INTO AQUA

CO-EXISTING WITH SEALS

MANAGEMENT OF SEAL PREDATION ON FISH FARMS IN AUSTRALIA

A very brief history

- Farming of Atlantic Salmon and Rainbow Trout on marine farms started in Tasmania in 1986
- Fattening of seined Southern Bluefin Tuna started in 1991
- Yellowtail Kingfish were first transferred to sea cages in South Australia in 2001
- Losses of salmon and trout to seals of up to 95% of a cage was reported after 4 years of farming. Today the reported rate of loss and damage is approximately 2% of stock
- Mortality of SBT and YTK to seal predation also became significant after 4 years of operations. Losses appear to have been more variable than salmon
- Current production
  - Atlantic Salmon – approximately 80,000t
  - Southern Bluefin Tuna – 8,000t
  - Yellowtail Kingfish – 4,000t

Seal species - Tasmania

- Australian Fur Seal – *Arctocephalus pusillus dorifers*
  - Females up to 113kg
  - Males up to 360kg
  - Almost 100% of captured seals
- NZ Fur seal – *Arctocephalus forsteri*
  - Present but not common.
- Leopard Seal – *Hydrurga leptonyx*
  - Occasional visitor

Seal species - South Australia

- Australian Sealion – *Neophoca cinerea*
  - *Females to 100kg*
  - *Males to 300kg*
  - *Most predation attributed to Sealions*

- NZ Fur seal – *Arctocephalus forsteri*
  - Females to 50kg
  - Males to 150kg

- Australian Fur Seal – *Arctocephalus pusillus dorifers*
  - Small numbers but population increasing

Predator species – northern Australia?

No seals but these definitely bite!

Seal Predation

- Seals are intelligent, inquisitive, and adaptable, displaying ability to work out problems and overcome barriers over time.
- They are powerful swimmers and force the net well into the cage to grab fish.
- Most damage is caused by seals grabbing fish through a poorly tensioned net. Many fish escape with fatal wounds to die within the next day or two. Seals can suck the softer parts of the fish through the net.
- On a tight net seal can charge at the fish and hit them hard enough to stun them. They then drop to the base where net is not as tight.

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Seal Predation

- Large seals which access the cage walkway have no trouble climbing over the handrail to access the cage.
- Smaller seals are known to jump into unprotected cages.
- Seals quickly find holes and can enlarge holes in weak netting.
- On a tight net seal can charge at the fish and hit them hard enough to stun them. They then drop to the base where net is not as tight.
- I have seen a seal burrow under a predator net that extended to the seabed.

Changes in seal numbers and predation impacts

The early years of the industry

- Seal visits were more seasonal
- Tended to be solitary animals
- Seals were wary and visited mostly at night

Today

- Seals always present
- At times there can be over 100 seals on a site
- Seals show no fear of farm staff
- Seals can be aggressive during interactions with farm staff

Seal Management Strategies

The early days

- Holding nets were made using relatively light netting and provided little protection
- Net weights were small
- Seal could easily penetrate nets
- Farmers were licensed to shoot seals under strict conditions
- Food aversion using emetics
- Seal “bombs” and deterrents used heavily
- Accoustic deterrents tested.

Ammendments to regulations and changes to management

- Seal trapping and relocation permitted
- Licences to shoot were revoked
- Identification of trapped seals
- Euthanising repeat offenders
- Use of deterrents expanded – seal “bombs”, bean bags, scare darts

Permitted seal deterrents

An “Arms Race”

Two fronts:

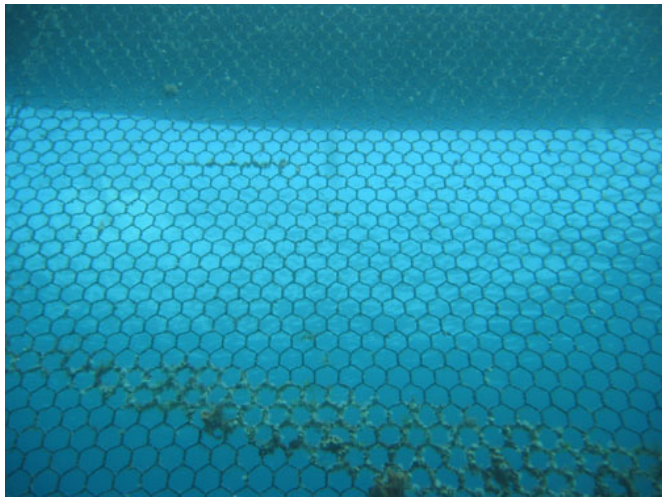
- Keeping seals out of cages
- Having better protection than your neighbours

