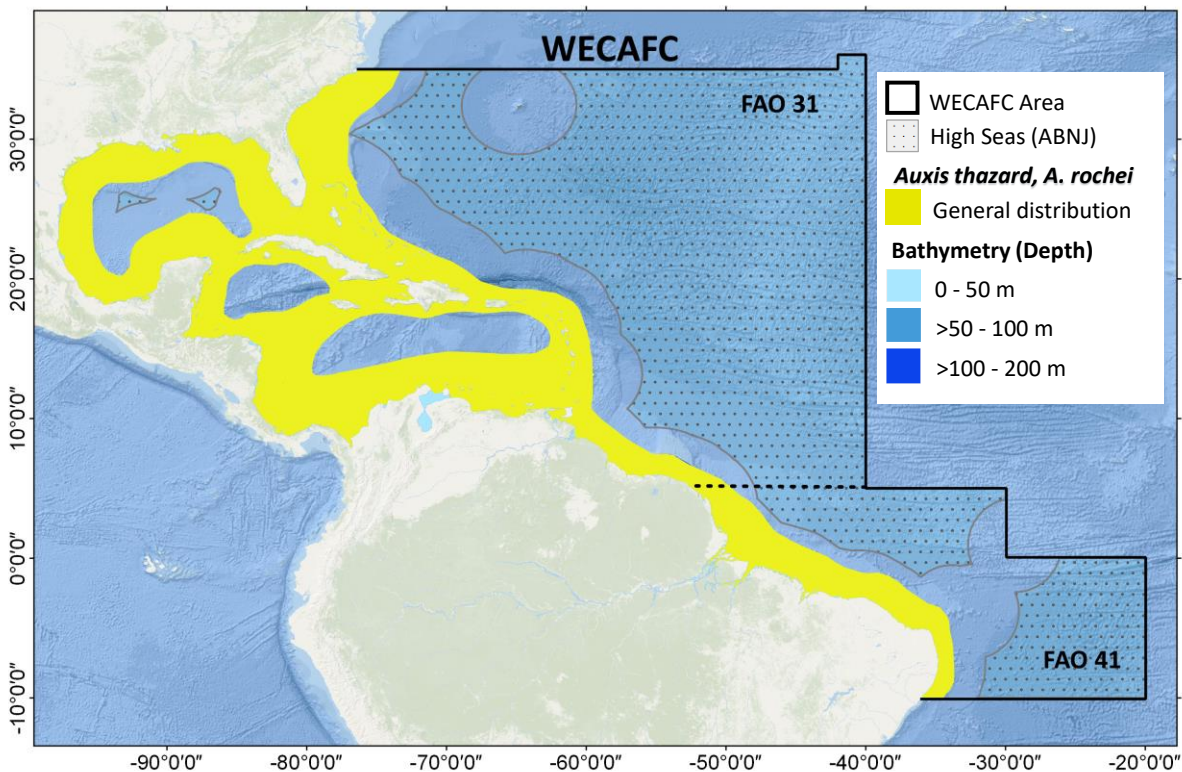


Figure 4.14. *Auxis thazard* (Frigate tuna, species code: FRI) and *A. rochei* (Bullet tuna, species code: BLT) general distribution in the WECAFC region.

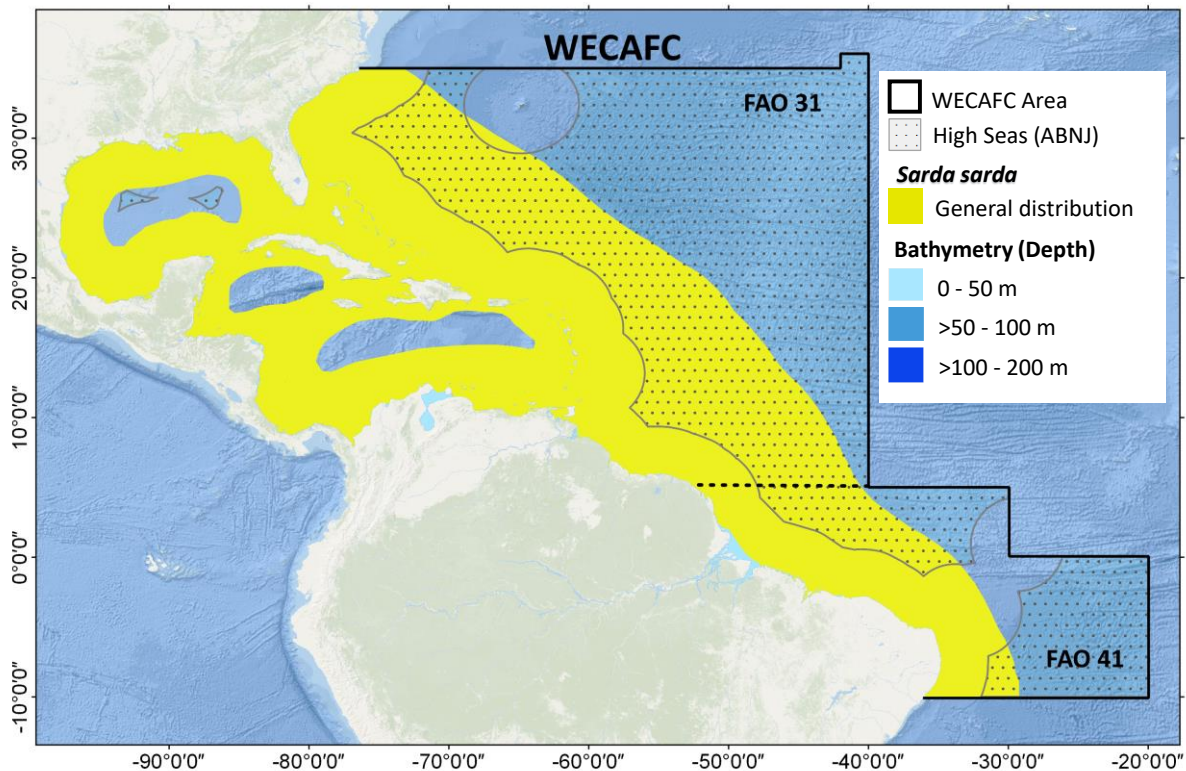


Figure 4.15. *Sarda sarda* (Atlantic bonito, species code: BON) general distribution in the WECAFC region.

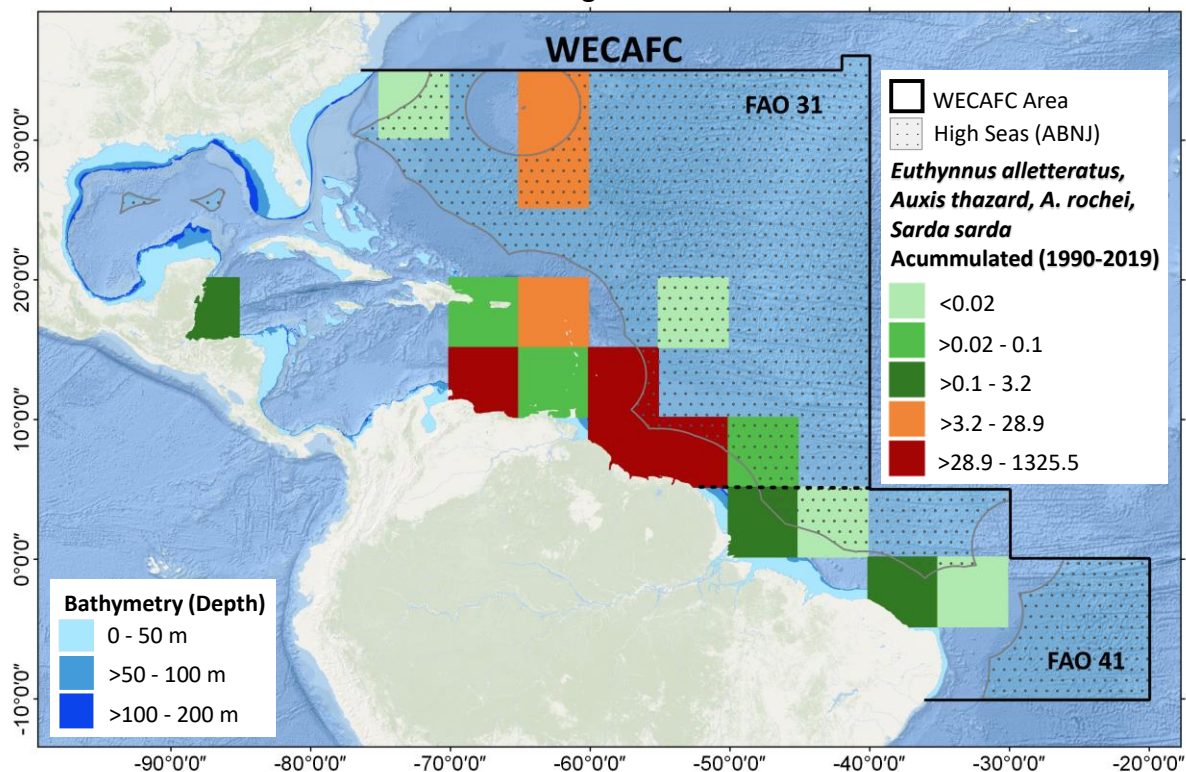


Figure 4.16. *Euthynnus alletteratus* (Little tunny, species code: LTA), *Auxis thazard* (Frigate tuna, species code: FRI), *A. rochei* (Bullet tuna, species code: BLT) and *Sarda sarda* (Atlantic bonito, species code: BON) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

WECAFC Transboundary and Straddling Resources

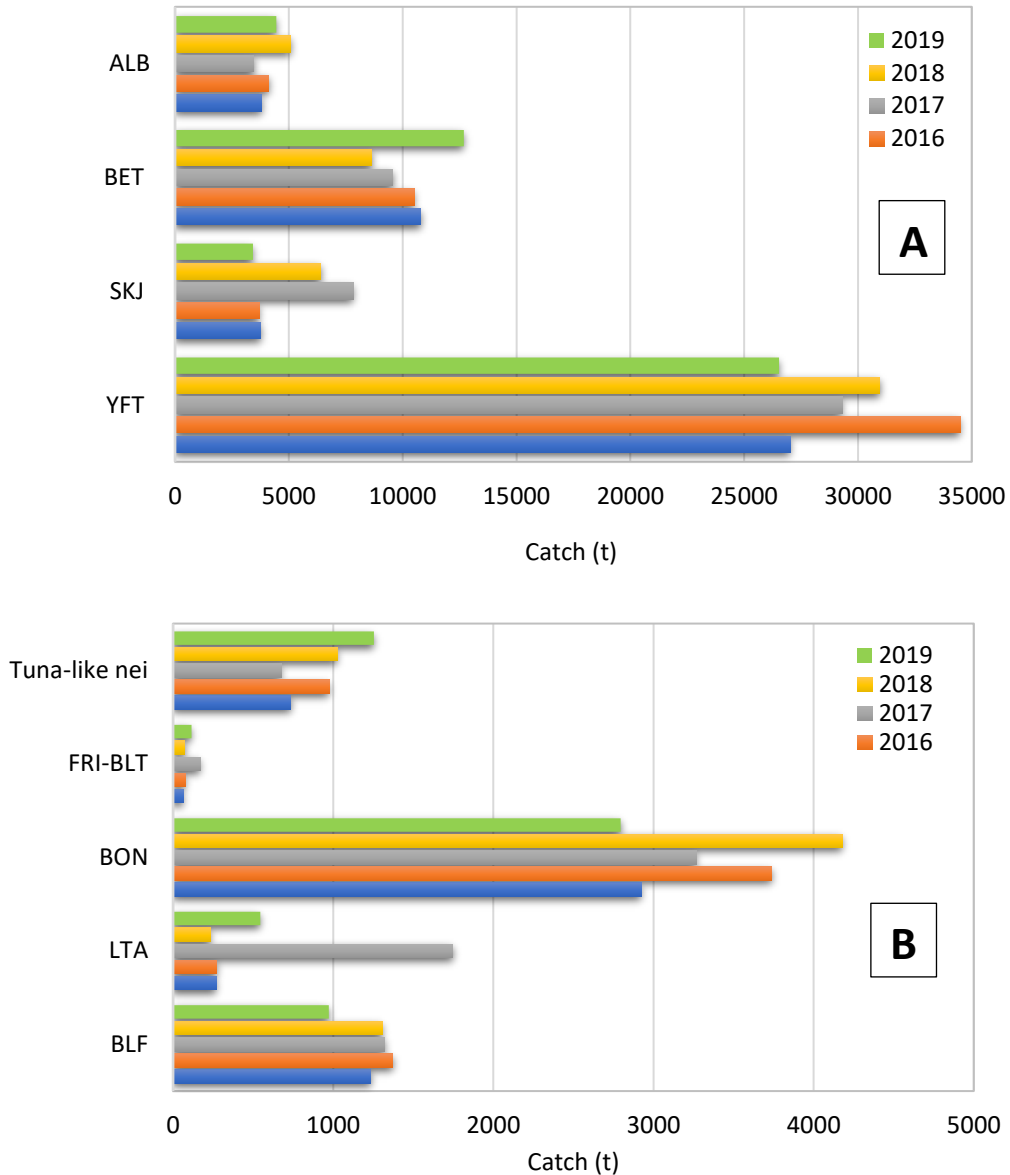


Figure 4.17. Recent trend in the WECAFC region catches of: A) Major tunas (ALB: albacore tuna, BET: bigeye tuna, SKJ: skipjack tuna, YFT: yellowfin tuna) catch (tonnes); and B) Tuna-like and small tunas (FRI: frigate tuna, BLT: bullet tuna, BON: bonito, LTA: little tunny, BLF: blackfin tuna).

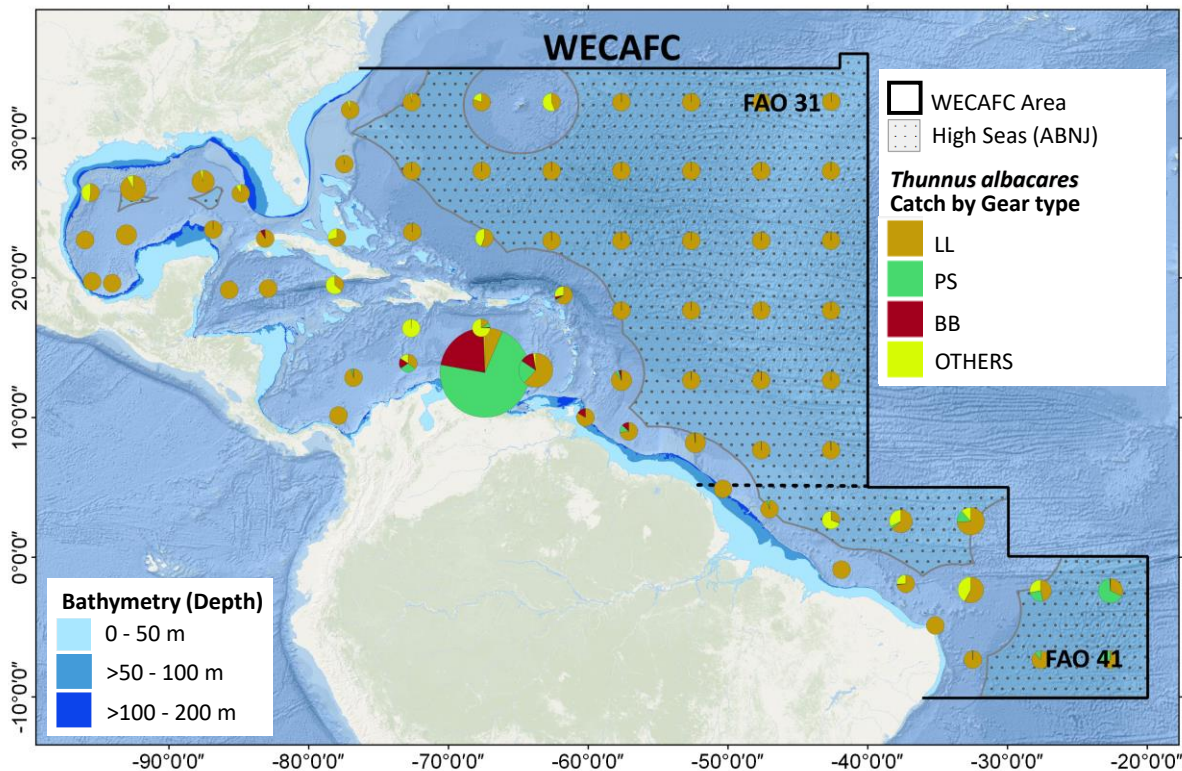


Figure 4.18. *Thunnus albacares* (Yellowfin tuna, species code: YFT) proportional catch in 5°x5° by major gear in the WECAFC region.

