

Under the Surface

In the Sea

Bioremediation

"Man is the only living creature that possesses reason. But no other living being would ever act so unreasonably." Friedensreich Hundertwasser

"Nature knows no problems, only solutions." Carl Amery

The caterpillars of *Galleria mellonella* digest PE plastic.

Every year, around 6.4 million tons of plastic end up in the sea.

Plastic particles collect to form islands of trash.

Nearly 300 marine species suffer from plastic waste.

Stomachs of seabirds are an indicator of pollution levels.

Plastic does not decompose (or supposedly within 450 years), it breaks down until it is completely pulverized. At the latest then it enters the food cycle.

Unless nature helps with bioremediation.

The bacterium *Ideonella sakaiensis* 201-F6 degrades PET plastic. It eats and reproduces specifically and has only evolved in the last 70 years.

Bacteria such as *Pseudomonas aeruginosa*, *Oleispira antarctica*, and *Alcanivorax borkumensis* are hydrocarbonoclastic - meaning they degrade oil in the ocean.

The fungus *Pestalotiopsis microspora* eats PUR plastic.

Particularly frequent marine litter: plastic bags

Plastic six-packs

PET bottles

Toothbrushes

Plastic waste

Cords

Fishing nets

Coolies

Electrical scrap and cables

Fleece fabric (approx. 2000 fibers from plastic clothing enter wastewater per wash cycle and cannot be stopped by wastewater treatment plants).

Polymerisates:

Polyethylene (PE)

Polypropylene (PP)

Polybutadiene

Polystyrene (PS)

Polyvinyl chloride (PVC)

Polyacrylonitrile (PAN)

Polytetrafluoroethene (PTFE)

Polyacrylic acid esters (PMCA)

Polymethacrylic acid ester (PMMA)

Polycondensates:

Polyamide (PA)

Polyester (PES, PET)
Formaldehyde resins

Polyadducts:
Epoxy resins
Polyurethanes (PUR)

The metabolic processes and the enzymes required for this are currently being researched in order to produce concentrated active ingredients that will break down the plastic waste in the sea into harmless components.

Streaming curiosity

"You don't have to understand the world, you just have to find your way around it." Albert Einstein

North Pacific Gyre West and East (Great Pacific Garbage Patch and North Pacific Gyre, respectively)

South Pacific Gyre (South Pacific Gyre)

North Atlantic Gyre (North Atlantic Gyre)

South Atlantic Gyre (South Atlantic Gyre)

Indian Ocean Gyre (Indian Ocean Gyre)

Five waste swirls in the sea, each with 1,000 to 2,500 g of plastic per km² on the water surface. At the total depth, ten times this amount is assumed.

Friendly Floatees (Friendly floating particles)

29,000 plastic animals washed into the North Pacific from the cargo ship Ever Laurel in 1992: yellow ducks, green frogs, blue turtles and red beavers.

Due in part to thermohaline circulation, they washed up on various coasts, providing information about ocean currents.

The first landed after eight months in Alaska, later some in Australia, Indonesia and in Chile. Many ducks entered the ring current of the Pacific Ocean, which takes two to three years to make one turn.

In 1995, some bathypetes drifted from the Bering Sea through the Bering Strait into the pack ice of the Arctic Ocean to the east coast of Greenland.

In 2000 and 2003, there were finds in the US states of Maine and Massachusetts.

A frog was found in the Hebrides in 2003.

In August 2007, there was the discovery of one of the ducks in Devon, about 27,000 km from the place of origin.

Now, researchers at the Potsdam Institute for Climate Research are interested in the migration paths of the floaties.

Sea noise

"Noise is the most significant of all disturbances. It is not a disturbance alone; it is more than a division of thought." Arthur Schopenhauer

"Noise is non-contact bodily harm." Helmut Glaßl

"Noise eats." Kurt Tucholsky

"The most beautiful sound is silence." Proverb

Sound propagates much more efficiently under water than in the air.

Hearing means for whales and dolphins:

Foraging

Orientation

Social behavior

Viability

Every decade, the noise level in the oceans doubles.

International: thousands of ships, especially huge, fast oil tankers and cargo ships.

Regional: Smaller boats, excursion boats, ferries and private boats.

Search for oil and gas with airgun sonic cannons,
up to 262 dB, often every minute for months.

Sound pressure is about 10,000 times greater than that of a jackhammer at a distance of one meter,
sound intensity is over 100 million times greater.

High power military sonar (up to 235 dB)

Military maneuvers, low-level flights, shooting exercises and explosions.

Construction of wind turbines (up to 257 dB due to pile driving).

Use of pingers to prevent bycatch.

Disruption via behavioral changes.

Disturbance of environmental perception and communication.

Disruption of foraging, hunting, orientation, and security.

Panic behavior, often with fatal outcome.

