

**DISEASE AND INTRODUCED SPECIES PREVENTION PROTOCOL FOR PERMITTED ACTIVITIES IN
THE MARINE ENVIRONMENT**

Papahānaumokuākea Marine National Monument

(Revised July 9, 2018)

Papahānaumokuākea Marine National Monument (Monument) was established to conserve and protect the unique biota of the islands, atolls, reefs and waters in the Northwestern Hawaiian Islands (NWHI). Endemic flora and fauna are especially vulnerable to the introduction of alien and/or invasive species, and the spread of disease. The introduction of disease and alien species may contribute to the extinction of native species and the destruction of ecosystems. The following protocols have been developed to protect these fragile resources.

Definitions:

Clothing: all apparel, hats, socks, over and under garments

Disinfected: the item has been (1) rinsed and is 100% free of encrusted mud, dirt, and sand, (2) closely inspected for seeds and insects, (3) soaked or wiped with an appropriate disinfecting solution as outlined below, and (4) rinsed if directed

Dive Gear: all gear such as wetsuit, booties, gloves, mask, snorkel, fins, regulator, buoyancy compensation device, tanks, weight belt, and dive flag

Equipment: includes gloves, chisels, forceps, drill bits, shears, clippers, spear tips, nets, chain, clipboards, slates, mesh gear bags; includes research equipment that may contact the benthos such as reels, tape measures, transect lines, etc.

Footwear: anything worn on the foot that makes contact with the substrate. Once you stand up a dive booty is considered footwear (footwear with spikes are prohibited)

Hard Gear: all gear taken to the intertidal zone made of a hard and non-porous surface such as plastic, glass, or metal and can be cleaned using a cloth type material or by soaking

Intertidal Zone: the area of substrate emergent during low tide and fully submerged during high tide, extending upwards from the mean low low-tide mark to the top of the splash zone during winter months (areas that are impacted by wave action, not including tsunamis)

New: off the shelf and never used

Non-Sensitive Equipment/Gear: equipment and gear that will not be damaged by freezing or submerging in water

“One-Island” Dedicated Gear: items that are purchased new, and have ONLY ever been used on a specific island, and nowhere else. When it is not being used on the specific island, gear should be quarantined and stored separated from all other gear

QACs: quaternary ammonium compounds; chemical group belonging to the surfactants, which possess both a cleaning and disinfecting effect. QACs spectrum of activity is limited to vegetative bacteria and enveloped, lipophilic viruses (incl. HIV); an example of an acceptable QAC solution is Lysol® All Purpose Cleaner at manufacturer’s recommended dilution source: (<http://www.bode-science-center.com/center/glossary/quaternary-ammonium-compounds.html>)

Quarantine Enforced Islands: all islands excluding Midway Atoll

Sensitive Equipment/Gear: computers, optical equipment, GPS, cameras, and other sensitive equipment that would be damaged by freezing or submerging in water

Soft Gear: all gear taken to the intertidal zone such as, daypacks, fanny-packs, camera bags, camera/binocular straps, microphone covers

Transition Zone: the area of land between the intertidal zone and the terrestrial zone identified by presence of vascular terrestrial plants, soil etc.

General disinfection procedures

- Disinfect all equipment and gear at least daily if used.
- Only disinfected equipment and gear may be transported either direction between the Monument and the main Hawaiian islands or other point of origin/destination.
- Dispose of organic matter, used disinfection solution, and rinse according to the ship's solid waste disposal or other approved secure holding system.
- Acceptable Disinfection Solutions:
 1. Levels One, Two, Three and Four (levels defined below): a 1 :32 dilution of commercial bleach in freshwater (1/2 cup bleach per gallon of freshwater), yielding a 1000 ppm dilution of sodium hypochlorite, or 3% free chlorine solution; and
 2. Levels Two, Three and Four: the manufacturer's recommended disinfection strength dilution of QACs.
- Rinse after disinfection: All gear in close proximity to the face or skin, e.g. masks, regulators, gloves, should be rinsed with potable water following disinfection.

A. Equipment and Dive Gear Disinfection

Equipment and gear is treated according to four levels that correspond to the potential for the spread of disease and/or introduced species.

General points applicable to all the levels and acceptable disinfection solutions are listed above.

