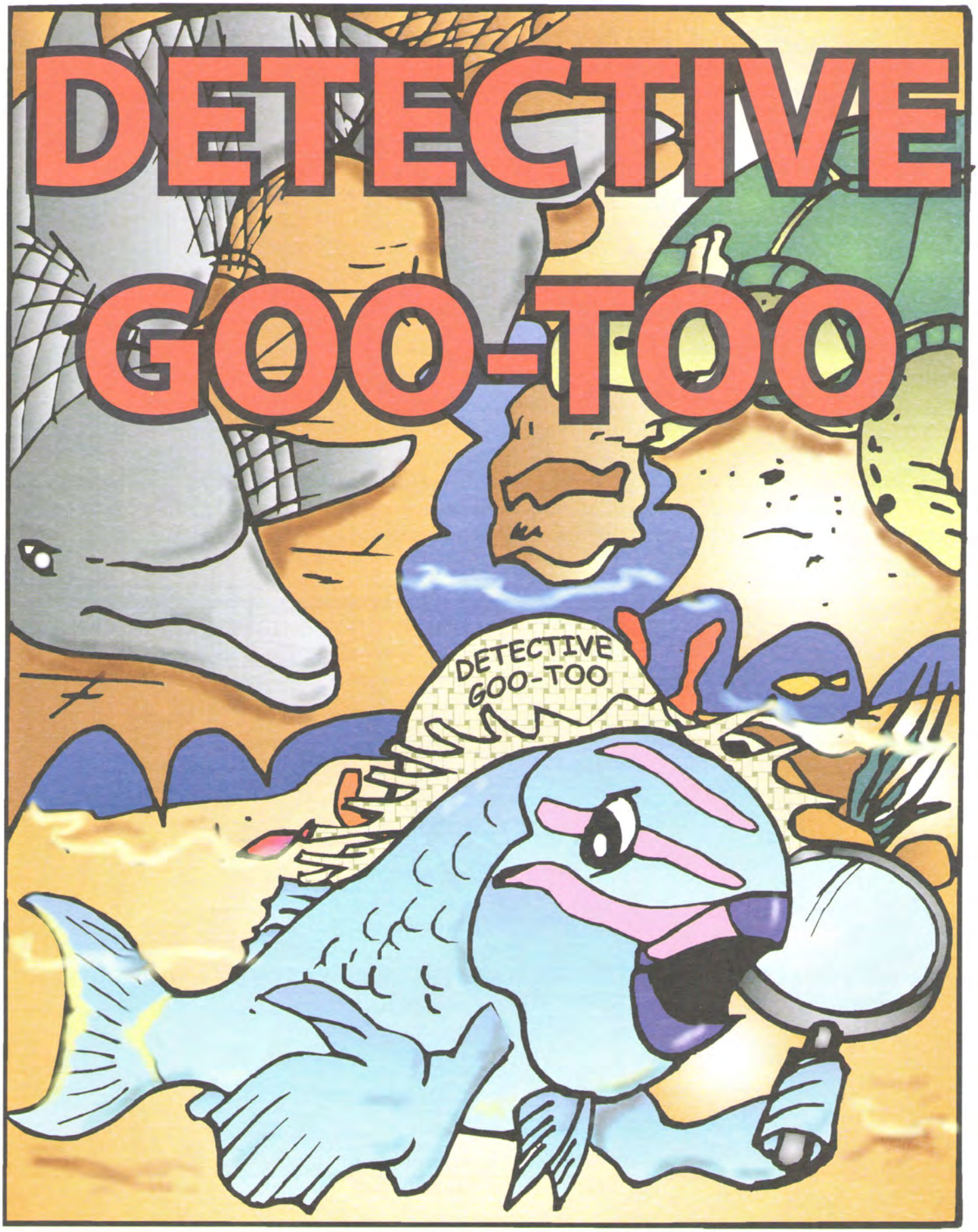
DETECTIVE GOO-TOO



PREVENTING WATER POLLUTION

It is very important for our government to protect, preserve and conserve the coral reefs within the territorial waters of the Commonwealth of Puerto Rico. The government has the responsibility of protecting this natural resource for the benefit and enjoyment of our generation and future ones. Therefore, the Puerto Rico Department of Natural and Environmental Resources (DNER) created a Program for the Conservation and Management of Coral Reefs in Puerto Rico. This Program is working towards getting our youth acquainted with these fragile marine ecosystems as well as the impact of our actions. For this reason, we are pleased to present the comic book, Detective Goo-Too!

The Virgin Islands Marine Advisory Service of the Sea Grant College Program worked with the University of the Virgin Islands to create this comic book, which the DNER translated into Spanish. Through this publication, we introduce the concept of non-point source pollution to elementary school students. The Detective Goo-Too comic character is a fish that investigates sources of water pollution with kids as assistants. Goo-Too, the name of the fish detective, is the local Virgin Islands name for one of the parrotfish.

It is the concern of many to avoid and prevent continuous and irreparable damage to coral reefs and its associated marine life. Thus, the need to educate youth on the importance of coral reefs, their conservation, and the way in which they could collaborate to protect them, is of great significance.

We expect that teachers and leaders of youth groups with interest in environmental conservation use this comic book as part of their educational strategies. Moreover, that this comic serves as a fun and friendly educational tool that encourages students' interest and awareness of our environment.

Enjoy!

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Administrator
Natural Resources Administration

