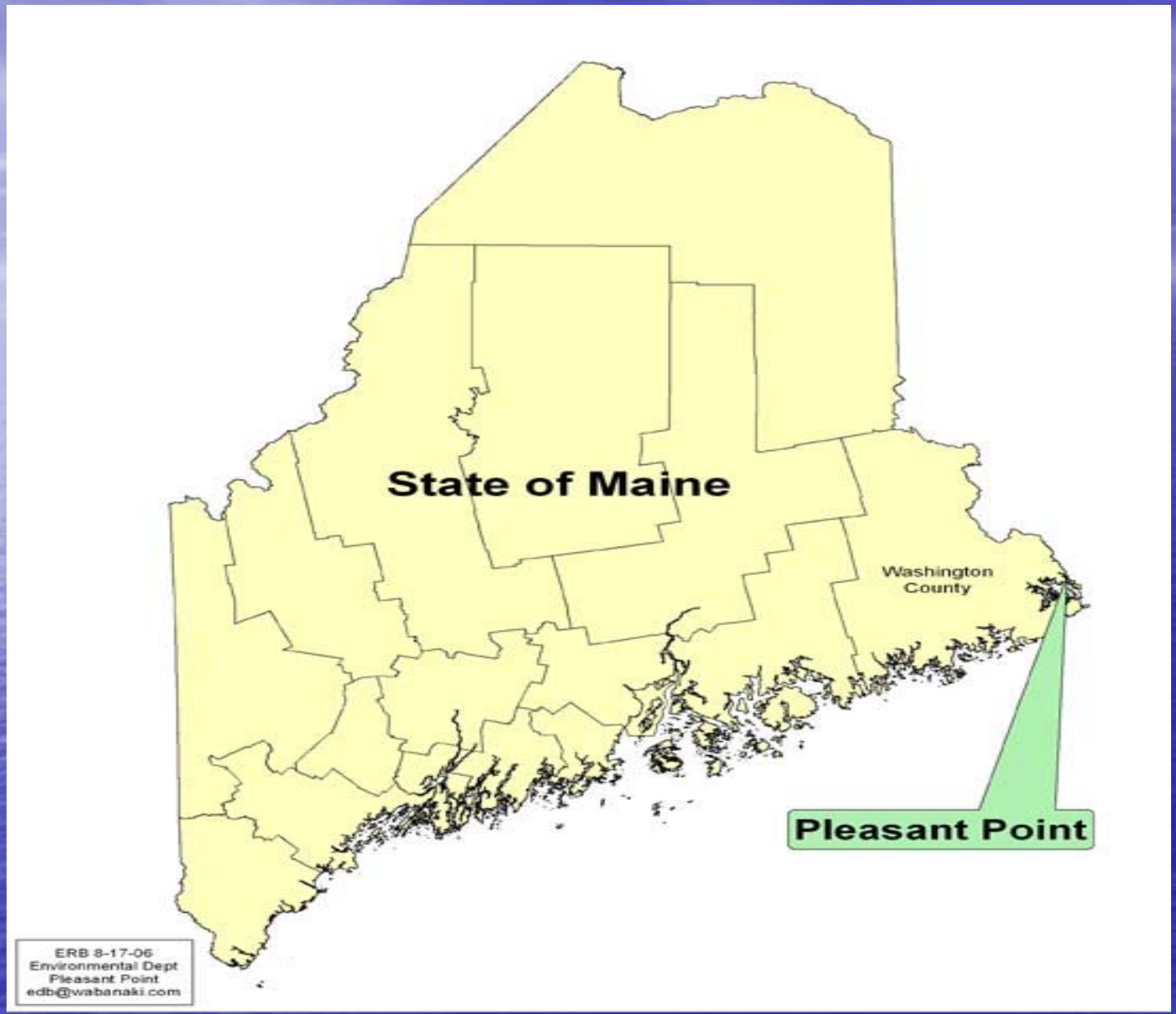
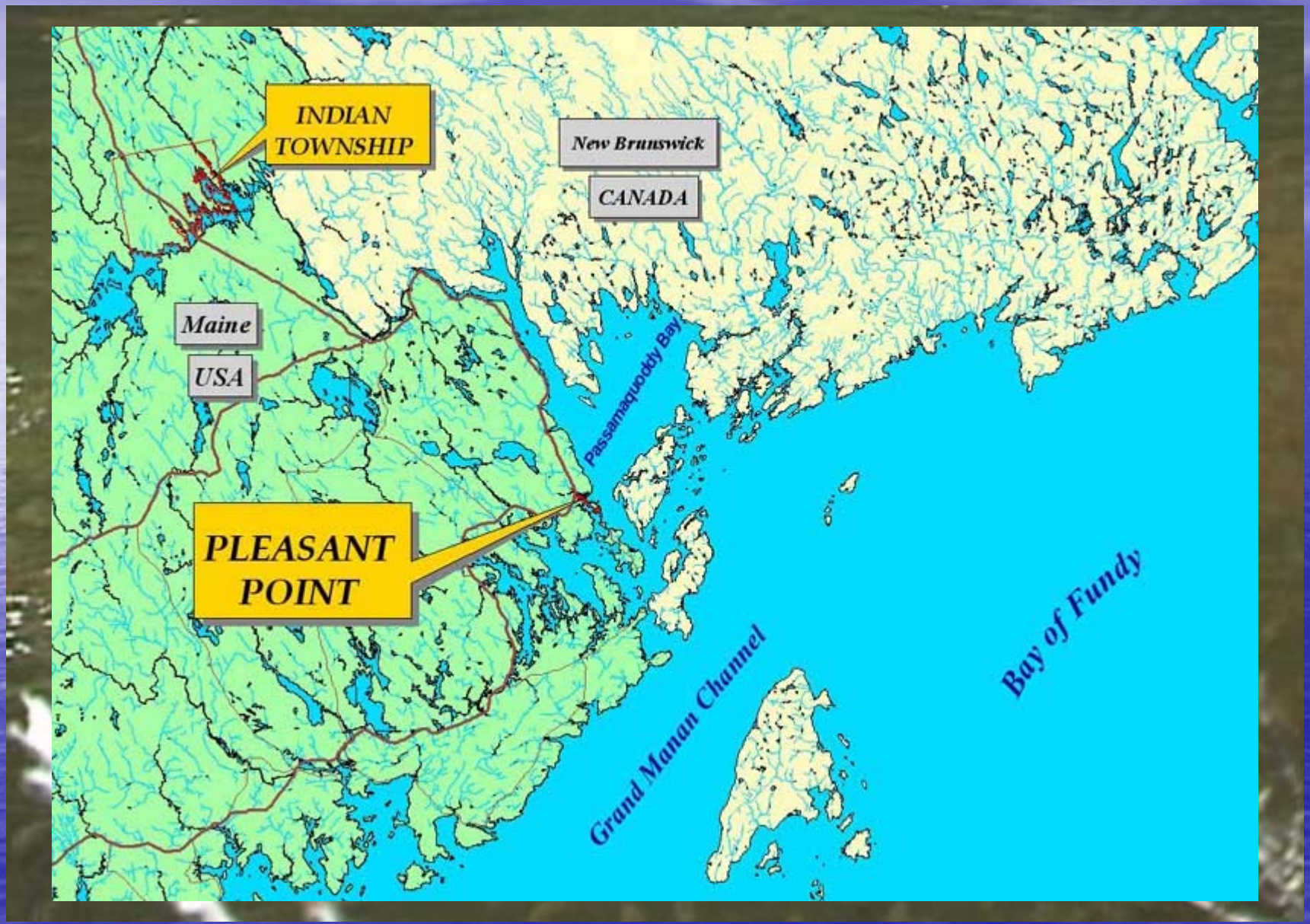
MONITORING THE WATER QUALITY OF BOYDEN LAKE