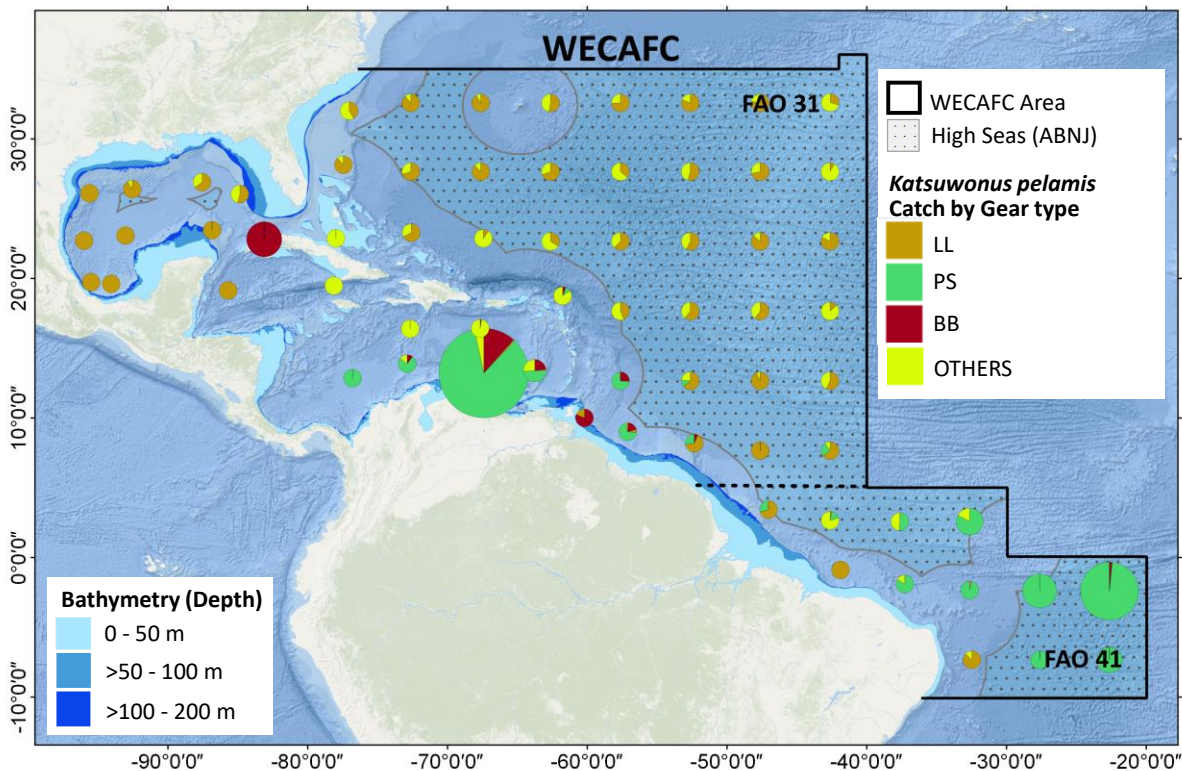


Figure 4.19. *Katsuwonus pelamis* (Skipjack tuna, species code: SKJ) proportional catch in 5°x5° by major gear in the WECAFC region.

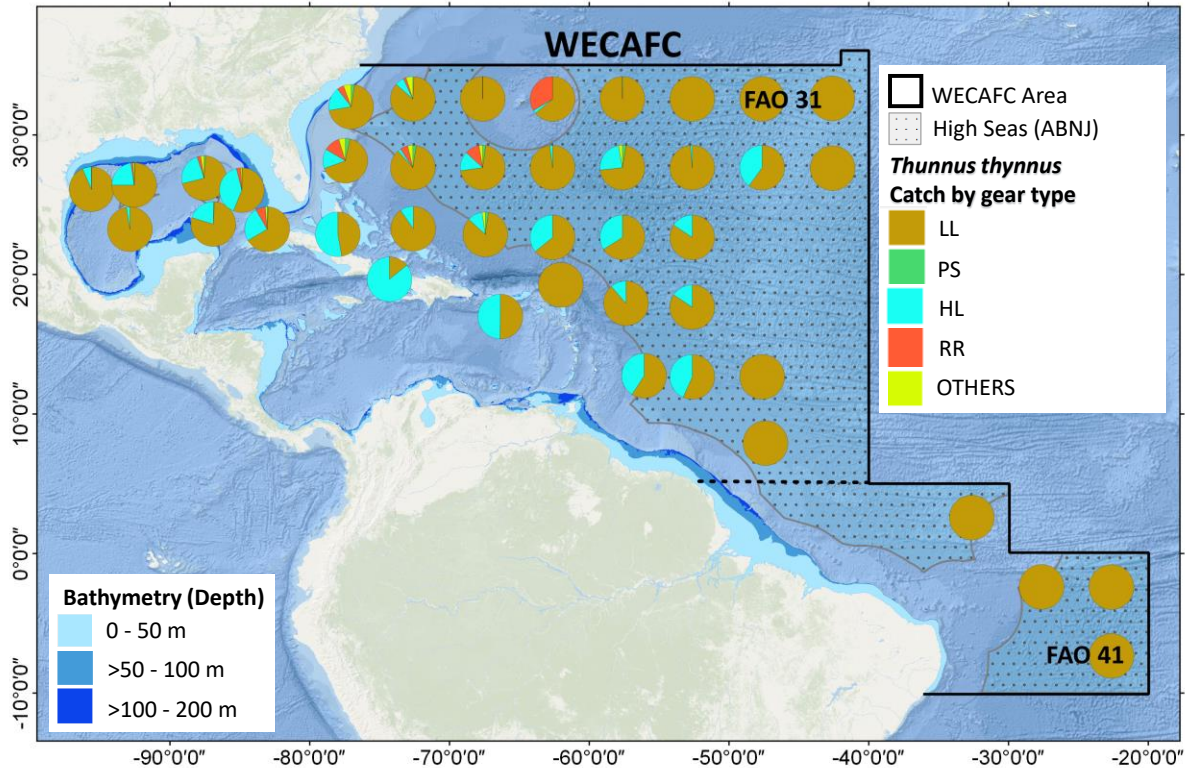


Figure 4.20. *Thunnus thynnus* (Northern bluefin tuna, species code: BFT) catch in 5°x5° by major gear in the WECAFC region.

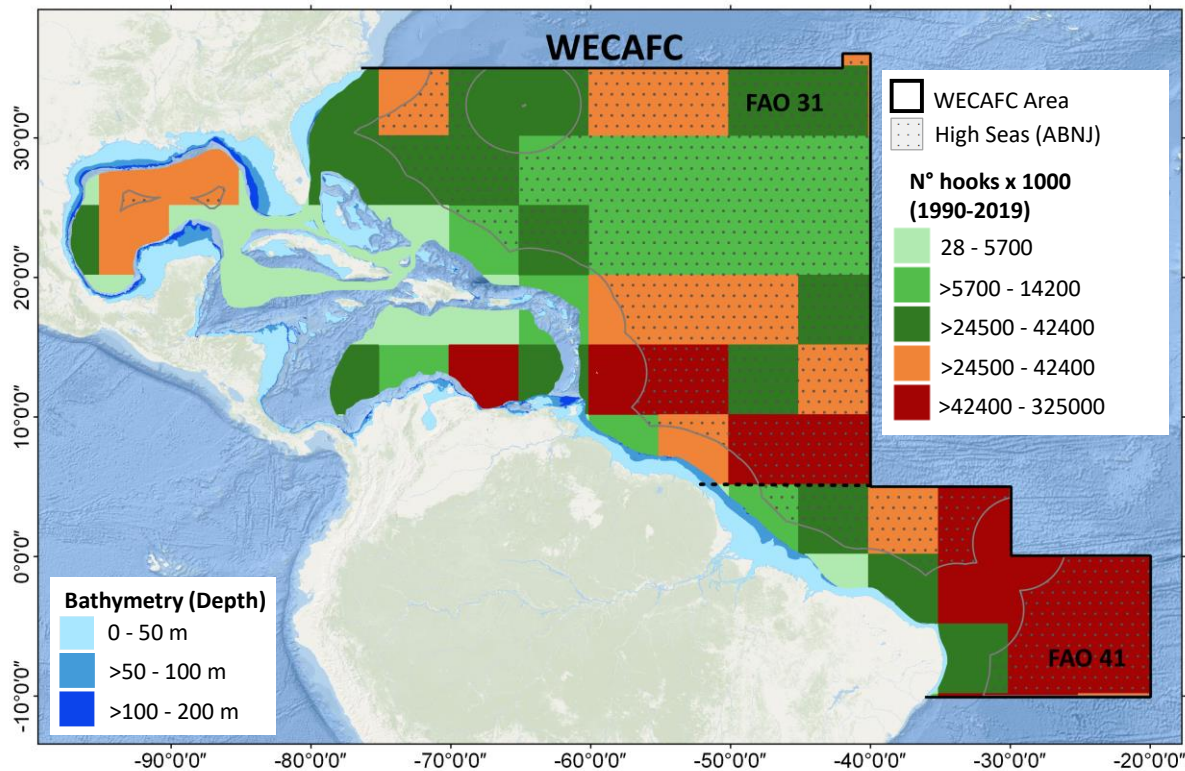


Figure 4.21. Estimated longline effort in number of hooksX1000 in 5°x5° for the WECAFC region (Data source: Taylor *et al.* 2020)

STRADDLING STOCKS

Tuna-like species

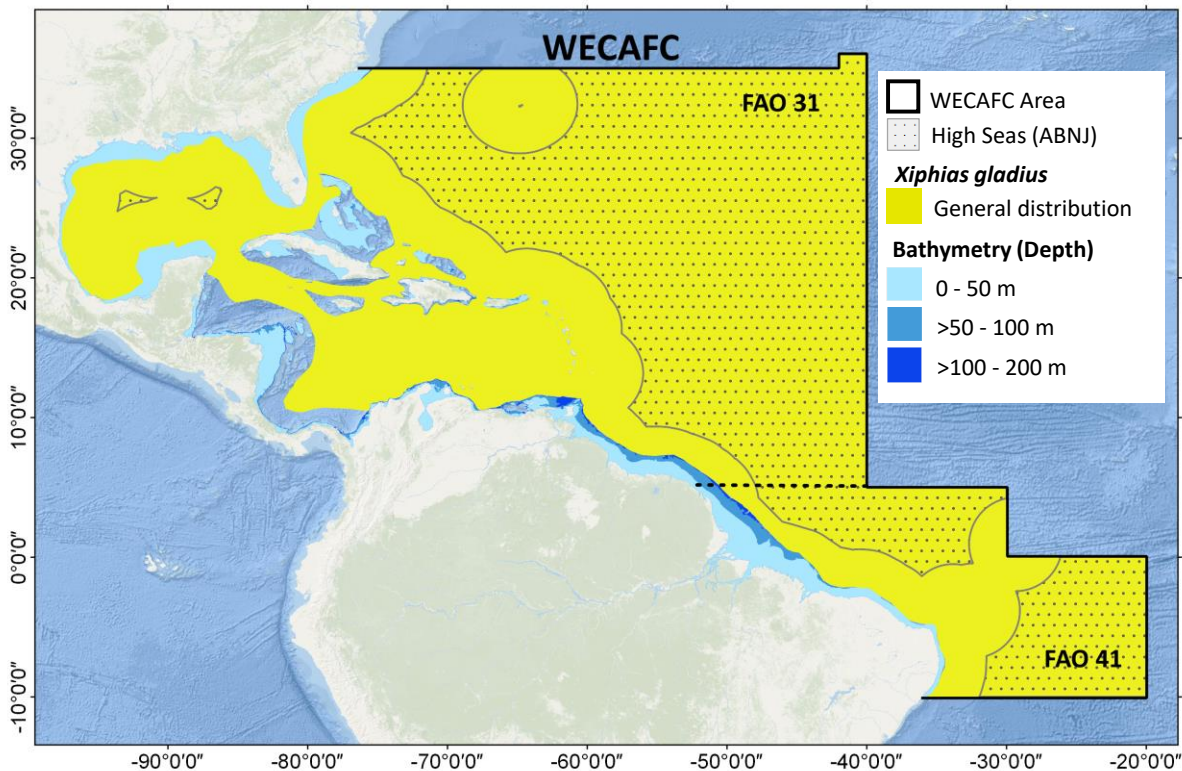


Figure 4.22. *Xiphias gladius* (Swordfish, SWO) general distribution in the WECAFC region.

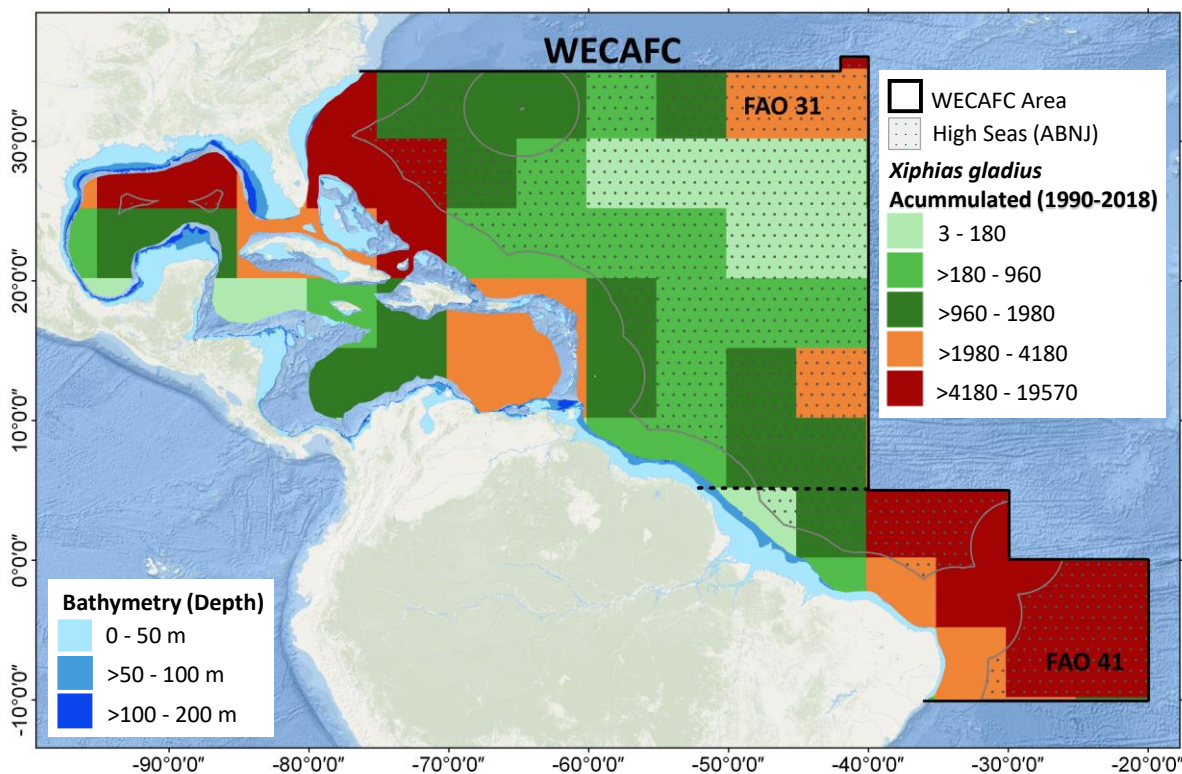


Figure 4.23. *Xiphias gladius* (Swordfish, SWO) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

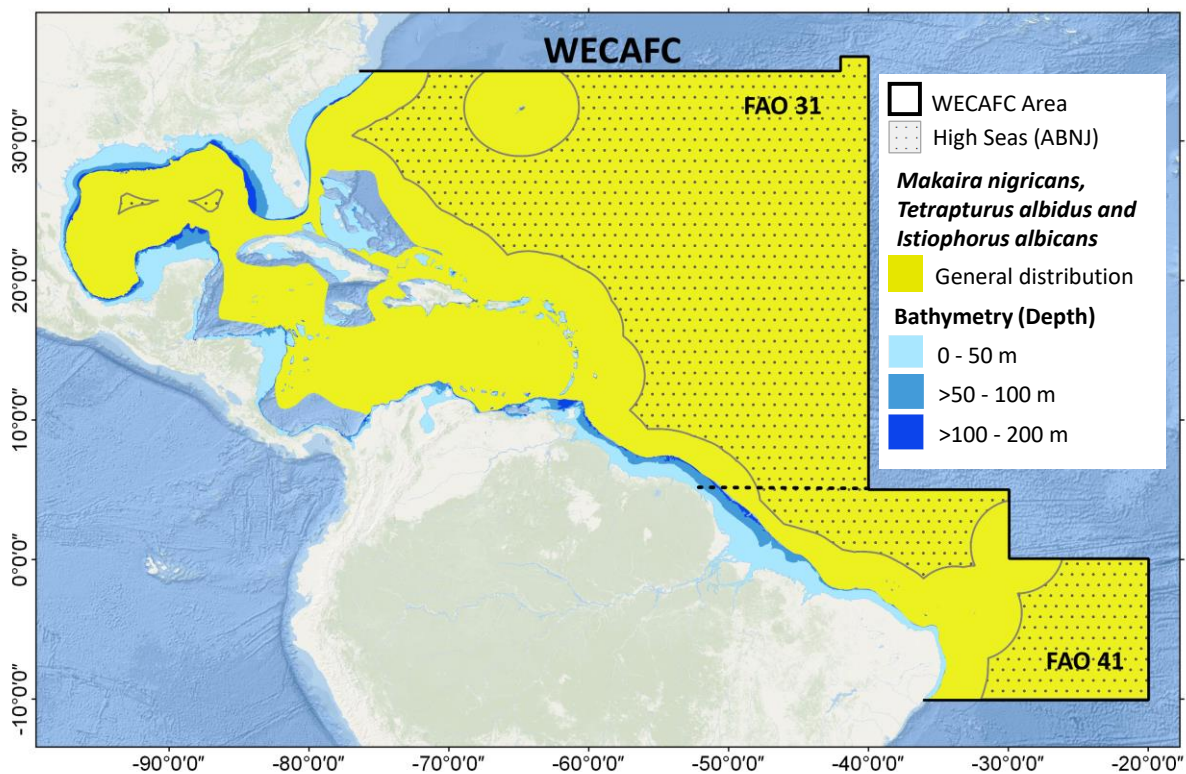


Figure 4.24. *Makaira nigricans* (Blue Marlin, BUM), *Tetrapturus albidus* (Atlantic white marlin, WHM) and *Istiophorus albicans* (Atlantic sailfish, SAI) general distribution in the WECAFC region.

