

Elasmobranchs in the Dutch Caribbean: current population status, fisheries & conservation

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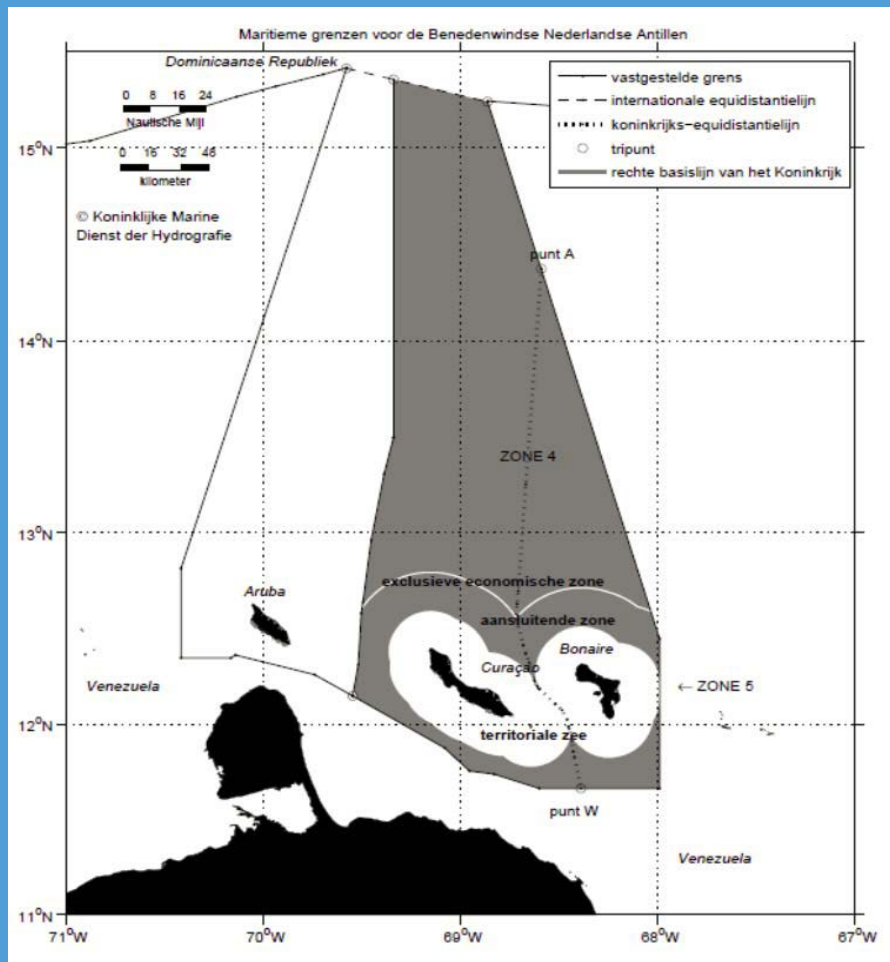
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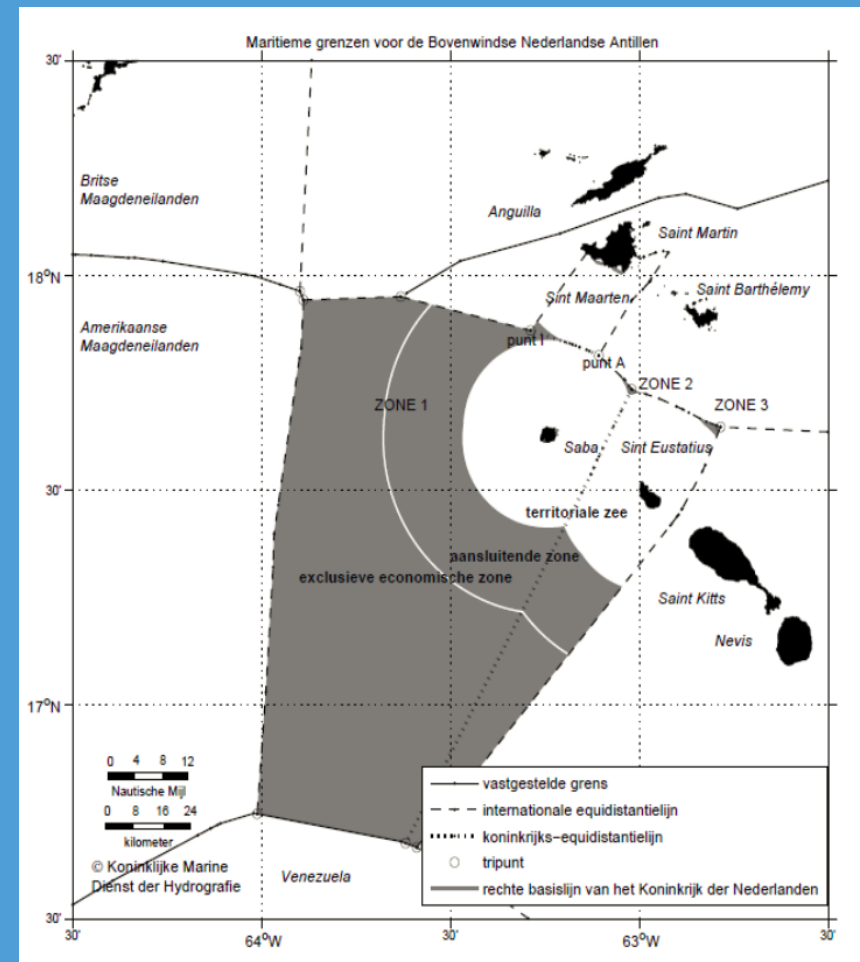
The Netherlands