Stronger nets, heavier weights

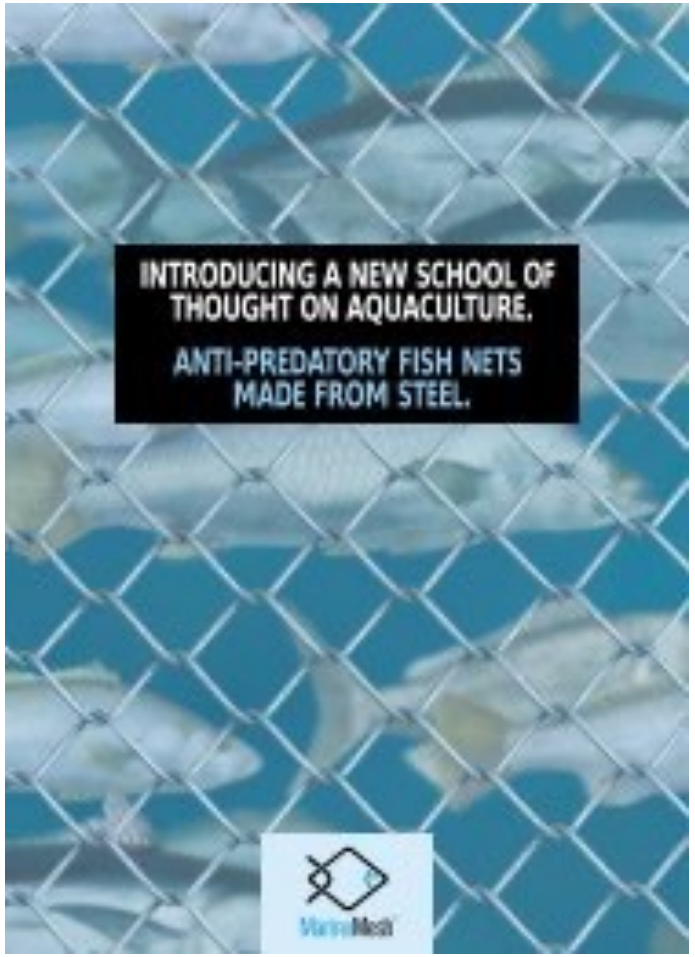
- Stiffening treatments – antifouling and paint
- OneSteel galvanized marine mesh
- Marine bronze nets
- AquaGrid
- Kikko/Environet

Predator nets

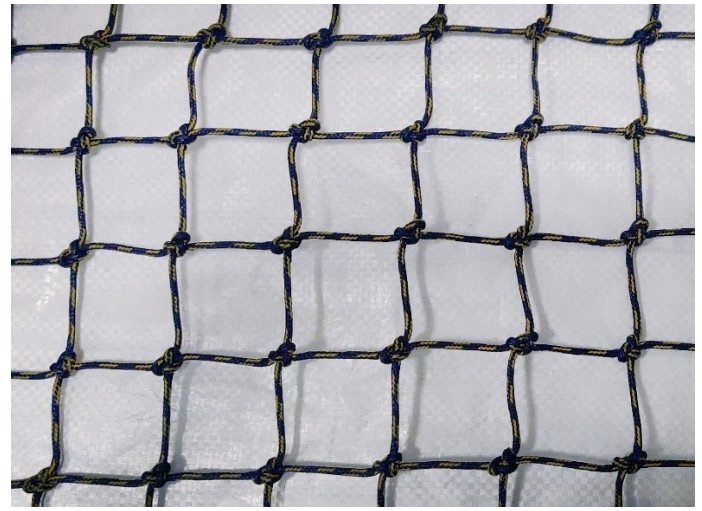
- “Ringlock” lamb and pig mesh
- Heavy knotted PE netting
- Metal base frames
- Electric fences