Stress leads to physical or psychological damage

Displacement from habitat.

Resource loss (habitat and energy).

Injury and damage to the sense of hearing.

Damage to other internal organs.

Pulse-like sound shock waves lead to death.

Extinction of species.

No international protection agreement.

Therefore, underwater noise even in protected areas.

Connection

"The world hasn't gotten worse; we just have a better communications network." Ken Hubbard

"When big words confuse the conversation, little ones fix it." From the Jabo in Sudan

Deep-sea cables are destroyed by seaquakes, sandbar migration, mussels, worms e.g. teredon worms), and larger fish (e.g. sharks), ship anchors, fishermen's trawls, military actions.

Submarine cable

America Movil Submarine Cable System-1 (AMX-1)

Asia Africa Europe-1 (AAE-1)

Australia-Japan Cable (AJC)

Caribbean-Bermuda U.S. (CBUS)

Djibouti Africa Regional Express (DARE)

Eastern Caribbean Fiber System (ECFS)

Europe India Gateway (EIG)

Hong Kong Guam (HK-G)

Jakarta-Bangka-Bintan-Batam-Singapore (B3JS)

Lower Indian Ocean Network (LION)

Nigeria Cameroon Submarine Cable System (NCSCS)

Pacific Crossing-1 (PC-1)

Pan-American Crossing (PAC)

Russia-Japan Cable Network (RJCN)

South America Pacific Link (SAPL)

Suriname-Guyana Submarine Cable System (SG-SCS)

ACS Alaska-Oregon Network (AKORN)

Adriatic-1

Africa Coast to Europe (ACE)

Alaska United East

Alaska United Turnagain Arm (AUTA)

ALBA-1

Alonso de Ojeda

America Movil Submarine Cable System-1 (AMX-1)

Americas-I North

Amerigo Vespucci

APCN-2

Apollo

ARBR

ARSAT Submarine Fiber Optic Cable

Asia Pacific Gateway (APG)

Asia-America Gateway (AAG) Cable System

Atlantic Crossing-1 (AC-1)

Atlas Offshore

Australia West Express (AWE)

Australia-Papua New Guinea-2 (APNG-2)

Avassa

Bahamas 2

Aden-Djibouti

AEConnect (AEC)

Africa-1

Alaska United Southeast

Alaska United West

Aletar

ALPAL-2

American Samoa-Hawaii (ASH)

Americas-II

Antillas 1

Aphrodite 2

Aqualink

ARCOS

Asia Africa Europe-1 (AAE-1)

Asia Submarine-cable Express (ASE)/Cahaya Malaysia

Atisa

Atlantis-2

Australia-Japan Cable (AJC)

Australia-Singapore Cable (ASC)

Azores Fiber Optic System (AFOS)

Bahamas Domestic Submarine Network (BDSNi)

Bahamas Internet Cable System (BICS)
 Baltic Sea Submarine Cable
 BARSAV
 Bass Strait-2
 Batam Dumai Melaka (BDM) Cable System
 Batam-Rengit Cable System (BRCS)
 BCS East
 BCS North - Phase 1
 BERYTAR
 Bicentenario
 Botnia
 BRUSA

 BT-MT-1
 C-Lion1
 CADMOS
 Canalink
 Caribbean-Bermuda U.S. (CBUS)
 Cayman-Jamaica Fiber System
 Ceiba-2
 CeltixConnect
 Channel Islands-9 Liberty Submarine Cable
 Circe North
 Colombia-Florida Subsea Fiber (CFX-1)
 Columbus-III
 Concerto
 Corse-Continent 5 (CC5)
 Danica North
 Denmark-Norway 5
 Denmark-Poland 2
 Denmark-Sweden 16
 Denmark-Sweden 18
 Dhiraagu-SLT Submarine Cable Network
 Djibouti Africa Regional Express (DARE)
 E-LLAN
 East-West
 Eastern Africa Submarine System (EASSy)
 ECLink
 EllaLink
 ESAT-1
 Estepona-Tetouan
 Europe India Gateway (EIG)
 Far East Submarine Cable System
 Farland North
 Fehmarn Bält
 Fibralink
 Finland-Estonia 2 (EESF-2)
 FLAG Atlantic-1 (FA-1)
 FLAG North Asia Loop/REACH North Asia Loop
 FOS Quillon-Chacabuco
 Geo-Eirgrid
 Germany-Denmark 2
 Glo-1

 Balalink
 Baltica
 Bass Strait-1
 Basslink
 Batam Singapore Cable System (BSCS)
 Bay of Bengal Gateway (BBG)
 BCS East-West Interlink
 BCS North - Phase 2
 Bharat Lanka Cable System
 Boracay-Palawan Submarine Cable System
 Brazilian festoon
 BT Highlands and Islands Submarine Cable System
 BUGIO