Introduction to the Dutch Caribbean



Aruba, Bonaire, Curaçao



Saba, St. Eustatius, St. Maarten



Data collection method

- Published data and sport diver accounts
 - Wider Caribbean: 2 (Bonfil, 1996; Chan A Shing, 1999)
 - Dutch Caribbean: 4 (Toller et al. 2010; Williams et al. 2010; Debrot et al. in press; Pattengill-Semmens 2000)

- Anecdotal accounts
 - 9 respondents
 - 6 fisheries departments, 3 marine park managers

- IUCN Shark Specialist Group

Elasmobranchs in Dutch Caribbean

Table 1. Documented shark and ray species in the Dutch Caribbean and their status according to international (CITES, CMS) and regional (SPAW) conventions and the IUCN Red list of endangered species. X=observations * tentatively present (IUCN SSG, N.Dulvy pers. comm.) Referees were not explicitly asked for the presence of sharks, hence the limited observations thereof. IUCN Red List categories of threatened species are: **CR**=Critically Endangered; **EN**=Endangered; **VU**=Vulnerable. Other categories are: **NT**=Near Threatened; **LC**=Least Concern en **DD**=Data Deficient. Habitat indicates which species are pelagic, indicating observations are more difficult and therefore less common. **P**=oceanic en **SP**=Semi-pelagic (Camhi et al. 2009).

