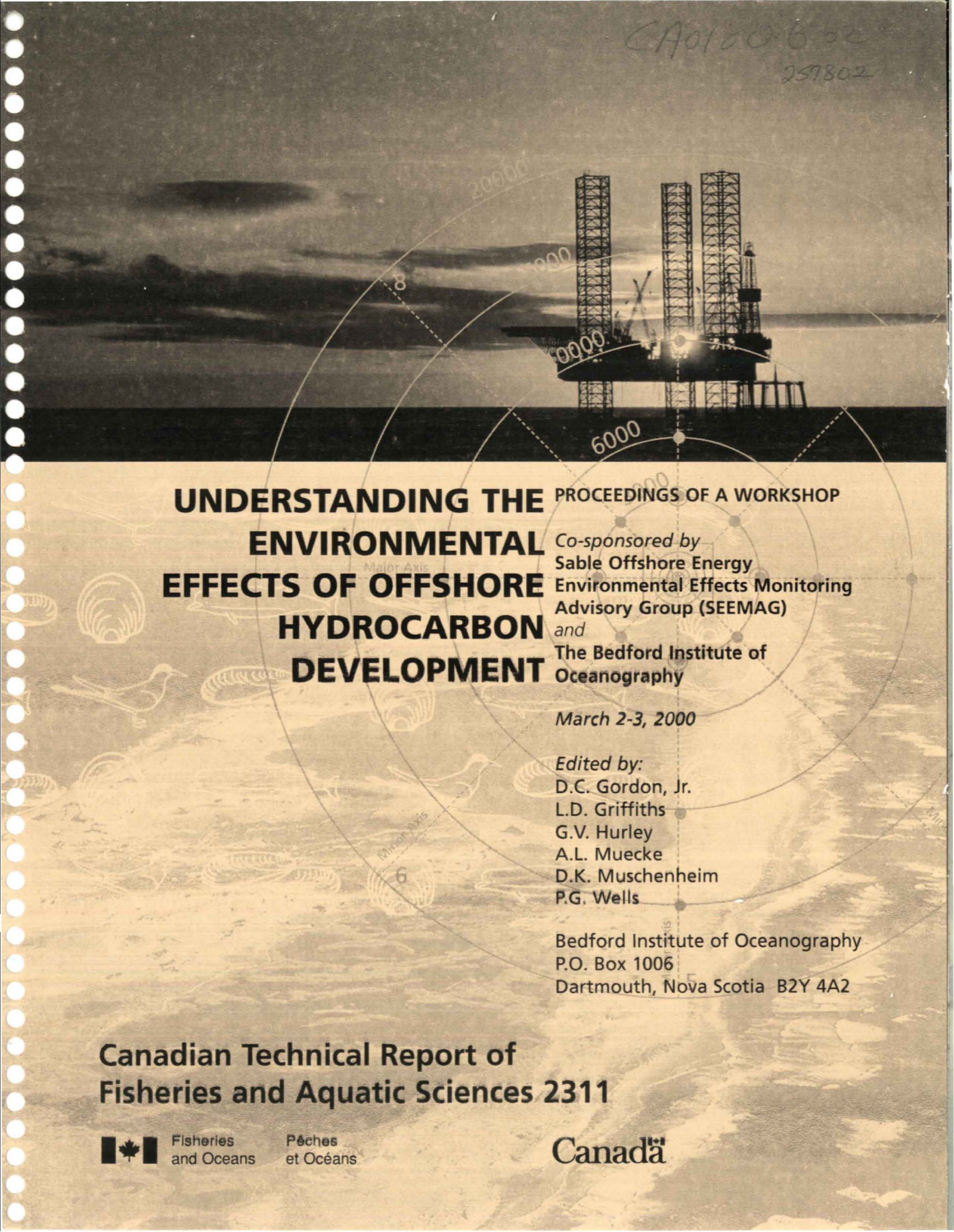


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**UNDERSTANDING THE
ENVIRONMENTAL
EFFECTS OF OFFSHORE
HYDROCARBON
DEVELOPMENT**

PROCEEDINGS OF A WORKSHOP

Co-sponsored by
Sable Offshore Energy
Environmental Effects Monitoring
Advisory Group (SEEMAG)
and
The Bedford Institute of
Oceanography

March 2-3, 2000

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TOXICITY OF PRODUCED WATER TO THE EARLY LIFE STAGES OF HADDOCK, AMERICAN LOBSTER AND SEA SCALLOP

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Acute and chronic of exposure to produced water (PW) from an offshore oil production facility were quantified for the early life stages of haddock (*Melanogrammus aeglefinus*), lobster (*Homarus americanus*) and sea scallop (*Placopecten magellanicus*) in terms of survival, growth and fertilization success. During 96-h exposures to 0-25% PW, yolk-sac haddock larvae, fed stage-I lobster larvae, and scallop veligers each displayed significant reductions in survival at 10 and 25%. The average size of scallop veligers was significantly reduced after exposure to 10 and 25% PW. Scallop fertilization success was significantly reduced at all concentrations $\geq 1\%$. During 18 d chronic exposures to concentrations of 0-10% PW, significant reductions in scallop veliger survival and size were observed in the 10% treatment. Chronic exposure of the diatom, *Thalassiosira pseudonana*, to 10% PW resulted in a significant reduction in physiological condition though there was no effect on chlorophyll-*a*

concentration.

Significant ($P < 0.05$) acute effects of PW on scallop fertilization and the larval stages of haddock, lobster and scallops were detected at concentrations between 1 and 10%. As PW rapidly dilutes to concentrations below these levels, acute impacts should be limited to the vicinity of the discharge. However, precipitation or adsorption of PW contaminants onto particles increases the risk of impacts. Although scallop veligers were relatively insensitive to impacts from chronic exposure to low levels of PW, it is possible that effects may be manifested later in life. Indirect effects of PW on larvae may also result from subtle effects on other ecosystem components (e.g. microalgae productivity). This study has shown the potential for using resource species in toxicological evaluations rather than 'classical' lab species that may not be representative of communities near offshore oil and gas production fields.