



## Grantee Early-Detection Mussel Monitoring Requirements

***If the applicant is awarded a Quagga and Zebra Mussel Infestation Prevention Grant (QZ Grant) and becomes a Grantee***, the following Early-Detection Mussel Monitoring (EDMM) requirements will be expected. EDMM can be a covered activity by the QZ Grant if requested by the applicant and approved by the Division of Boating and Waterways (DBW).

The California Department of Fish and Wildlife (CDFW) will recommend to DBW the method and frequency of EDMM that a Grantee must conduct. This will depend upon the reservoir's calcium concentration and will follow CDFW's Recommended Minimum Dreissenid Mussel Early Detection Monitoring (PDF) available at:

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=180290&inline>. If you have questions regarding EDMM including your reservoir's calcium level, contact the appropriate CDFW Regional Staff Representative:

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4955&inline>.

The following language is based on CDFW's recommendations discussed above and will be added to the QZ Grant Agreements (with the yellow highlighted paragraph chosen for each grantee, as applicable):

Grantees shall conduct early-detection mussel monitoring for quagga and zebra mussels during the term of this agreement to substantiate that the reservoir continues to be uninfested and report the data to the DBW Grant Administrator in accordance with the deadlines in Exhibit A, Section B, Table of Deliverables. Early-detection monitoring methods used are based on average dissolved calcium concentration measurements (mg/L) at the given reservoir. The three accepted methods for early-detection monitoring for quagga and zebra mussels include plankton sampling (appropriate to detect larval life stage), surface surveys (to detect adult life stage), and artificial substrates (to detect adult life stage). Surface surveys utilize existing surfaces (docks, mooring lines, rocks, etc.), and can be used to monitor for adult mussels either alone, or in combination with artificial substrates when suitable hard surfaces are not present.

a. METHOD AND FREQUENCY OF EARLY-DETECTION MUSSEL MONITORING:

**(DBW: INSERT 1 CORRECT PARAGRAPH)** CDFW has determined your reservoir(s) to be "High calcium level" based on your reservoir Calcium levels ( $\text{Ca}^+ > 24 \text{ mg/L}$ ). Based on this determination, the following methods and frequency of monitoring are required:

- Plankton tows twice per month when water temperature is 16-24 °C (61 -75 °F), and once per month when water temperature is 12-16 °C (54-61 °F) or 24-28 °C (75-82 °F).



California State Parks Division of Boating and Waterways  
**Quagga and Zebra Mussel Infestation Prevention Grant Program**

---

- Surface surveys (and/or artificial substrates if absence of existing surfaces), checked at least once per month, monitored at locations where introductions are most likely to occur and be detected.

**(DBW: INSERT 1 CORRECT PARAGRAPH)** CDFW has determined your reservoir(s) to be “Moderate calcium level” based on your reservoir Calcium levels (Ca+ 15-24 mg/L). Based on this determination, the following methods and frequency of monitoring are required:

- Plankton tows twice per month when water temperature is 16-24 °C (61-75 °F), and once per month when water temperature is 12-16 °C (54-61 °F) or 24-28 °C (75-82 °F).
- Surface surveys (and/or artificial substrates if absence of existing surfaces), checked at least once per month, monitored at locations where introductions are most likely to occur and be detected.

**(DBW: INSERT 1 CORRECT PARAGRAPH)** CDFW has determined your reservoir(s) to be “Low calcium level” based on your reservoir Calcium levels (Ca+ 12-15 mg/L). Based on this determination, the following methods and frequency of monitoring are required:

- Surface surveys (and/or artificial substrates if absence of existing surfaces), checked at least once per month, monitored at locations where introductions are most likely to occur and be detected.

**(DBW: INSERT 1 CORRECT PARAGRAPH)** The CDFW has determined your reservoir(s) to be “Very low calcium level” based on your reservoir Calcium levels (Ca+ Less than 12 mg/L). Based on this determination, the following methods and frequency of monitoring are required:

- Surface surveys (and/or artificial substrates if absence of existing surfaces), checked at least once per month, monitored at locations where introductions are most likely to occur and be detected..

**(DBW: INSERT 1 CORRECT PARAGRAPH)** CDFW has not yet determined your Calcium levels. The following methods and frequency are required:

- Surface surveys (and/or artificial substrates if absence of existing surfaces), checked at least once per month, monitored at locations where introductions are most likely to occur and be detected.

- b. EARLY-DETECTION MUSSEL MONITORING PROTOCOL: Each early monitoring effort shall be documented in writing. Protocols and datasheets



## California State Parks Division of Boating and Waterways Quagga and Zebra Mussel Infestation Prevention Grant Program

---

have been developed by CDFW, and are recommended, however not required. These protocols are available on CDFW's website, and CDFW regional scientists are available to assist with monitoring site selection and training. Regional scientist contacts:

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4955&inline>.

*Plankton protocol:*

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4954&inline>

*Surface survey protocol:*

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4948&inline>

*Artificial substrate protocol:*

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4953&inline>

If using a protocol and datasheet other than CDFW's, the following information shall be included for each monitoring event:

- Reservoir name;
- County;
- Sampling date;
- Sampling sites within the reservoir (latitude and longitude)
- Name and contact information of person who conducted the sampling;
- Sampling method type (plankton tow(s), artificial substrate, or surface survey);
- Sampling method used (reference to the document that described the methodology used);
- Result (presence or absence of dreissenid mussels)

In addition, information specific to each method reported shall include, as applicable:

- Plankton tows:
  - Tow volume
  - Preservation method and preservative used
  - Method of analysis (Cross-Polarized Light Microscopy (CPLM) and/or polymerase chain reaction (PCR) analysis)
  - Name and contact information of the person/entity who analyzed the samples
- Artificial substrate - surface area inspected
- Surface surveys - linear distance and type of surfaces inspected