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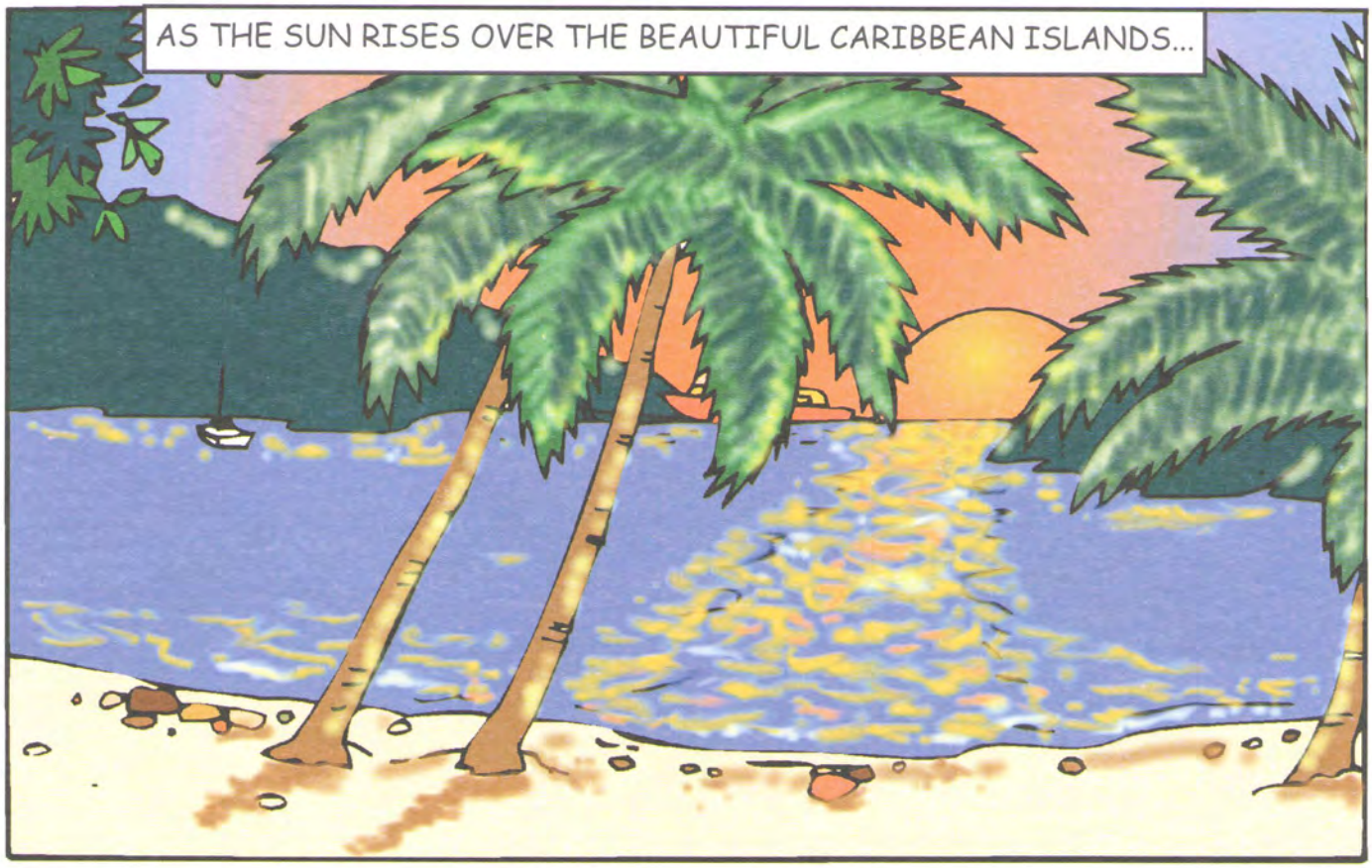
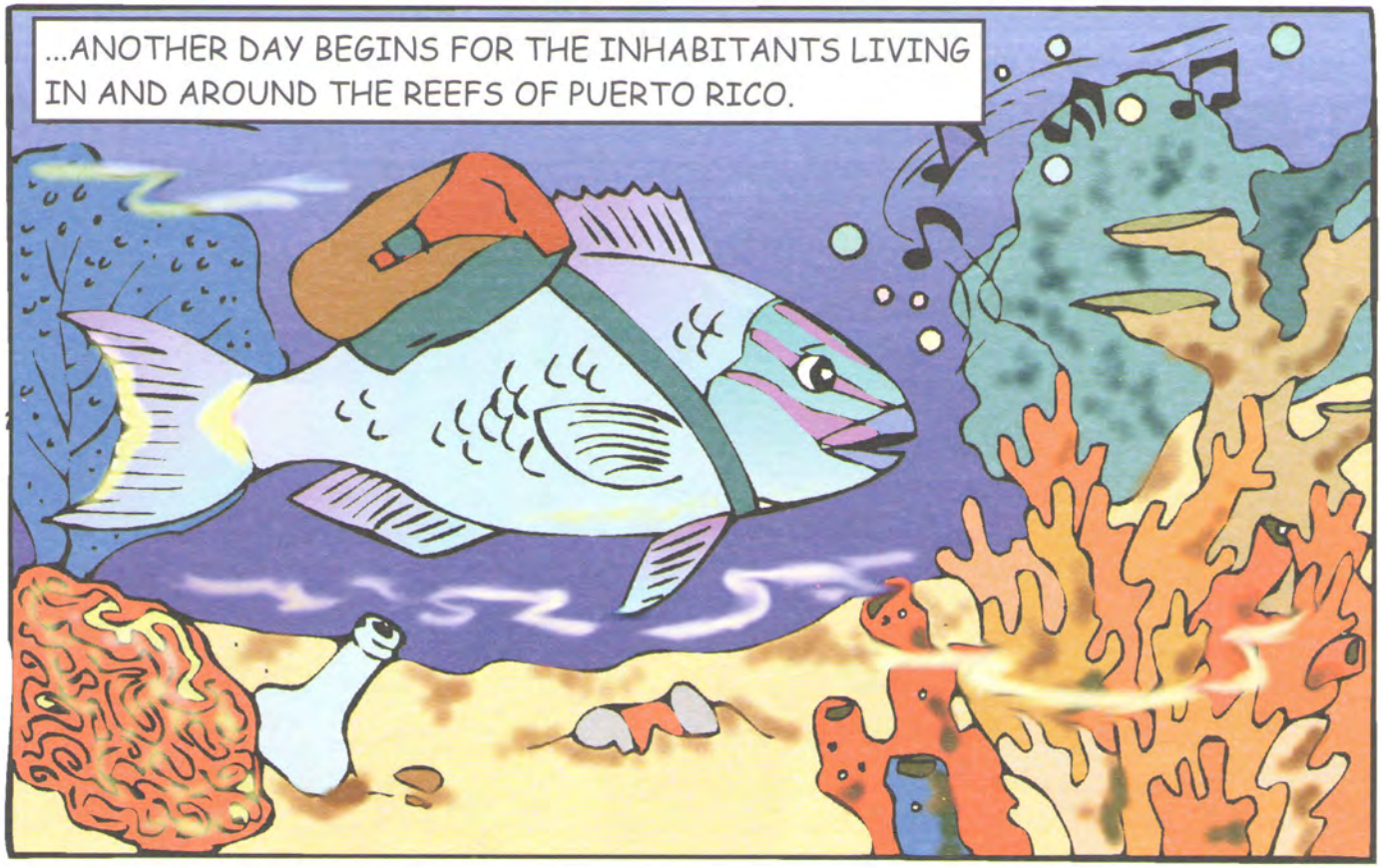
Department of Natural and Environmental Resources

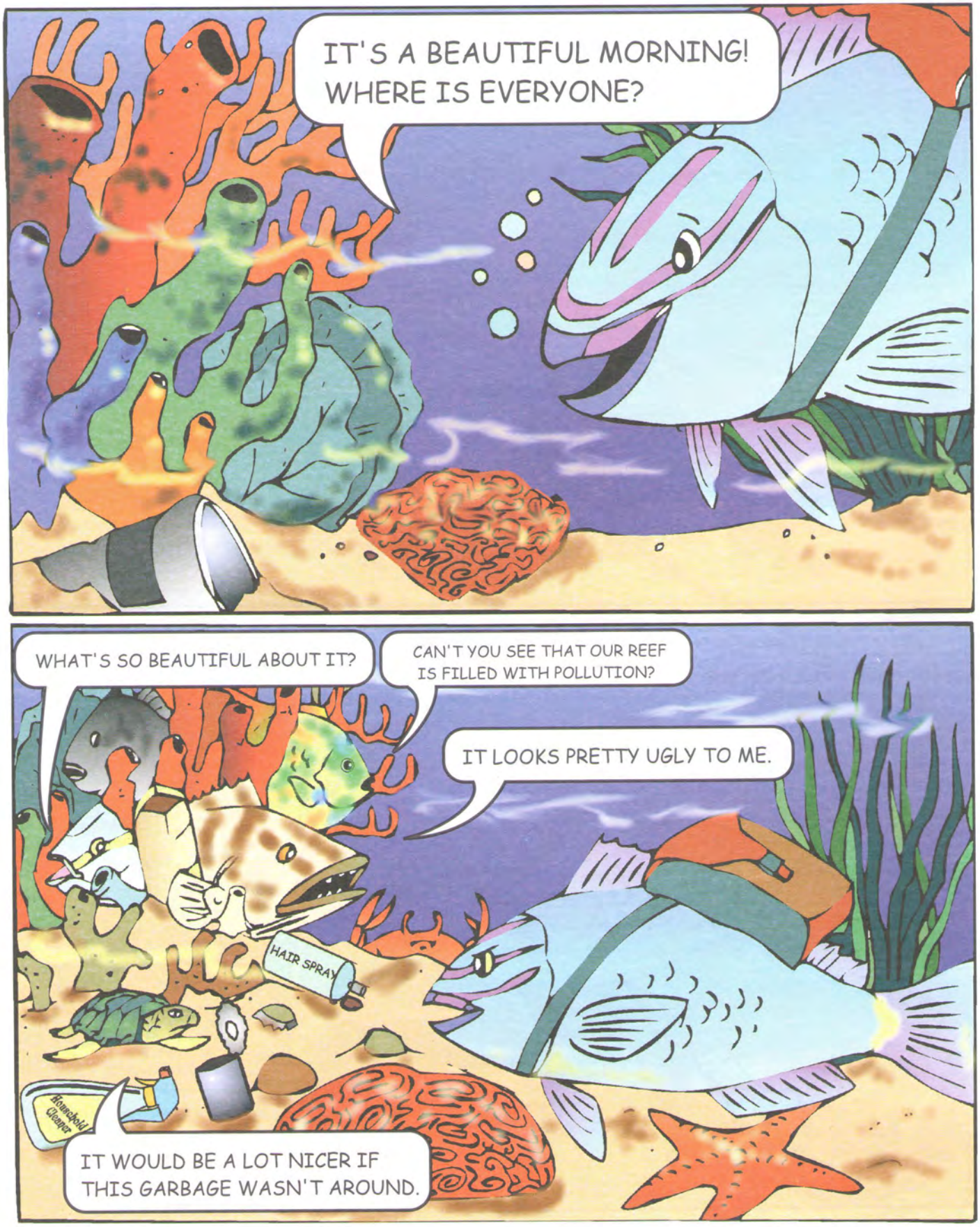
THE CORAL REEFS OF PUERTO RICO ARE FRAGILE, BEAUTIFUL AND UNIQUE!
LEARN MORE: www.coralpr.net