 CAM Ring
 CANTAT-3
 Caucasus Cable System
 Ceiba-1
 Celtic
 Challenger Bermuda-1 (CB-1)
 Chuuk Cable
 Circe South
 Columbus-II b
 Comoros Domestic Cable System
 Corse-Continent 4 (CC4)
 Cross Straits Cable Network
 DANICE
 Denmark-Norway 6
 Denmark-Sweden 15
 Denmark-Sweden 17
 Dhiraagu Cable Network
 Didon
 Dumai-Melaka Cable System
 EAC-C2C
 East-West Submarine Cable System
 Eastern Caribbean Fiber System (ECFS)
 Elektra-GlobalConnect 1 (GC1)
 Emerald Bridge Fibres
 ESAT-2

 FALCON
 FARICE-1
 FASTER
 Fiber Optic Gulf (FOG)
 Finland Estonia Connection (FEC)
 Finland-Estonia 3 (EESF-3)
 FLAG Europe-Asia (FEA)
 Flores-Corvo Cable System
 Gemini Bermuda
 Georgia-Russia
 Germany-Denmark 3
 Global Caribbean Network (GCN)

GlobalConnect 2 (GC2)
 GlobalConnect-KPN
 GO-1 Mediterranean Cable System
 Greece-Western Europe Network (GWEN)
 Greenland Connect North
 GTT Atlantic
 Guam Okinawa Kyushu Incheon (GOKI)
 Gulf Bridge International Cable System
 (GBICS)/Middle East North Africa (MENA)
 Cable System
 HANNIBAL System
 Hawaiki
 HICS (Hawaii Inter-Island Cable System)
 High-capacity Undersea Guernsey Optical-fibre
 (HUGO)
 Hong Kong Guam (HK-G)
 i2i Cable Network (i2icn)
 INDIGO-Central
 Indonesia Global Gateway (IGG) System
 Interchange Cable Network 1 (ICN1)
 IP-Only Denmark-Sweden
 Isles of Scilly Cable
 Italy-Croatia
 Italy-Libya
 Italy-Monaco
 JAKABARE
 Jambi-Batam Cable System (JIBA)
 Japan-U.S. Cable Network (JUS)
 Jerry Newton
 Junior
 Kattegat 2
 Kodiak Kenai Fiber Link (KKFL)

Labuan-Brunei Submarine Cable
 Lanis-2
 Latvia-Sweden 1 (LV-SE 1)
 LFON (Libyan Fiber Optic Network)
 Liquid Sea
 Lower Indian Ocean Network 2 (LION2)
 Lynn Canal Fiber
 Malaysia-Cambodia-Thailand (MCT) Cable
 Mariana Guam Cable
 Matrix Cable System
 Med Cable Network
 Melita 1
 Middle East North Africa (MENA) Cable
 System/Gulf Bridge International
 Monet

Myanmar-Thailand Interconnect Cable
 (MYTHIC)

GlobalConnect 3 (GC3)
 GlobeNet
 Gondwana-1
 Greenland Connect

GTT Express
 Guernsey-Jersey-4
 Gulf2Africa (G2A)

HANTRU1 Cable System
 Hawk
 HIFN (Hawaii Island Fibre Network)
 Hokkaido-Sakhalin Cable System (HSCS)

Honotua
 IMEWE
 INDIGO-West
 INGRID
 IOX Cable System
 Ireland-France Cable-1 (IFC-1)
 Italy-Albania
 Italy-Greece 1
 Italy-Malta
 JaKa2LaDeMa
 Jakarta-Bangka-Bintan-Batam-Singapore (B3JS)
 Janna
 JASUKA
 Jonah
 Kattegat 1
 Kerch Strait Cable
 Korea-Japan Cable Network (KJCN)
 Kuwait-Iran
 Lanis-1
 Lanis-3
 Lev Submarine System
 Libreville-Port Gentil Cable
 Lower Indian Ocean Network (LION)
 Luwuk Tutuyan Cable System (LTCS)
 Main One
 MAREA
 Mataram Kupang Cable System (MKCS)
 Maya-1
 MedNautilus Submarine System
 Mid-Atlantic Crossing (MAC)
 Midgardsormen

Moratelindo International Cable System-1 (MIC-
 1)
 Nationwide Submarine Cable Ooredoo Maldives
 (NaSCOM)
 Nelson-Levin

New Cross Pacific (NCP) Cable System

North West Cable System

NorthStar

Oran-Valencia (ORVAL)

Pacific Crossing-1 (PC-1)

Palawa-Iloilo Cable System

Pan European Crossing (UK-Belgium)

Pan-American Crossing (PAC)

