

INTRODUCTION

I've always loved movies. They always seemed so distant from my reality. I was fascinated by how the combination of scenes could transport us to other worlds and other experiences. They didn't always reflect my life, but they carried the energy needed to tell stories. We are always storytelling — as our ancestors did — and thanks to their narrative skills, today I can also tell my own.

This manual is not just a technical guide on how to film in underwater or extreme environments. Above all, it is a political and pedagogical tool in service of those who wish to tell stories that emerge from the depths — from the sea, rivers, bodies of water — but also from our own bodies and minds. By pointing the lens of a camera at our soul, we also focus on the forms of love that manifest in our communal relationships. But beyond that, we must also film our wounds, the memories silenced by official history, and the violence we experience daily.

This guide, the result of collaboration between the AfrOrigens Institute and WITNESS, is the product of crossroads and joint efforts to amplify voices. With ambition — and necessity — we set out to guide people who already possess the "ancestral technology" of storytelling, enabling them to enhance their documentation work in extreme situations. In our case, it is about documenting evidence of a crime against humanity: the remains of the slave ship Brig Camargo, wrecked in 1852, undeniable proof of crimes committed centuries ago against Black African people, which can now support processes of historical reparations.

In short, while offering guidance on techniques and equipment care in adverse contexts, this document proposes something deeper: an invitation to the conscious and engaged practice of audiovisual recording as a way to produce knowledge and create symbols of resistance. Symbols that can—and must—be shared collectively as an essential part of our decolonial agendas. A necessary journey, guided

by lenses that belong to us.

As we explore the waters, not only in their physical depths, we deal with the challenges of underwater filming and dive deeply into historical, social, and political conditions. But with the power of images as language, we can counter the "images" that have been created about us. Until now, we only knew the language of colonial violence. We have played many roles: we were the "other," the "noble savage," the "morally and psychologically corrupt," the "researcher's source," the "scene object." We are now not only protagonists but narrators of these stories, agents shaping visual symbols of our identities — creators of our own "images."

Visual symbols have historically played a crucial role in shaping collective identities, constructing imaginaries, and legitimizing power — especially that exercised against our peoples, sustaining inequalities and social injustices. Recognizing this power is essential for those who wish to use images not just as illustrations, but as arguments, denunciations, and living memory. It is a tool that must be appropriated and integrated into our struggles.

generated in underwater environments are not neutral. They produce a photogenic quality that immediately rescues primordial elements of our "wet" imaginary often unknown even to ourselves. The waters that reveal are the same that conceal, move, and mobilize. When these images are crafted with sensitivity and awareness, they become capable of driving "not-so-photogenic" processes, exposing colonial crimes, and intentionally paving the way for historical reparations, social justice, and the strengthening of traditional communities' struggles. In this sense, the camera becomes an instrument of (visual) appropriation and visibility — a link between worlds, a mirror reflecting violence and beauty, trauma and resistance, survival and the power to dream.

When filming a slave ship wreck, for example, one does not merely record a material trace, the most superficial dimension of what is seen. One captures the trail of human lives, stories of a forced diaspora, routes of pain and survival. The fragments of wood and metal that resisted the action of time — the materiality of the crime — are our own image reflected and fragmented, crossing kalûnga, yet constantly transforming.

This manual, therefore, serves both to protect equipment and to enhance the technical-political sensitivity of the camera operator. It invites the reader to think of the image as a symbol of an ancestral language, an essential part of our way of communicating. We are all potential storytellers, and this material proposes strategies to amplify the power of your audiovisual discourse.

May this brief manual be used with the technical rigor that extreme environments demand, but also with the ethical and aesthetic commitment that the stories to be dived into and narrated require.

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HOW TO FILM UNDERWATER



INTRODUCTION

There are many reasons you might want to capture images near or even inside the water. The story you want to tell might take place entirely or partially in an aquatic environment, or perhaps the camera needs to be submerged to reveal a crucial detail or a unique angle essential to the narrative.

Today, there is a wide range of equipment options available, including affordable ones, that can deliver excellent results when used creatively. In this guide, we will cover the necessary precautions for filming in aquatic environments, introduce some of the equipment you can use, and provide guidance on preparation, maintenance, and practical tips for filming in the water.



UNDERSTANDING THE ENVIRONMENT

The first thing to understand is that aquatic environments can be hostile. Therefore, they demand greater attention, specific precautions, and careful planning of every action.