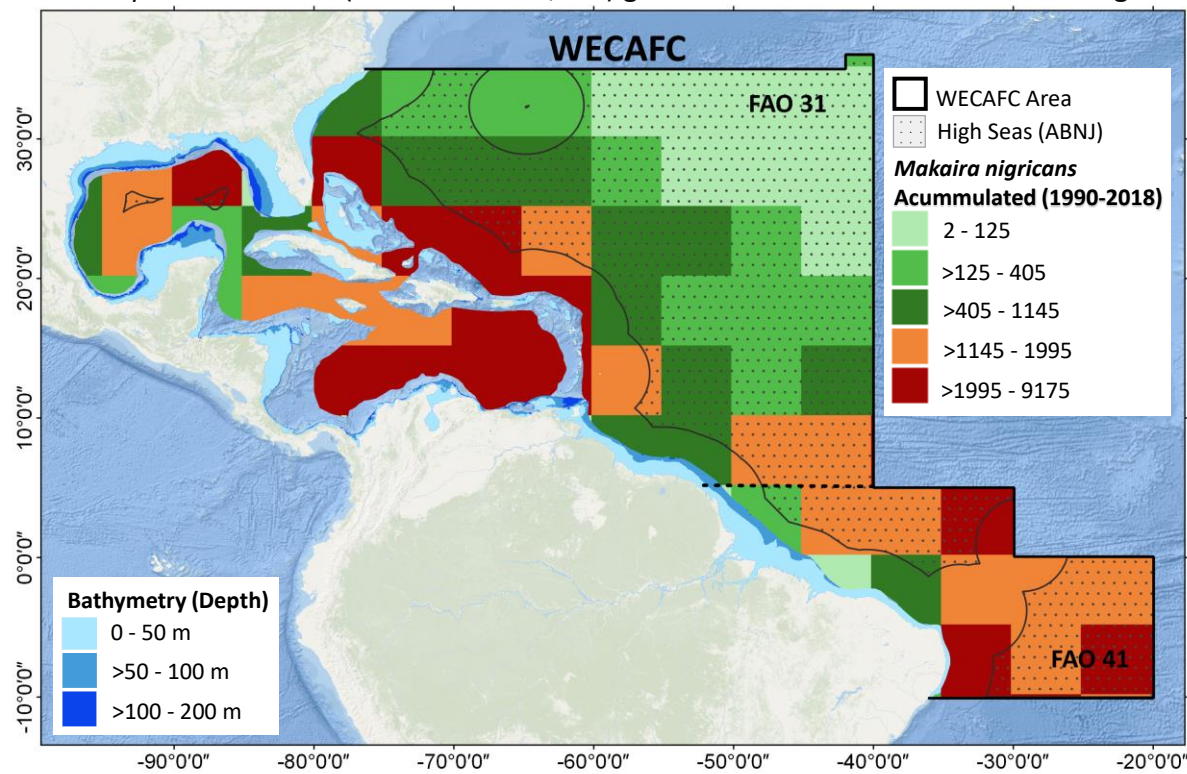


Figure 4.25. *Makaira nigricans* (Blue Marlin, BUM) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

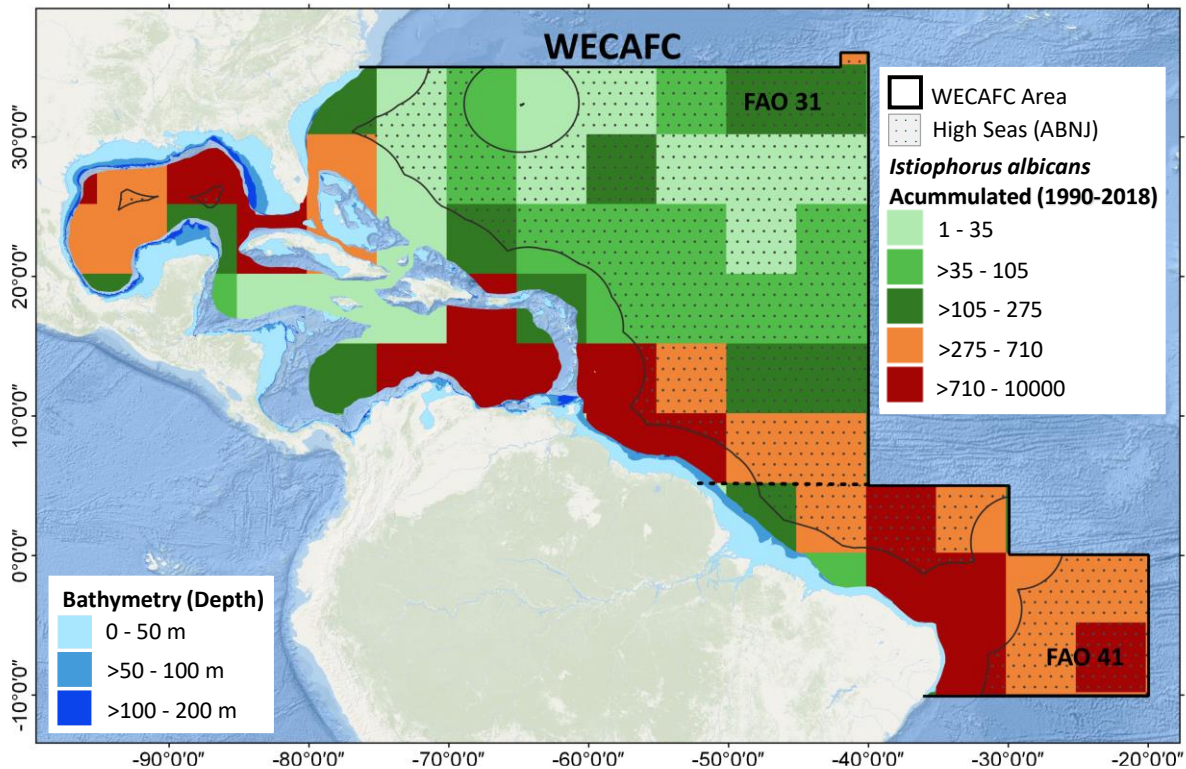


Figure 4.26. *Istiophorus albicans* (Atlantic sailfish, SAI) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

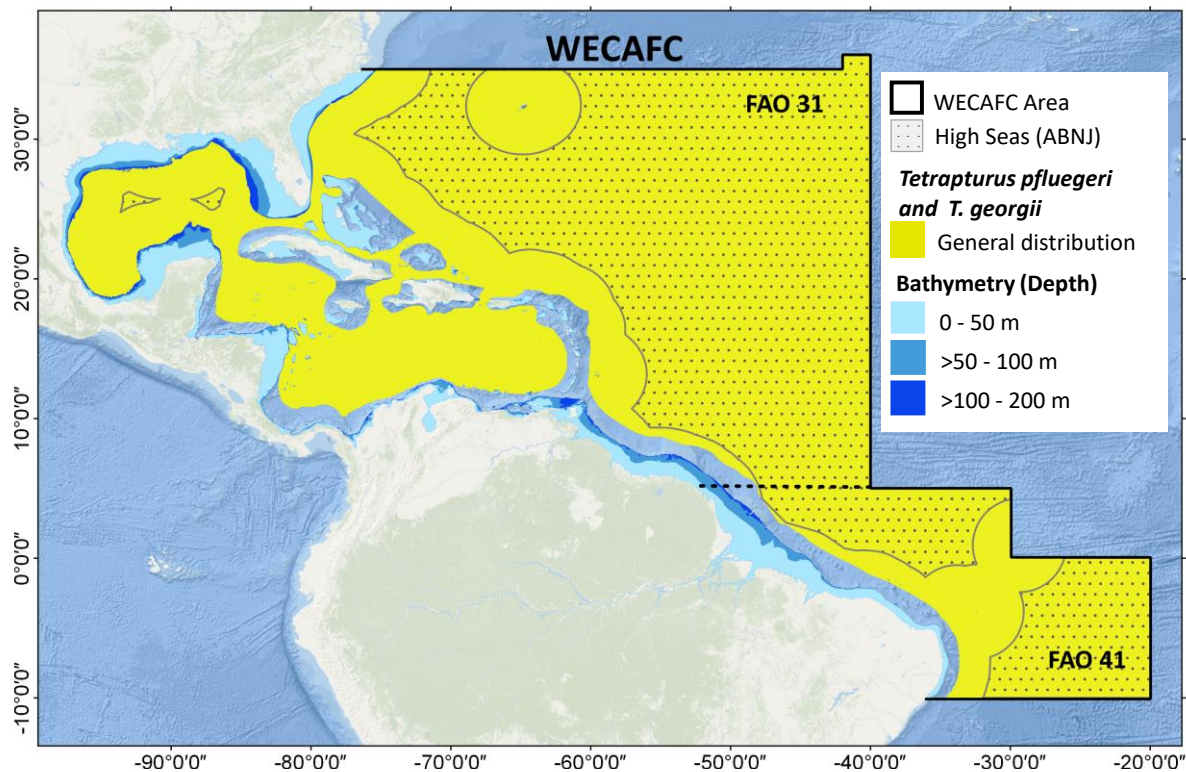


Figure 4.27. *Tetrapturus pfluegeri* (Longbill spearfish, SPF) and *T. georgii* (Roundscale spearfish, RSP) general distribution in the WECAFC region.

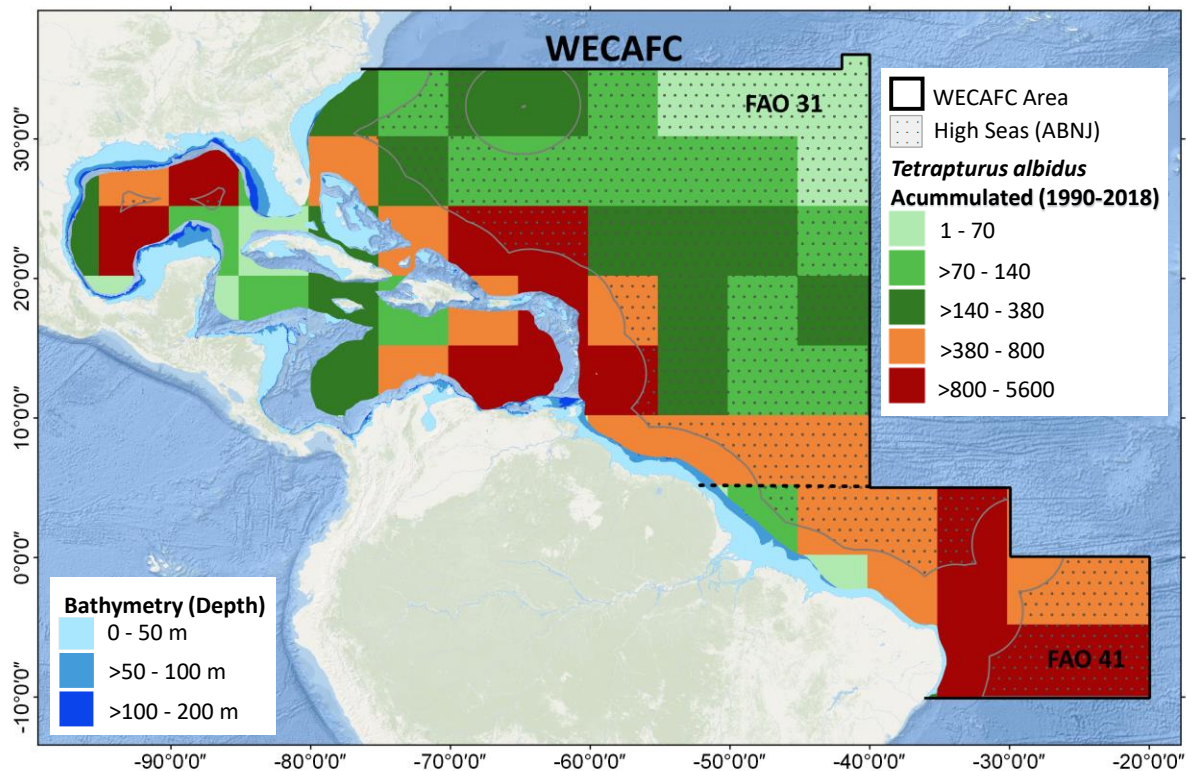


Figure 4.28. *Tetrapturus albidus* (Atlantic white marlin, WHM) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

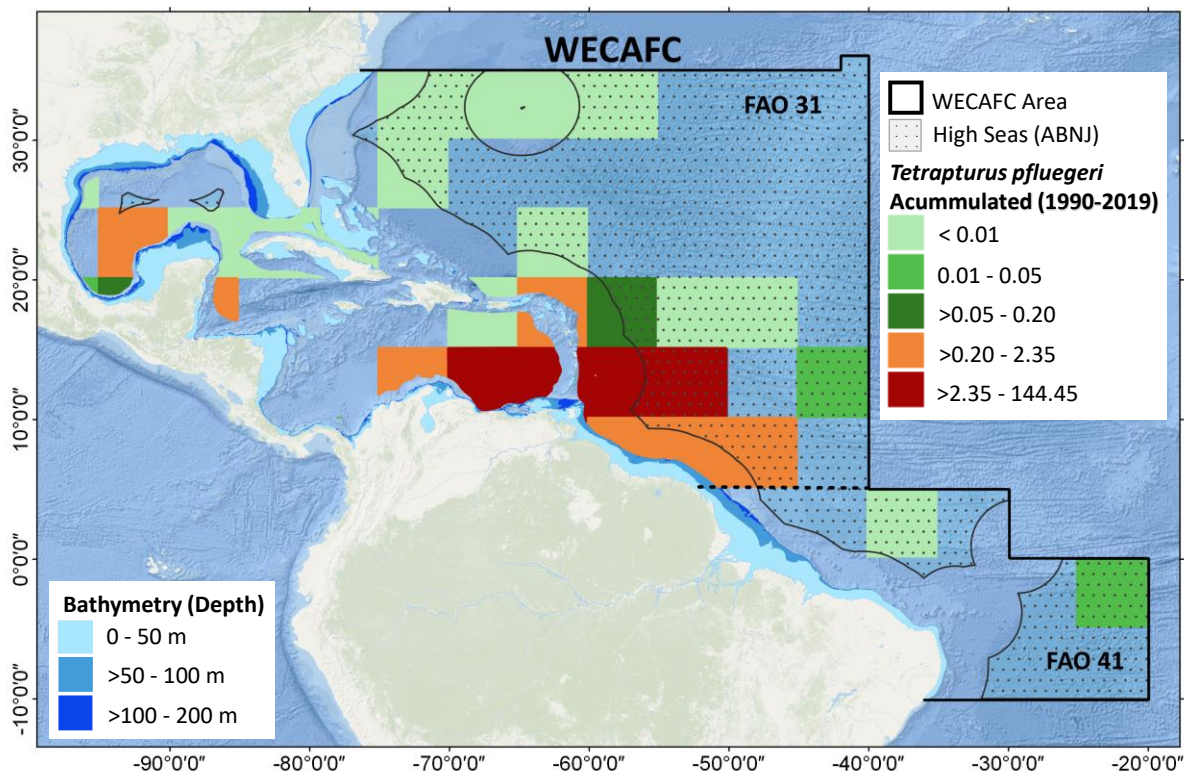


Figure 4.29. *Tetrapturus pfluegeri* (Longbill spearfish, SPF) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

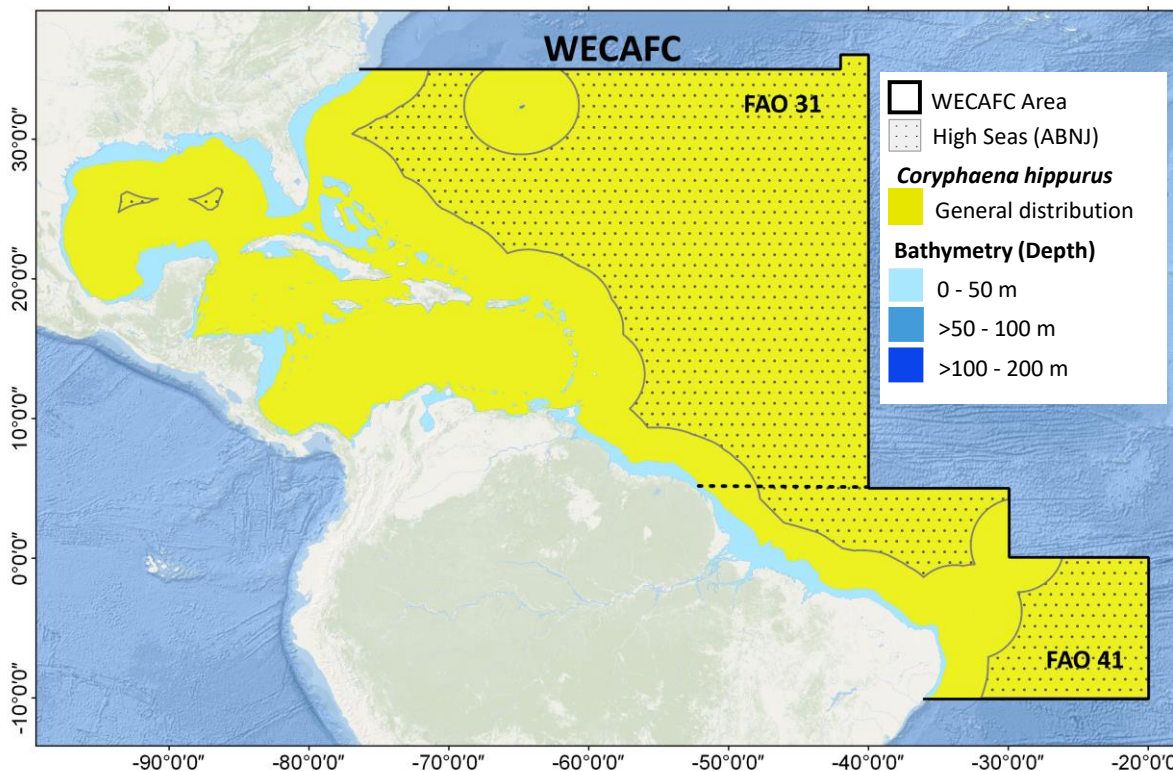


Figure 4.30. *Coryphaena hippurus* (Common dolphinfish, DOL) general distribution in the WECAFC region.

