

# Fine Mesh Barriers and The Marine Life Exclusion System™ (MLES™)

*Water Use from California Bays and Rivers – Providing Water, Saving Fish*



Gunderboom, Inc. offers “fine-mesh” screening technologies that are proven to exclude fish, even small fish, fish eggs and fish larvae, while providing a reliable water withdrawal. The Marine Life Exclusion System™ (MLES™) excludes organisms as small as anchovy eggs (0.6 – 0.8 mm) from water intakes ranging in maximum flow from <600 gals per minute (~1 cubic foot per second) to >270,000 gpm (386 MGD or 600 cfs).

## Keys to success of the Gunderboom® MLES™ are:

- Has achieved up to 95% exclusion for a full season
- Full-Depth, Treated Polypropylene/Polyester Fabric Curtain
- Two-Fabric Pocket Filters Water while Excluding and Protecting Aquatic Life
- Large filter screen area compared to other screens— Low approach and through-barrier flow velocities so that fish and larger fish larvae (e.g., >5 mm) are easily able to swim away from the barrier while fish eggs or smaller larvae are not harmed by any brief contact they may have with the barrier.
- Periodic compressed air release from within layers of the filter barrier prevent the buildup of sediments or fine debris.
- Design and durability of the structure and fabric allow it to withstand currents, debris, sudden water level changes or other challenging conditions.

Gunderboom has developed designs for two anchored, floating systems on Delta waterways, one for a generating station and the other for a municipal utility water withdrawal. Both systems are feasible and one was reviewed and received a favorable Biological Opinion regarding impacts to protected fish species.

Gunderboom designs, fabricates, installs, and maintains MLES™ systems.

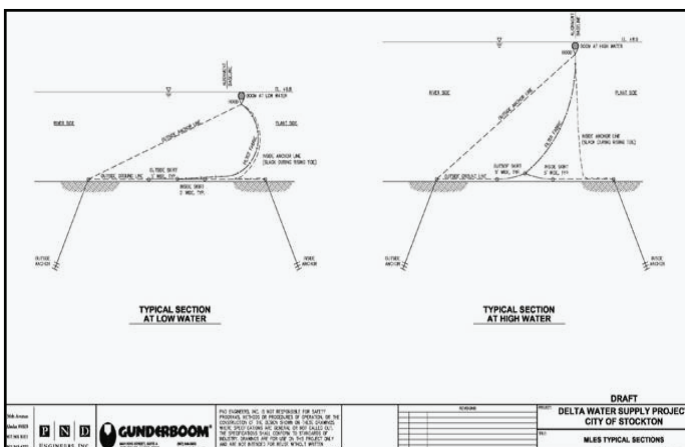


- Water Surface Flotation Billets
- Sealed Anchoring System
- Integration into Shoreline Intake Structures
- Low-Water Velocity
- AirBurst™ Cleaning System routinely releases air to remove sediment and passively floating organisms drawn onto fabric



Alternative MLES™ designs for different application types provide cost savings, incorporate replaceable filter fabric panels, minimize O&M, incorporate fail-safe water delivery and provide remote monitoring capability.

Larger applications use bottom-anchored, floating filter curtains, such as deployed successfully for four years at the Lovett Generating Station, Hudson River, NY (~600 cfs), and in its second year of operation, the Taunton River Desalination Plant, Taunton River, MA (~40 cfs). MLES cartridge systems have been designed so individual cartridges draw from 0.5 – 3.5 cfs each and can be arrayed to achieve relatively high flow rates. New York City Waterfalls used Intake Filter Pools that delivered up to 35 cfs.



**Exclude Nuisance Species, Reduce Solids Concentrations--**

Gunderboom's custom filter fabric perforation sizing means that the system can be designed to exclude planktonic larvae of nuisance organisms, such as zebra, quagga or green-lipped mussels. The Airburst™ cleaning system may be designed and operated to prevent or minimize successful settlement on the fabric, altering the periodicity, duration and/or intensity of the bursts during the organism's spawning season. The MLES also filters out suspended solids, providing an additional advantage for desalination plants and other intakes and withdrawals that benefit by lower solids loading.

**Clean Water Act Section 316(b)** For electricity generating plants or industrial withdrawals or other intakes regulated or being evaluated under Clean Water Act Section 316(b) criteria, Gunderboom systems have met and can meet site-specific BTA (Best Technology Available) requirements.

The MLES configurations of the same technology have been developed and applied, including:

- Anchored, floating curtain system, sealed to the bottom and the shoreline or enclosed with intake inside the enclosed area (front side)
- Cartridge designs where rectangular cartridges with two filter fabric sides feed into a common intake through a manifold (immediate right)
- Fixed panel design where the filter fabric panels are mounted in framework on the outside of a bulkhead, water drawn into a common intake bay (right upper)
- Floating intake filter pool (IFP) (right lower)



[www.gunderboom.com](http://www.gunderboom.com)