



PSSA - INTERNATIONAL SOLUTION OF MARINE BIODIVERSITY IN THE HA LONG BAY - CAT BA AREA

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Abstract

PSSA is an important management tool for marine biodiversity protection. The designation of a PSSA associated with maritime protective measure is recognized by IMO as a legal instrument to prevent, reduce, or eliminate risks and threats to the ecological environment. Information on PSSAs that has been designated by IMO is available on the nautical chart. Vietnam's coastal zones are extremely rich in marine biodiversity. However, Vietnam coastal areas have been facing high risks from maritime activities, particularly international shipping. Therefore in the future, identification of some PSSA for Vietnam is necessary. This paper proposes a PSSA for Ha Long Bay - Cat Ba Area as a solution for marine biodiversity conservation.

Keywords: PSSA; Vietnam sea; Marine biodiversity; Ha Long - Cat Ba; International shipping, Oil spill.

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1. Introduction

Roughly 80% of international traded commodity volume is carried by ships through the marine channel. Such traffic carries the risk of groundings, collisions, spills, and other incidents that threaten the ecological health of marine systems. The associated hazards to habitats and wildlife can pose a persistent concern for managers of marine protected areas, particularly those near major ports or shipping routes. In several cases around the world, Marine protected area (MPA) practitioners have moved to reduce these threats by implementing focused regulatory instruments, such as shipping lanes, areas to be avoided, or discharge restrictions. But a broader, higher-profile tool remains available the international designation of sites as Particularly Sensitive Sea Areas, or PSSAs - offering managers a comprehensive approach to

seeking vigilance and awareness of the international shipping industry. Available since 1991, the PSSA tool has so far been approved for 17 sites, but more are now in the designation pipeline. [1]

The Vietnam East Sea has many maritime activities, especially maritime international shipping. Up to 50% of the world's oil tankers visit the Vietnam East Sea. With the increase in regional economic development in Northeast Asia, there has been an increase in oil consumption and increase the number of ships passing through the South China Sea, thus the risk of oil pollution is very high. Recent oil spills from international maritime activities are adversely affecting the environment of coastal areas and islands of Vietnam. As reported by the Vietnam Environment Agency, the 2007 oil spill has affected many Vietnam's sea areas from Ha Tinh Province to Ca

Mau, which causes great damage to the economy of Vietnam. The cause is mainly due to the oil spills from the international maritime routes or other countries of South East, under the action of the east monsoon, hydrodynamics oil to the coastal areas and islands of Vietnam [2, 3]

2. PSSA methodology

The guidelines [1] set out by IMO for an area to gain PSSA status are separated into three categories, which are then subdivided into further criteria. For a PSSA to be designated it must meet any one of the following criteria (see also table 1):

Table 1. PSSA categories and criteria

PSSA Categories	Criteria to be met
Ecological	Uniqueness, dependency, representativeness, diversity, productivity, naturalness, integrity and vulnerability
Social, cultural and economic	Economic benefit, recreation, and human dependency
Scientific and educational	Research, baselines and monitoring studies, education and historical values

2.1. IMO-approved protective measures to accompany a PSSA proposal

IMO tools that could serve as associated protective measures with a PSSA include:

- a. Traffic separation schemes - used to separate opposing streams of traffic through the establishment of traffic lanes or separation zones.
- b. Areas to be avoided - closure of an area to all ships or to certain sizes or classes of vessels.
- c. No anchoring areas - established to protect areas with an unstable anchoring bottom or that may be damaged by anchor weight or slippage.
- d. Ship reporting systems - used to determine the intended movement of a ship through a given area.
- e. Discharge restrictions - regulating operational discharges from ships.

2.2. Applying for PSSA designation

IMO has the ability to designate PSSA's on the territorial sea, the 200-mile exclusive economic zone, and into the high seas. Only IMO member states can submit proposals for PSSA designation.

Governments with a common interest in an area should submit a coordinated proposal. The application itself must contain:

- a. A summary of the objectives of the proposed PSSA identification, its location, the need for protection, and a proposal for associated protective measures.
- b. A detailed description of the area, together with a chart; an explanation of the significance of the area based on recognized criteria; and an explanation of the vulnerability of the area to damage by international shipping activities.
- c. A description of the proposed measures showing how they will provide the needed protection from threats of shipping damage.
- d. A review of the possible impact of any proposed measures on the safety and efficiency of navigation.