When planning an aquatic shoot, it's vital to ensure the person operating the camera is comfortable in that environment. Preferably, they should have experience compatible with the specific conditions of the location, whether it's the ocean, a river, a lake, or even a deeper puddle.

Knowing how to swim is not enough to guarantee safety. It's crucial to know your personal limits. Someone used to swimming in a pool may not understand the effects of a river or ocean current, or even the force of water rushing down a flooded street, which can be extremely dangerous.

Rivers and oceans also present other risks, such as marine life that may attack if they feel threatened, are stepped on, or touched, even accidentally.

Water conducts heat away from the body much faster than air. Because of this, a person immersed in cold water — even if they initially feel comfortable — can develop hypothermia as their body heat dissipates, leading to a drop in core body temperature and the onset of shivering.

Weather conditions on the day of the shoot also impact your planning. Rain can wash muddy water from slopes into rivers or the sea, reducing visibility. It can also strengthen currents and sweep dangerous debris like fallen tree trunks into the water.





When filming in enclosed environments like caves, it's important to consider the risk of flooding. Rain in areas above the cave, even miles away from your location, can cause sudden flash floods, blocking passages that were once dry and making exit dangerous or even impossible.

If the filming is to be done in enclosed underwater spaces, like caves or shipwrecks, specific training for this type of diving is absolutely essential. This is because in these overhead environments, with no direct access to the surface, any emergency requires the diver to know how to navigate through a confined path to reach a safe exit point.

Furthermore, it is essential to familiarize yourself with the environment beforehand. Structures like cave ceilings or rusty parts of a shipwreck can collapse from the pressure of air bubbles released from a scuba tank. This represents a significant risk, so familiarity with the location and proper diving conduct are indispensable for safety.

There are many details to analyze and plan before you start recording near the water, but the general tips are:

- Never enter the water if you don't feel safe.
- Honestly assess your skills in the water.
- Plan every detail of your actions.
- Avoid filming alone in aquatic environments.
- Check the area's weather forecast and conditions.
- Have an emergency plan.







THE EFFECT OF WATER DENSITY ON THE RECORDED IMAGE

One of the most important aspects of filming in water is understanding that light behaves differently in this environment. As light moves from air into water, it bends, or refracts, due to water's higher density. As a result, submerged objects can appear larger than they actually are (Figure 1).

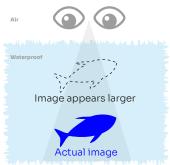


Figure 1

THE AQUATIC ENVIRONMENT

Since the cameras used for underwater filming have air inside them, this refraction effect also impacts the captured images. Generally, there is a loss of about 30% of the field of view. This means a camera inside a waterproof housing (Figure 2) recording an underwater scene will have a tighter, more zoomed-in frame than it would when filming on land. To reduce this effect, some housings feature dome-shaped ports. These convex lenses help capture objects at a size closer to their true proportions.

Camera in a housing with a flat port



WATER PRESSURE ON THE CAMERA

Some cameras and even smartphones are waterproof and can be used without an external housing. These devices have their openings sealed with rubber gaskets to prevent water from entering. There are also plastic, silicone, or latex cases, like those from the Brazilian brand Outex, that seal and waterproof your gear.

However, these are typically only rated for shallow depths—generally up to 3 meters (about 10 feet)—and may have a time limit for submersion, depending on the manufacturer's specifications. If used beyond these limits, the increased water pressure can force water inside and damage the device.

This happens because the seals on this equipment are only effective up to a certain pressure level. To understand why, imagine carrying two buckets: one full of water and one full of air. The bucket of water is obviously much heavier because water is denser than air; it has more particles packed into the same volume. When you submerge a camera, it feels the pressure from the weight of the water coming from all directions. The deeper you go, the more water is above it, and therefore, the greater the pressure. This is why for filming at greater depths, the camera must be placed in a sturdy, pressure-rated housing.





THE SHIFT IN COLORS

One of the most noticeable visual effects in underwater images is the overwhelming dominance of blue tones, even when there is plenty of ambient light. As you go deeper into the water column (Figure 3), you see fewer and fewer colors. This occurs because sunlight is absorbed by the density of the water as the depth increases. The first color to disappear is red, which leaves images looking bluer. As you descend further, more colors vanish, until only gray remains, and finally, total darkness in the absence of light.