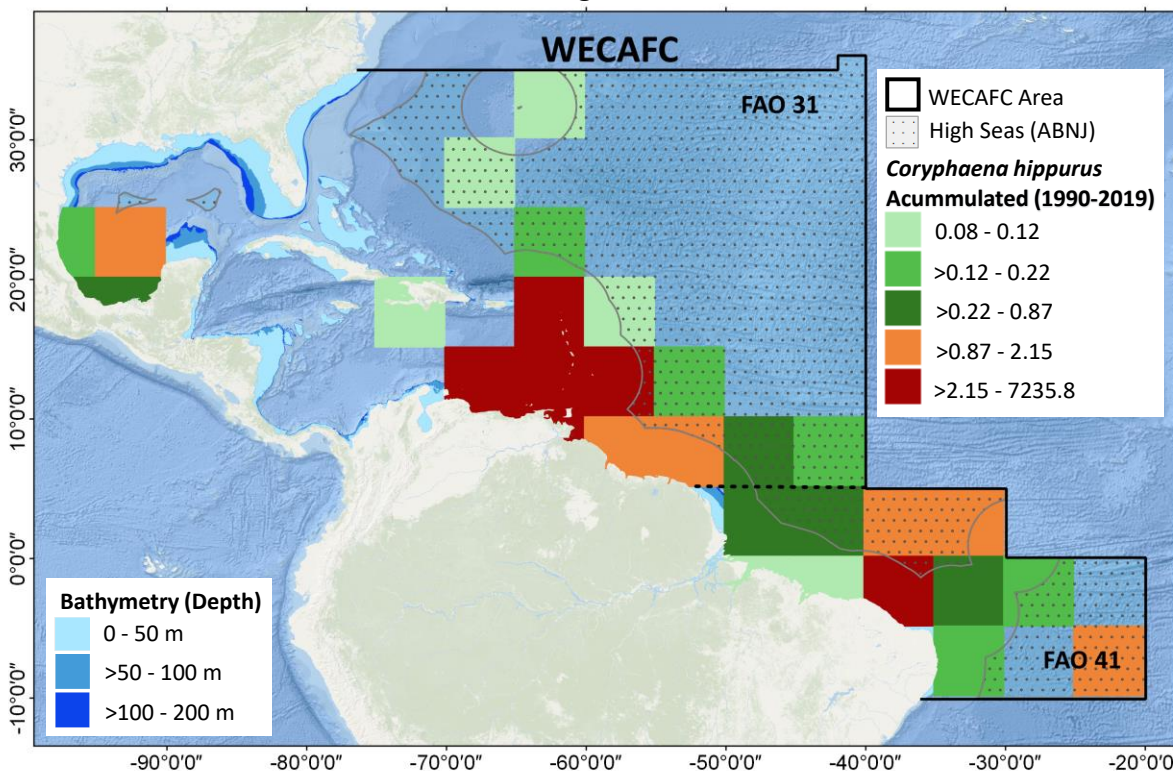


Figure 4.31. *Coryphaena hippurus* (Common dolphinfish, DOL) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

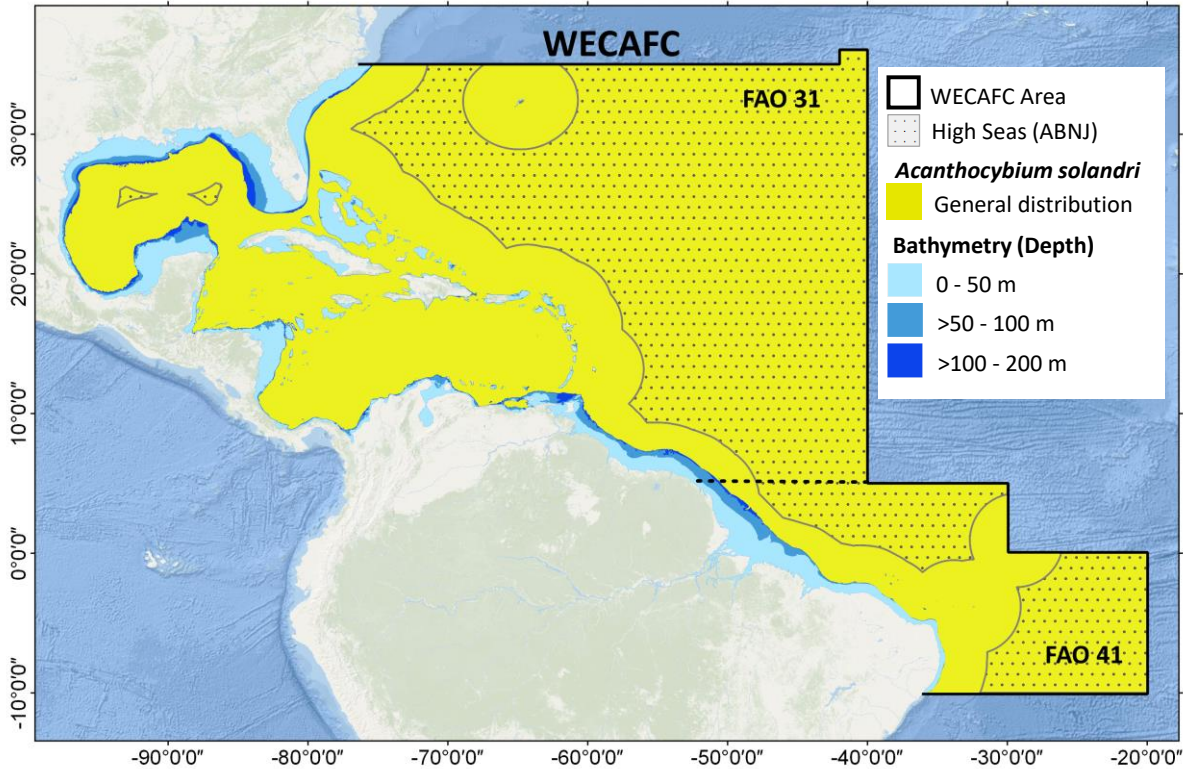


Figure 4.32. *Acanthocybium solandri* (Wahoo, species code: WAH) general distribution in the WECAFC region.

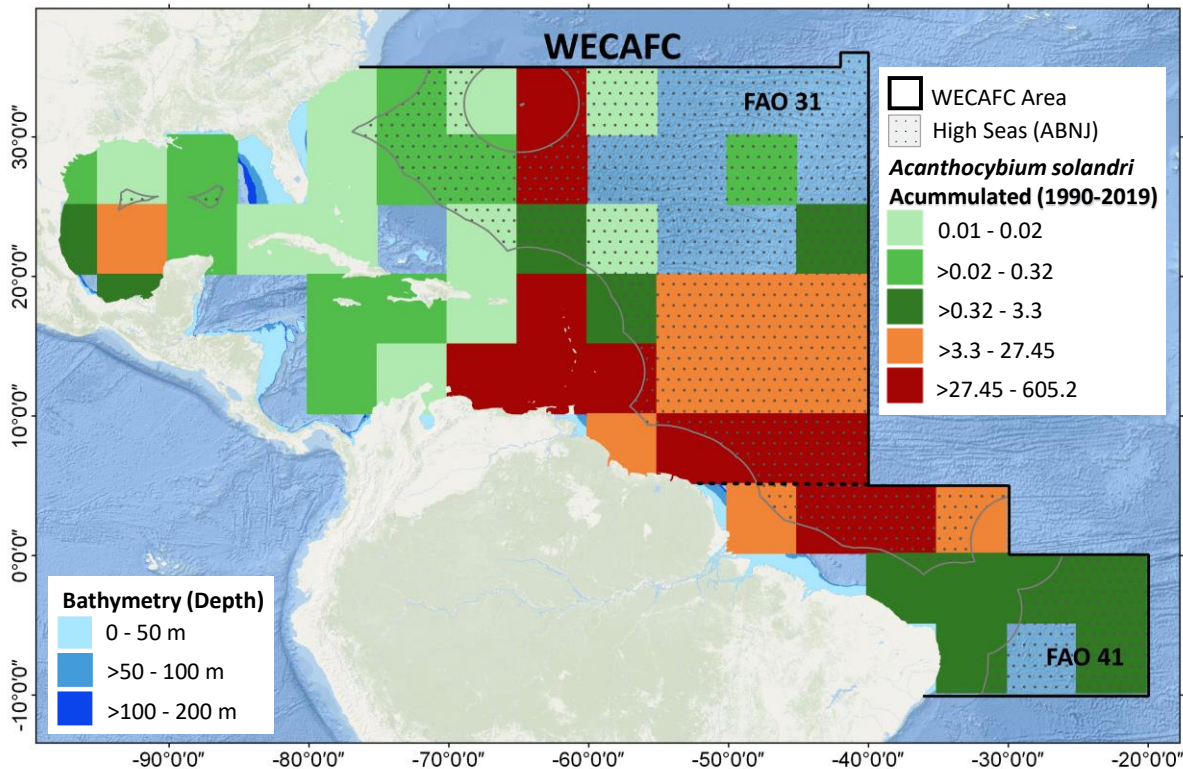


Figure 4.33. *Acanthocybium solandri* (Wahoo, species code: WAH) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

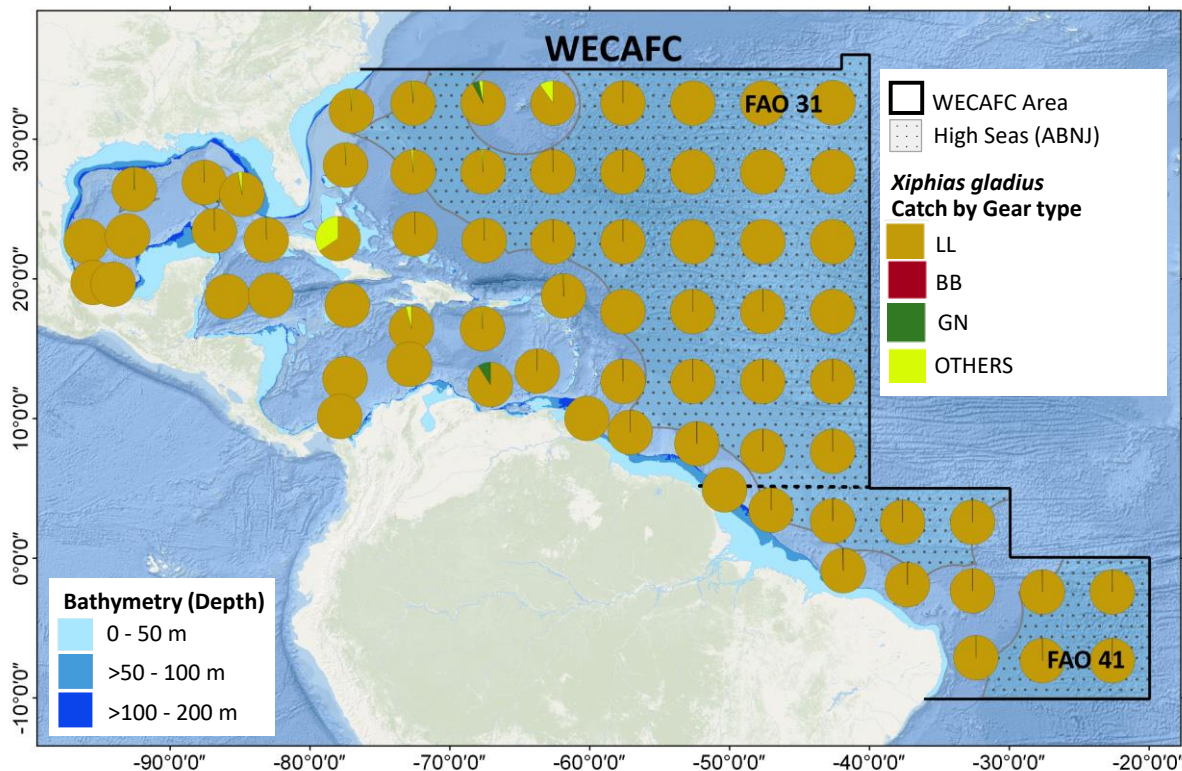


Figure 4.34. *Xiphias gladius* (Swordfish, species code: SWO) accumulated (1990-2019) catch by major gear in 5°x5° for the WECAFC region.

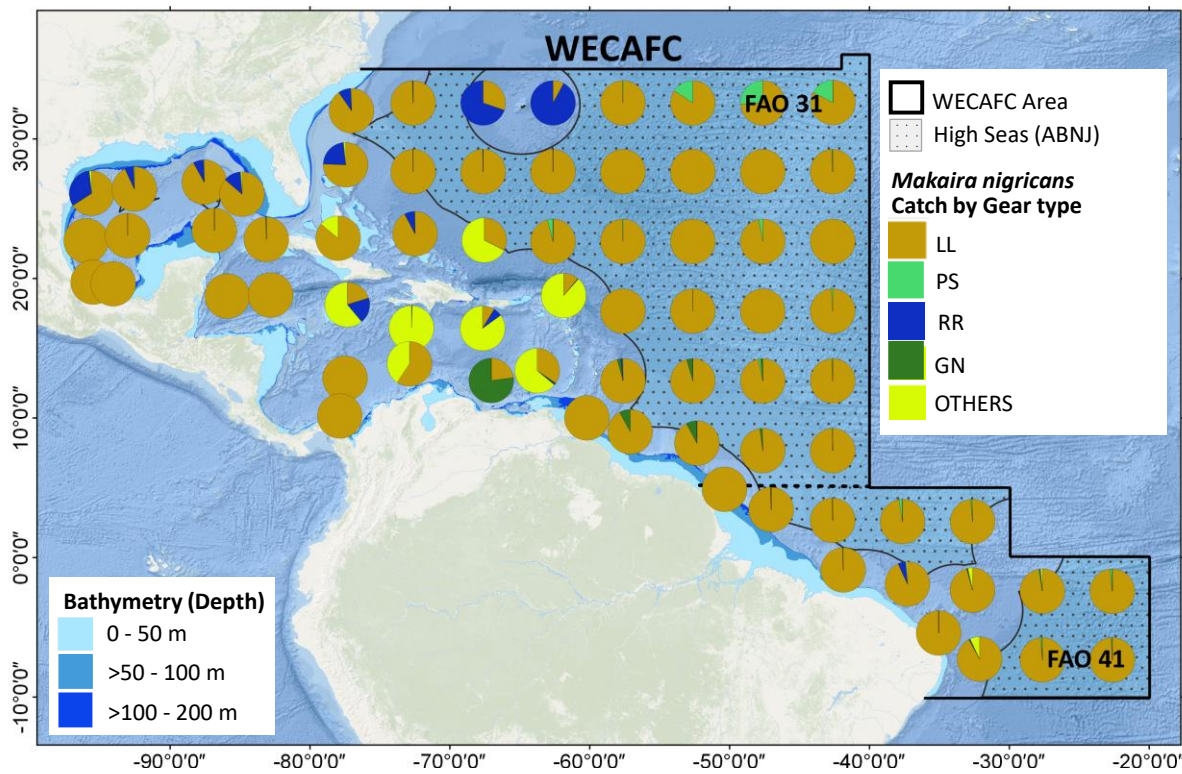


Figure 4.35. *Makaira nigricans* (Blue Marlin, species code: BUM) accumulated (1990-2019) catch by major gear in 5°x5° for the WECAFC region.

