Fact Sheet

REMEDIATION OF WHITE-PHOSPHORUS-CONTAMINATED PONDS USING REMOTE PUMPING SYSTEMS

PROBLEM

Deposition of white phosphorus from smoke munitions in the saturated wetland sediments and shallow ponds of the Eagle River Flats Firing Range on Fort Richardson, Alaska, has resulted in the deaths of large numbers of dabbling waterfowl. Shallow ponded areas within this tidal salt marsh where waterfowl feed are ideal locations for preserving white phosphorus particles and are the sites of greatest mortality. Previous work by CRREL has shown that if contaminated pond sediments are allowed to dry below saturation, the particles within the sediment will begin to attenuate when soil temperatures are above about 15°C.

SOLUTION

Several remediation strategies have been developed and tested at Eagle River Flats, the most promising and least intrusive being pond pumping. This remedial method employs an autonomous remote pumping system to remove the water from permanently ponded areas, allowing sediments to dry over the short summer season when ground temperatures are highest. During flooding events, which occur up to once a month and can last several days, the pump system automatically shuts down, allowing natural drainage to occur before resuming pumping. Use of tide gates extends periods of nonflooding by preventing tidal infiltration during minor flooding events.

Pump deployed at Eagle River Flats.

STATUS

Results of the first-year study, conducted in a highly contaminated permanently ponded area of Eagle River Flats, indicate a reduction of white phosphorus of more than 85% in the surface sediments. Additional systems have been purchased and further testing will be conducted in areas with different environmental and hydrological characteristics. Full deployment, consisting of up to six systems, is planned for 1999.

Area pumped dry.

POINTS OF CONTACT

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March 1998

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