Some underwater cameras use a red filter in front of the lens to compensate for this color loss, temporarily restoring reddish tones. However, this only works to a certain depth, as beyond that point the light becomes so scarce that the filter has no effect.

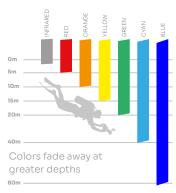


Figure 3

USING NATURAL LIGHT

The deeper you go, the less available light there is underwater. Because water is denser than air, ambient sunlight is absorbed and diminished as you descend. Therefore, a good tip is to film near the surface whenever possible.

Just like on land, underwater imaging should also account for the direction of the sunlight. It's not always easy to tell where the sunlight is coming from when you're submerged, as it becomes very diffuse. However, depending on the time of day and the water's clarity, the sun's angle can make a difference by casting shadows on the subjects below.

Be cautious when filming pointed directly toward the sun, as the image can capture reflections off of particles suspended in the water. This effect, known as "backscatter," appears as small, bright white specks in the footage, which can ruin the clarity of the scene.

So, before you dip your camera (and your head) into the water, pay attention to the sun's position and how the light hits the water. This simple consideration can make a significant difference in your image quality.





ARTIFICIAL LIGHTS

The best way to capture the true color of objects underwater is to illuminate them with white light, as it contains all colors of the spectrum.

The main consideration is to balance the light's intensity to avoid objects that are too dark or blown out (overexposed).

Another crucial tip is to avoid pointing the light straight ahead, with the video light mounted directly on top of the camera. The reason is that even in seemingly clear water, there are countless suspended particles — like sand, dirt, algae, plankton, and other debris—that reflect light. This causes those white specks, or backscatter, to appear.

To prevent these white specks from showing up in your recording, it's important to position the lights away from the camera lens. The best practice is to mount them on adjustable arms, forming an angle of approximately 45 degrees from the camera. Underwater camera rigs often come with these arms, allowing you to easily adjust the lighting to get closer to subjects, widen the beam, or flood the environment with light. By lighting subjects from the side, the reflections are directed away from the lens, resulting in cleaner images without the distracting white dots (Figure 4).

Using two light sources is ideal to avoid harsh shadows created by lighting from only one side.

Your proximity to the subject is also very important. Getting closer reduces the amount of water and its suspended particles between your lens and the subject. Furthermore, water significantly limits the range of light due to its density.

Another important tip, especially when filming in tide pools, lakes, or while diving, is to avoid stirring up the water. In still water, suspended particles will eventually settle on the bottom, leaving the water clearer and sometimes even transparent. However, any sudden movement — like steps, fin kicks, or equipment — can stir these particles up again, ruining the visibility. Therefore, approach your filming location slowly and with minimal movement. If you're using scuba gear, practice your buoyancy control to avoid touching the bottom, which will help keep the water clear for longer.





Figure 4



TYPES OF UNDERWATER CAMERAS

There are underwater cameras for every taste and budget, and the choice should be made based on the intended use and the desired results.

Some smartphones have very efficient cameras, and there are waterproof protective cases, like plastic bags or even hard shells, that allow you to use them underwater. However, it's important to note that these protections have low depth limits. Diving deeper than the manufacturer's recommendation will result in water leaking in, as water pressure increases with depth.

The simplest cameras that offer good results are action cameras, like GoPros and similar models. They usually come with a waterproof housing and some accessories. They are a great solution due to their practicality, and even though their video is compressed to some degree, the loss in quality is unnoticeable in most cases.

Recently, 360-degree action cameras have revolutionized filming in challenging environments. These devices record everything around them, allowing the footage to be later exported for viewing on virtual reality devices, like VR headsets — which provide an immersive experience, making you feel like you're inside the recorded environment. It's also possible to select just one part of the image and export it in the desired format to then edit it as a conventional video.

Compact cameras are photo or video cameras that usually come with a fixed zoom lens, meaning you cannot change the lens. Some are already waterproof, supporting depths of up to 10 meters, while others offer waterproof housings as an accessory for those who want to go deeper.

Currently, there are no more professional cameras manufactured specifically for underwater use. In practice, any camera can be used underwater as long as it's protected by a waterproof housing. The most popular models have their own dedicated housings, which allow access to almost all buttons and controls. Other equipment requires custom-made waterproof housings. These professional versions allow you to reach greater depths, generally between 40 and 60 meters, and can be adapted for even deeper dives.