2.3. Benefits of PSSA designation

The International Maritime Organization (IMO) - a United Nations agency focusing on international shipping is responsible for designating various internationally recognized protective

measures, including PSSAs. Member states submit proposals for PSSA designation to the IMO; if approved, the designated PSSA appears on international nautical charts.

The IMO defines a PSSA as “an area that needs special protection through action by IMO because of its significance for recognized ecological, socio-economic or scientific reasons, and which may be vulnerable to damage by international shipping activities.”

In short, the PSSA designation offers three principal benefits:

a. Providing global recognition of the special significance of a designated area through identification of PSSA status on international nautical charts;

b. Informing mariners of the importance of taking extra care when navigating through a region;

c. Giving coastal states the opportunity to adopt additional protective measures to best address the particular risks associated with international shipping in the area.

The third benefit is a critical part of any PSSA designation because, by itself, PSSA status confers no direct regulatory benefits. Associated measures - such as areas to be avoided (ATBA) and other regulatory actions - provide the actual legal basis for restrictions on shipping. For this reason, any application made to the IMO for PSSA designation is expected to identify at least one associated protective measure that addresses the risk posed to the area by international shipping activities.

An Example for areas was PSSA designated in the world ocean is listed in Tab. 2, Fig. 1 shows the location of the PSSA designated areas in the world ocean.

Table 2. List of adopted PSSAs [1]

TT	PSSA	Year
1	Great Barrier Reef, Australia	1990
2	Sabana-Camagüey Archipelago in Cuba	1997
3	Malpelo Island, Colombia	2002
4	Florida Keys, United States	2002
5	Wadden Sea, Denmark, Germany, Netherlands	2002
6	Paracas National Reserve, Peru	2003
7	Western European Waters	2004
8	Extension of the existing Great Barrier Reef PSSA to include the Torres Strait (proposed by Australia and Papua New Guinea)	2005
9	Canary Islands, Spain	2005
10	Galapagos Archipelago, Ecuador	2005
11	Baltic Sea area, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden	2005
12	Papahānaumokuākea Marine National Monument, United States	2007
13	Bonifacio Strait, France and Italia	2011
14	Saba Bank, Netherlands	2012
15	Extension of Great Barrier Reef and Torres Strait to encompass the south-west part of the Coral Sea, Australia	2015
16	The Jomard Entrance, Papua New Guinea	2016
17	Tubbataha Reefs Natural Park, Philippines	2017



Figure 1: PSSA designated in the World Ocean [1]

3. PSSA - core proposal for Vietnam East Sea

Determined by the method of PSSA's identification, the authors have a proposal for the direction of Vietnam's three PSSA groups (I - III) as follows [3, 6]:

I. Vietnam MPA:

1. Cat Ba (Hai Phong). 2. Son Tra - Hai Van (Thua Thien-Hue). 3. Nha Trang (Khanh Hoa). 4. Con Dao (Ba Ria - Vung Tau). 5. Tran (Quang Ninh). 6. Hon Me (Thanh Hoa). 7. Cu Lao Cham (Quang Nam). 8. Ly Son (Quang Ngai). 9. Co To (Quang Ninh). 10. Phu Quy (Binh Thuan). 11. Bach Long Vy (Hai Phong). 12. Con Co (Quang Tri). 13. Spratly Islands (Khanh Hoa). 14. Phu Quoc (Kien

Giang). 15. Hon Cau (Binh Thuan). 16. Nui Chua (Ninh Thuan)

II. Areas with special social and cultural values, such as Ha Long Bay, Bai Tu Long, Cam Ranh, Van Phong, Lang Co, Xuan Dai, Vung Ro.

III. Areas of special ecosystems such as coral reefs in the Spratly Islands, Paracel Islands, Ran Trao, such as mangroves in coastal provinces: Quang Ninh, Hai Phong, Thai Binh, Nam Dinh, Ninh Binh, Thanh Hoa, Can Gio, Tien Giang, Ben Tre, Soc Trang, Tra Vinh, Bac Lieu, Ca Mau, Kien Giang,...