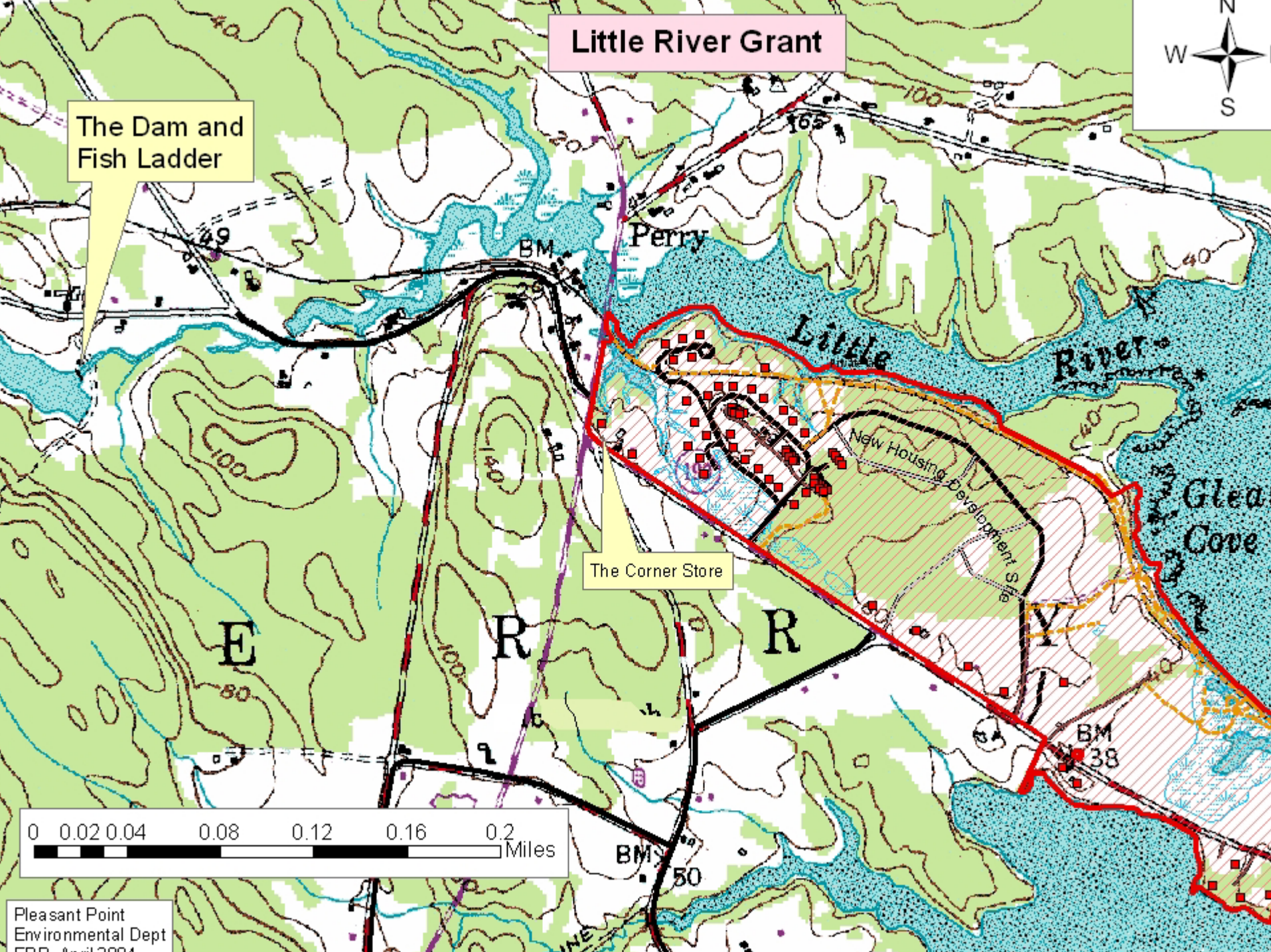
Steve Crawford
Environmental Director
Passamaquoddy Tribe
At
Pleasant Point