Pencan-6

Pencan-8

Persona

Picot-1

Pishgaman Oman Iran (POI) Network

PNG LNG

POSEIDON

Quintillion Subsea Cable Network

S-U-B Cable System

SAFE

Samoa-American Samoa (SAS)

SAT-3/WASC

Saudi Arabia-Sudan-2 (SAS-2)

Scandinavian Ring South

Scotland-Northern Ireland 2

SEA-US

SEACOM/Tata TGN-Eurasia

SeaMeWe-4

Segunda FOS Canal de Chacao

SHEFA-2

Silphium

Sirius South

Skagerrak 4

SMPCS Packet-2

Solomons Islands Submarine Cable (SISC)

South America-1 (SAM-1)

South Atlantic Cable System (SACS)

Southeast Asia Japan Cable (SJC)

Southern Cross Cable Network (SCCN)

Strategic Evolution Underwater Link (SEUL)

Subcan Link 2

Suriname-Guyana Submarine Cable System (SG-SCS)

Swansea-Brean

Sweden-Finland 4 (SFS-4)

Sweden-Finland Link (SFL)

Taba-Aqaba

Taiwan Strait Express-1 (TSE)-1

Tampnet Offshore FOC Network

Tannat

Tasman Global Access (TGA) Cable

Tata TGN-Atlantic

Nigeria Cameroon Submarine Cable System (NCSCS)

Northern Lights

OMRAN/EPEG Cable System

Pacific Caribbean Cable System (PCCS)

Pacific Light Cable Network (PLCN)

Pan American (PAN-AM)

Pan European Crossing (UK-Ireland)

PENBAL-5

Pencan-7

Pencan-9

PGASCOM

PIPE Pacific Cable-1 (PPC-1)

PLDT Domestic Fiber Optic Network (DFON)

PNG National Submarine Fibre Cable Network

Qatar-U.A.E. Submarine Cable System

Russia-Japan Cable Network (RJCN)

Saba, Statia Cable System (SSCS)

Saint Maarten Puerto Rico Network One (SMPR-1)

San Andres Isla Tolu Submarine Cable (SAIT)

Saudi Arabia-Sudan-1 (SAS-1)

Scandinavian Ring North

Scotland-Northern Ireland 1

SEA Cable Exchange-1 (SEAX-1)

Seabras-1

SeaMeWe-3

SeaMeWe-5

Seychelles to East Africa System (SEAS)

Silk Route Gateway (SRG-1)

Sirius North

Sistem Cable Rakyat 1Malaysia (SKR1M)

SMPCS Packet-1

Solas

South America Pacific Link (SAPL)

South American Crossing (SAC)/Latin American Nautilus (LAN)

South Atlantic Inter Link (SAIL)

Southern Caribbean Fiber

St. Thomas-St. Croix System

Subcan Link 1

Sumatera Bangka Cable System (SBCS)

Svalbard Undersea Cable System

Sweden-Estonia (EE-S 1)

Sweden-Finland 6

Sweden-Latvia

Taino-Carib

Tamares North

Tangerine

Tarakan Selor Cable System (TSCS)

TAT-14

Tata TGN Gulf

Tata TGN-Intra Asia (TGN-IA)
Tata TGN-Pacific
Tata TGN-Western Europe
Telstra Endeavour
Thailand-Indonesia-Singapore (TIS)
Tobrok-Emasaed Cable System
Trans-Pacific Express (TPE) Cable System
Transworld (TW1)
Trident Subsea Cable
Tui-Samoa
Turcyos-2
UGARIT
UK Channel Islands-8
Ulysses
Unity/EAC-Pacific
WARF Submarine Cable
XL Bali Lombok Submarine Cable System

Tata TGN-Tata Indicom
TE North/TGN-Eurasia/SEACOM/Alexandros
TERRA SW
The East African Marine System (TEAMS)
Tonga Cable
TRANSCAN-3
Trapani-Kelibia
TT-1
Turcyos-1
UAE-Iran
UK Channel Islands-7
UK-Netherlands 14
Unisur
Vodafone Malta-Sicily Cable System (VMSCS)
West African Cable System (WACS)
Yellow

Unter der Oberfläche

Im Meer

Bioremediation

"Der Mensch ist das einzige Lebewesen, das Vernunft besitzt. Aber kein anderes Lebewesen würde jemals so unvernünftig handeln." Friedensreich Hundertwasser

"Die Natur kennt keine Probleme, nur Lösungen." Carl Amery

Die Raupen der *Galleria mellonella* verdauen PE-Kunststoff.

Jedes Jahr landen rund 6,4 Millionen Tonnen Kunststoff im Meer.

Kunststoffpartikel sammeln sich zu Inseln aus Müll.

Fast 300 Meerestierarten leiden unter dem Plastikmüll.

Mägen von Meeresvögeln sind ein Indikator für den Grad der Verschmutzung.