Just as there are drones for filming in the sky, ROVs (Remote Operated Vehicles) are underwater cameras that allow for filming in the water while the operator controls everything from the surface. Unlike conventional drones, ROVs are connected to the controller by cables, since water prevents the transmission of wireless signals like in the air.

FLAT OR DOME PORTS

Camera lenses are mostly flat, with some exceptions, like fisheye lenses, which capture a larger image area. These wide-angle lenses are convex, with a curved shape similar to a dome.

Waterproof housings can also be equipped with dome ports, which are a more suitable choice for underwater filming than flat ports. There's an important reason for this: when light passes through water and into the air inside the housing, refraction occurs. If the port is flat, this refraction compresses the image, causing distortions. A dome port, however, allows light to arrive from different directions without being compressed, ensuring more natural images are captured by the camera's sensor.

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BATTERIES AND DATA STORAGE

Aquatic environments are often very humid. This moisture can seep into the camera's waterproof housing and cause condensation on the lens. Therefore, it's important to avoid opening the housing unnecessarily. A good practice is to use higher-capacity batteries and memory cards, reducing the number of times the camera needs to be opened between dives during filming.

PROTECTING YOUR EQUIPMENT

Filming in aquatic environments often involves travel on boats or through flooded areas, which can damage equipment even during transport. It's important to keep the camera and accessories well protected, preferably in waterproof bags. If that's not possible, it's recommended to protect the items with sealed plastic bags to prevent damage in case of contact with water.





Transporting equipment in externally reinforced coolers can also be a good alternative, as they offer extra protection against impacts and pressure, and are less conspicuous than professional and more expensive cases. For the camera and its housing, it's worth using small towels around them. They can help with both cushioning and drying the housing before opening it.

The housing's port should always be protected whenever it's out of the water. A good practice is to keep a neoprene cover on the lens, removing it only when the camera is submerged. The cover should be put back on immediately after the camera emerges, even if only briefly — for example, when handing it to someone on a boat. This prevents the lens from accidentally being placed face down and getting damaged.



BEFORE ENTERING THE WATER

PREVENTING CONDENSATION

One of the biggest problems when filming underwater is condensation forming inside the waterproof housing or the camera itself. When humid air is trapped inside the housing and it is submerged, it cools down rapidly. This causes droplets of moisture to form on the smoothest surface inside — the lens — which fogs up and ruins the recording.

The warmer the environment where the housing was sealed, and the colder the water at the filming location, the higher the risk of lens condensation.

One way to prevent this is to seal the camera in a dry environment, preferably with the air conditioning on, as it removes moisture from the air. It's also important that the camera not be left in the sun or in a place where it can get too hot before being used underwater.

Inside the waterproof housing, you should use silica gel packets to absorb moisture. If you don't have them, pieces of feminine hygiene pads can also help.

If you need to open the housing or the camera between dives, first rinse the housing in fresh water to remove sea salt (if applicable) and let it dry completely. Make sure your hands are dry when handling the camera inside the housing to prevent any water from dripping inside.

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SEAL FOR CAMERA OR HOUSING

Waterproof cameras and underwater housings always have one or more openings that must be closed carefully to prevent water from entering.

They are typically sealed with rubber or silicone rings, called O-rings. Always check that the O-rings are free of cracks or cuts. If you find any damage, they must be replaced immediately.

It's important to apply silicone grease or a specific lubricant to the O-ring. This helps preserve it, prevents cracking, and also stops it from shifting or pinching when you close the lid, which sometimes requires significant pressure.

Ensure that no sand grains, hairs, or other foreign objects are stuck to the sealing ring. As water pressure increases at greater depths, even a single hair can compromise the seal and allow water to enter.



INITIAL TESTS

When you acquire new equipment for use in water, your first step should be to perform a test to minimize risk in case of failure. For a new housing, it's crucial to test it without the camera inside first.

Once the housing is assembled, remember that if there's a leak while you're in the water, air will be trapped in the top of the housing. Therefore, it's a good idea to test the equipment by keeping the part most sensitive to water (the top) facing upward. This way, in the event of a leak, water will pool at the bottom, giving you time to exit the water before the camera is affected.

Be careful of impacts underwater, and remember that the lens is glass and can easily scratch against rocks and other objects.



DRY RUNS

A good practice, if time allows, is to first rehearse on land what you plan to do in the water. This is especially useful when more people are involved in the shoot, as verbal communication is nearly impossible underwater without special equipment. Even for surface-level recordings, conditions can make communication difficult.