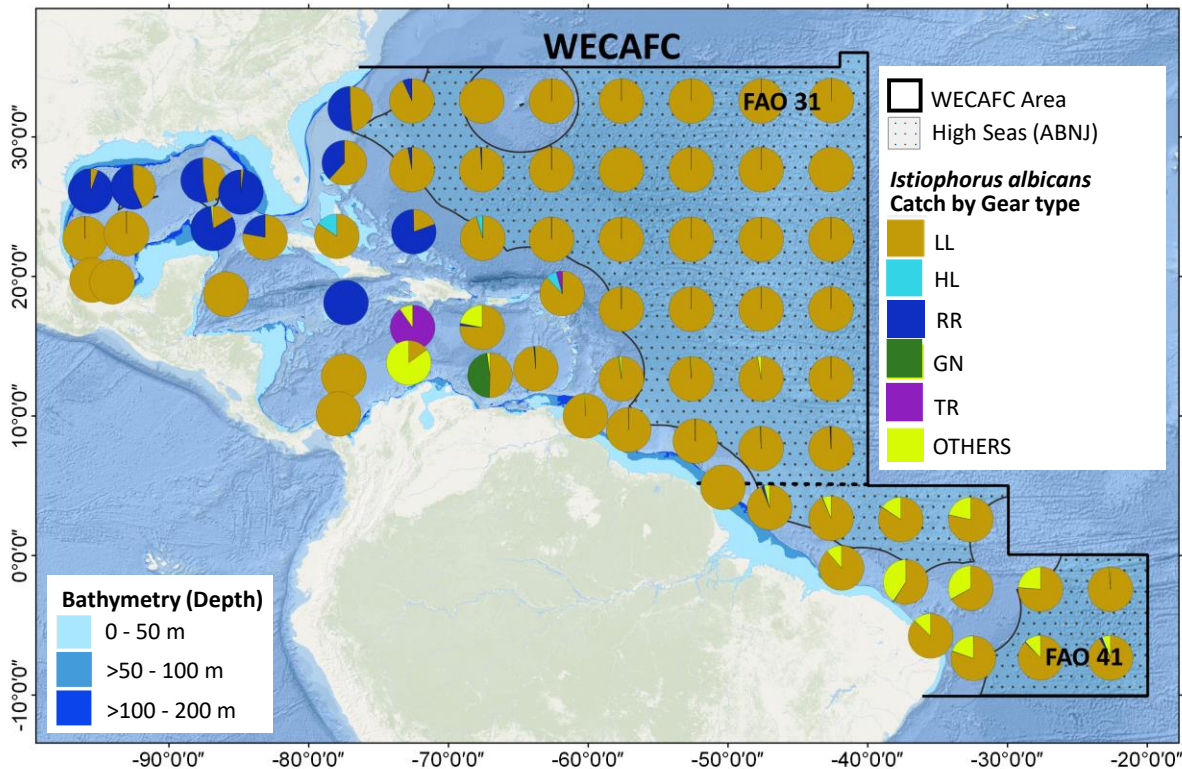


Figure 4.36. *Istiophorus albicans* (Atlantic sailfish, SAI) accumulated (1990-2019) catch by major gear in 5°x5° for the WECAFC region.

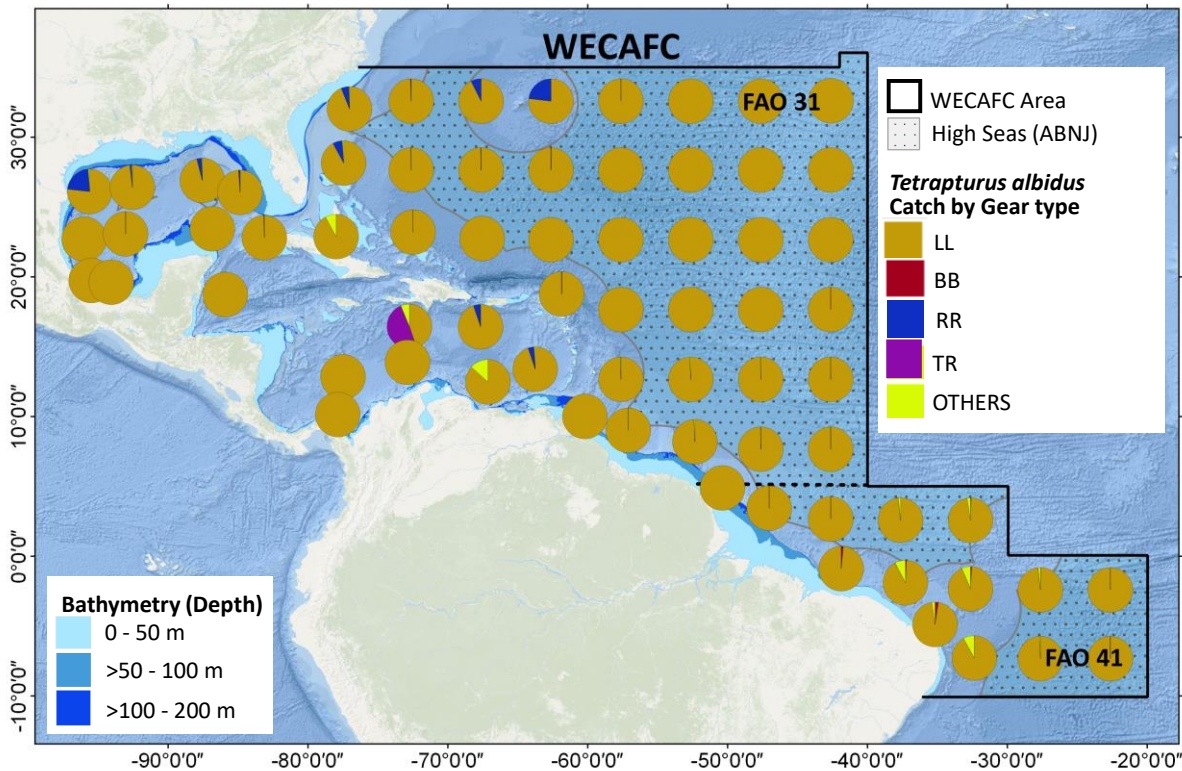


Figure 4.37. *Tetrapturus albidus* (Atlantic white marlin, WHM) accumulated (1990-2019) catch by major gear in 5°x5° for the WECAFC region.

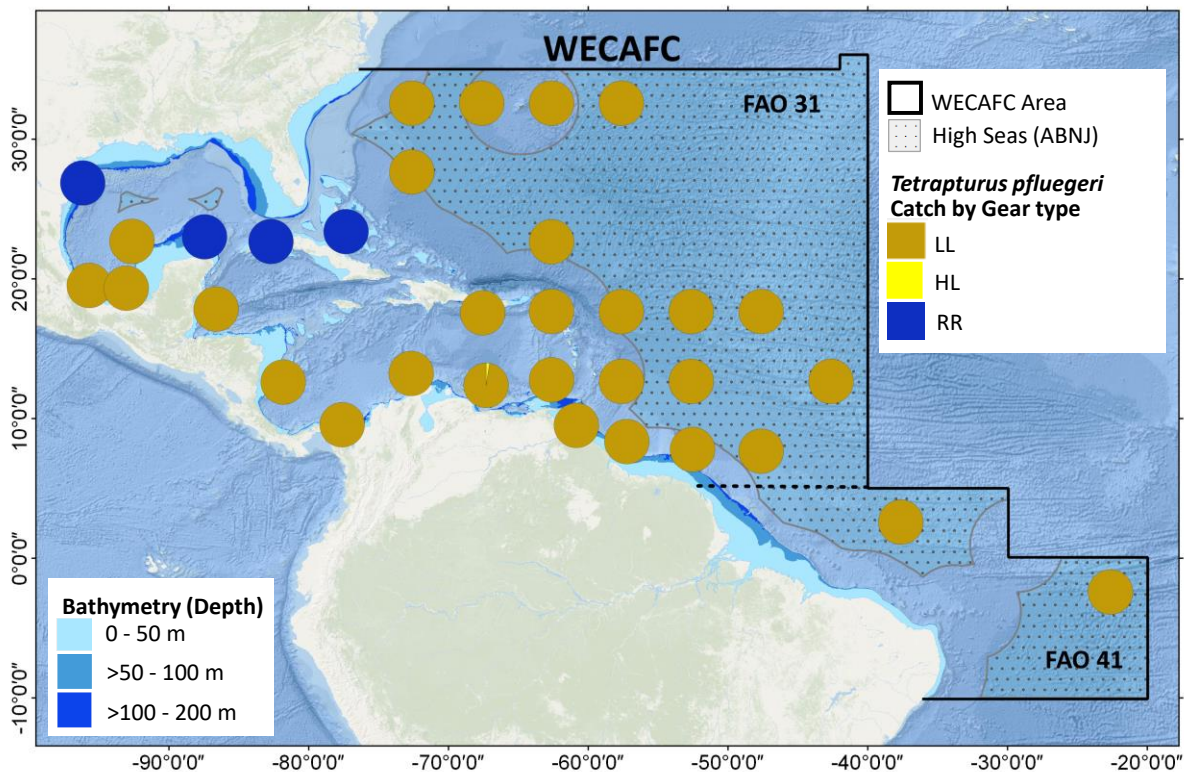


Figure 4.38. *Tetrapturus pfluegeri* (Longbill spearfish, SPF) accumulated (1990-2019) catch by major gear in 5°x5° for the WECAFC region.

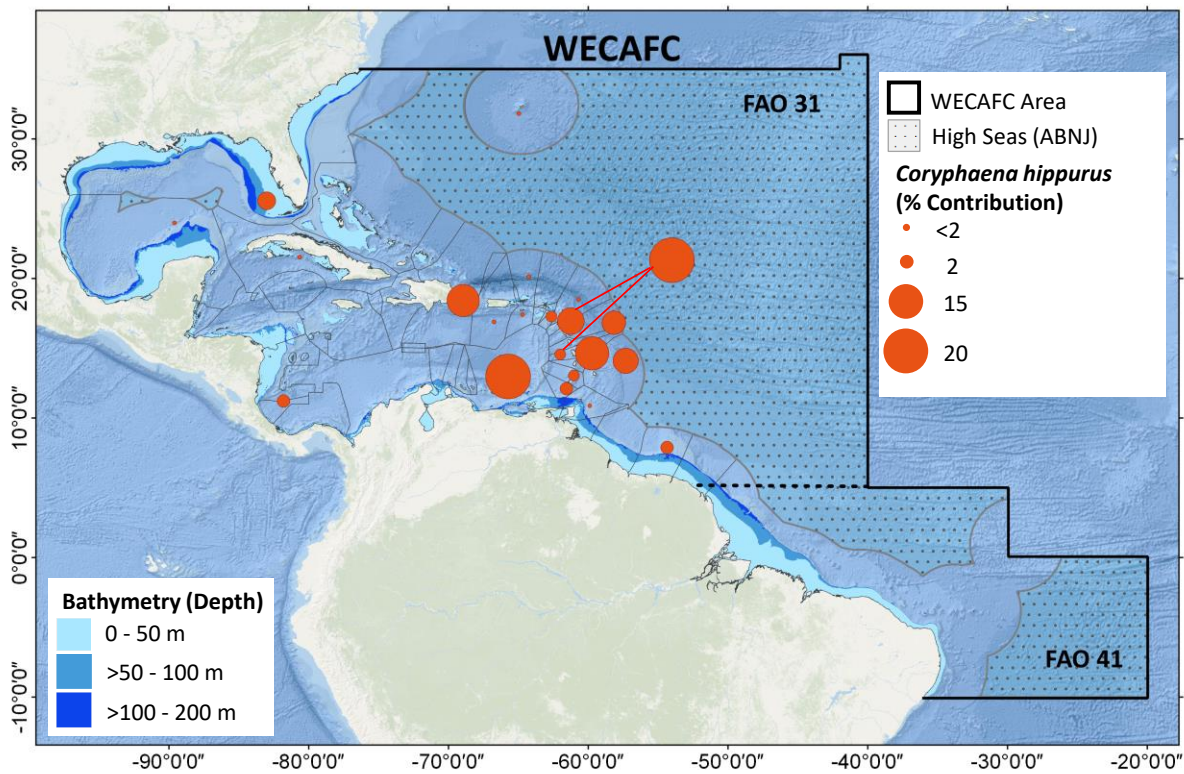


Figure 4.39. *Coryphaena hippurus* (Common dolphinfish, DOL) percentage of contribution to total catch. (EU_France is linked to Martinique and Guadeloupe bubbles)

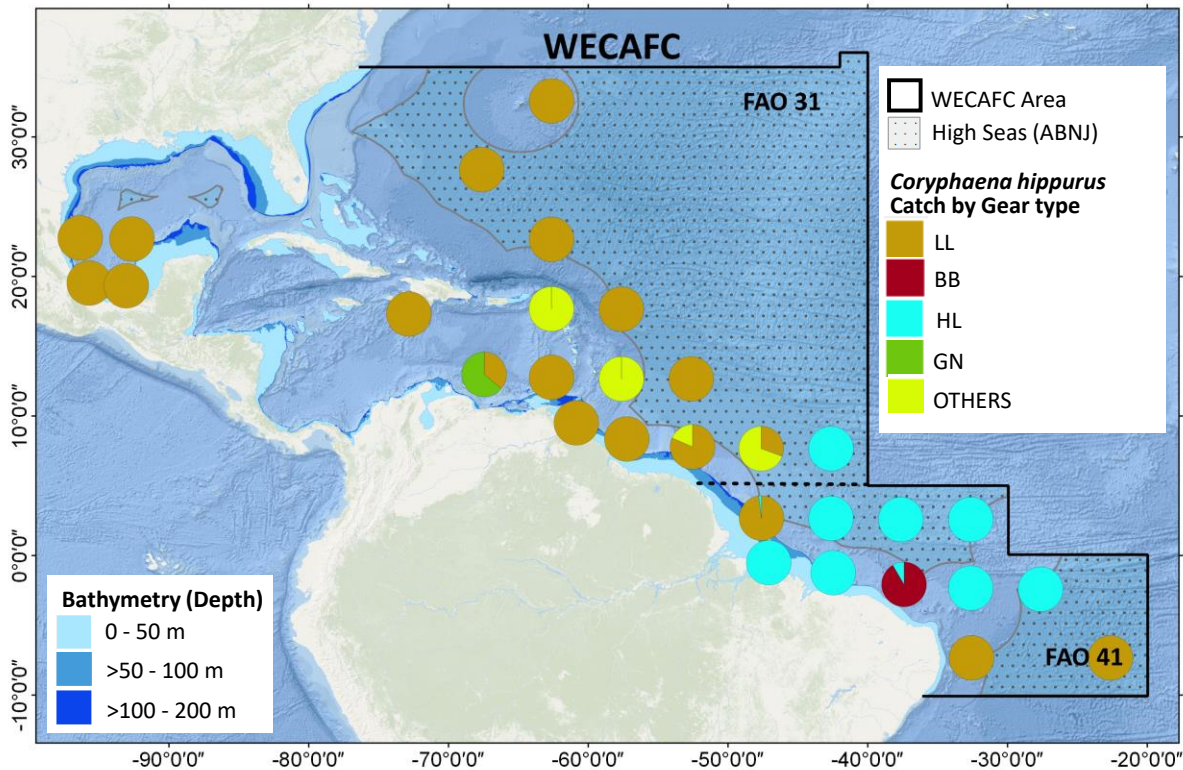


Figure 4.40. *Coryphaena hippurus* (Common dolphinfish, DOL) accumulated (1990-2019) catch by major gear in 5°x5° for the WECAFC region.

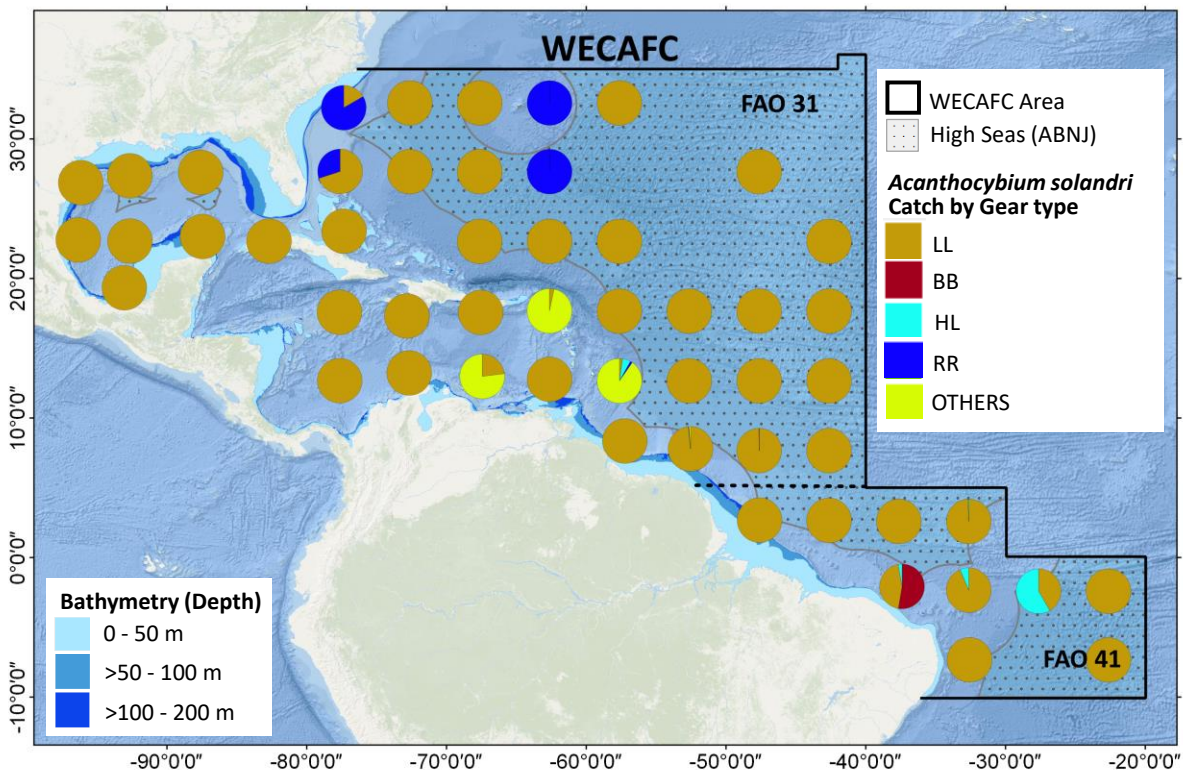


Figure 4.41. *Acanthocybium solandri* (Wahoo, WAH) accumulated (1990-2019) catch by major gear in 5°x5° for the WECAFC region.