Kikko PET



OneSteel



PE Net

Marine Bronze

Ringlock fencing

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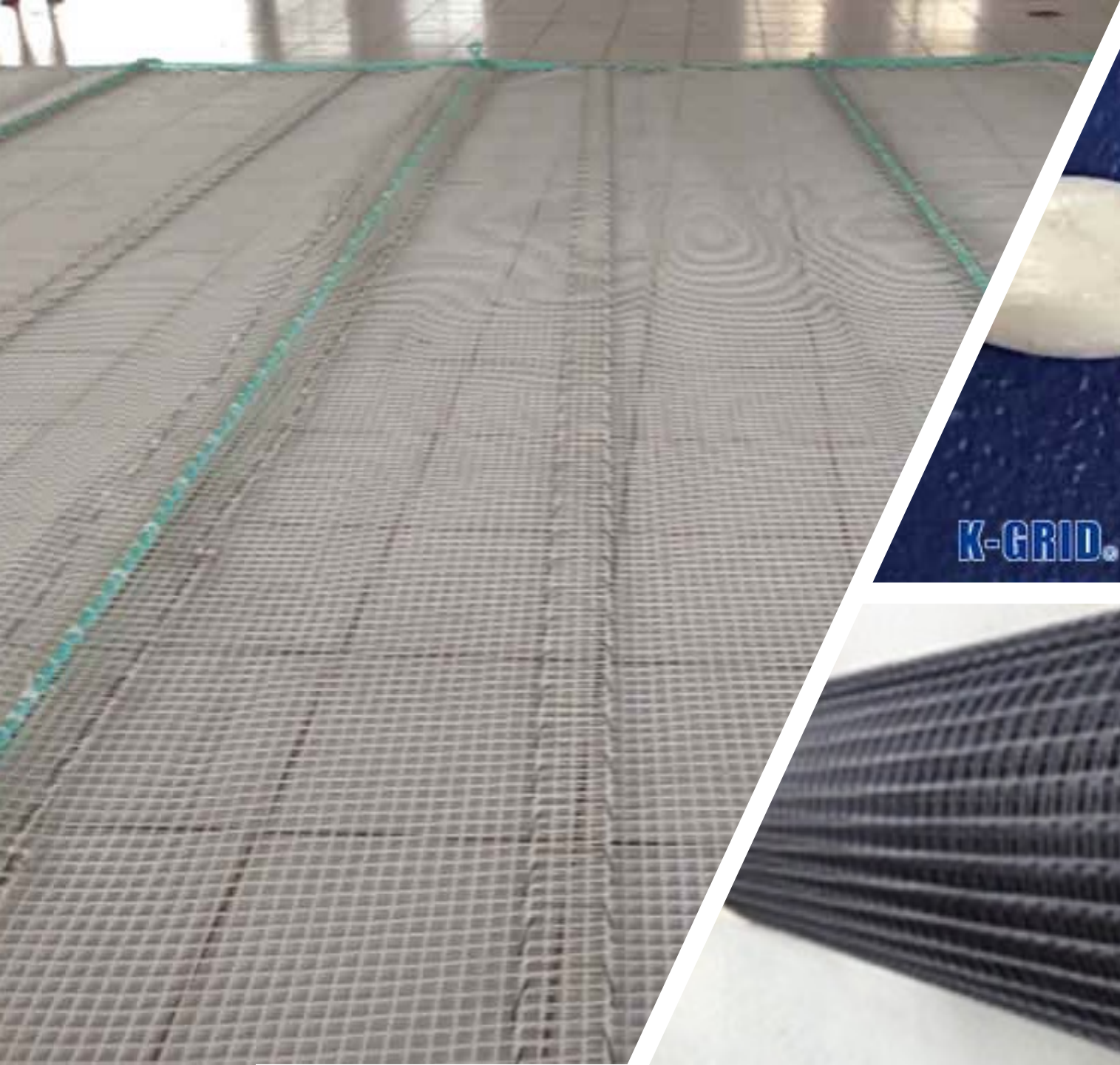
Best Practise Today