Another important recommendation is to enter the water to scout the terrain and environment before bringing in the recording gear.

If the underwater shoot involves more than one person, it's advisable to practice hand signals and light signals beforehand to communicate the essentials during the dive.



these lines. Try to leave space around the subject for movement — for example, if filming a fish, leave space in front of it so it can "swim into" the frame.

Whenever possible, film at the same level as your subject or angle the camera slightly upward. Shots looking straight down from above tend to be less attractive. Look for a background that contrasts with the subject to make it stand out more.

Finally, keep the camera as stable as possible, which isn't always easy. Quick or jerky movements are common in water but can make viewers uncomfortable.



AFTER THE WATER

IN THE WATER

During recording, avoid taking unnecessary risks. Remember, you are operating in an environment that is not your natural habitat. In drier regions, water sources like rivers, puddles, and ponds often attract land animals and can hide venomous species in burrows or among rocks, which may attack out of self-defense. Be mindful of slippery or sharp surfaces. And never take souvenirs or objects from the location: respect the environment you are visiting.



SHOT COMPOSITION

Perhaps the best advice for recording underwater is: get rid of the water. This means getting the camera lens as close as possible to the subject you want to film, thereby reducing the amount of sediment and suspended particles between the camera and the target.

To do this, avoid using digital zoom; instead, get physically closer. For this reason, most professional underwater cameras use wide-angle lenses, which facilitate this close approach.

The well-known rule of thirds for framing also applies underwater. When composing your shot, avoid placing your main subject directly in the center of the frame. Imagine the screen divided into nine equal parts by two horizontal and two vertical lines, and position your subject at the intersection of





EOUIPMENT CLEANING

After diving in the ocean or a pool, it's important to soak the equipment in a container of clean, non-chlorinated water to dissolve salt and impurities. Then, dry it thoroughly and clean it carefully before disassembling it.

Never leave equipment to dry in the sun, especially if the housing or camera is sealed shut, as excessive heat can damage the electronics.

BEFORE EDITING

Before you start editing your video, it's crucial to preserve the original footage. The first step is to avoid renaming the raw files. Also try to keep notes with basic information about each recording, such as date, location, and a brief summary of the content.

Organize files into folders with clear, standardized names, avoiding spaces, accents, or special characters (@-#\$%&*:"<>?/~|). You can use underscores (_) in the names.

Before starting to edit, create a backup copy of the original files for preservation. When you finish editing, export a copy at the highest resolution.



EDITING

The recommended practice for storing both raw and edited footage is to keep three copies, stored on at least two different types of media (like an external HDD and an SSD), with one copy kept in a separate physical location. If this isn't feasible, make at least one backup on another type of storage device.

When preparing your footage for editing, remember that if you didn't use a red filter on the lens or artificial white lights, your scenes will have a bluish tint, the intensity of which depends on the depth at which they were recorded.

During editing, you can restore the missing reds through color correction and increase the contrast of the images to give them a more vivid and natural tone.

Many films use underwater scenes in slow motion to create a fluid effect or heighten the drama of an environment we seldom see. Creativity in editing is just as important as creativity in capturing the aquatic footage.

Scenes in aquatic environments, whether above or below the waterline, have the power to present a strange and unknown world — sometimes enchanting, but also potentially frightening, depending on the story being told.

Although it is more work and requires more equipment, these scenes can help your film stand out among purely land-based productions.

Whatever you choose for capturing your footage, always remember that your safety and the safety of others in the aquatic environment must always come first.







IMAGE AND VIDEO AS TOOLS FOR Accountability and memory

The underwater research at the Bracuí 1 archaeological site faces significant technical challenges. Visibility at the site is extremely limited due to silt and mud, so much of the work depends on touch. In this scenario, the use of video and photography has become crucial, both for documentation and as a tool for analysis and communication.

Cameras with waterproof housings and improvised solutions, like clear plastic bags filled with clean water, are used to record the dives. The resulting images help visually reconstruct what was identified manually and will, in the future, allow the information to be shared with wider audiences, including those who cannot access the seafloor.

The images captured during the dives reveal details that are often not perceptible at the moment of discovery, especially because items cannot be removed from the site without compromising their integrity. Every object remains in its original place, as its removal would mean the loss of valuable information. For this reason, the complete preservation of the archaeological site is a top priority.