STRADDLING STOCKS
ELASMOBRANCHS

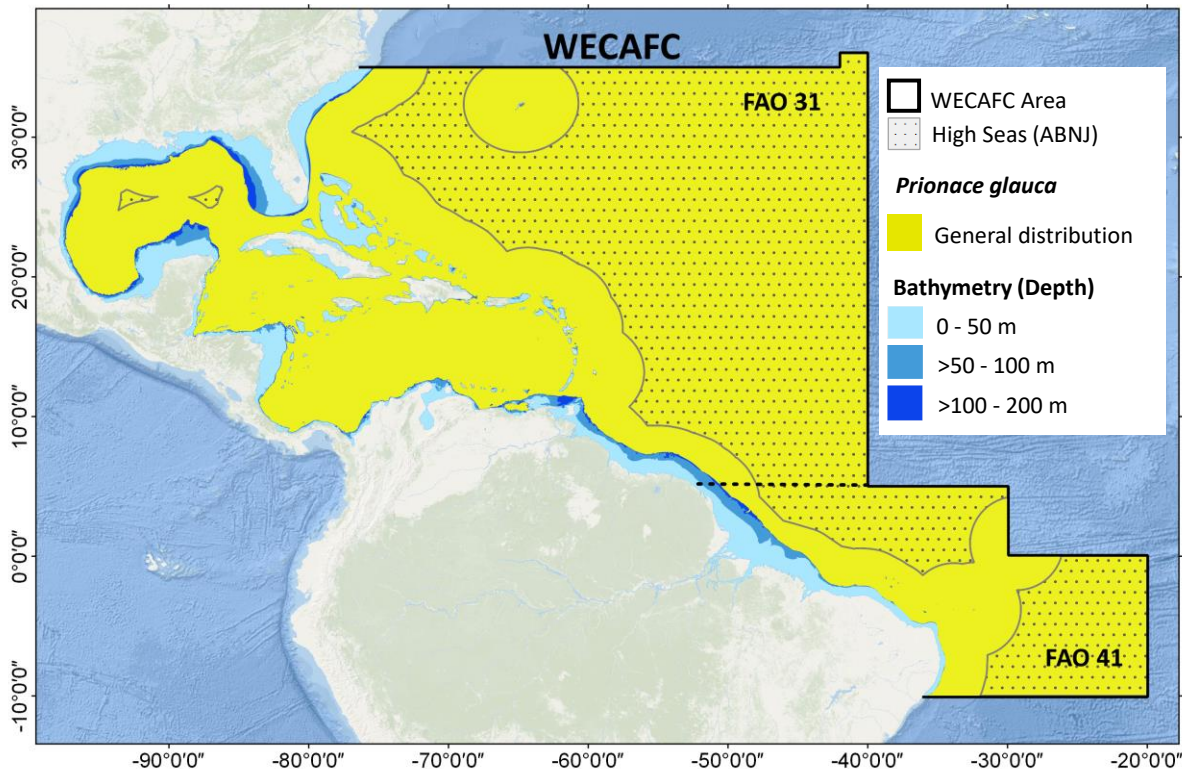


Figure 4.42. *Prionace glauca* (Blue shark, BSH), *Carcharhinus falciformis* (Silky shark, FAL), *Carcharhinus longimanus* (Oceanic whitetip shark, OCS), *Sphyrna mokarran* (Great hammerhead, SPK), *Isurus oxyrinchus* (Shortfin mako, SMA) and *Alopias superciliosus* (Bigeye thresher shark, BTH) general distribution in the WECAFC region.

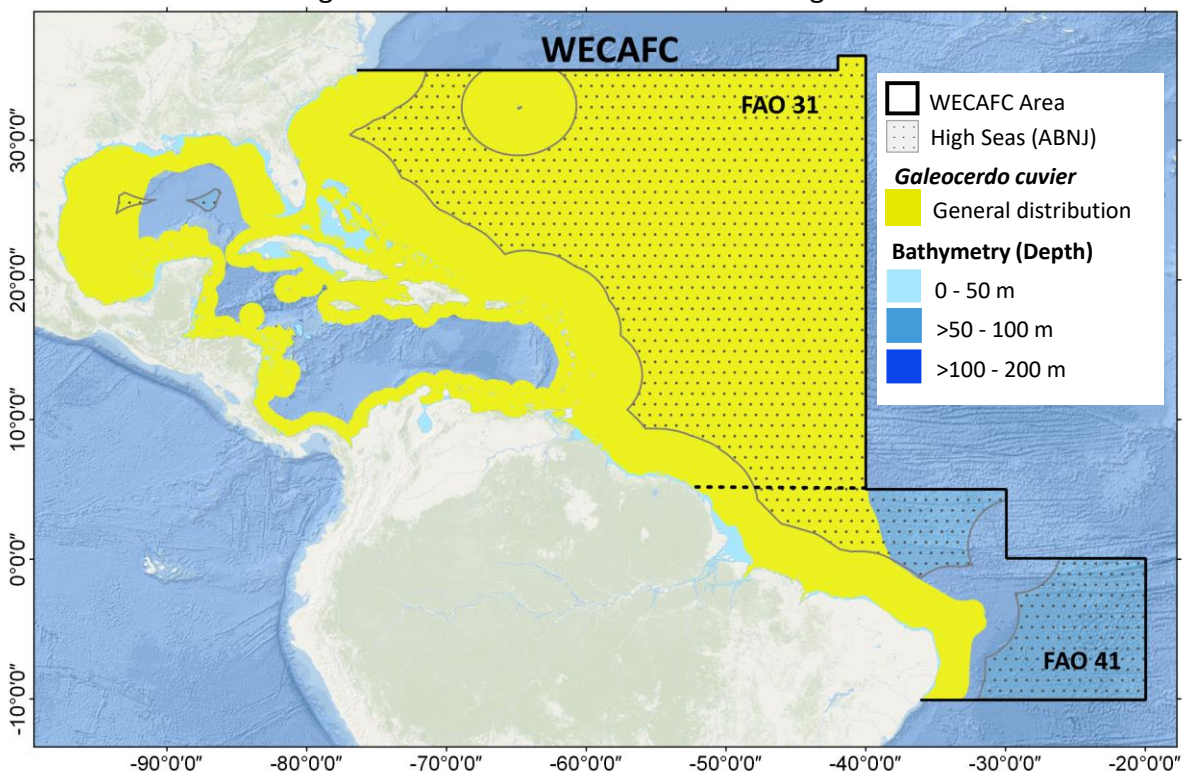


Figure 4.43. *Galeocerdo cuvier* (Tiger shark, TIG) general distribution in the WECAFC region.

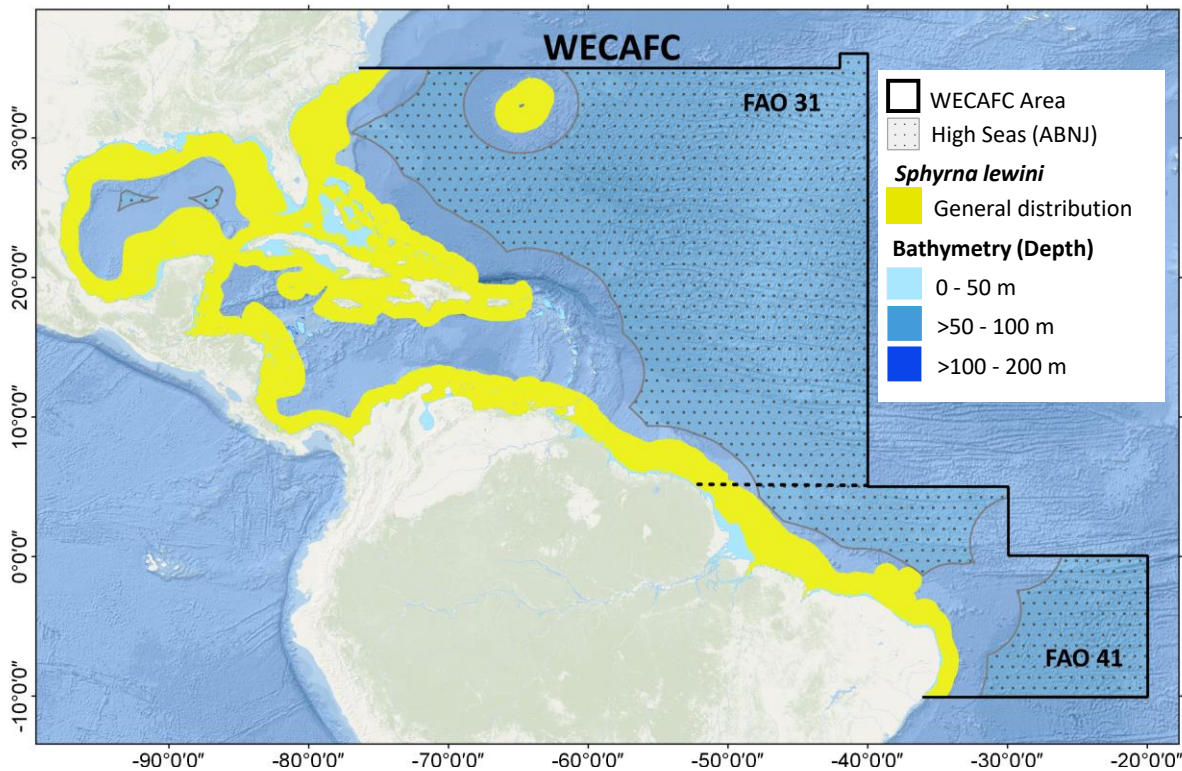


Figure 4.44. *Sphyrna lewini* (Scalloped hammerhead shark, SPL) general distribution in the WECAFC region.

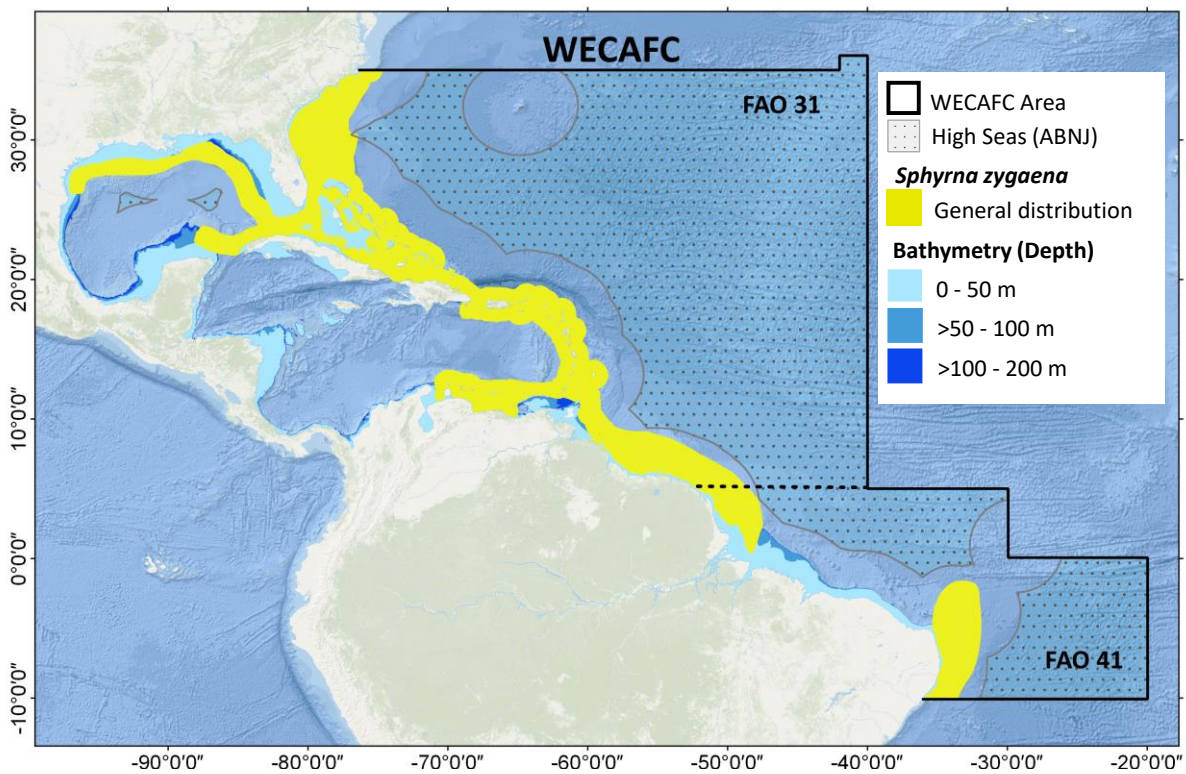


Figure 4.45. *Sphyrna zygaena* (Smooth hammerhead, SPZ) general distribution.

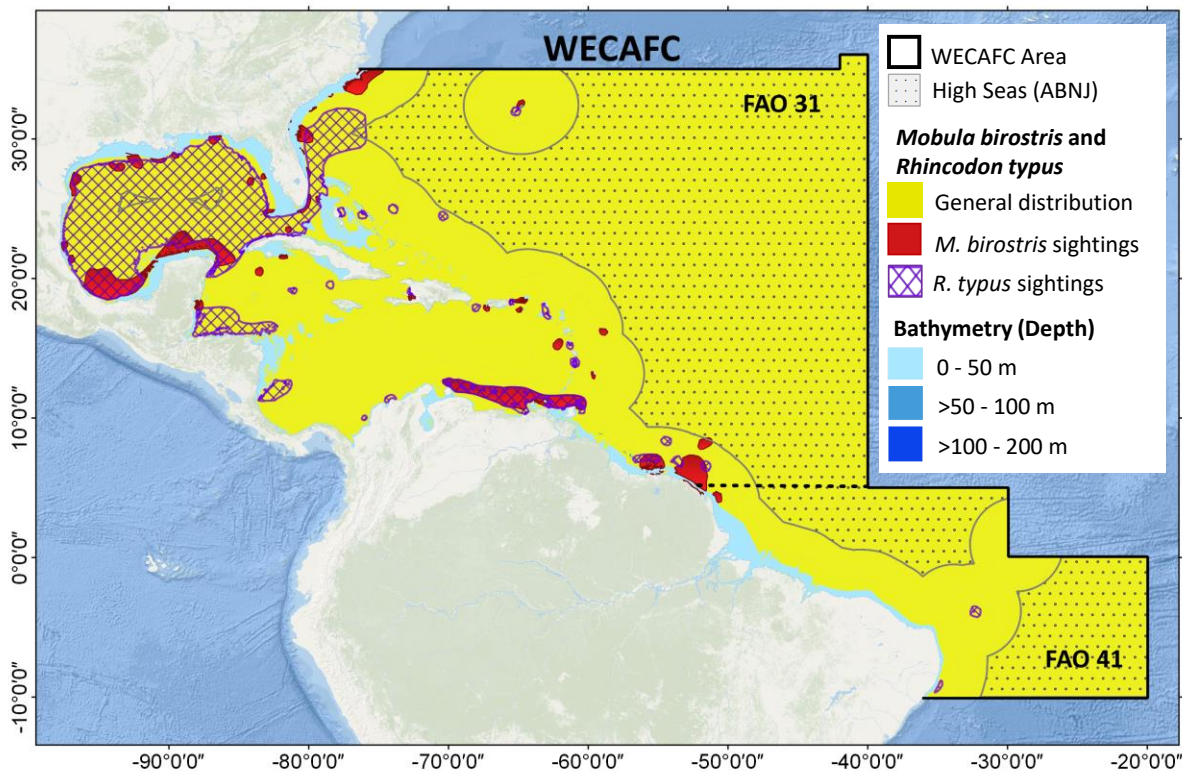


Figure 4.46. *Mobula birostris* (Giant Oceanic Manta Ray, RMB) and *Rhincodon typus* (Whale Shark, RHN) general distribution and sightings in the WECAFC region.

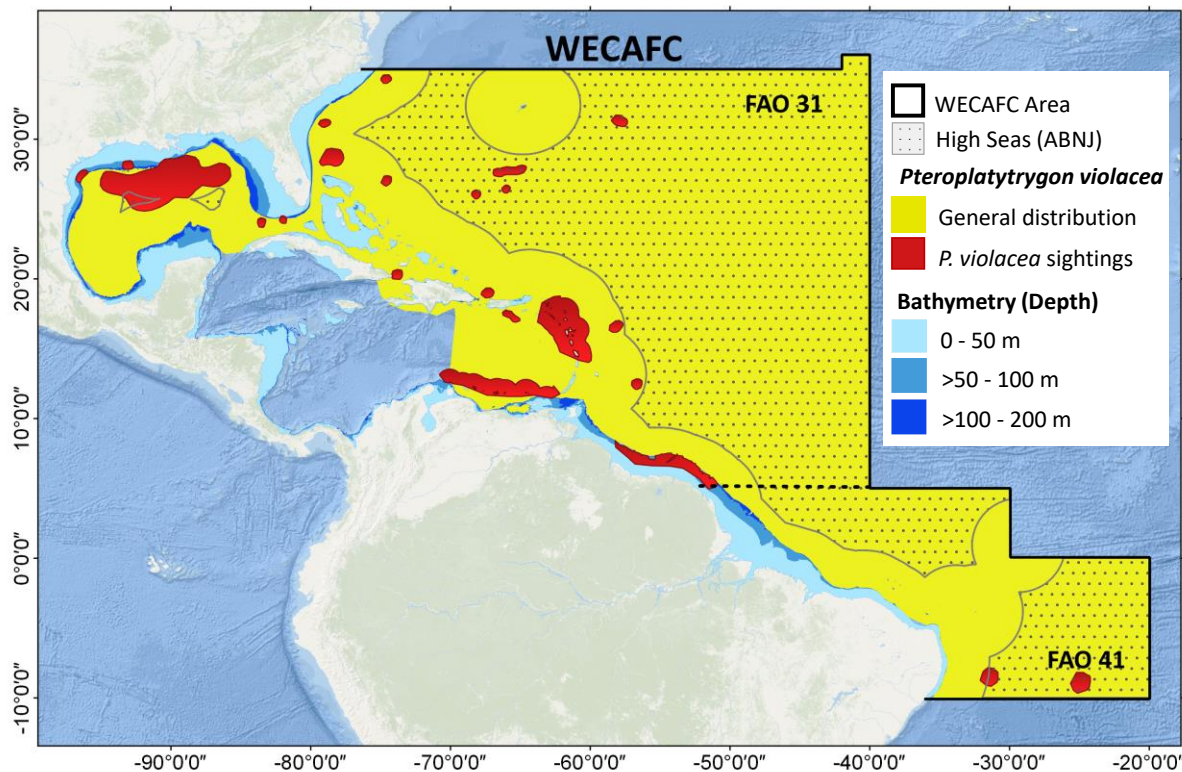


Figure 4.47. *Pteroplatytrygon violacea* (Pelagic stingray, PLS) general distribution and sightings in the WECAFC region.