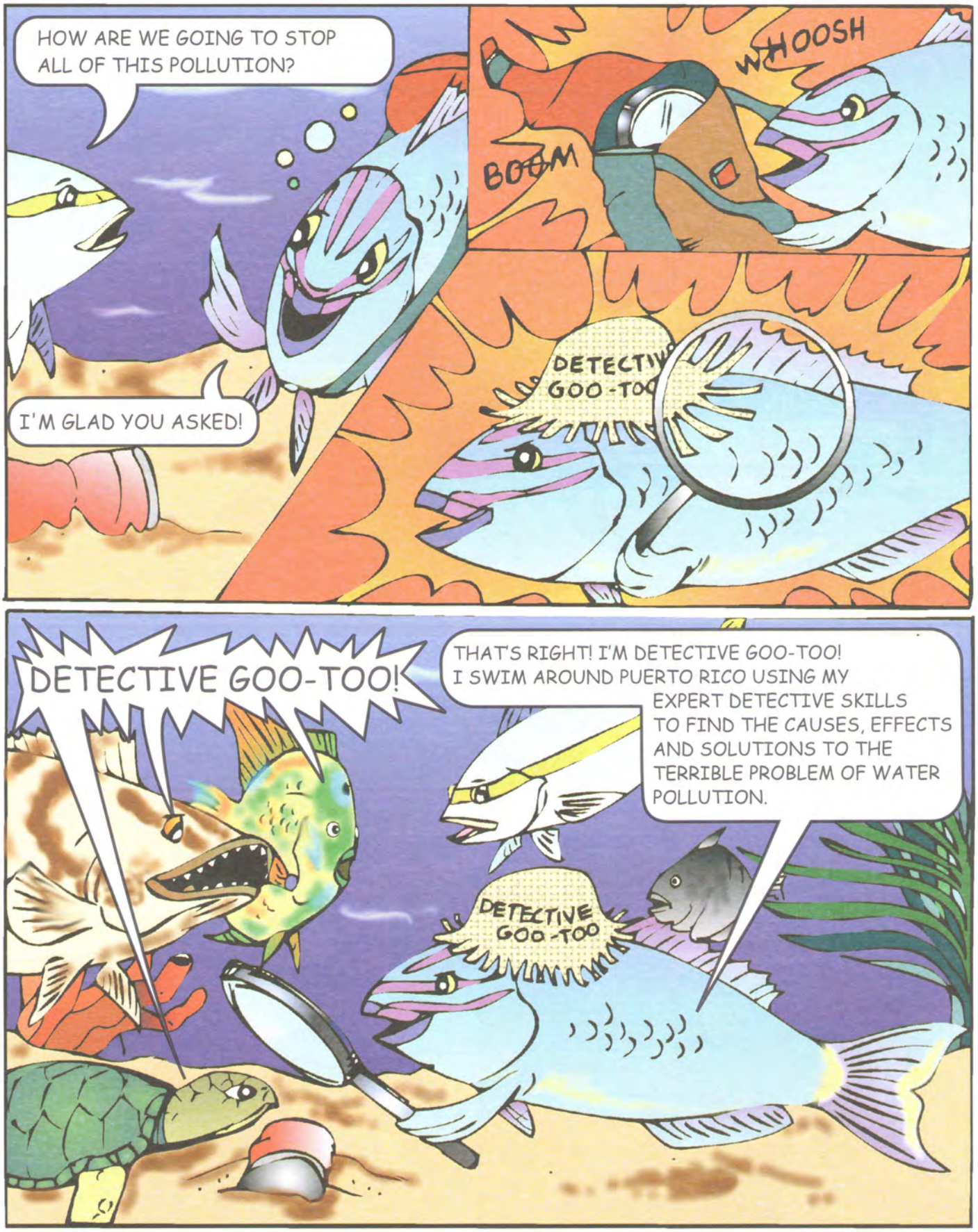
Authors: Scott Sevin, Elaine Sevin
Illustrations by 7-Dippity, Inc.

Created for the University of the Virgin Islands V.I. Marine Advisory Service (VIMAS) by
7-Dippity, Inc. 1313 Ponce De Leon Blvd., Suite 301, Coral Gables, FL 33134, U.S.A.
Modified for the Department of Natural and Environmental Resources, San Juan, Puerto Rico; August 2006

