MANAGING RISK OF ESCAPES THROUGH TECHNOLOGY

Fish may escape their pens in weather events like severe storms, from nets being damaged, or during harvest operations. There can be risks to wild fish when farm fish escape and interbreed with wild populations, but those risks can be reduced with new tools and technology.

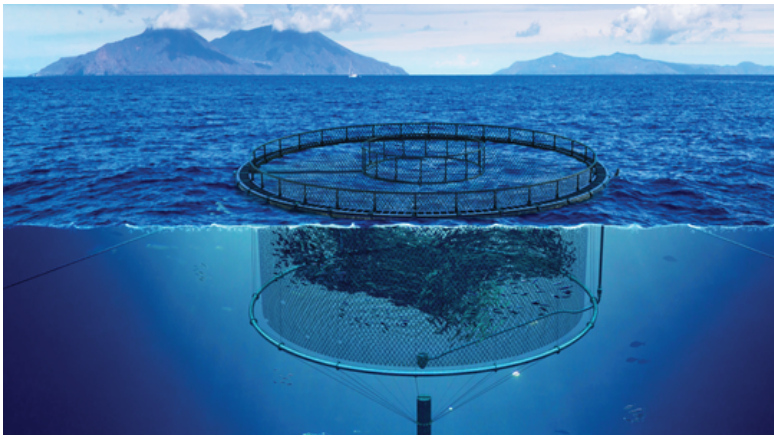
GENETICS

Potential impacts to the genetic diversity of wild fish can be minimized by selecting hatchery broodstock from local wild fish so the genetic makeup is similar to wild counterparts. Stocking of sterile fish, or a single-sex population of fish, are also tools that can reduce potential genetic impacts related to reproduction.

Domesticated fish raised in captivity are poor performers and have low fitness in the wild. Escapees quickly become prey to other predators, lessening their potential for food and habitat competition.

OFFSHORE MARICULTURE ESCAPES GENETICS ASSESSMENT (OMEGA)

The OMEGA model, designed by NOAA Fisheries is a mathematical model that shows how escape risk varies by differences in a species' life history (e.g., population status, age at maturity, fecundity, etc.), differences in aquaculture operations (e.g., size of fish and length of time fish are in the pen, culture methods, etc.), and geographic settings of an aquaculture operation (e.g., proximity to the wild populations, severity of potential weather). OMEGA shows impacts of aquaculture escapees on the survival and fitness of the mixed population over time. This model can help conduct aquaculture escape risk assessments on species identified as potential candidates for marine finfish aquaculture development in the United States.



CAGE TECHNOLOGY

Advances in cage design including stronger net material, improved mooring components, and additions of anti-predator nets have dramatically reduced escapes. Best management practices including choosing appropriate cage technology for the area, routine inspection, and good maintenance have also aided in the reduction of escapes.

New cage technology such as submersible fish pens can be used for sites that experience severe weather events and strong surface currents. The heavily anchored cages can withstand storms due to the design, materials, mooring, shape, positioning, and resilience. The cages are submerged below the high-frequency, small-period waves that can lead to fatigue failure in conventional surface gravity cages. Moreover, these cages maintain their full volume and shape regardless of the current or hurricane-force winds. Currents may move the cages, but the fish remain inside.

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