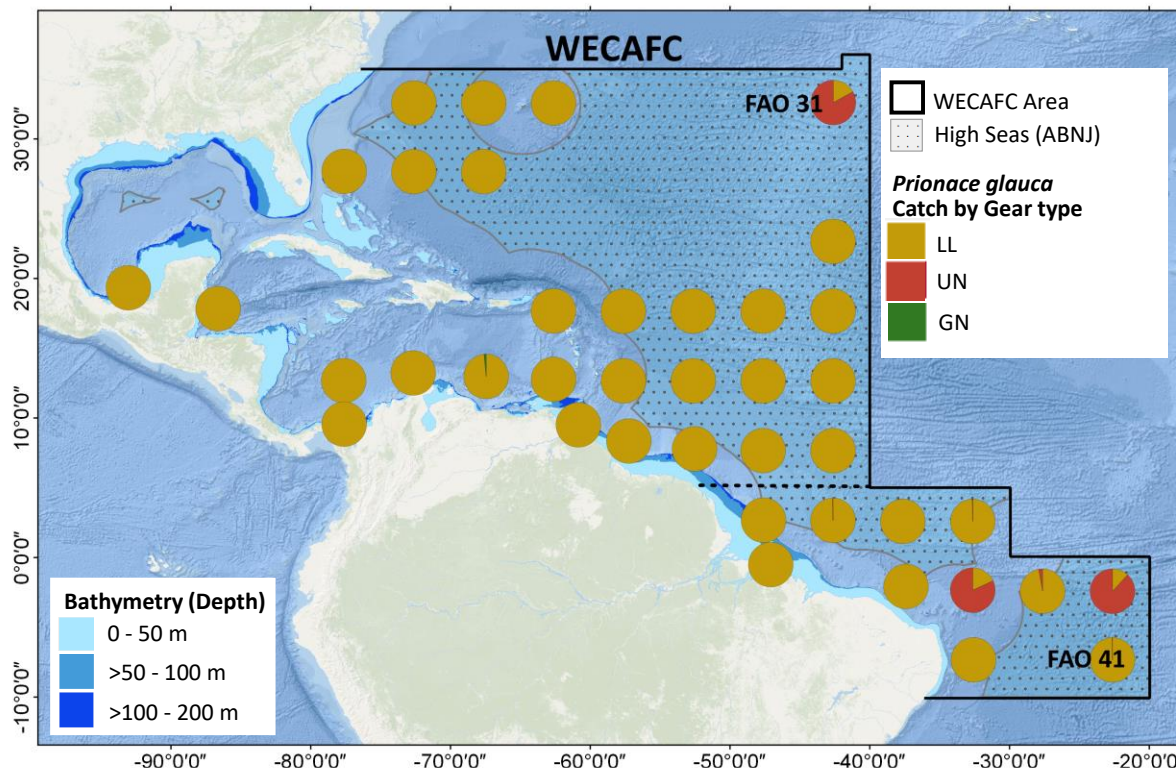


Figure 4.48. *Prionace glauca* (Blue shark, BSH) accumulated (1990-2019) catch by major gears in 5°x5° in the WECAFC region.

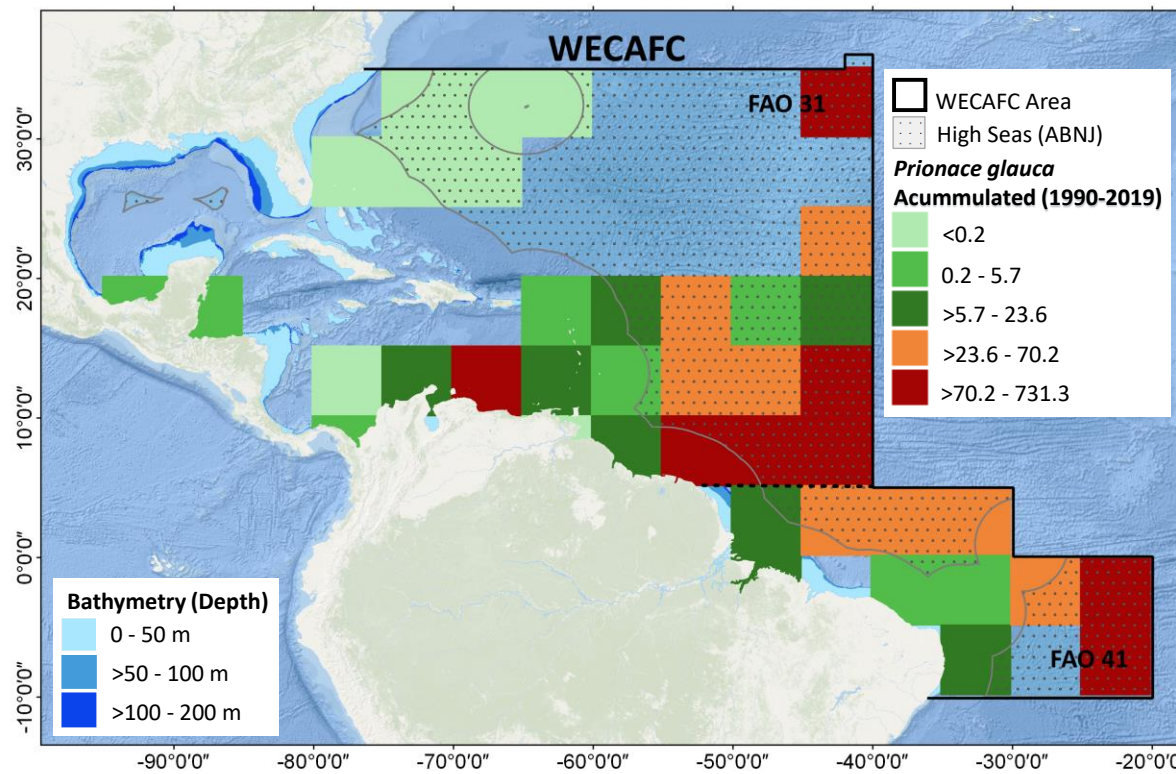


Figure 4.49. *Prionace glauca* (Blue shark, BSH) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

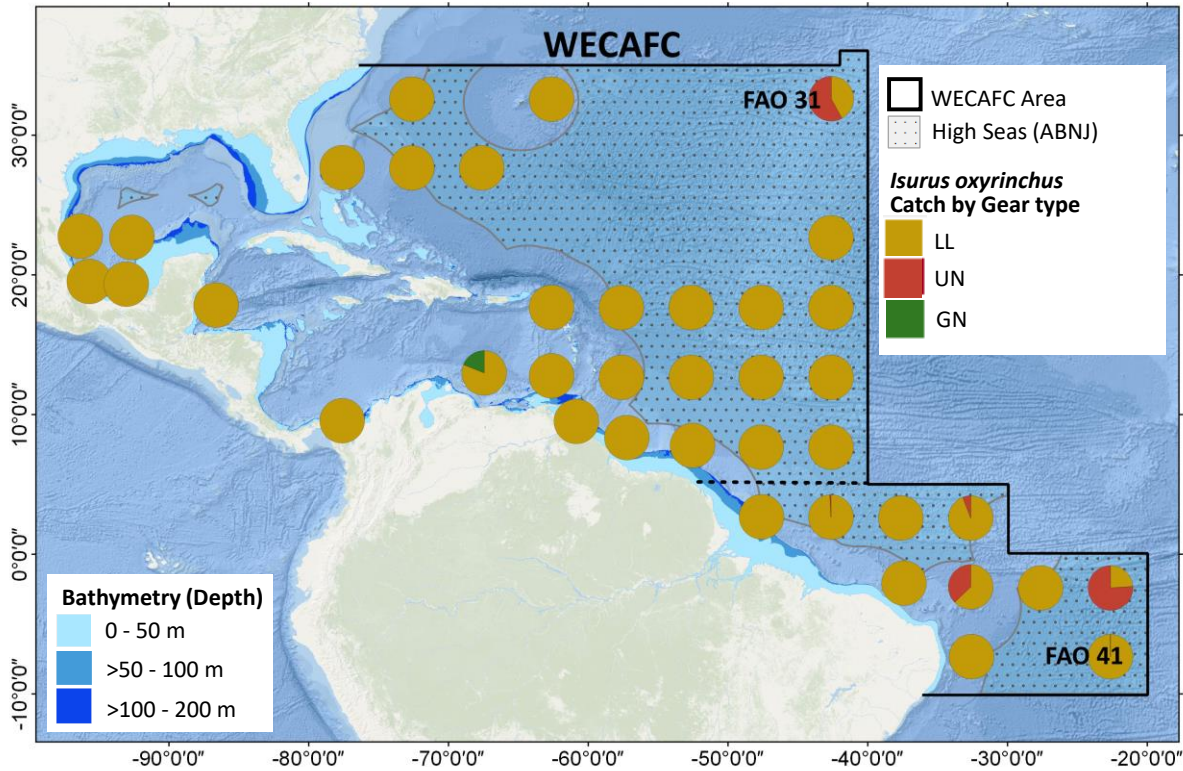


Figure 4.50. *Isurus oxyrinchus* (Shortfin mako, SMA) accumulated (1990-2019) catch by major gears in 5°x5° in the WECAFC region.

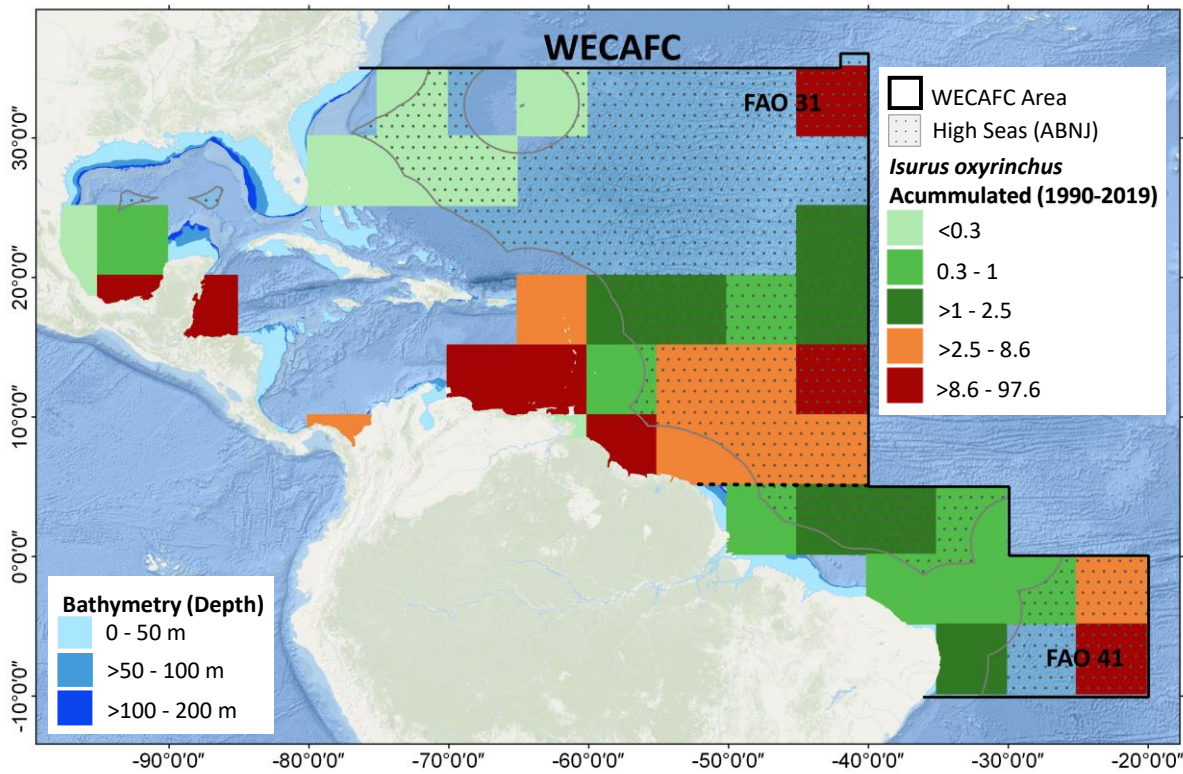


Figure 4.51. *Isurus oxyrinchus* (Shortfin mako, SMA) accumulated catch in 5°x5° (tonnes) in the WECAFC region.

ECOLOGICAL CONNECTIVITY

WECAFC Transboundary and Straddling Resources

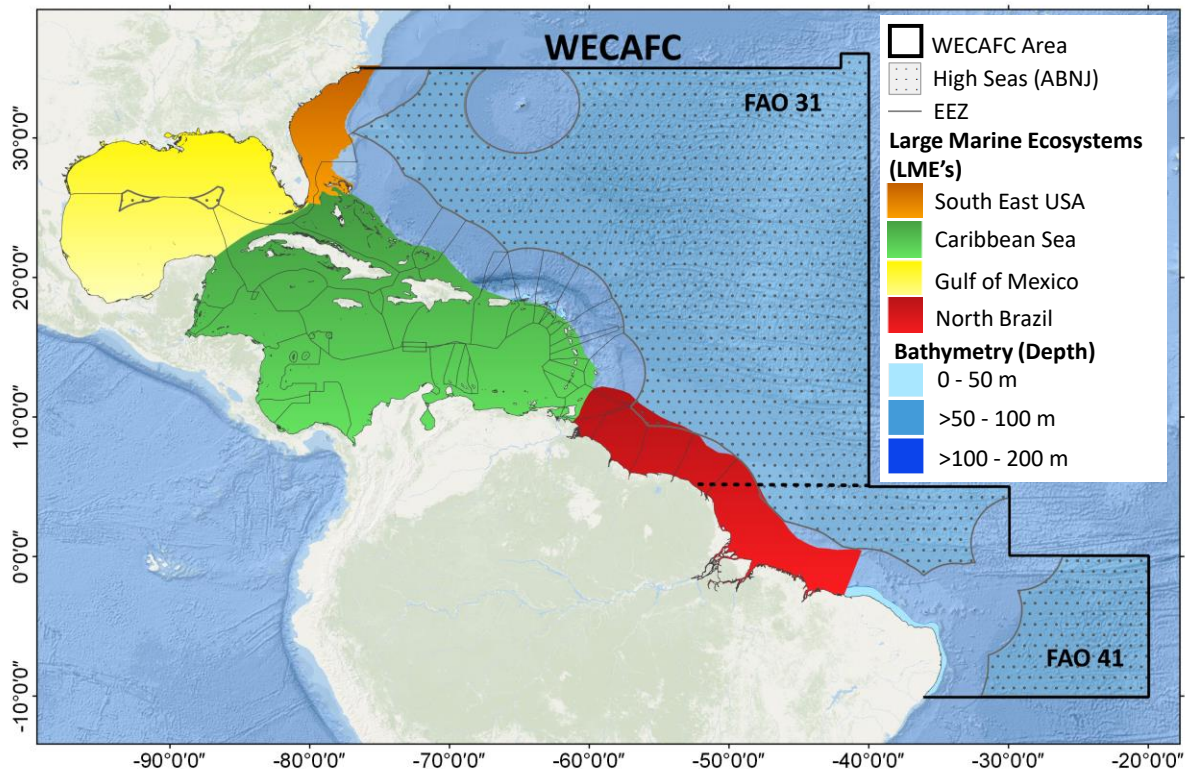


Figure 6.1. Large marine ecosystems (LMEs) and area beyond national jurisdiction (ABNJ) in the WECAFC region.

