

Quagga/Zebra Mussel Surface Survey Protocol*

California Department of Fish and Wildlife

*This protocol was adapted from the California Department of Water Resources *Zebra/Quagga Mussel Surface Survey Protocol*.

Surface surveys are employed alone or in conjunction with artificial substrate monitoring to sample for juvenile and adult dreissenid mussels. Surface surveys may be the only option where there are not structures to attach artificial substrates to and have the benefit of not having to be maintained, provide diverse substrate for mussels to settle on, and passively “sample” over long periods of time (months, and even years).

When, Where, and How to Monitor

Surface surveys should be conducted year-round, access permitting. Visually inspect hard and soft substrates, exercising caution when sticking your hands where you cannot see, or rubbing them on unknown surfaces. Gently run fingers over surfaces, checking for gritty feeling or small “seed-like” or “pebble-like” objects. Fan areas covered with silt to expose what is underneath it. Inspect dark areas, dark substrates, and low light / shaded areas. Flows exceeding 2 meters/second preclude veliger settlement, therefore in flowing waters inspect surfaces out of the main channel, in backwaters and sheltered low velocity waters.

Quagga and zebra mussels prefer dark substrates and low light/dark areas. They prefer concrete and other rough surfaces. Search areas at or near boat ramps, gas docks, docks near marina stores, other docks in high traffic areas, all concrete structures, and low flow areas. Do not disturb private vessels or property.

Other areas that should be inspected include dock flotation, buoys, mooring lines, cables, rocks, concrete, logs, driftwood, vegetation, and anything else that has been in the water for a long time.

Minimum Sample Size

The minimum number of linear meters to be searched per substrate is defined below. Sampling more than the minimum increases the potential to find something if it is there. You can stop before meeting the minimum distance if quagga/zebra mussels are found in 3 or more locations within the survey location, or if all available substrate has been searched.

- Boat ramp bottom – 30 m (~100 ft) if the ramp is at a marina, 60 m (~200 ft) if the ramp is the only structure at the survey location.
- Shoreline – 30 m if at a marina, 60 m if at a survey location with only a boat ramp
- Dock – 60 m
- Mooring/dock lines (portion hanging in water) – 60 m

- Anchor/dock cable or chain (portion under water) – 30 m
- Concrete structures – 30 m
- Logs and woody debris – 30 m
- All accessible buoys

Make a notation in “Comments” section if minimum sample size requirements could not be met.

Specimen Collection

If you suspect you have found a mussel, immediately contact the appropriate CDFW regional mussel contact. To aid identification, first take a close-up digital photograph of each specimen. Next, collect the specimen(s) and place in a vial with 70% ethanol. Label the vial with location, date, and name of collector. If ethanol is not available, place the sample in a rigid container (to prevent crushing) without water, label, and refrigerate. E-mail the photos to the CDFW contact and they will attempt to identify the specimens from the photographs and will request the actual specimen(s) to make a positive identification.

Record the latitude and longitude (in decimal degrees and use WSG 84) of the mussels' location(s) and draw a map of and describe location(s) in the space provided on the datasheet. If possible, take photos of the mussels as a record of the density. Also take photos of the surroundings to aid in locating the site. Record the type of substrate(s) the mussel(s) was found on (for example: concrete, plastic, rope, chain, buoy).

Data Recording and Reporting

Every time a survey is made the data must be recorded on a datasheet before leaving the field. Absence information is as important to document as presence, so complete and submit a datasheet even if no mussels were found. Send datasheets to the appropriate CDFW regional contact. All data will be entered into a data reporting system and the datasheets will be retained on-site.

Datasheets are available at:

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4949>

CDFW Regional Scientist Contacts:

<http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4955>.

**California Department of Fish and Wildlife
Surface Survey Datasheet**

Waterbody:	County:	
Location	GPS (decimal degrees WSG 84):	
Description:		
Date:	Collector:	
Number of Linear Meters:		
Boat Ramp Bottom (30 m at marina, 60 m at ramp only) _____	Shoreline (30 m at marina, 60 m at ramp only) _____	
Dock (60 m) _____	Concrete Structure (30 m) _____	
Mooring Line (60 m) _____	Logs/Woody Debris (30 m) _____	
Anchor/Dock Cable (30 m) _____	Other _____	
% of Dock/Marina/Boat Ramp Searched _____ Quagga/Zebra Mussels Present? Y / N Specimens Collected? Y / N		
If mussels present, complete this section for up to 3 mussel locations		
1. Approximate Number (circle one) 1-10 10-100 >100 Substrate Type: _____	2. Approximate Number (circle one) 1-10 10-100 >100 Substrate Type: _____	3. Approximate Number (circle one) 1-10 10-100 >100 Substrate Type: _____
Draw a map showing where the mussels were observed and note any landmarks that will aid in locating them, and take a photograph to include with the datasheet		
Corbicula Clams Present? Y / N Snails Present? Y / N Other Mussel/Clam Species Present? Y / N Specimens Collected? Y / N		
Comments: _____		