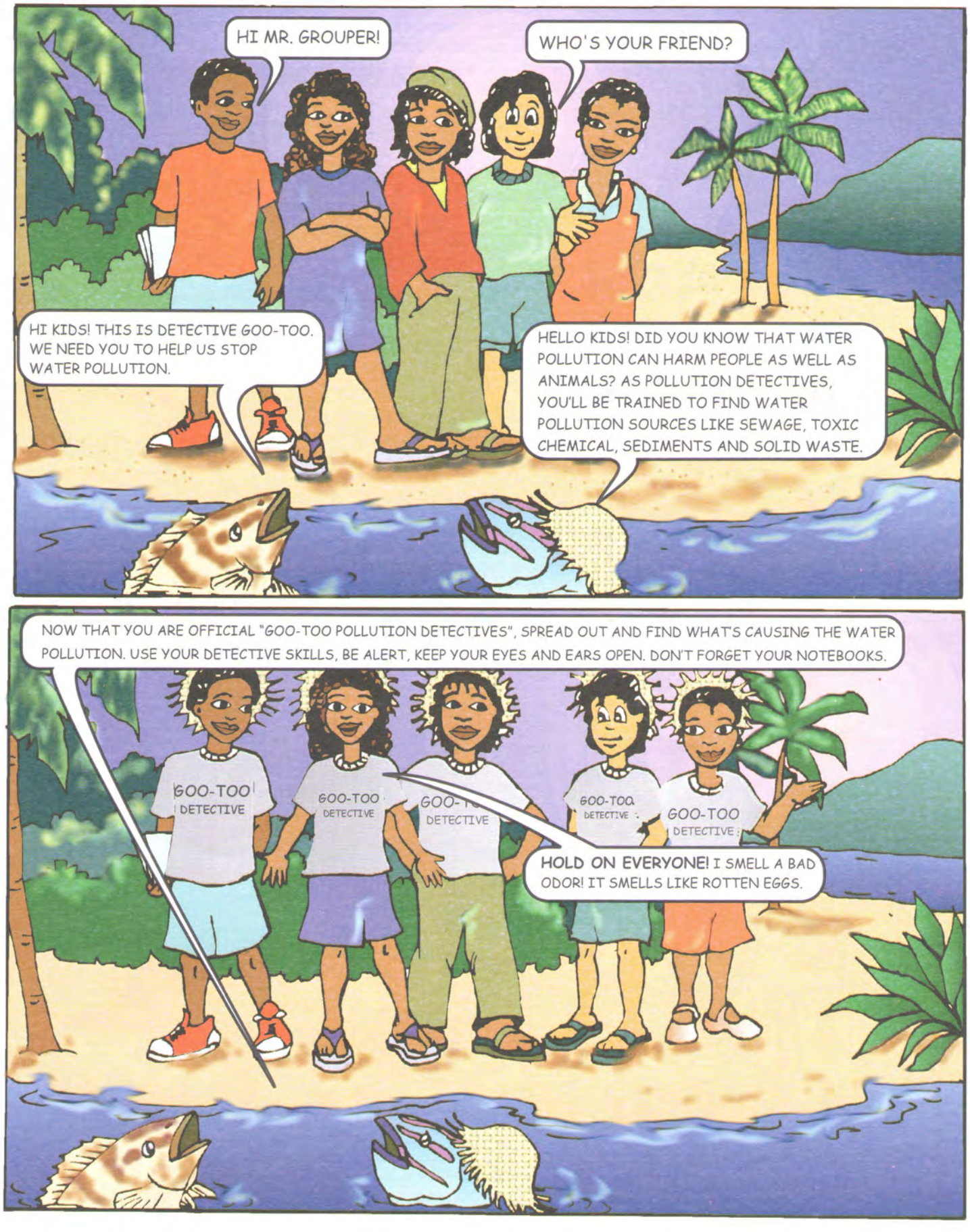

AS THE SUN RISES OVER THE BEAUTIFUL CARIBBEAN ISLANDS...

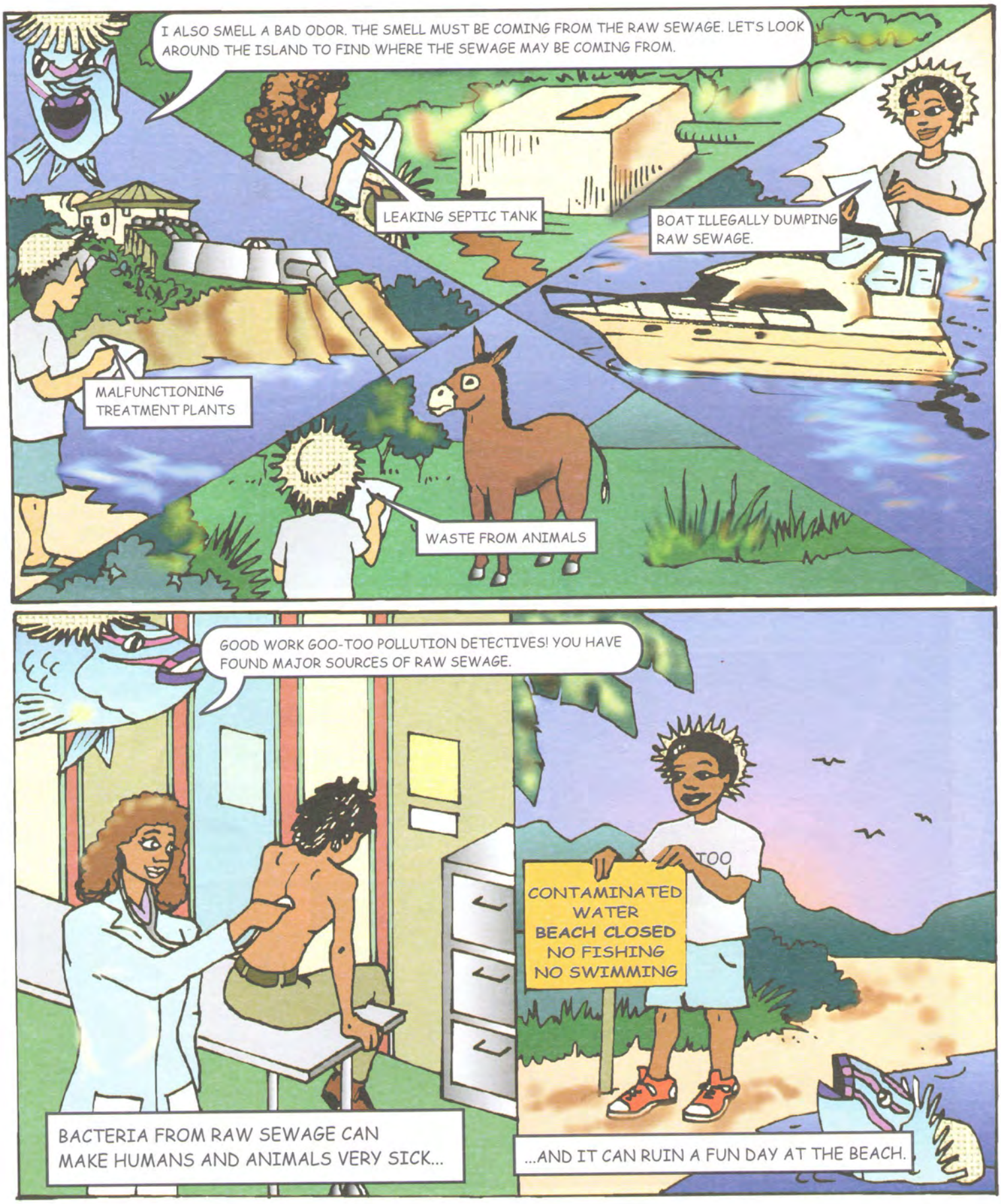

...ANOTHER DAY BEGINS FOR THE INHABITANTS LIVING IN AND AROUND THE REEFS OF PUERTO RICO.


IT'S A BEAUTIFUL MORNING! WHERE IS EVERYONE?
WHAT'S SO BEAUTIFUL ABOUT IT?
CAN'T YOU SEE THAT OUR REEF IS FILLED WITH POLLUTION?
IT LOOKS PRETTY UGLY TO ME.
HAIR SPRAY
Household Cleaner
IT WOULD BE A LOT NICER IF THIS GARBAGE WASN'T AROUND.