Common name	Scientific name	Observed species per island						Status per species				Habitat
		Aruba	Bonaire	Curacao	Saba	St. Eustatius	St. Maarten	CITES ⁽¹³⁾	CMS	SPAW ⁽¹⁴⁾	IUCN	
Family: Whale sharks – Rhincodontidae												
1. Whale shark	<i>Rhincodon typus</i>	x(1,2)	x(1,3)	X (1)	X (1)	X (1)	X(1,9)	II	II	(II)	VU	P
Family: Nurse sharks – Ginglymostomatidae												
2. Nurse shark	<i>Ginglymostoma cirratum</i>	X (2)	X (3)	X (4)	X(7,8)	X (10)	X ⁽⁹⁾				DD	
Family: Requiem sharks – Carcharhinidae												
3. Caribbean reef shark	<i>Carcharhinus perezi</i>	X (2)	X (3)		X(7,8)	X (10)	X ⁽⁹⁾			(II)	NT	
4. Blacktip shark	<i>Carcharhinus limbatus</i>	X (2)			X (8)		X ⁽⁹⁾				NT	SP
5. Lemon shark	<i>Negaprion brevirostris</i>	X (2)		X (4)			X ⁽⁹⁾				NT	
6. Bull Shark	<i>Carcharhinus leucas</i>	X (2)	X (3)		X (8)	X (10)	X ⁽⁹⁾				NT	SP
7. Tiger Shark	<i>Galeocerdo cuvier</i>	X (2)	X (12)		X(7,8)	X (10)	X ⁽⁹⁾				NT	SP
8. Oceanic white-tip shark	<i>Carcharhinus longimanus</i>	X (2)		X (4)						(II)	VU	P
9. Silky shark	<i>Carcharhinus falciformis</i>			X (4)							NT	P
10. Blue shark	<i>Prionace glauca</i>			X (4)							NT	P
*Blacknose reef shark	<i>Carcharhinus acronotus</i>	*	*	*	*	*	*				NT	
*Brazilian Sharp-nose Shark	<i>Rhizoprionodon lalandii</i>	*	*	*	*	*	*				DD	
*Caribbean Sharp-nose Shark	<i>Rhizoprionodon porosus</i>	*	*	*	*	*	*				LC	
Family: Hammerhead sharks – Sphyrnidae												
11. Smooth hammerhead	<i>Sphyrna zygaena</i>	X (2)								(II)	VU	SP
12. Scalloped hammerhead	<i>Sphyrna lewini</i>	X (2)		X (11)				III		(II)	EN	SP
13. Greater hammerhead	<i>Sphyrna mokarran</i>	X (2)					X ⁽⁹⁾			(II)	EN	SP
14. Bonnethead shark	<i>Sphyrna tiburo</i>	X (2)		X (5)							LC	
Hammerhead unspecified	<i>Sphyrna spp.</i>		X (3)	X (4)	X (8)							
Family: Mackerel sharks – Lamnidae												
15. Shortfin mako	<i>Isurus oxyrinchus</i>	X (2)							II	(II)	VU	P
Family: Thresher sharks – Alopiidae												
16. Thresher shark	<i>Alopias vulpinus</i>	X (2)								(II)	VU	P



Elasmobranchs in Dutch Caribbean

- 24 (+4) shark species and 3 (+2) ray species = 33
- IUCN Red List status:
 - 10 threatened with extinction (1 CR; 2 EN; 7 VU)
 - 8 near threatened
 - 9 data deficient
- Dramatic decline in past 50 years:
 - 2 common: nurse sharks and Caribbean reef sharks
 - 9 occasional: hammerhead, lemon, bull, tiger, blacktip and whale sharks