Table 3 presents a list of areas mentioned above. In the table, it is seen that most areas are recognized with the biodiversity properties. The locations of those areas core to the PSSA are shown in Fig. 2.

Table 3. List of application PSSA on the Vietnam East Sea

<i>N</i>	Name	Province	Biodiversity
1	Halong Bay	Quang Ninh	WH, MPA
2	Daotran Island	Quang Ninh	MPA
3	Coto Island	Quang Ninh	MPA
4	Baitulong bay	Quang Ninh	NP
5	Catba island	Hai Phong	MPA, NP, BR
6	Bachlongvi island	Hai Phong	MPA
7	Xuanthuy CZ	Nam Dinh	NP, RAMSAR, BR
8	Tienhai CZ	Thai Binh	NR

9	Honme Island	Thanh Hoa	MPA
10	Conco Island	Quang Tri	MPA
11	Sontra-Haivan CZ	Da Nang	MPA
12	Culaocham Island	Quang Nam	MPA, NP
13	Lyson Island	Quang Ngai	MPA
14	Nhatrang CZ	Khanh Hoa	MPA
15	Namyet Island (Spratly isl.)	Khanh Hoa	MPA
16	Nuichua CZ	Ninh Thuan	MPA, NP
17	Honcau Island	Binh Thuan	MPA
18	Phuquy Island	Binh Thuan	MPA
19	Condao islands	Ba Ria - Vung Tau	MPA, NP, RAMSAR
20	Cangio CZ	HoChiMinh city	Mangroves, BR
21	Camau CZ	Ca Mau	NP, BR
22	Phuquoc islands	Kien Giang	MPA, NP, BR
23	Hoangsa islands (Paracel isl.)	Da Nang	Coral reef, MPA

(WH - World heritage site of UNESCO, BR- Biosphere reserve of UNESCO,
NP - National park, MPA - Marine protected area, RS - Ramsar site)