HOW ARE WE GOING TO STOP ALL OF THIS POLLUTION?
I'M GLAD YOU ASKED!
WHOOSH
BOOM
DETECTIVE GOO-TOO
DETECTIVE GOO-TOO!
THAT'S RIGHT! I'M DETECTIVE GOO-TOO! I SWIM AROUND PUERTO RICO USING MY EXPERT DETECTIVE SKILLS TO FIND THE CAUSES, EFFECTS AND SOLUTIONS TO THE TERRIBLE PROBLEM OF WATER POLLUTION.
DETECTIVE GOO-TOO

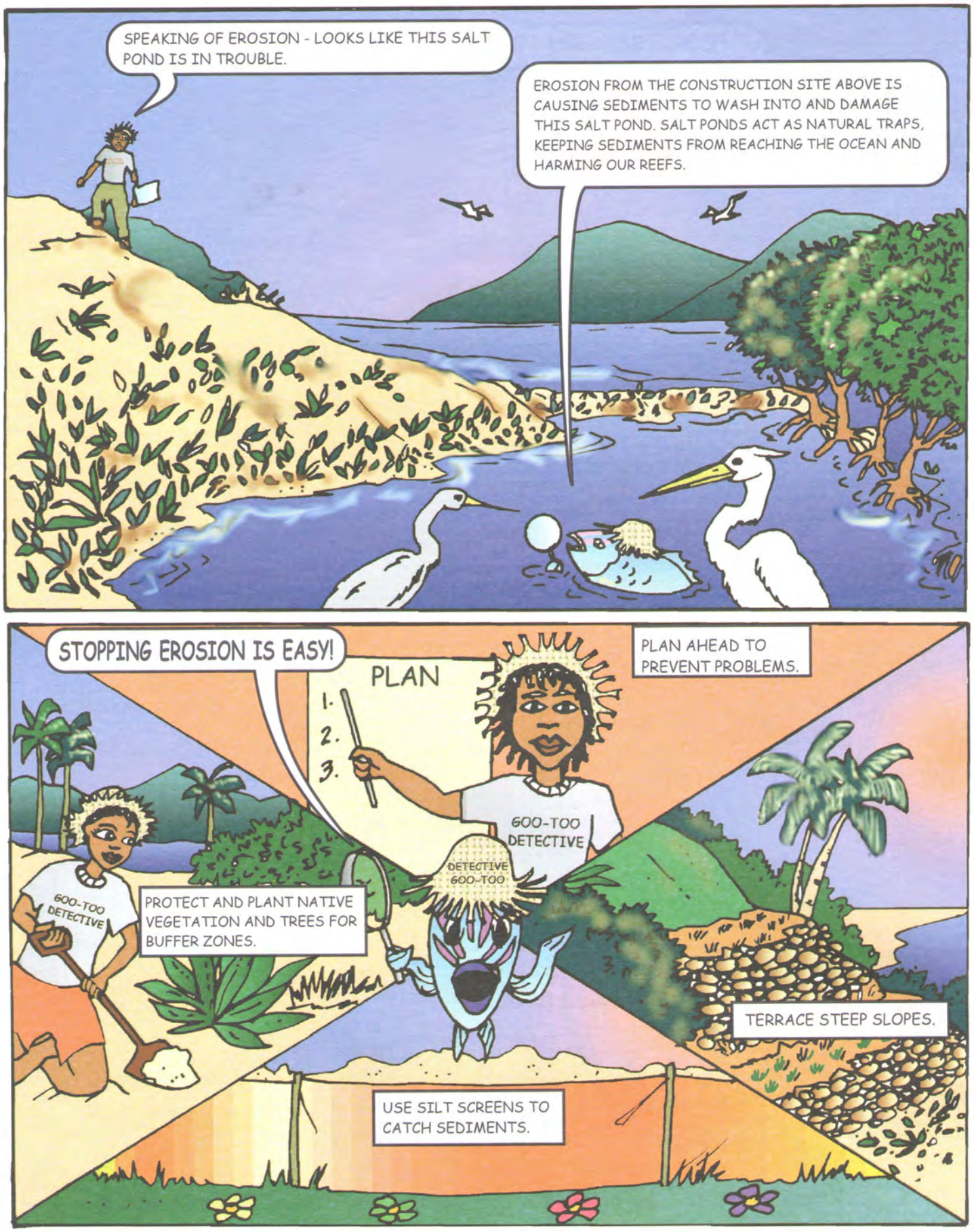
WE'RE TIRED OF LIVING IN THIS MESS.
I NEED EVERYONE'S HELP! NOW LISTEN CLOSELY, HERE'S WHAT WE NEED TO DO. FIRST, WE MUST FIND THE POLLUTION, THEN WE HAVE TO DISCOVER WHERE IT'S COMING FROM, AND FINALLY, WE MUST PLAN AND TAKE ACTION TO PREVENT FURTHER POLLUTION PROBLEMS.
WHAT CAN WE DO TO HELP?
OIL
WE'LL HELP YOU DETECTIVE GOO-TOO!
THERE ARE TWO TYPES OF POLLUTION TO LOOK FOR, POINT SOURCE AND NON-POINT SOURCE POLLUTION. POINT SOURCE POLLUTION COMES FROM ONE PLACE, SUCH AS THIS SEWAGE TREATMENT PLANT.
OUR DETECTIVE WORK GETS HARDER WITH NON-POINT SOURCE POLLUTION.
IT'S VERY HARDTO FIND THE CAUSES OF NON-POINT SOURCE POLLUTION BECAUSE IT COMES FROM MANY DIFFERENT PLACES.
THEN WE'LL NEED MORE HELP. COME WITH ME DETECTIVE GOO-TOO. I HAVE FRIENDS WHO CAN HELP US.


HI MR. GROUPER!
WHO'S YOUR FRIEND?
HI KIDS! THIS IS DETECTIVE GOO-TOO. WE NEED YOU TO HELP US STOP WATER POLLUTION.
HELLO KIDS! DID YOU KNOW THAT WATER POLLUTION CAN HARM PEOPLE AS WELL AS ANIMALS? AS POLLUTION DETECTIVES, YOU'LL BE TRAINED TO FIND WATER POLLUTION SOURCES LIKE SEWAGE, TOXIC CHEMICAL, SEDIMENTS AND SOLID WASTE.
NOW THAT YOU ARE OFFICIAL "GOO-TOO POLLUTION DETECTIVES", SPREAD OUT AND FIND WHAT'S CAUSING THE WATER POLLUTION. USE YOUR DETECTIVE SKILLS, BE ALERT, KEEP YOUR EYES AND EARS OPEN. DON'T FORGET YOUR NOTEBOOKS.
GOO-TOO DETECTIVE
GOO-TOO DETECTIVE
DETECTIVE
GOO-TOO DETECTIVE
GOO-TOO DETECTIVE
HOLD ON EVERYONE! I SMELL A BAD ODOR! IT SMELLS LIKE ROTTEN EGGS.