Double nets

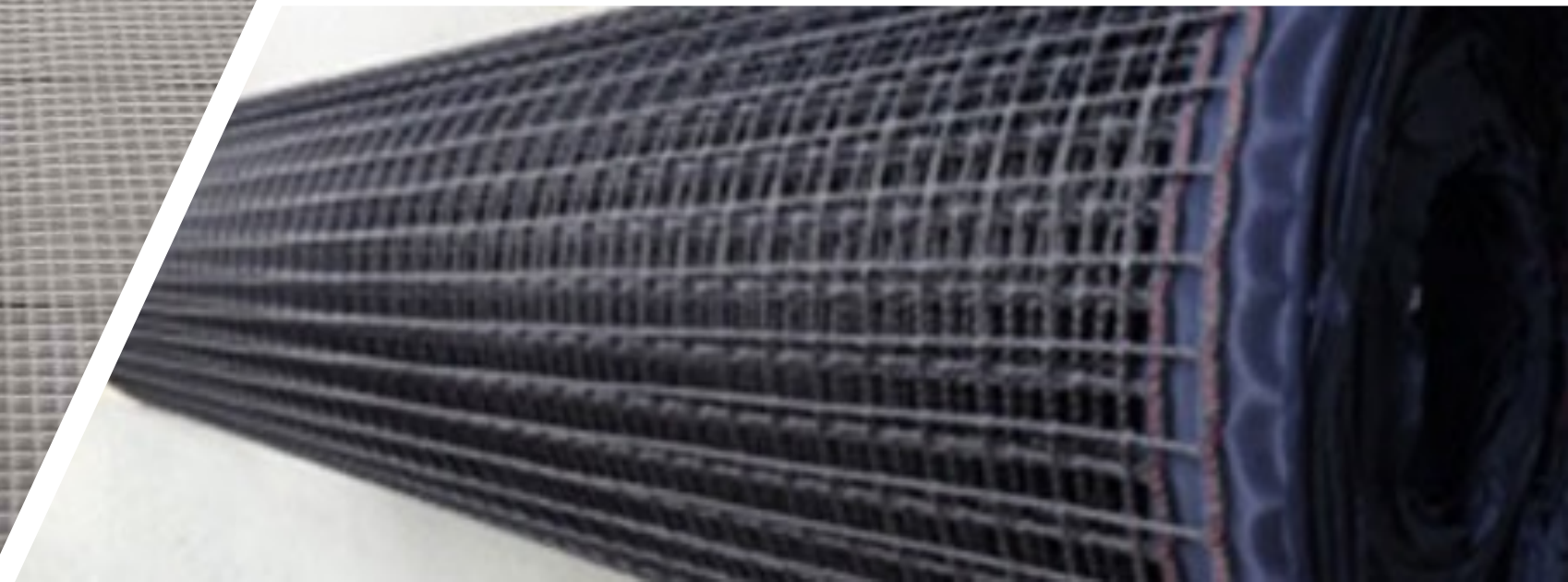
- Heavy duty Dyneema, Plateena, Chineema fish nets and predator nets
- Triple collar cages
- Heavy sinker tube
- Min 1.5 metre gap between inner and outer nets
- 2.4m high ”jump” fence

Single nets

- Heavy monofilament nets – Super 20 , King Kong
- Fused netting – K-Grid
- Netting is very tightly laced into farming ropes
- Heavy net weights to create significant tension on net
- Double bases to prevent seals accessing dead fish.
- High jump fences.