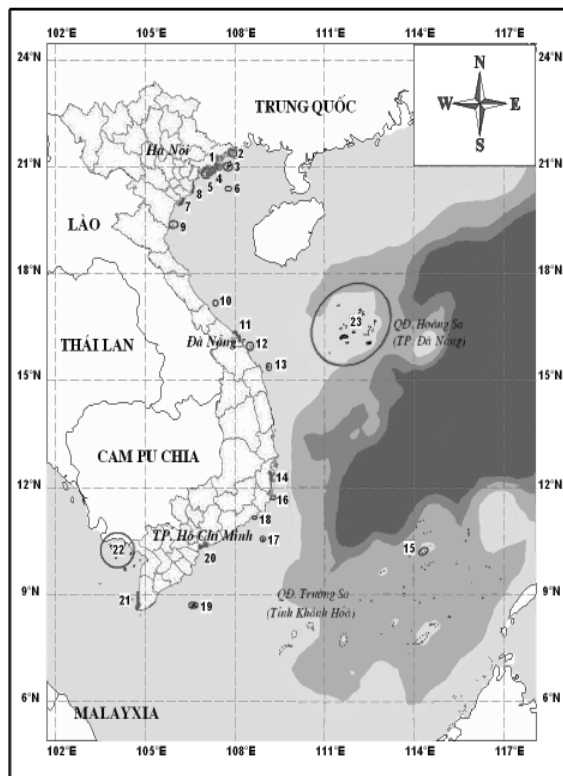


Figure 2: PSSA - core proposal in the Vietnam East Sea

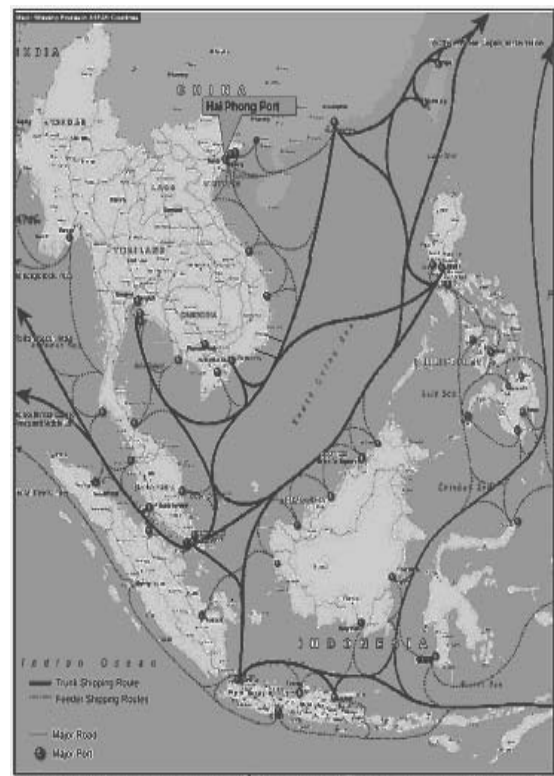


Figure 3: Main Seaports and Shipping routes in the Vietnam East Sea [7]

4. Proposed border and protective measures of Ha Long Bay - Cat Ba PSSA

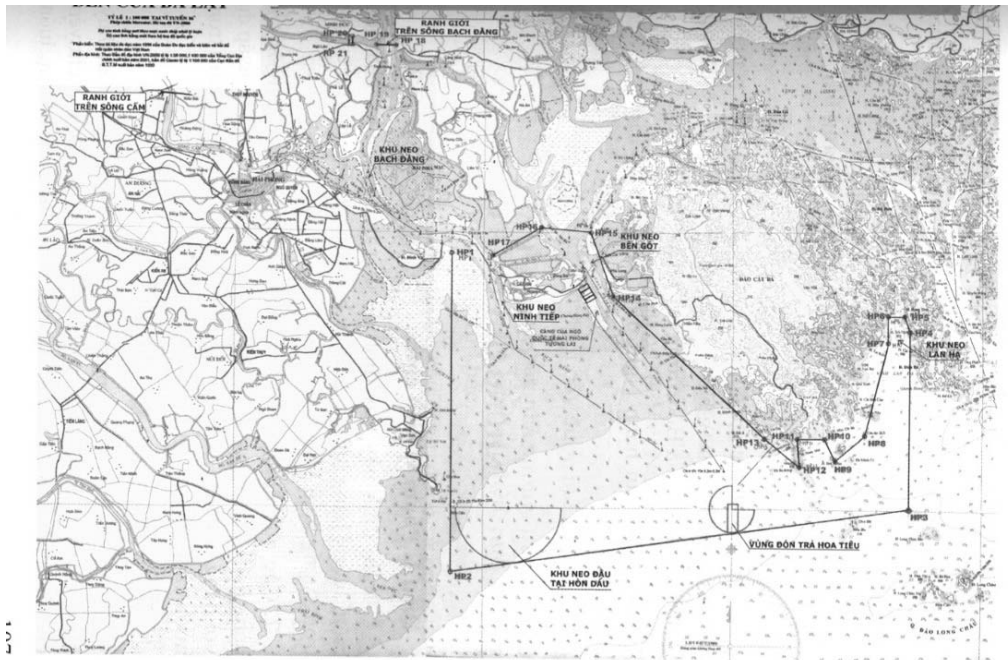


Figure 4: Map of Navigation channels, anchorage areas in the PSSA

Source: Local Maritime Administrations of Hai Phong and Quang Ninh [8]