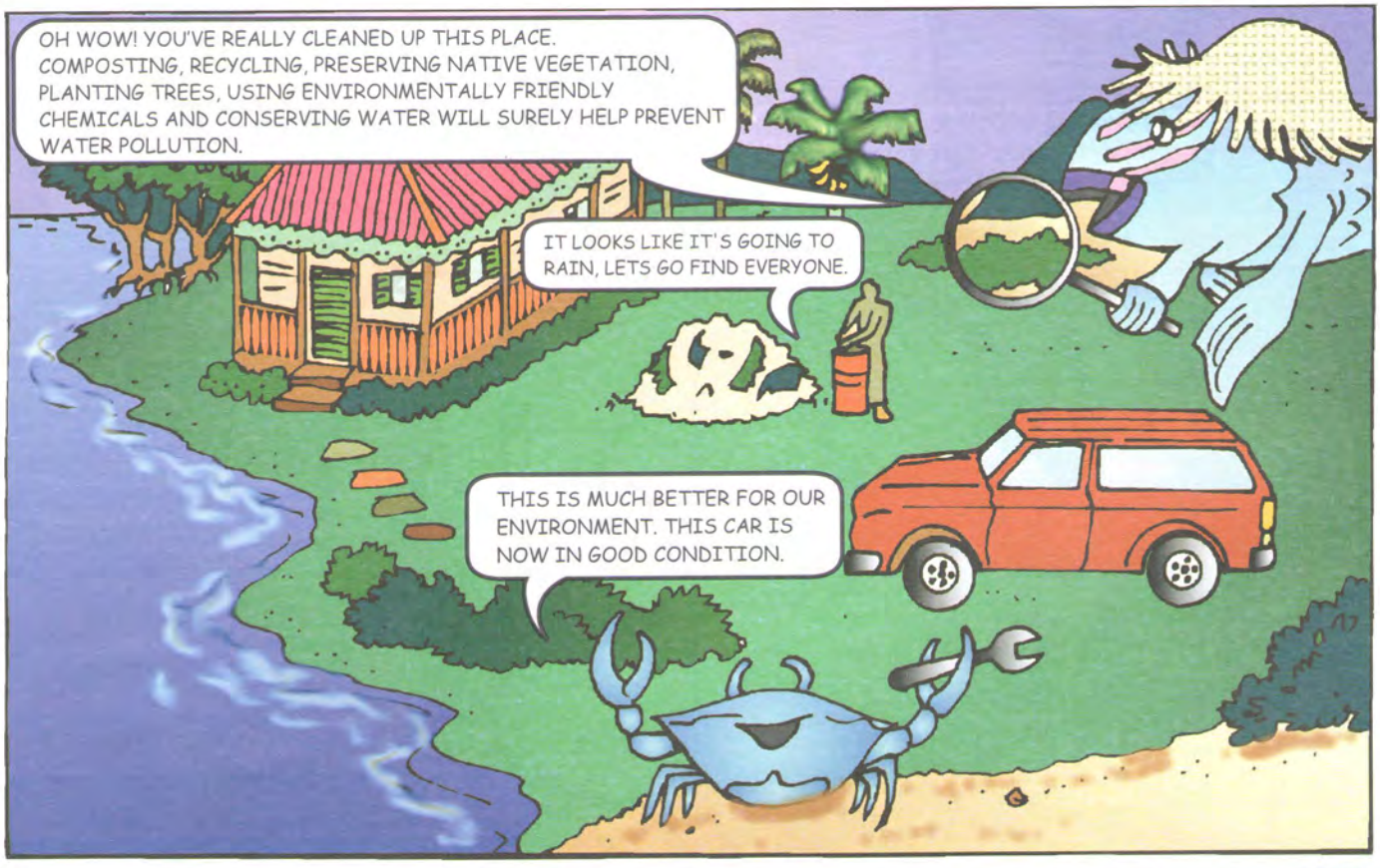

I ALSO SMELL A BAD ODOR. THE SMELL MUST BE COMING FROM THE RAW SEWAGE. LET'S LOOK AROUND THE ISLAND TO FIND WHERE THE SEWAGE MAY BE COMING FROM.
LEAKING SEPTIC TANK
BOAT ILLEGALLY DUMPING RAW SEWAGE.
MALFUNCTIONING TREATMENT PLANTS
WASTE FROM ANIMALS
GOOD WORK GOO-TOO POLLUTION DETECTIVES! YOU HAVE FOUND MAJOR SOURCES OF RAW SEWAGE.
CONTAMINATED WATER
BEACH CLOSED
NO FISHING
NO SWIMMING
BACTERIA FROM RAW SEWAGE CAN MAKE HUMANS AND ANIMALS VERY SICK...
...AND IT CAN RUIN A FUN DAY AT THE BEACH.

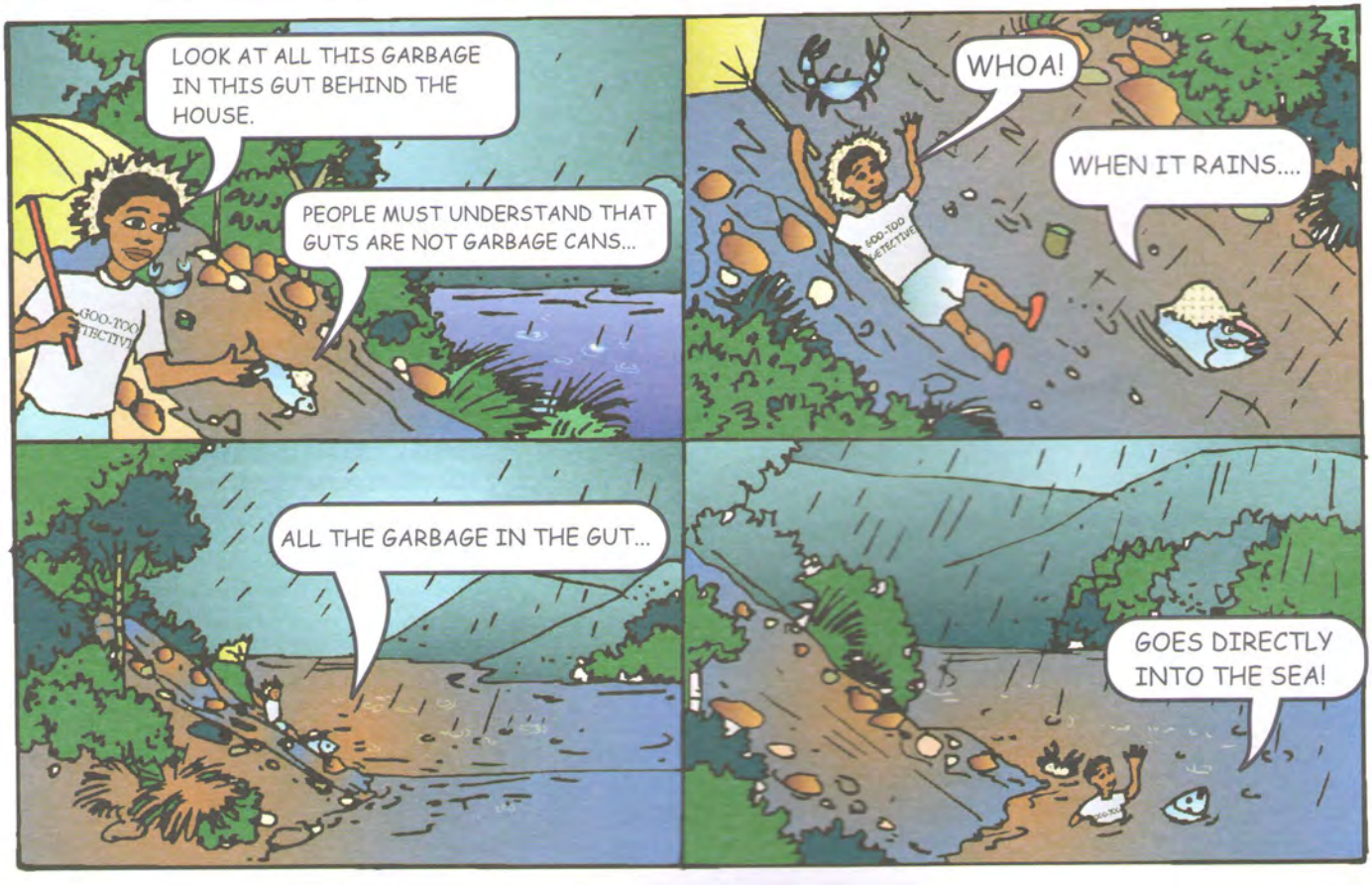
PEOPLE CAN HELP PREVENT SEWAGE CONTAMINATION IN OUR GROUND AND SURFACE WATER BY.....
TOXIC
SEPTICLEAN
PUMP OUT STATION
MARINA
FENCING IN LIVESTOCK
NOT DUMPING CHEMICALS DOWN DRAINS OR TOILETS
MAINTAINING SEPTIC SYSTEMS
USING BOAT PUMP OUT STATIONS AT MARINAS.