Plastik zersetzt sich nicht (bzw. angeblich innerhalb von 450 Jahren), es zerkleinert sich bis zur kompletten Zerreibung. Spätestens dann gelangt es in den Nahrungskreislauf.

Es sei denn, die Natur hilft mit Bioremediation.

Das Bakterium *Ideonella sakaiensis* 201-F6 baut den PET-Kunststoff ab. Es frisst und vermehrt sich spezifisch und hat sich erst in den letzten 70 Jahren entwickelt.

Bakterien wie *Pseudomonas aeruginosa*, *Oleispira antarctica* und *Alcanivorax borkumensis* sind hydrocarbonoklastisch – sie bauen also Öl im Meer ab.

Der Pilz *Pestalotiopsis microspora* frisst PUR-Kunststoff.

Besonders häufiger Meermüll: Plastiktüten

Plastiksixpacks

PET-Flaschen

Zahnbürsten

Plastikmüll

Schnüre

Fischernetze

Kulis

Elektroschrott und Kabel

Fleece-Stoff (ca. 2000 Fasern aus Kunststoffkleidung gelangen pro Waschgang ins Abwasser und können nicht von Klärwerken aufgehalten werden.)

Polymerisate:

Polyethylen (PE)

Polypropylen (PP)

Polybutadien

Polystyrol (PS)

Polyvinylchlorid (PVC)

Polyacrylnitril (PAN)

Polytetrafluorethen (PTFE)

Polyacrylsäureester (PMCA)

Polymethylacrylsäureester (PMMA)

Polykondensate:

Polyamid (PA)

Polyester (PES, PET)
Formaldehydharze

Polyaddukte:
Epoxidharze
Polyurethane (PUR)

Die Stoffwechselforgänge sowie die dazu notwendigen Enzyme werden zur Zeit erforscht, um daraus konzentriert wirkende Wirkstoffe herzustellen, die den Kunststoffmüll im Meer in ungefährliche Bestandteile zerlegen sollen.

Strömungsneugier

„Man muss die Welt nicht verstehen, man muss sich nur darin zurechtfinden.“ Albert Einstein

Nordpazifischer Wirbel West und Ost (Great Pacific Garbage Patch bzw. North Pacific Gyre)

Südpazifischer Wirbel (South Pacific Gyre)

Nordatlantischer Wirbel (North Atlantic Gyre)

Südatlantischer Wirbel (South Atlantic Gyre)

Indischer Ozean Wirbel (Indian Ocean Gyre)

Fünf Müllwirbel im Meer mit je 1.000 bis 2.500 g Plastik pro km² auf der Wasseroberfläche. Auf der gesamten Tiefe wird die zehnfache Menge angenommen.

Friendly Floatees (Freundliche Treibteilchen)

29.000 Kunststofftiere, die vom Frachtschiff Ever Laurel 1992 in den Nordpazifik gespült wurden: gelbe Enten, grüne Frösche, blaue Schildkröten und rote Biber.

Unter anderem aufgrund der thermohalinen Zirkulation wurden sie an verschiedenen Küsten angespült, was Auskunft über die Meeresströmungen gab.

Die ersten landeten nach acht Monaten in Alaska, später einige in Australien, Indonesien und in Chile.

Viele Enten gelangten in die Ringströmung des Pazifiks, die zwei bis drei Jahre für eine Umdrehung benötigt.

1995 drifteten einige Badetierchen vom Beringmeer durch die Beringstraße ins Packeis des Nordpolarmeeres bis zur Ostküste Grönlands.

2000 und 2003 gab es Funde in den US-Staaten Maine und Massachusetts.

Auf den Hebriden wurde 2003 ein Frosch gefunden.

Im August 2007 gab es den Fund einer der Enten in Devon, rund 27.000 km vom Ursprungsort entfernt.

Nun sind die Forscher am Potsdamer Institut für Klimaforschung an den Wanderwegen der Floatees interessiert.

Meeresrauschen

„Lärm ist die bedeutendste von allen Störungen. Es ist nicht allein eine Störung, es ist mehr als eine Spaltung des Denkens.“ Arthur Schopenhauer

„Lärm ist berührungslose Körperverletzung.“ Helmut Glaßl

„Lärm frisst.“ Kurt Tucholsky

„Das schönste Geräusch ist Stille.“ Sprichwort

Unter Wasser breitet sich Schall erheblich effizienter aus als in der Luft.

Gehörsinn bedeutet für Wale und Delfine:

Nahrungssuche

Orientierung

Sozialverhalten

Lebensfähigkeit

Jede Dekade verdoppelt sich der Lärmpegel in den Meeren.

International: Tausende Schiffe, insbesondere riesige, schnelle Öltanker und Frachtschiffe.