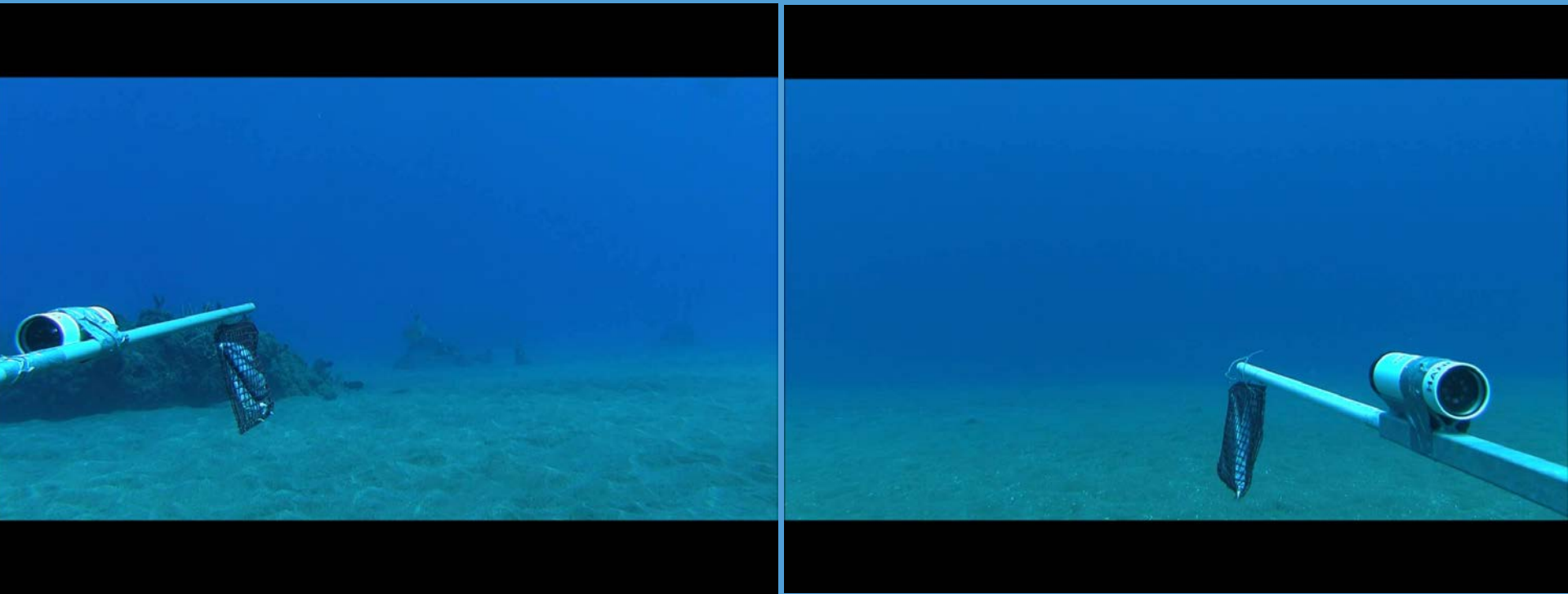
Fisheries monitoring programs

- No directed shark fisheries
- Sharks considered nuisance by fishermen
- Bycatch: discarded, bait, consumption, market
- Preliminary quantification of bycatch:
 - St. Eustatius: 48 yr⁻¹ (based on 16% port sampling)
 - Saba port sampling: 13 yr⁻¹ (based on 30% on-board sampling: bycatch on each trip⁻¹)



Fish monitoring programs

- Stereo Baited Remote Underwater Video (sBRUV)



Caribbean reef shark *Carcharhinus perezii*



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Shark valuation

- Ecological value → ecosystem functioning
 - Organisation, stability and biodiversity of foodweb (Rezende et al. 2009)
 - Potential biological control of invasive lionfish (Albins and Hixon 2008; Arias-Gonzalez et al. 2011)

- Economic value → ecosystem services
 - Provisioning: negligible
 - Regulating: biological control
 - Cultural: dive tourism

- Raise (awareness) economic value of non-consumptive forms of exploitation (Maljkovic and Cote 2011)



Legislation in Dutch Caribbean

- International

- CITES: 3 species
- CMS: 3 species

- Regional

- SPAW: Habitats and 11 species proposed

- National & island jurisdiction

- Bonaire: protection of all shark and 3 ray sp. but...
- St. Maarten: temporary shark fishing ban





Opportunistic observer network

- Opportunistic observer network to get broad overview of trends in distribution and relative abundance over time.
- Pro's
 - Time extensive, large coverage
 - Successful use in whale observations (Debrot et al. 1998)
 - Simple, structured data entry
- Con's
 - Does not account for effort → effort = dive time
 - Risk of double counts → count by DM in group
 - Risk of wrong identification → training + ID key



Conclusions

- Population status: dramatic decline in past 50 years
- Data collection: use sBRUV and opportunistic observer network for accurate (sBRUV) and broad (observer network) data on distribution and relative abundance
- Shark bycatch: higher than reported/landed, low value as local food or fish feed/bait
- Shark protection: incentive is the economic value of non-consumptive forms of exploitation

Thank you!



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