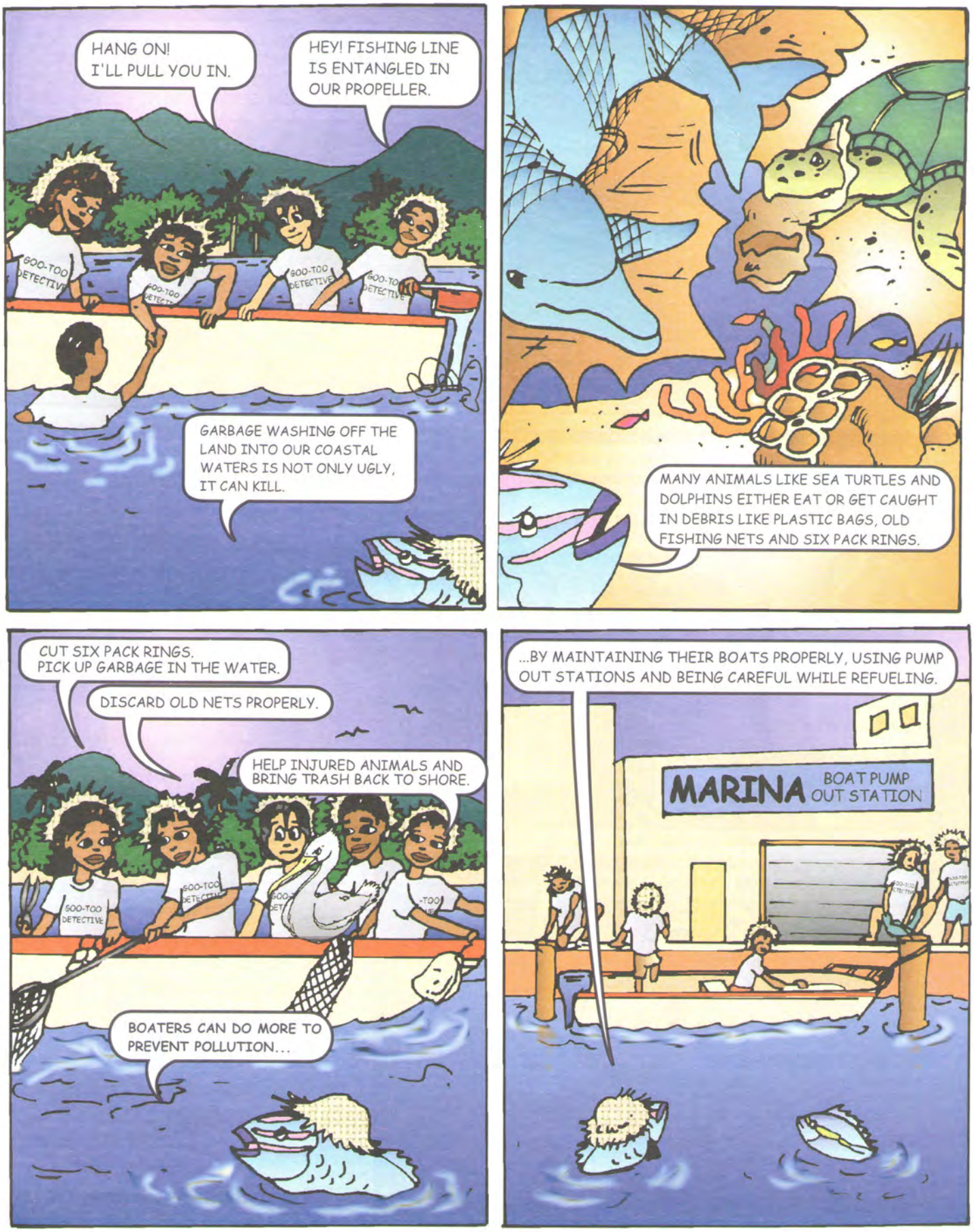
BANG
CLANG
QUICK DETECTIVE GOO-TOO. COME OVER HERE. I'VE FOUND WHERE ALL THE NOISE IS COMING FROM. THERE ARE MANY POLLUTION PROBLEMS AT THIS CONSTRUCTION SITE SUCH AS EROSION. PLEASE HELP ME FIND THREE OTHER SOURCES OF NON-POINT SOURCE POLLUTION AT THIS SITE.
1. Erosion
2.
3.
4.
Gasoline
GAS
Toxic
OIL
Paint
Paint
Paint

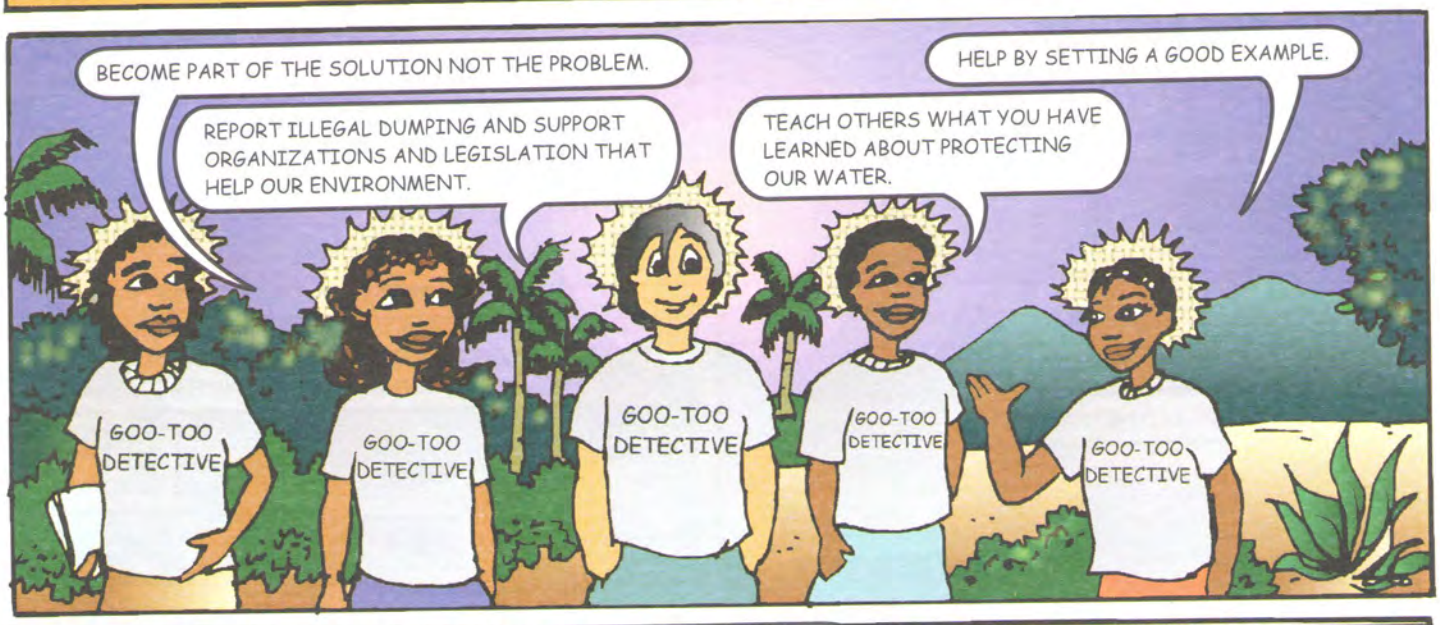

SPEAKING OF EROSION - LOOKS LIKE THIS SALT POND IS IN TROUBLE.
EROSION FROM THE CONSTRUCTION SITE ABOVE IS CAUSING SEDIMENTS TO WASH INTO AND DAMAGE THIS SALT POND. SALT PONDS ACT AS NATURAL TRAPS, KEEPING SEDIMENTS FROM REACHING THE OCEAN AND HARMING OUR REEFS.
STOPPING EROSION IS EASY!
PLAN
1.
2.
3.
PLAN AHEAD TO PREVENT PROBLEMS.
GOO-TOO DETECTIVE
DETECTIVE GOO-TOO
GOO-TOO DETECTIVE
PROTECT AND PLANT NATIVE VEGETATION AND TREES FOR BUFFER ZONES.
TERRACE STEEP SLOPES.
USE SILT SCREENS TO CATCH SEDIMENTS.