Regional: Kleinere Boote, Ausflugsschiffe, Fähren und Privatboote.

Suche nach Öl und Gas mit Airgun-Schallkanonen,
bis zu 262 dB, oft im Minutentakt über Monate.

Schalldruck ist ca. 10.000-fach größer wie der eines Presslufthammers in einem Meter Abstand,
Schallintensität ist über 100 Millionen Mal größer.

Militärische Hochleistungssonare (bis zu 235 dB)

Militärische Manöver, Tiefflüge, Schießübungen und Explosionen.

Bau von Windkraftanlagen (bis zu 257 dB durch pile driving).

Einsatz von Pingern zur Verhinderung von Beifang.

Störung über Verhaltensveränderungen.

Störung der Umgebungswahrnehmung und Kommunikation.

Störung von Nahrungssuche, Jagd, Orientierung und Sicherheit.

Panikverhalten, oft mit tödlichem Ausgang.

Stress führt zu physischen oder psychischen Schäden

Vertreibung aus Lebensraum.

Ressourcenverlust (Habitat und Energie).

Verletzung und Schäden des Gehörsinns.

Schäden anderer innerer Organe.

Pulsartige Schallschockwellen führen zum Tod.

Aussterben der Arten.

Kein internationales Schutzabkommen.

Daher Unterwasserlärm auch in Schutzgebieten.

Verbindung

„Die Welt ist nicht schlechter geworden; wir haben nur ein besseres Kommunikationsnetz.“ Ken Hubbard

„Wenn große Worte das Gespräch verwirren, bringen es Kleine wieder in Ordnung.“ Von den Jabo im Sudan

Tiefseekabel werden zerstört durch Seebeben, Sandbankwanderung, Muscheln, Würmer z.B. Teredon-Würmer), und größere Fische (z.B. Haie), Schiffsanker, Schleppnetze von Fischern, militärische Aktionen.

Tiefseekabel

America Movil Submarine Cable System-1 (AMX-1)
Asia Africa Europe-1 (AAE-1)
Australia-Japan Cable (AJC)
Caribbean-Bermuda U.S. (CBUS)
Djibouti Africa Regional Express (DARE)
Eastern Caribbean Fiber System (ECFS)
Europe India Gateway (EIG)
Hong Kong-Guam (HK-G)
Jakarta-Bangka-Bintan-Batam-Singapore (B3JS)
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Pacific Crossing-1 (PC-1)
Pan-American Crossing (PAC)
Russia-Japan Cable Network (RJCN)
South America Pacific Link (SAPL)
Suriname-Guyana Submarine Cable System (SG-SCS)

ACS Alaska-Oregon Network (AKORN)	Aden-Djibouti
Adria-1	AEConnect (AEC)
Africa Coast to Europe (ACE)	Africa-1
Alaska United East	Alaska United Southeast
Alaska United Turnagain Arm (AUTA)	Alaska United West
ALBA-1	Aletar
Alonso de Ojeda	ALPAL-2
America Movil Submarine Cable System-1 (AMX-1)	American Samoa-Hawaii (ASH)
Americas-I North	Americas-II
Amerigo Vespucci	Antillas 1
APCN-2	Aphrodite 2
Apollo	Aqualink
ARBR	ARCOS
ARSAT Submarine Fiber Optic Cable	Asia Africa Europe-1 (AAE-1)
Asia Pacific Gateway (APG)	Asia Submarine-cable Express (ASE)/Cahaya Malaysia
Asia-America Gateway (AAG) Cable System	Atisa
Atlantic Crossing-1 (AC-1)	Atlantis-2
Atlas Offshore	
Australia West Express (AWE)	Australia-Japan Cable (AJC)

Australia-Papua New Guinea-2 (APNG-2)
 Avassa
 Bahamas 2
 Bahamas Internet Cable System (BICS)
 Baltic Sea Submarine Cable
 BARSAV
 Bass Strait-2
 Batam Dumai Melaka (BDM) Cable System
 Batam-Rengit Cable System (BRCS)
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 Ceiba-2
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 Channel Islands-9 Liberty Submarine Cable
 Circe North
 Colombia-Florida Subsea Fiber (CFX-1)
 Columbus-III
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 Corse-Continent 5 (CC5)
 Danica North
 Denmark-Norway 5
 Denmark-Poland 2
 Denmark-Sweden 16
 Denmark-Sweden 18
 Dhiraagu-SLT Submarine Cable Network
 Djibouti Africa Regional Express (DARE)
 E-LLAN
 East-West
 Eastern Africa Submarine System (EASSy)
 ECLink
 EllaLink
 ESAT-1
 Estepona-Tetouan
 Europe India Gateway (EIG)
 Far East Submarine Cable System
 Farland North
 Fehmarn Bält
 Fibralink
 Finland-Estonia 2 (EESF-2)
 FLAG Atlantic-1 (FA-1)
 FLAG North Asia Loop/REACH North Asia Loop
 FOS Quellon-Chacabuco

