# The Blue Dog State Fish Hatchery • Waubay, SD - USA

## Fish Hatchery uses Firestone GeoGard™ EPDM to fix leaking ponds

The Blue Dog State Fish Hatchery, owned by the State of South Dakota, is an existing 25-year-old aquaculture facility in Waubay, South Dakota. Faced with leaking ponds and subsequent maintenance issues, the state determined the ponds needed to be lined.

The site consisted of 38 unlined ponds, split into two regions. The northern ponds were installed into the low-permeability in-situ soils of the region, and performed adequately. The western ponds were constructed using embanked soil materials compacted into place. Water levels in these ponds were difficult to maintain and efforts to redirect flooding with drains and pipe trenches were unsuccessful.

When reviewing lining options, state officials considered PVC (buried), EPDM (exposed) and fPP-R (exposed) geomembranes.

In the end the state decided to go with Firestone GeoGard™ EPDM because of its large panels (up to 930 $m^2$), membrane flexibility, durability and compatibility with fish.

## Quick Facts

**Project scope:**

- 25-year-old aquaculture facility with 38 unlined ponds
- 21 ponds constructed with embanked soils compacted into place were leaking
- State officials considered PVC, EPDM and fPP-R membrane options

**Challenges faced:**

- Impact of lining material on safety of fingerlings
- Controlling oxygen levels and food materials; maintaining constant water volume

**Solutions offered by:**

- Removal and screening of riprap on the side slopes
- Add 7 cm layer to serve as substrate for geomembrane
- Installation of 111.500 $m^2$ of 1,1 mm Firestone GeoGard™ EPDM

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Exceptional conformance, elongation and lay flat characteristics are some of the additional benefits that led to the decision to use Firestone GeoGard™ EPDM.

Because of these characteristics, the material did not require extra folds at installation to compensate for the expansion and contraction that takes place during normal operating conditions. This led to savings in material costs, but more importantly, it was better for the fish, as fingerlings can get caught in material folds and die.

Ease of repair was another consideration. Should the membrane ever sustain damage, whether by wildlife or mechanical means, it can easily be repaired, by hatchery personnel, without any special tools or equipment.

The work performed included the removal and screening of riprap on the side slopes, stripping of vegetation and organic material from pond bottoms, regrading of each pond's subgrade, installing an underdrain/detection piping network, installing a 7 cm sand layer and the geomembrane, attaching the geomembrane to concrete harvest structures, and piping installation. In total, more than 111.500 $m^2$ of Firestone GeoGard™ EPDM was installed in 21 ponds.

With Firestone GeoGard™ EPDM in place, the hatchery now has better control over the water's oxygen content, food material will no longer be lost into the soil, and there will be reduced water contamination because the liner eliminates contact with the substrate. The geomembrane will make it easier to harvest small fish, because it has a smooth surface and does not have flaps at the seams. Also, by maintaining a more constant water volume, the hatchery will be able to administer more precise dosages of medication to the fish.



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