There is still an expectation of finding artifacts like shackles, small objects linked to the violence of the trafficking trade, and organic materials associated with the cultural practices of the enslaved African groups who were forcibly brought to Brazil. In this context, the images also play a political role by serving as material evidence of historical crimes and contributing to the reconstruction of memory.

Documenting the ship and its objects, combined with the tradition of oral history, aids in recovering and building new perspectives on unofficial history and creating new narratives committed to highlighting the role of the Black population in Brazil.

RETELLING WITH IMAGES

The rediscovery of the Brig Camargo also reflects the mobilization of Black and Quilombola movements, which demand historical reparations — both in terms of retelling events and ensuring dignified living conditions and the right to remain on their land.

Mastering the tools of language and imagery becomes essential in a context marked by social and historical exclusion. For a long time, narratives about Black people were produced by others. The production of their own images and narratives represents a decisive step in reconstructing this history and transforming the social imagination.

When associated with oral accounts, images help deconstruct stereotypes and raise important questions about the experience of enslaved people, such as the conditions of the forced voyages and their confinement in tight spaces for long periods.

In this process, the archaeological heritage and material culture are not just research objects. They represent concrete proof of the crimes committed against Black populations and serve as a basis for claiming rights, identity, and memory. The work with the Brig Camargo demands and provokes historical awareness. The wreck site and the quilombo itself are points of memory that allow us to understand the violence of the transatlantic slave trade and the need to critically revise Brazilian history.

In this context, the use of underwater filming functions as a fundamental tool in building memory, truth, and reparations.

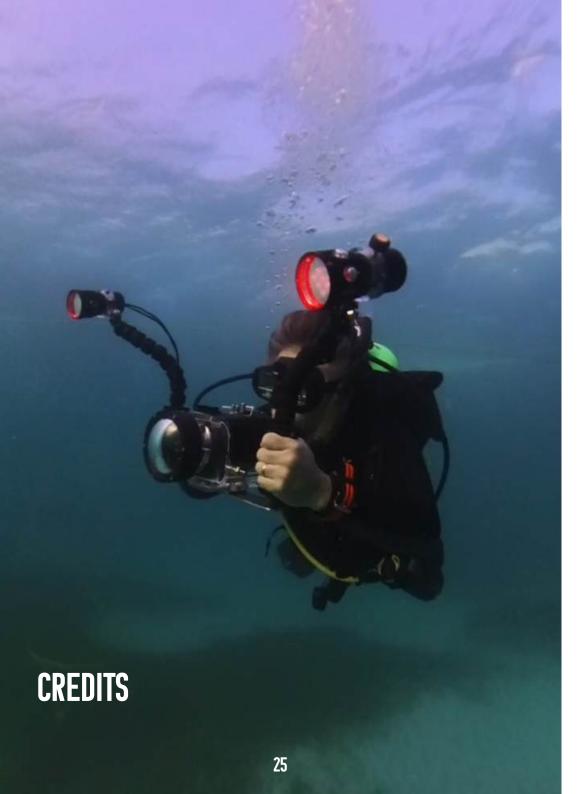




We hope this guide serves as a practical reference for anyone wishing to undertake underwater filming or filming in other extreme environments. More than just offering technical guidance and precautions, this material seeks to expand the use of audiovisual tools as instruments for accountability, memory, and territorial defense — especially in the face of frequent environmental violations in rivers, oceans, and other areas of community importance.

We believe the case study presented, based on the search for the Brig Camargo ship, can inspire other people and communities to use audiovisual language to tell stories of resistance. These stories often live only in oral memory and are ignored by official records. They need to emerge and gain visibility, contributing to processes of justice, reparation, and the valorization of ancestral knowledge.

CONCLUSION



PRODUCED BY

AfrOrigens Institute - From Shipwrecks to Quilombos

AfrOrigens is a major Archaeology project focused on the African Diaspora in Brazil. It seeks answers for the debate on transatlantic slave voyages and how the shipwrecks of these slave ships represent the physical evidence—the proof—of these crimes against humanity. The Quilombos, from their formation to their present situations, are intimately linked to these ships of death and are an essential part of this research and documentation.

WITNESS

WITNESS is a global nonprofit organization that helps people use video and technology to protect and defend human rights. We provide support and training so activists and citizen journalists can document, expose, and advocate against human rights violations safely and effectively.

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