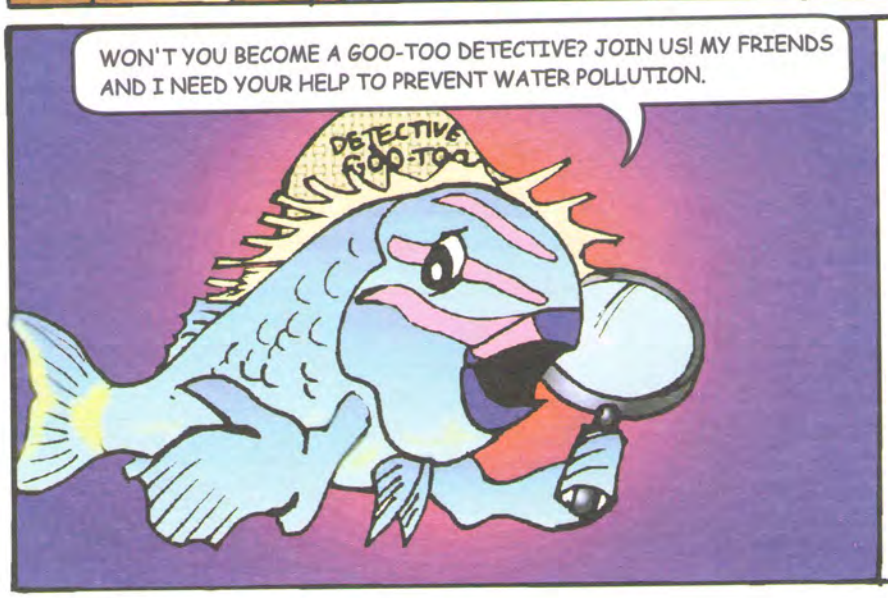
THIS SAMPLE LOOKS LIKE OIL FROM A LEAKING BOAT.
DO YOU SEE THE RAINBOW TYPE COLORS ON THE WATERS' SURFACE?
GOO-TOO DETECTIVE
I HAVE A HUNCH THIS OIL CAME FROM LAND-BASE SOURCES. FOLLOW ME! I SEE A HOUSE NEARBY.
GREAT WORK DETECTIVES!
LOOK AT THIS MESS!
THIS HOUSE HAS SOME MAJOR SOURCES OF NON-POINT SOURCE POLLUTION. WHEN NOT DISCARDED PROPERLY, OIL AND CHEMICALS CAN WIND UP IN OUR COASTAL WATERS.
FIND AND CIRCLE ALL THE POLLUTION SOURCES IN THIS PICTURE.
1. LEAKING SEPTIC TANK
2. CAR OIL LEAK
3. SOLID GARBAGE
4. PESTICIDE
5. FERTILIZER
6. CLEAR-CUTTING TREES
PESTICIDE


OH WOW! YOU'VE REALLY CLEANED UP THIS PLACE. COMPOSTING, RECYCLING, PRESERVING NATIVE VEGETATION, PLANTING TREES, USING ENVIRONMENTALLY FRIENDLY CHEMICALS AND CONSERVING WATER WILL SURELY HELP PREVENT WATER POLLUTION.
IT LOOKS LIKE IT'S GOING TO RAIN, LETS GO FIND EVERYONE.
THIS IS MUCH BETTER FOR OUR ENVIRONMENT. THIS CAR IS NOW IN GOOD CONDITION.


LOOK AT ALL THIS GARBAGE IN THIS GUT BEHIND THE HOUSE.
PEOPLE MUST UNDERSTAND THAT GUTS ARE NOT GARBAGE CANS...
WHOA!
WHEN IT RAINS....
ALL THE GARBAGE IN THE GUT...
GOES DIRECTLY INTO THE SEA!


HANG ON! I'LL PULL YOU IN.
HEY! FISHING LINE IS ENTANGLED IN OUR PROPELLER.
GOO-TOO DETECTIVE
GARBAGE WASHING OFF THE LAND INTO OUR COASTAL WATERS IS NOT ONLY UGLY, IT CAN KILL.
MANY ANIMALS LIKE SEA TURTLES AND DOLPHINS EITHER EAT OR GET CAUGHT IN DEBRIS LIKE PLASTIC BAGS, OLD FISHING NETS AND SIX PACK RINGS.
CUT SIX PACK RINGS. PICK UP GARBAGE IN THE WATER.
DISCARD OLD NETS PROPERLY.
HELP INJURED ANIMALS AND BRING TRASH BACK TO SHORE.
BOATERS CAN DO MORE TO PREVENT POLLUTION...
...BY MAINTAINING THEIR BOATS PROPERLY, USING PUMP OUT STATIONS AND BEING CAREFUL WHILE REFUELING.
MARINA
BOAT PUMP OUT STATION





DRAW OR PASTE YOUR PICTURE HERE.

GOO-TOO POLLUTION DETECTIVE.

VOCABULARY

Corals – Marine animals composed of tiny individual polyps. A polyp is a tiny animal that looks like an upside down jellyfish. In hard corals, polyps sit inside little cups that they build out of calcium carbonate. Many of these cups, cemented together, make up a coral colony. Reefs are formed when hundreds of hard coral colonies grow next to and on top of each other.

Goo-Too – Local Virgin Islands name for the Stoplight parrotfish. In Puerto Rico, this fish is known as "cotorro" or "loro verde". It lives around coral reef areas. Scientists call this fish *Sparisoma viride*.

Marine Debris – Solid wastes that have been discarded into the ocean; trash.

Non-point Source Pollution – Discharge of pollutants from various, unidentified locations.

Organic Matter – Very small particles of the remains of dead plants and animals.

Point Source Pollution – Discharge of pollutants from a location that can be identified.

Pump-out Station – Pump that empties sewage from a boat's holding tank.

Reef – Ridge of rocks, sand or coral at or near the surface of the water.

Salinity – Total amount of dissolved salts present in a given amount of substance.

Salt Pond – A small, coastal body of water that is isolated from the ocean, usually by mangrove growth. The water in the pond is seawater. During the rainy season, rain and storm water runoff lower the salinity in the pond. During the dry season, the water evaporates quickly, increasing the salinity.

Sea Turtles – Turtles with flipper-like appendages for legs/arms. These animals spend their entire life in the water, emerging on the beaches only to lay eggs.

Sediments – Small particles of rock, soil and organic matter.

Septic Systems – Areas that keep sewage and other used waters from households or businesses in areas that don't have a plumbing system to carry it to a sewage treatment plant.

Silt Screen/Silt Fence – a screen that blocks silts or fine sediments carried by water from causing sediment pollution.

Stormwater Runoff – Excess water from rainfall that runs off the land's surface.

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The Sea Grant College Program's Virgin Islands Marine Advisory Service in conjunction with the University of the Virgin Islands originally created this comic book with a grant from the EPA. The Spanish version was revised by Myra Rivera Torres, Translator and Director of the DNER's Translation, Publications, and Library Division and Aileen T. Velazco-Domínguez, Technical Advisor for the Puerto Rico Coral Reef Program.