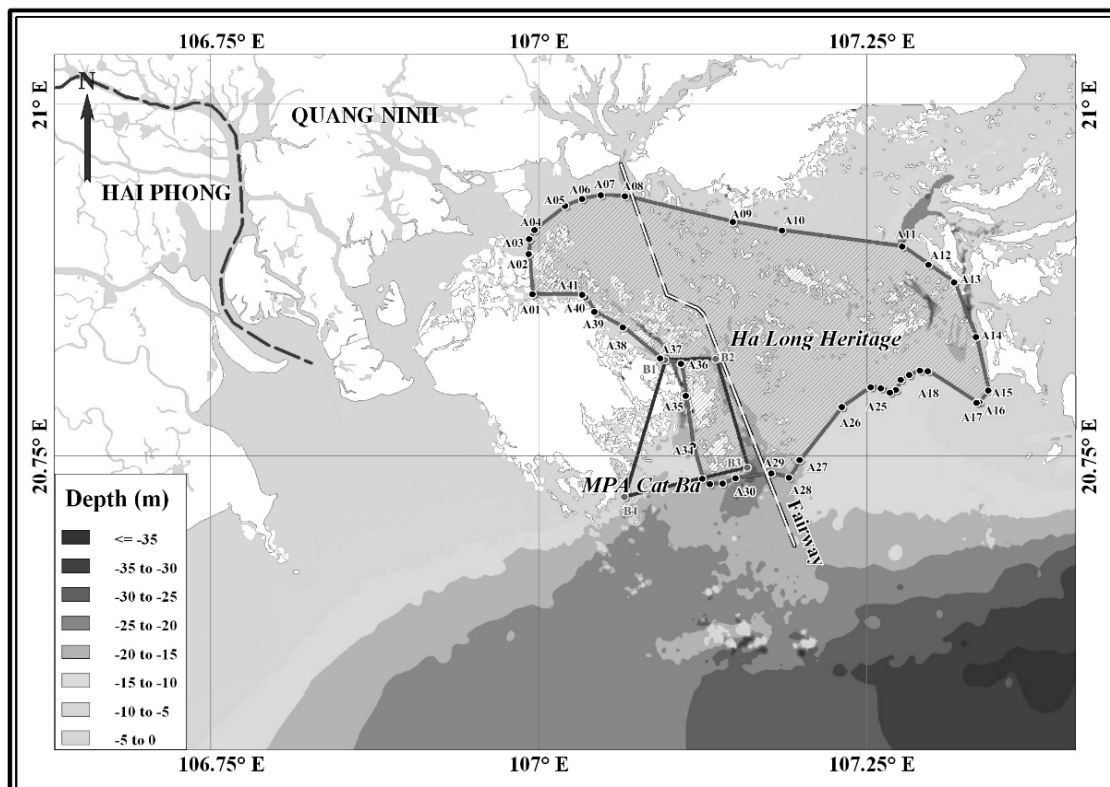


Figure 5: Map of the area under PSSA proposal Ha Long Bay - Cat Ba

Table 4. Position coordinates to identify the border of Ha Long Bay - Cat Ba PSSA

Point	Longitude (E)	Latitude (N)	Point	Longitude (E)	Latitude (N)
01	106° 59' 45" E	20° 51' 54" N	20	107° 16' 59" E	20° 48' 28" N
02	106° 59' 36" E	20° 53' 38" N	21	107° 16' 35" E	20° 48' 15" N
03	106° 59' 37" E	20° 54' 16" N	22	107° 16' 23" E	20° 47' 49" N
04	106° 59' 51" E	20° 54' 40" N	23	107° 16' 07" E	20° 47' 43" N
05	107° 01' 15" E	20° 55' 41" N	24	107° 15' 41" E	20° 47' 53" N
06	107° 02' 02" E	20° 55' 58" N	25	107° 15' 13" E	20° 47' 56" N
07	107° 02' 53" E	20° 56' 08" N	26	107° 13' 55" E	20° 47' 06" N
08	107° 03' 59" E	20° 56' 06" N	27	107° 11' 59" E	20° 44' 49" N
09	107° 08' 55" E	20° 55' 00" N	28	107° 11' 29" E	20° 44' 04" N
10	107° 11' 10" E	20° 54' 38" N	29	107° 10' 41" E	20° 44' 16" N
11	107° 16' 40" E	20° 53' 57" N	30	107° 05' 17" E	20° 43' 28" N
12	107° 17' 51" E	20° 53' 11" N	31	107° 05' 01" E	20° 44' 30" N
13	107° 19' 02" E	20° 52' 24" N	32	107° 06' 45" E	20° 47' 34" N
14	107° 20' 01" E	20° 50' 05" N	33	107° 06' 37" E	20° 48' 04" N
15	107° 20' 35" E	20° 47' 48" N	34	107° 05' 36" E	20° 49' 11" N
16	107° 20' 10" E	20° 47' 17" N	35	107° 03' 53" E	20° 50' 29" N
17	107° 20' 04" E	20° 47' 16" N	36	107° 02' 35" E	20° 51' 10" N
18	107° 17' 50" E	20° 48' 37" N	37	107° 02' 10" E	20° 51' 46" N
19	107° 17' 29" E	20° 48' 39" N	38	107° 02' 02" E	20° 51' 54" N

5. Discussion

The coastal areas of Vietnam are very high-risk areas affected by maritime activities, particularly international shipping (Fig. 3), and so identification of the PSSA for Vietnam (Fig. 2) is necessary. These are tools to monitor, manage and protect natural resources and the marine environment under the criteria of the International Maritime Organization. If the IMO PSSA is recognized as the international maritime activities, it will limit pollution to these areas and these areas will become more attractive to developing a sustainable maritime economy.

