SPECIES OF CONCERN RESEARCH NEEDS

NOAA's National Marine Fisheries Service
Northeast Regional Office, Protected Resources Division

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WORKING MATRIX

Background

Species of Concern (SOC) are those species about which NOAA's National Marine Fisheries Service (NMFS) has concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the Endangered Species Act (ESA). "Species of concern" status does not carry any procedural or substantive protections under the ESA; however, the goal is to promote proactive conservation efforts for these species in order to preclude the need to list them in the future. The following species are considered to be SOCs in the NMFS Northeast Region: Atlantic bluefin tuna (*Thunnus thynnus*), dusky shark (*Carcharhinus obscurus*)*, sand tiger shark (*Carcharias taurus*), thorny skate (*Amblyraja radiata*), rainbow smelt (*Osmerus mordax*), cusk (*Brosme brosme*)*, Atlantic wolffish (*Anarhichas lupus*), Atlantic halibut (*Hippoglossus hippoglossus*), porbeagle shark (*Lamna nasus*), river herring (alewife (*Alosa pseudoharengus*) & blueback herring (*Alosa aestivalis*).

Research Needs

Bycatch: Although directed harvest of many SOCs is prohibited, and many are not species typically targeted in commercial or recreational fisheries, bycatch and bycatch mortality have been documented with many SOCs throughout their ranges. Bycatch and bycatch mortality have been indentified as threats to many SOCs; therefore, reduction in the incidence and occurrence of bycatch of SOCs is necessary for best management of SOCs and the fisheries that may pose a threat through bycatch.

Population genetics and stock structure: Limited information exists on stock structure of many SOCs. SOCs in the Northeast Region range from being anadromous species, highly migratory species, to deepwater species, among other life history characteristics. Some SOCs exhibit natal homing or spawning site fidelity even though they may have extensive migratory ranges. It is important to understand population genetics and stock structure in order to better inform the most appropriate strategy for conservation and management of SOCs.

Distribution and abundance: To better inform the most appropriate strategy for conservation and management of SOCs, information on the distribution and abundance of all life stages as well as general abundance data for SOCs is necessary.

Habitat Use: In order to ensure proper conservation and management of SOCs, it is critical to understand how each life stage uses specific habitats.

Stressors: Increasing known impacts of identified stressors (e.g., dams, dredging, contaminants) on the health and recovery of many SOCs rangewide, potential impacts from increasing water temperatures and other environmental changes due to climate change, as well as other trophic effects are areas of particular interest for SOCs.

Research Priorities

- Investigate extent of bycatch and methods for reducing bycatch and bycatch mortality of SOCs in commercial and recreational fisheries, specifically for river herring and cusk.
- Assessment of abundance of SOCs including non-traditional methods (e.g. using longline rather than trawl).
- Investigate stock structure of SOCs through genetic analyses

*Note - Dusky shark and cusk are also considered to be NMFS Candidate Species. Candidate species are species that are the subject of a petition to list and for which we have determined that listing may be warranted under the ESA, as well as species that are not the subject of a petition but for which we have announced the initiation of a status review in the Federal Register. In 2007, NMFS initiated a status review on cusk. In November, 2012, and February, 2013, NMFS was petitioned to list dusky shark under the ESA. Following a positive 90-day finding in May 2013, NMFS initiated a status review for the species.

For further information or questions: Please visit the Proactive Conservation Program website at http://www.nero.noaa.gov/prot_res/CandidateSpeciesProgram/