I. Level One: Equipment in direct contact with diseased coral tissue or other diseased organisms.

- Require multiple sets of equipment: Use a disinfected set of equipment for diseased organisms and another disinfected set of equipment for non-diseased organisms at each dive site.
- Disinfect all equipment between uses: Use a disinfected set of equipment at each dive site.
- Approved disinfection method: 1) Remove any organic matter from the equipment. 2) Soak equipment for a minimum of ten minutes in a 1:32 dilution of commercial bleach in freshwater (1/2 cup bleach per gallon of freshwater), yielding a 1000 ppm dilution of sodium hypochlorite, or 3% free chlorine solution.

- Secure all samples: Seal all samples in bags or jars under water and place sample bags and jars in secure holding container.

II. Level Two: Equipment not used to sample diseased coral tissue or other diseased organisms

- Disinfect all equipment between sites: Use a disinfected set of equipment at each dive site.
- Approved disinfection method: 1) Remove any organic matter from the equipment. 2) Soak and or wipe equipment as specified for equipment type, below. See list of acceptable disinfection solutions above.
 1. Non-porous equipment must be wiped or soaked. If wiping, use wipes in which the active ingredient is a quaternary ammonium compound (QAC). Acceptable wipes include Clorox® wipes or Lysol® wipes. If soaking, soak for a minimum of ten minutes in an acceptable disinfectant solution.
 2. Porous equipment must be soaked for a minimum of ten minutes in an acceptable disinfectant solution.

III. Level Three: All dive gear used in the Monument

- Disinfect dive gear daily (if used)
- Approved disinfection method: 1) Remove any organic matter. 2) Disinfect by submerging for a minimum of ten minutes in an acceptable disinfection solution, followed by a thorough fresh water rinse, and hanging to dry.
- Rinse after disinfection: Rinse all gear in close proximity to the face or skin, e.g. masks, regulators, gloves, etc. with potable water following disinfection.

IV. Level Four: Conditions and Rules for accessing specified intertidal zones within the Monument

The intertidal zone is the area of substrate emergent during low tide and fully submerged during high tide, extending upwards from the mean low low-tide mark to the top of the splash zone during winter months (areas that are impacted by wave action, not including tsunamis).

The transition zone is the area of land between the intertidal zone and the terrestrial zone identified by presence of vascular terrestrial plants, soil etc.

- All personnel entering the intertidal zone on quarantine enforced islands must have disinfected, new, or island dedicated footwear, clothing and gear.
- To avoid transport of alien and/or invasive species, propagules, and seeds from vessels and their small boats, vessel crew and small boat operators must carefully inspect and clean vessel deck and common areas and small boats daily during an expedition to the Monument. Care should be taken to look for seeds, insects, and animals which may be in the small boat.
- Equipment/Gear (with the exception of island dedicated gear) may be moved between

- islands, however all gear must be inspected and disinfected per the relevant cleaning and disinfection methods described above. Dry bags can be disinfected by wiping.
- Underwater cameras, binoculars, radios, GPS units, and other electronic equipment must be disinfected, including internal inspection whenever possible.
 - Pack supplies in plastic buckets with fitted lids or other sealable metal or plastic containers since they can be thoroughly cleaned inside and out.
 - Special requirements are required if transitioning outside the intertidal zone towards terrestrial habitat. See BMP #007 for details.

B. Cleaning Tender Vessels

- Prior to entry into the Monument the tender must be washed inside and out, to remove all loose dirt, seeds, organic material, invertebrates, algae, etc. The bottom of the tender should have no growth, organic films or fouling on it.
- At least daily, if tender vessel is used, inspect for and remove any algal fragments and other organisms.
- Dispose of organic matter and used solution according to the ship's solid waste disposal or other approved secure holding system.
- Inspect and clean anchor, anchor chain, and anchor line if used.
- Rinse tender vessel internal and external surfaces with fresh water between islands, including during transits in either direction between the Monument and the main Hawaiian Islands or other point of origin/destination.
- Allow tender vessel to dry before redeployment.

C. Disinfection of Shipboard Wet Laboratory

- At least daily if used, disinfect entire laboratory, including sinks, countertops, walls, doors, and floors.
- Acceptable Disinfection Solutions and Wipes:
 1. a 1:32 dilution of commercial bleach in freshwater (1/2 cup bleach per gallon of freshwater), yielding a 1000 ppm dilution of sodium hypochlorite, or 3% free chlorine solution;
 2. The manufacturer's recommended disinfection strength dilution of QACs;
 3. commercially available wipes containing QACs (e.g. Clorox® wipes, Lysol® wipes); and
 4. 70-80% ethanol.
- Dispose of all materials generated during cleaning according to the ship's solid disposal or other secure holding system.
- The laboratory must be clean between islands, including during transits in either direction between the Monument and the main Hawaiian islands.