 Australia-Singapore Cable (ASC)
 Azores Fiber Optic System (AFOS)
 Bahamas Domestic Submarine Network (BDSNi)
 Balalink
 Baltica
 Bass Strait-1
 Basslink
 Batam Singapore Cable System (BSCS)
 Bay of Bengal Gateway (BBG)
 BCS East-West Interlink
 BCS North - Phase 2
 Bharat Lanka Cable System
 Boracay-Palawan Submarine Cable System
 Brazilian Festoon
 BT Highlands and Islands Submarine Cable System
 BUGIO

 CAM Ring
 CANTAT-3
 Caucasus Cable System
 Ceiba-1
 Celtic
 Challenger Bermuda-1 (CB-1)
 Chuuk Cable
 Circe South
 Columbus-II b
 Comoros Domestic Cable System
 Corse-Continent 4 (CC4)
 Cross Straits Cable Network
 DANICE
 Denmark-Norway 6
 Denmark-Sweden 15
 Denmark-Sweden 17
 Dhiraagu Cable Network
 Didon
 Dumai-Melaka Cable System
 EAC-C2C
 East-West Submarine Cable System
 Eastern Caribbean Fiber System (ECFS)
 Elektra-GlobalConnect 1 (GC1)
 Emerald Bridge Fibres
 ESAT-2

 FALCON
 FARICE-1
 FASTER
 Fiber Optic Gulf (FOG)
 Finland Estonia Connection (FEC)
 Finland-Estonia 3 (EESF-3)
 FLAG Europe-Asia (FEA)
 Flores-Corvo Cable System
 Gemini Bermuda

Geo-Eirgrid
 Germany-Denmark 2
 Glo-1
 GlobalConnect 2 (GC2)
 GlobalConnect-KPN
 GO-1 Mediterranean Cable System
 Greece-Western Europe Network (GWEN)
 Greenland Connect North
 GTT Atlantic
 Guam Okinawa Kyushu Incheon (GOKI)
 Gulf Bridge International Cable System
 (GBICS)/Middle East North Africa (MENA)
 Cable System
 HANNIBAL System
 Hawaiki
 HICS (Hawaii Inter-Island Cable System)
 High-capacity Undersea Guernsey Optical-fibre
 (HUGO)
 Hong Kong-Guam (HK-G)
 i2i Cable Network (i2icn)
 INDIGO-Central
 Indonesia Global Gateway (IGG) System
 Interchange Cable Network 1 (ICN1)
 IP-Only Denmark-Sweden
 Isles of Scilly Cable
 Italy-Croatia
 Italy-Libya
 Italy-Monaco
 JAKABARE
 Jambi-Batam Cable System (JIBA)
 Japan-U.S. Cable Network (JUS)
 Jerry Newton
 Junior
 Kattegat 2
 Kodiak Kenai Fiber Link (KKFL)

Labuan-Brunei Submarine Cable
 Lanis-2
 Latvia-Sweden 1 (LV-SE 1)
 LFON (Libyan Fiber Optic Network)
 Liquid Sea
 Lower Indian Ocean Network 2 (LION2)
 Lynn Canal Fiber
 Malaysia-Cambodia-Thailand (MCT) Cable
 Mariana-Guam Cable
 Matrix Cable System
 Med Cable Network
 Melita 1
 Middle East North Africa (MENA) Cable
 System/Gulf Bridge International
 Monet

Georgia-Russia
 Germany-Denmark 3
 Global Caribbean Network (GCN)
 GlobalConnect 3 (GC3)
 GlobeNet
 Gondwana-1
 Greenland Connect

GTT Express
 Guernsey-Jersey-4
 Gulf2Africa (G2A)

HANTRU1 Cable System
 Hawk
 HIFN (Hawaii Island Fibre Network)
 Hokkaido-Sakhalin Cable System (HSCS)

Honotua
 IMEWE
 INDIGO-West
 INGRID
 IOX Cable System
 Ireland-France Cable-1 (IFC-1)
 Italy-Albania
 Italy-Greece 1
 Italy-Malta
 JaKa2LaDeMa
 Jakarta-Bangka-Bintan-Batam-Singapore (B3JS)
 Janna
 JASUKA
 Jonah
 Kattegat 1
 Kerch Strait Cable
 Korea-Japan Cable Network (KJCN)
 Kuwait-Iran
 Lanis-1
 Lanis-3
 Lev Submarine System
 Libreville-Port Gentil Cable
 Lower Indian Ocean Network (LION)
 Luwuk Tutuyan Cable System (LTCS)
 Main One
 MAREA
 Mataram Kupang Cable System (MKCS)
 Maya-1
 MedNautilus Submarine System
 Mid-Atlantic Crossing (MAC)
 Midgardsormen