Ha Long Bay of Vietnam was recognized by UNESCO twice as the World Natural Heritage (17/12/1994 for its aesthetic and on 02/12/2000 for its geomorphological values) and on 12/11/2011, Ha Long bay overpassed

more than 400 other places of the world to become one of the seven world new wonders [4]. Cat Ba archipelago was adopted by the UNESCO Man and Biosphere Program as 3rd Biosphere Reserve in Vietnam and it is also under consideration for a status of a World Natural Reserve. The Cat Ba MPA [5] was established by the Prime Minister's Decision, No. 742/QĐ-TTg, dated 26/5/2010 to approve the Master Plan of the Marine Protection Areas System of Vietnam up to the year 2020 (now replaced by Decision 45/QĐ-TTg, dated 08/01/2014 of the Prime Minister to approve the Master Plan of the National MPA system with vision to 2030). There are international shipping routes, navigational channels passing through Ha Long Bay and Cat Ba MPA to the seaports in Quang Ninh and Hai Phong. The number of vessels operating in this area is quite big.

The Ha Long Bay - Cat Ba area meets the criteria for a PSSA of the International Maritime Organisation, namely it has clearly defined the border, under the total sovereignty of Vietnam as per UNCLOS 82. The Area of Ha Long - Cat Ba PSSA as proposed herewith consists of the core parts of Ha Long World Natural Reserve and Cat Ba MPA. The area meets all 17 criteria on ecology, biodiversity, socio-economics, science and education.

Furthermore, the navigation channels to/from 2 main ports of Vietnam (Cai Lan, B12 and Cam Pha) run through the Ha Long - Cat Ba area, where many vessels of different types and sizes operate and many of them carry toxic cargo (Fig. 4). The risks of degradation of marine environment and marine ecosystems from maritime activities, namely oil spill, oil leakage, leakage of toxic chemicals, discharge of waste, oil sediment, water ballast and ballast sediment, paint, as well as the invasion of exotic species in addition to the noise from ship engines and dredging is huge.

Understanding the serious threats to various aspects of Ha Long Bay and Cat Ba MPA including environment, ecosystem, socio-economic development, culture, science and education from the maritime operation, and on the base of the guidelines and guideline amendments of IMO, Vietnam Maritime Authority conducted the study "To define the Ha Long - Cat Ba PSSA". The study is an essential step to develop additional measures, tools to monitor and manage the maritime operation in order to protect better the sea environment of the Ha Long - Cat Ba area for its sustainable development.

6. Conclusion

Resolution 982 of IMO on 6 Feb 2006 on identifying and defining a PSSA

provides that any marine area meeting 1 of the 17 criteria (11 ecological, 3 cultural - social - economic, 3 cultural and educational) and is at risks of being impacted by international shipping activities, can be considered a PSSA. Once an area is defined as a PSSA, then all international maritime, shipping activities shall be subject to strict regulations of IMO. Those activities which might cause oil or hazardous chemical pollution shall have to be conducted at other locations which are of lower ecological values as those of the PSSA.

The Ha Long Bay - Cat Ba PSSA will also generate to legal corridor of the jurisdiction of Vietnam on our sea and islands and make Vietnam ready for global integration in an attempt to protect the marine environment, biodiversity for our sustainable development.

For the PSSA, Vietnam considers adding additional protective measures including the establishment of ATBA at Dau Be - Hang Trai area, establishment of the VTS system (Vessel traffic services) in combination with the AIS (Automatic Identification System) for the Ha Long bay area and marking the 2 ways traffic on the navigation channels in the proposed PSSA.

The Ministry of Transport of Vietnam needs to report to the Government for the submission of the PSSA Document to IMO for the approval of Ha Long Bay - Cat Ba PSSA at the Meeting of the IMO Marine Environment Protection Committee for our better protection of marine environment and biodiversity, toward full international integration in international conventions on the sea.

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