K-GRID



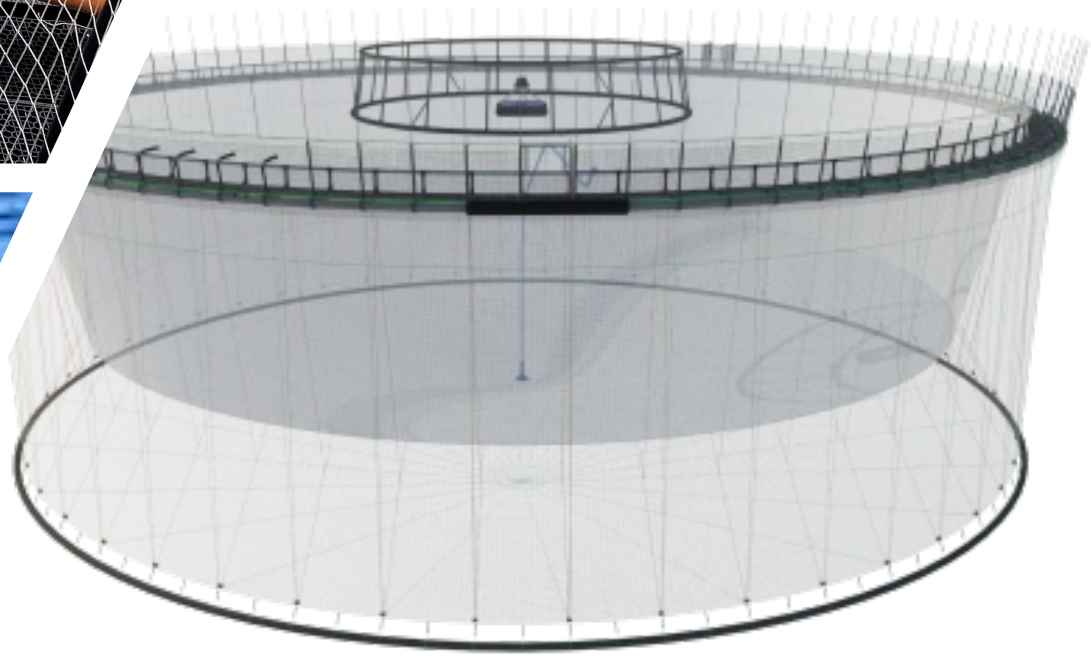
Advantages/Disadvantages

Double nets

- Easier to handle the net
- Fish well protected during handling
- Expensive
- More nets to keep clean
- Easy for boats or chaffing against cage pipes to create holes in outer
- Increased risk of entangling marine mammals and birds

Single nets

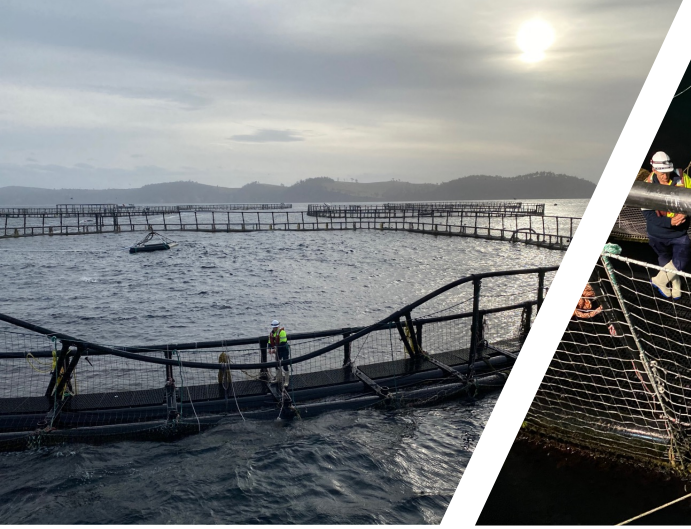
- Cheaper to install
- Less surface area and easier to clean
- Provide good protection if properly made and installed
- Very difficult to handle fish
- Jump fence must be sewn to outer edge of walkway and netting sewn from waterline of net to inner side of walkway to prevent seal access.
- Expensive
- Seals can get close to fish



Best Practise Today (cont.)

Farm Practices

- Attention to detail. Ensure all nets are 100% at all times
- Eliminate all “haul outs” on farms. Don’t provide a place to rest.
- Document all interactions with seals including use of deterrents
- No trapping or relocation except under extraordinary circumstances
- Limiting the use of deterrents to ensure they are effective when needed
- Use of Wildlife officers to manage seals in cages



Finish

Thank you