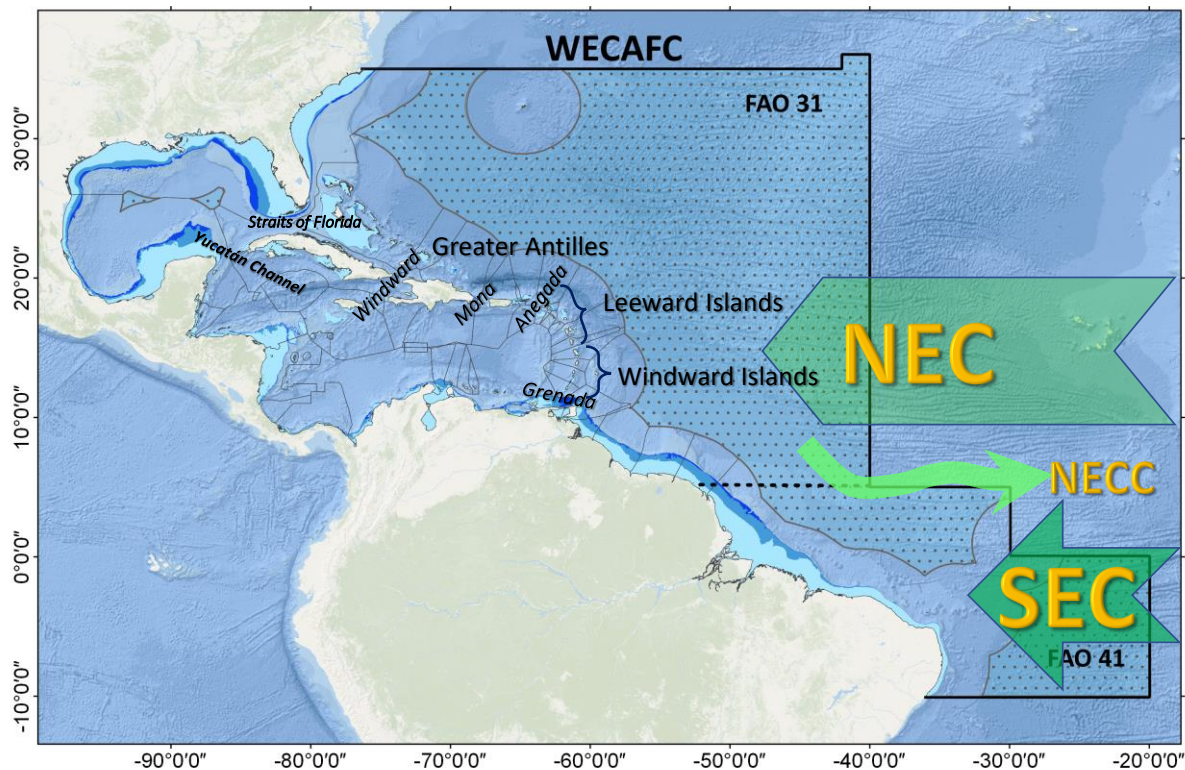


Figure 6.2. Large scale westward currents (North Equatorial Current-NEC, South Equatorial Current-SEC) and eastward counter current (North Equatorial Counter Current-NECC) in the WECAFC region, and major passages into the Caribbean Sea and Gulf of Mexico.

WECAFC Transboundary and Straddling Resources

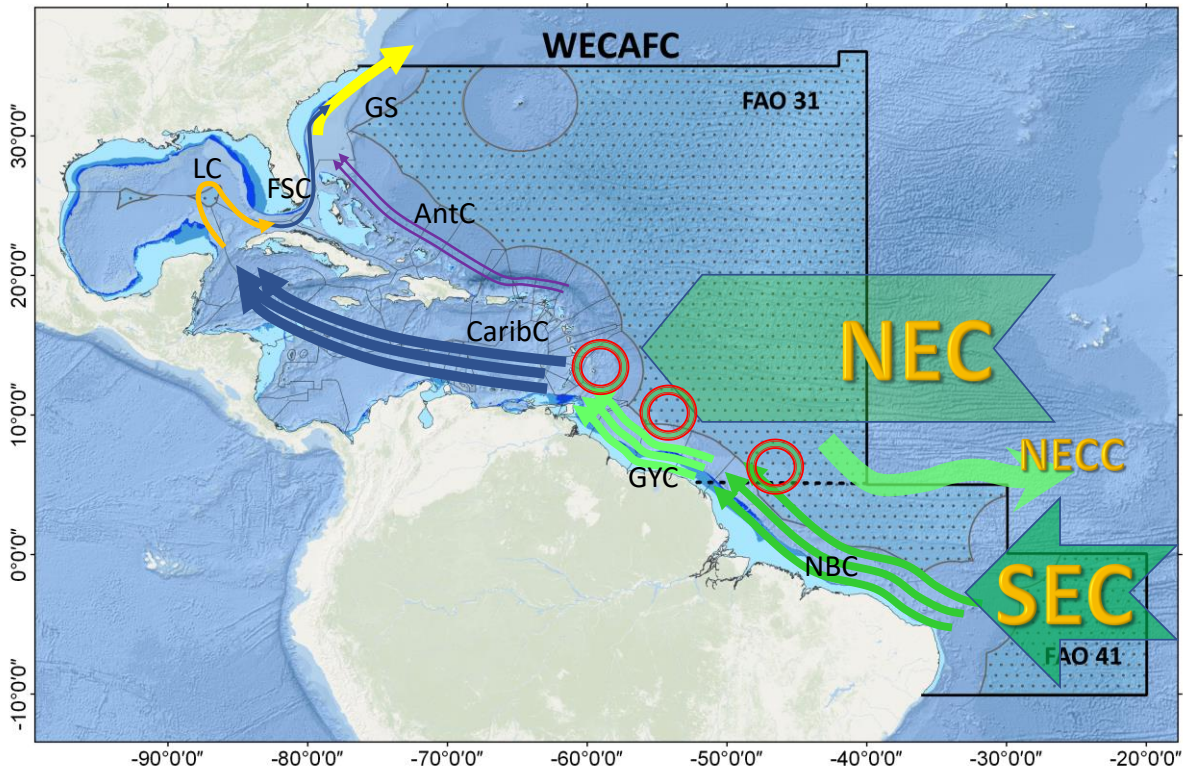


Figure 6.3. Link currents between WECAFC's ABNJ and the EEZs of boundary states with the high seas (Loop Current-LC, Florida Straits Current-FSC, Gulf Stream-GS, Antilles Current-AntC, Caribbean Current-CaribC, Guyana Current-GYC, North Brazil Current-NBC).

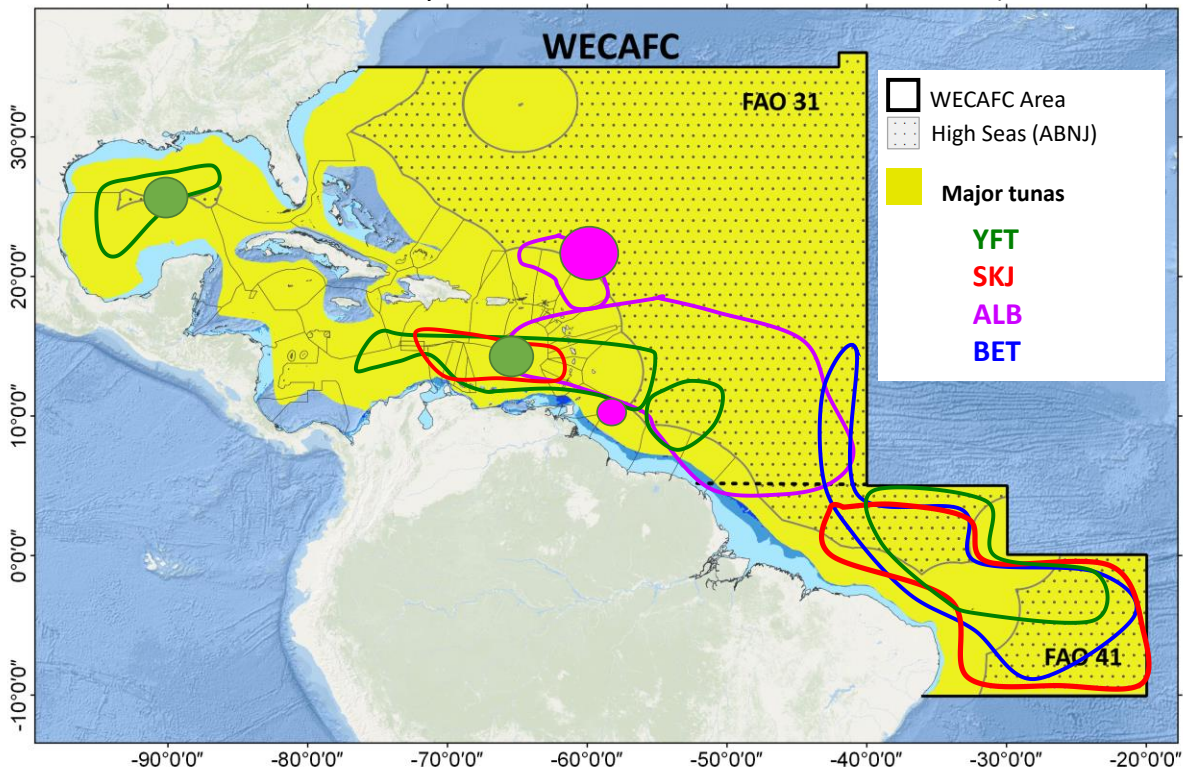


Figure 6.4. Distribution and/or movement of major tunas (YFT: yellowfin tuna, SKJ: skipjack tuna, ALB: albacore tuna, BET: Bigeye tuna) in the western central Atlantic within the WECAFC region. Filled circles indicate spawning grounds for each species.

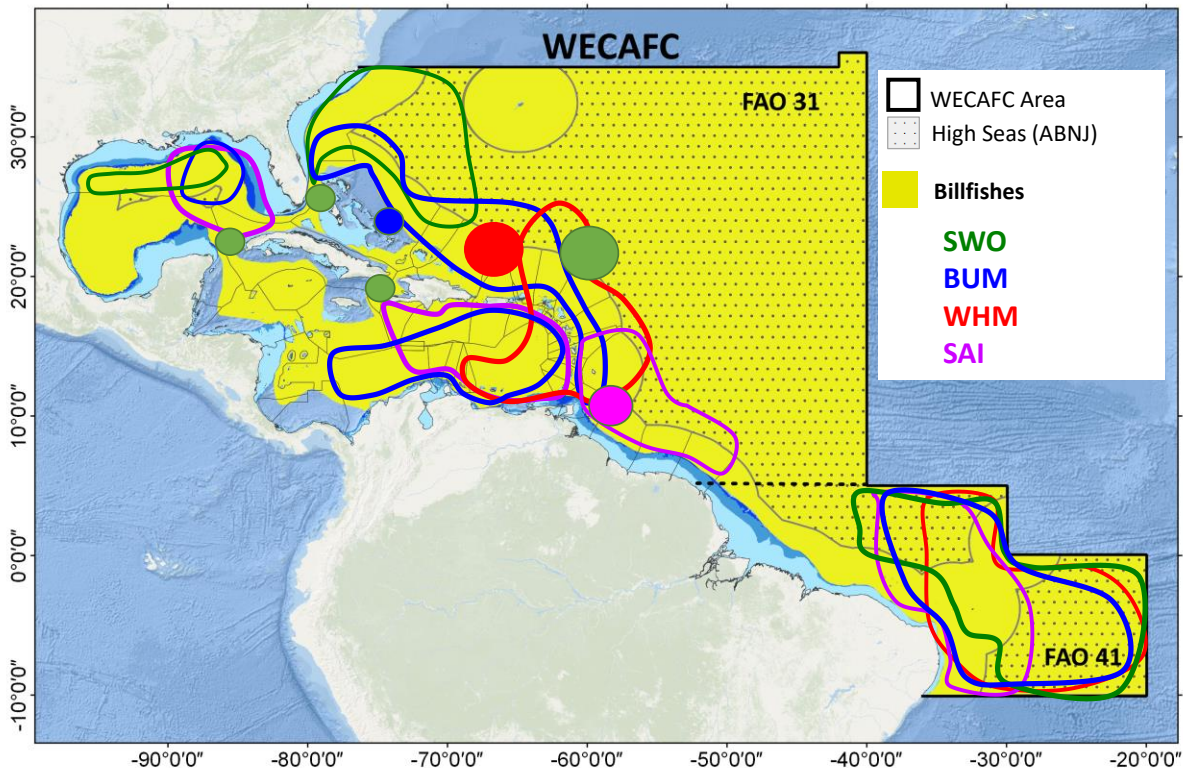


Figure 6.5. Distribution and/or movement of billfishes (SWO: swordfish, BUM: blue marlin, WHM: white marlin, SAI: sailfish) in the western central Atlantic within the WECAFC region. Filled circles indicate spawning grounds for each species.

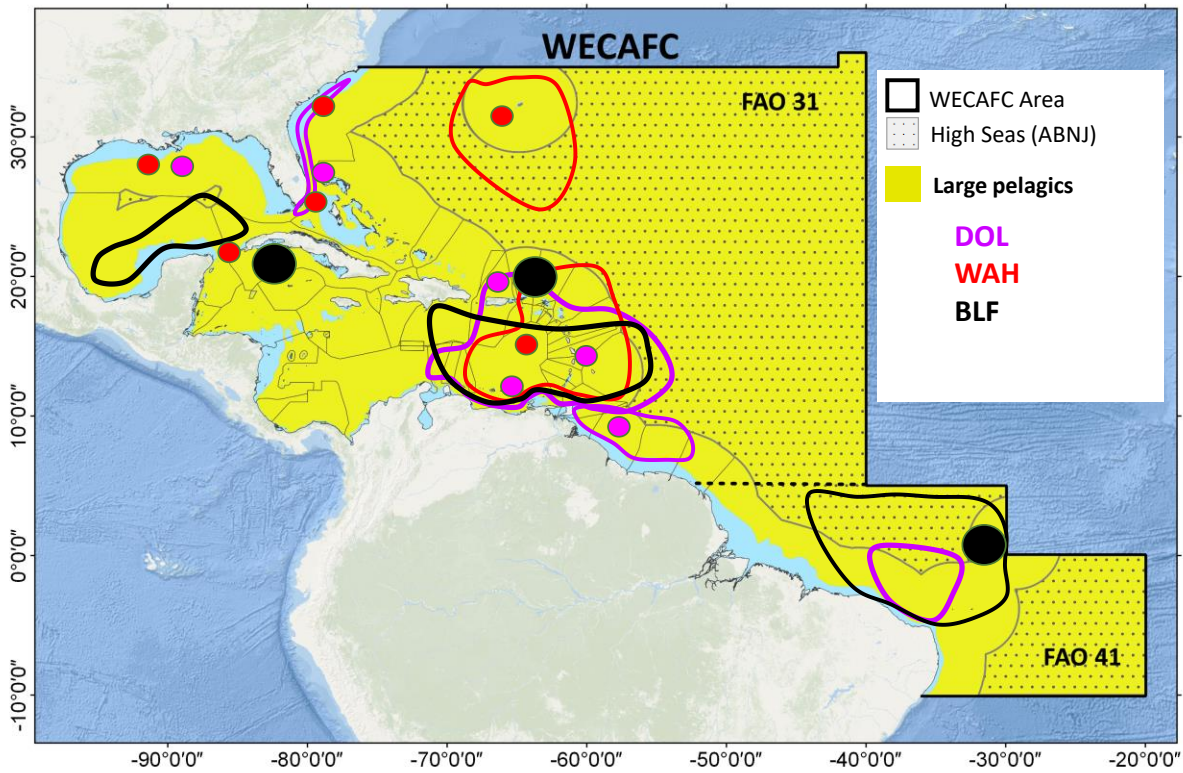


Figure 6.6. Distribution and/or movement of large pelagics (DOL: dolphinfish, WAH: wahoo, BLF: blackfin tuna) in the western central Atlantic within the WECAFC region. Filled circles indicate spawning grounds for each species.

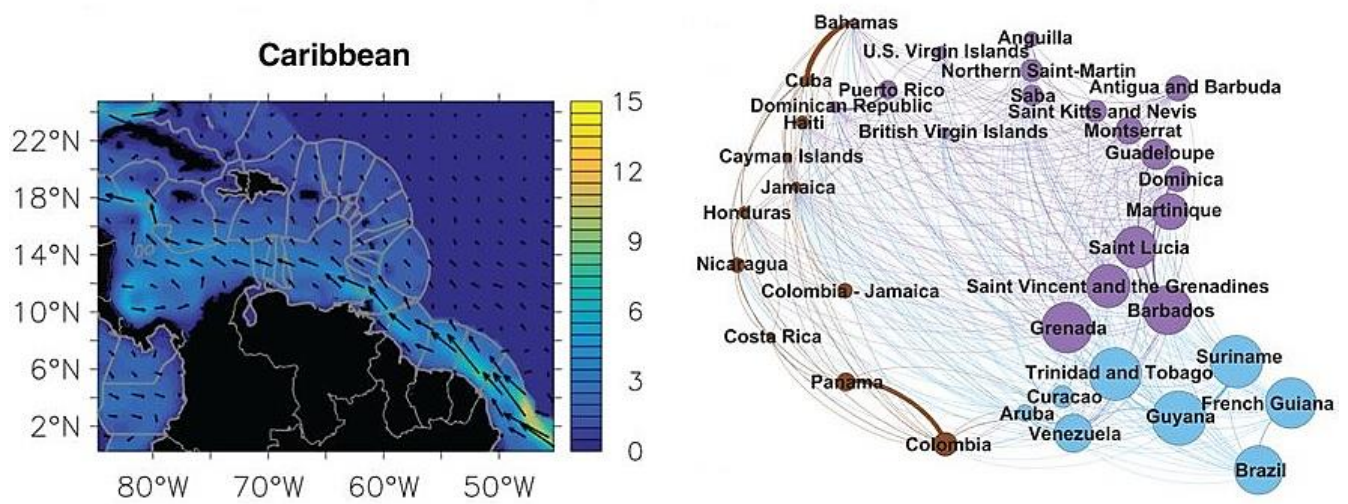


Figure 6.7. Ecological connectivity network structure for the Caribbean Region (Source: Ramesh, N., J.A. Rising, K.L. Oremus. 2019. The small world of global marine fisheries: The cross-boundary consequences of larval dispersal. *Science*, 364 (6446):1192-1196. DOI: 10.1126/science.aav3409).