Moratelindo International Cable System-1 (MIC-1)

Myanmar-Thailand Interconnect Cable (MYTHIC)

New Cross Pacific (NCP) Cable System

North West Cable System

NorthStar

Oran-Valencia (ORVAL)

Pacific Crossing-1 (PC-1)

Palawa-Iloilo Cable System

Pan European Crossing (UK-Belgium)

Pan-American Crossing (PAC)

Pencan-6

Pencan-8

Persona

Picot-1

Pishgaman Oman Iran (POI) Network

PNG LNG

POSEIDON

Quintillion Subsea Cable Network

S-U-B Cable System

SAFE

Samoa-American Samoa (SAS)

SAT-3/WASC

Saudi Arabia-Sudan-2 (SAS-2)

Scandinavian Ring South

Scotland-Northern Ireland 2

SEA-US

SEACOM/Tata TGN-Eurasia

SeaMeWe-4

Segunda FOS Canal de Chacao

SHEFA-2

Silphium

Sirius South

Skagerrak 4

SMPCS Packet-2

Solomons Islands Submarine Cable (SISC)

South America-1 (SAM-1)

South Atlantic Cable System (SACS)

Southeast Asia Japan Cable (SJC)

Southern Cross Cable Network (SCCN)

Strategic Evolution Underwater Link (SEUL)

Subcan Link 2

Suriname-Guyana Submarine Cable System (SG-SCS)

Swansea-Brean

Sweden-Finland 4 (SFS-4)

Sweden-Finland Link (SFL)

Taba-Aqaba

Taiwan Strait Express-1 (TSE)-1

Tampnet Offshore FOC Network

Nationwide Submarine Cable Ooredoo Maldives (NaSCOM)

Nelson-Levin

Nigeria Cameroon Submarine Cable System (NCSCS)

Northern Lights

OMRAN/EPEG Cable System

Pacific Caribbean Cable System (PCCS)

Pacific Light Cable Network (PLCN)

Pan American (PAN-AM)

Pan European Crossing (UK-Ireland)

PENBAL-5

Pencan-7

Pencan-9

PGASCOM

PIPE Pacific Cable-1 (PPC-1)

PLDT Domestic Fiber Optic Network (DFON)

PNG National Submarine Fibre Cable Network

Qatar-U.A.E. Submarine Cable System

Russia-Japan Cable Network (RJCN)

Saba, Statia Cable System (SSCS)

Saint Maarten Puerto Rico Network One (SMPR-1)

San Andres Isla Tolu Submarine Cable (SAIT)

Saudi Arabia-Sudan-1 (SAS-1)

Scandinavian Ring North

Scotland-Northern Ireland 1

SEA Cable Exchange-1 (SEAX-1)

Seabras-1

SeaMeWe-3

SeaMeWe-5

Seychelles to East Africa System (SEAS)

Silk Route Gateway (SRG-1)

Sirius North

Sistem Kabel Rakyat 1Malaysia (SKR1M)

SMPCS Packet-1

Solas

South America Pacific Link (SAPL)

South American Crossing (SAC)/Latin American Nautilus (LAN)

South Atlantic Inter Link (SAIL)

Southern Caribbean Fiber

St. Thomas-St. Croix System

Subcan Link 1

Sumatera Bangka Cable System (SBCS)

Svalbard Undersea Cable System

Sweden-Estonia (EE-S 1)

Sweden-Finland 6

Sweden-Latvia

Taino-Carib

Tamara North

Tangerine

Tannat
Tasman Global Access (TGA) Cable
Tata TGN-Atlantic
Tata TGN-Intra Asia (TGN-IA)
Tata TGN-Pacific
Tata TGN-Western Europe
Telstra Endeavour
Thailand-Indonesia-Singapore (TIS)
Tobrok-Emasaed Cable System
Trans-Pacific Express (TPE) Cable System
Transworld (TW1)
Trident Subsea Cable
Tui-Samoa
Turcyos-2
UGARIT
UK-Channel Islands-8
Ulysses
Unity/EAC-Pacific
WARF Submarine Cable
XL Bali Lombok Submarine Cable System

Tarakan Selor Cable System (TSCS)
TAT-14
Tata TGN-Gulf

Tata TGN-Tata Indicom
TE North/TGN-Eurasia/SEACOM/Alexandros
TERRA SW
The East African Marine System (TEAMS)
Tonga Cable
TRANSCAN-3
Trapani-Kelibia
TT-1
Turcyos-1
UAE-Iran
UK-Channel Islands-7
UK-Netherlands 14
Unisur
Vodafone Malta-Sicily Cable System (VMSCS)
West African Cable System (WACS)
Yellow