Species of Concern - RESEARCH NEEDS

Research Topic	Research Activity	Need for Activity
Bycatch		
	Further research is needed to determine the susceptibility of and impacts to SOC from bycatch, as well as methods for reducing bycatch and related mortality on SOCs. ***Specific priorities:*** *CUSK - research to investigate reducing bycatch and increasing survivability of cusk in commercial and recreational fisheries.* *RIVER HERRING - research to investigate the extent of river herring bycatch and incidental catch in commercial fisheries, and methods for reducing bycatch and incidental catch.*	As noted above, bycatch and bycatch mortality have been documented as threats to many SOCs throughout their ranges. Bycatch mortality has been specifically identified as an issue for cusk. Cusk are not typically a target species; however, they are caught in both commercial and recreational fisheries, and because they are a relatively deepwater species, bycatch mortality is high due to the barotrauma experienced when they are brought up from depth. Specific research on increasing survival (e.g., decreasing/reversing barotrauma) for cusk is needed. Bycatch and incidental catch of river herring has also been identified as a threat to the species. Although catch of river herring is prohibited in most areas, they are still caught as bycatch and incidental catch in commercial fisheries including the Atlantic herring fisheries, and the extent of that catch is not well known.
Population genetics and stock structure		
	Collect genetic samples and conduct analyses of samples collected from river habitats (for anadromous SOC specifically), as well as in the marine environment for all SOCs. ***Specific priorities:*** *RIVER HERRING - research on stock structure of river herring coastwide, in-river as well as the open ocean migration and overwintering areas.*	Limited information exists on stock structure of many SOCs. Specifically, river herring exhibit natal homing lending to the stock structure noted in Palcovacs *et al* ., 2012 (for more information, please visit the NER River herring webpage - http://www.nero.noaa.gov/prot_res/candidatespeciesprogram/RiverHerringSOC.htm) ; however, these separate stocks may mix in the coastal overwintering areas and migration corridors. Combining the rate of mixing with bycatch and incidental catch (noted above) could greatly enhance and inform the best management for the species.
Distribution and Abundance		
	Collect distribution and abundance data for all life stages of SOCs. Investigate new research techniques to facilitate the collection of distribution and abundance data for various life stages to understand population connectivity (early life stages (ELS) and juveniles in particular). ***Specific priorities:*** *CUSK - Non-traditional assessment of cusk abundance (e.g. using longline rather than trawl). Also, consider adding an ROV component (or other applicable video platform) to such a survey to compare abundance based on visual census in untrawlable habitats to longline catches to better gauge trawl survey catches and what may be missing.*	Information on the distribution and abundance of all life stages of many SOCs is lacking, particularly for early life stages (ELS) and juveniles. General abundance data is limited for some SOCs because the primary gear used for multispecies research surveys (i.e. bottom trawl) does not effectively sample the primarily rocky habitat of some SOC (e.g., cusk, Atlantic wolffish). Therefore, non-traditional assessments of abundance (e.g. using longline rather than trawl) are needed to fully assess some SOC abundance. In order to compare abundance based on visual census in untrawlable habitats to longline catches to better gauge trawl survey catches and what may be missing, an ROV component (or other applicable video platform) may be necessary.
Habitat		
	Develop targeted research studies to collect data on foraging ecology, growth of various life stages, defining habitat that support SOC and preferred prey items, and characterization of migration, nursery and spawning, and aggregation sites. ***Specific priorities:*** *RIVER HERRING - research on river herring use of habitat coastwide during the open ocean migration and overwintering areas.*	In order to ensure proper conservation and management of SOCs, it is critical to understand the habitat use of each life stage. Of particular importance are studies on foraging ecology, growth of various life stages, defining benthic habitat that support the SOC and preferred prey items, and characterization of nursery habitat. Additionally, information on migration, spawning habitat and potential aggregation sites is still lacking for many SOCs. In particular, overwintering habitats used by river herring are largely unknown; therefore, studies into the specific areas, aggregation sites, and habitat types utilized by river herring during the ocean migration and overwintering period would greatly benefit management of the species.

Stressors		
	Develop studies targeting the effects of impacts on SOCs and their habitat from environmental stressors (e.g., from dams, dredging, contaminants, and climate change). Both short and long term effects should be assessed. Consideration should also be given to potential measures to minimize adverse impacts and novel technologies that may be implemented to avoid harmful effects (e.g., fish passage technology).	Dams, dredging, contaminants, and climate change among other stressors have been identified as having negative impacts on many SOCs rangewide. Dams block access to spawning habitats of anadromous SOC (e.g., river herring); thus, research to further fish passage technology could be highly beneficial where removal of dams is not an option. Climate change may effect SOC with a more vulnerable life history such as anadromy (e.g., river herring) as well, given that they rely on riverine habitat for spawning. Alternatively, SOC that prefer cooler, deeper waters such as wolffish and cusk, that also rely on specific, limited, specialized habitat (e.g., rocky, boulders, hard bottom) have the potential to lose those areas due to temperature change impacts as a result of climate change. Additionally, ocean acidification poses a potential risk directly or indirectly to SOC if prey are detrimentally affected, or if early life stages are negatively impacted.