PLEASANT POINT PASSAMAQUODDY

ENVIRONMENTAL DEPARTMENT


State of Maine
Washington County
Pleasant Point
ERB 8-17-06
Environmental Dept
Pleasant Point
edb@wabanaki.com


INDIAN TOWNSHIP
New Brunswick
CANADA
Maine
USA
Passamaquoddy Bay
PLEASANT POINT
Grand Manan Channel
Bay of Fundy


Little River Grant
The Dam and Fish Ladder
The Corner Store
Perry
Little River
New Housing Development Site
Glea
Cove
BM
38
BM
50
E R R Y
N
W
S
0 0.02 0.04 0.08 0.12 0.16 0.2 Miles
Pleasant Point Environmental Dept

North Perry
Penknife
Brook
Brook
BOYDEN
77
LAKE
P E R R Y
E M B R O K E
Taylor
Brook
Taylor
Brook
Boyden 77 Lake
Boyden Lake
Ironworks Mtn
Iron Works Mtn
P E R R Y
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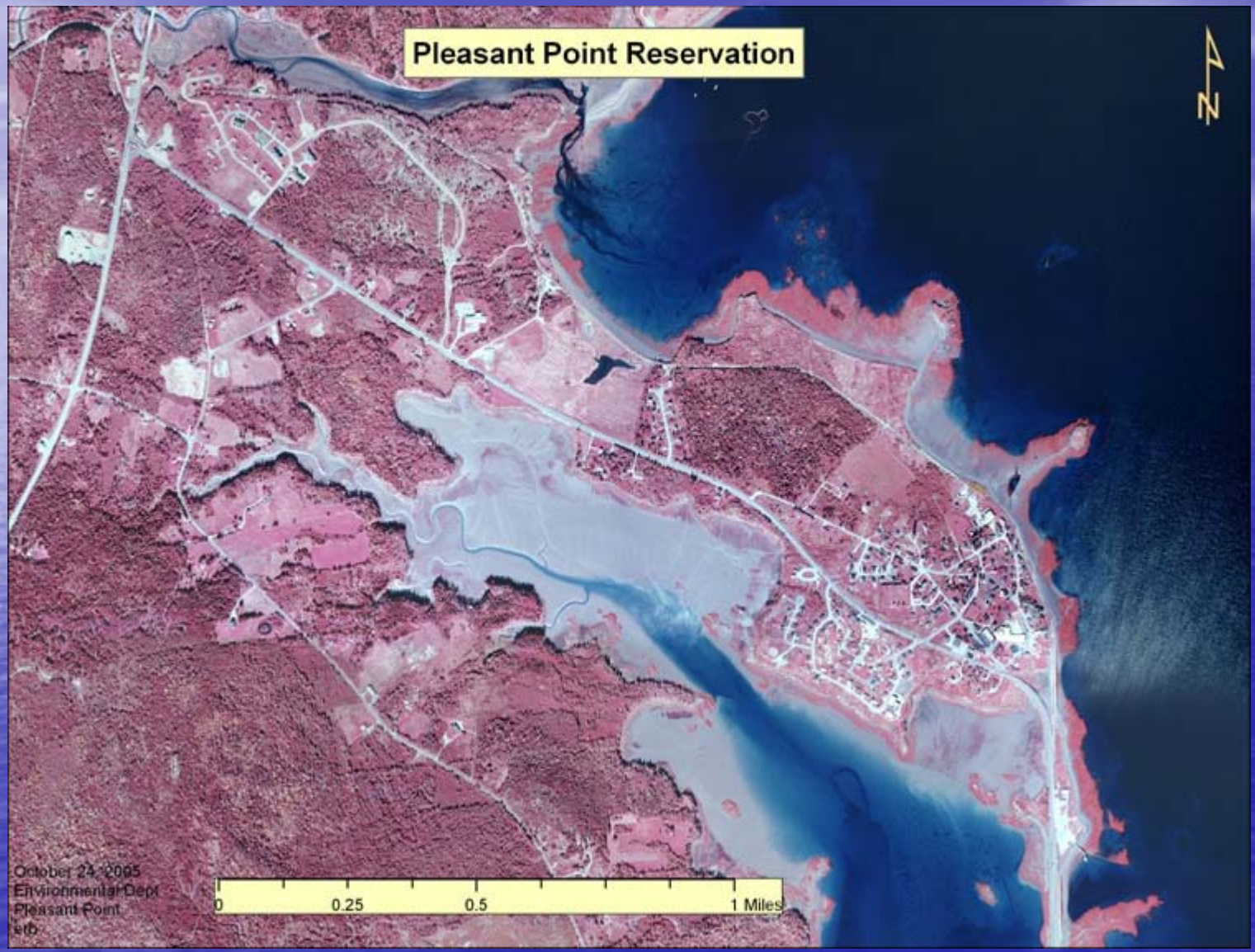
Pleasant Point Reservation
N
October 24, 2005
Environmental Dept
Pleasant Point
etb
0
0.25
0.5
1 Miles

BOYDEN LAKE

- 1704 ACRES
- EUTROPHIC
- DOWNEAST MAINE
- SINGLE STREAM DRAINAGE

ONLY ACCESS FOR ALEWIVES

SCIENTIFIC INTEREST

- GREATLY REDUCED POP. OF ALEWIVES DUE TO FAILED FISH LADDER
- ESTIMATED POTENTIAL OF 1.2 MILLION; 500K TO 1 MILLION LBS CARRYING CAPACITY
- IMPACT ON FOOD WEB STRUCTURE
- IMPACT ON DRINKING WATER QUALITY
- NO PREVIOUS STUDIES OF ALEWIFE POP IN DOWNEAST MAINE PONDS
- COMPARISONS TO ALEWIFE STUDIES IN SOUTHERN NE

OBJECTIVES

- GATHER INFORMATION ON ALEWIFE POPULATION IN BOYDEN LAKE
- ASSESS CHANGES IN BOD, NH4, TURBIDITY, OTHER CHEMICAL CHANGES
- STUDY IMPACT OF ALEWIFES ON FOOD WEB STRUCTURE IN BOYDEN LAKE (MACROINVERTEBRATES, ZOOPLAANKTON)

CONCERNS

- PASSAMAQUODDY WATER DISTRICT
- VIOLATION OF TURBIDITY VALUES
- IMPACT OF ESTIMATED 1.2 MILLION LB ALEWIVES DURING SUMMER MONTHS ON ECOSYSTEM

TIME TABLE

- FIELD STUDIES INITIATED SUMMER 2006
- SOP'S DEVELOPED, PRELIMINARY DATA COLLECTED
- SPRING-FALL 2007 DATA COLLECTION

METHODS 1

- ALEWIFE MONITORING

Sea Viewer color camera w/infrared lights

Digital video disk recorder EverFocus

Motion detector

Monitor

SeaViewer
Underwater Video Systems
XENARC
EDR410H
FULL
MODE
ZOOM
SEQ
SELECT
CALL
DISPLAY
REC
REV.PLAY
STOP
PLAY
PAUSE
COPY
ENTER
REW
SHUTTLE
JOG
LAN
ALARM
POWER
EverFocus
CH1
CH2
CH3

METHODS 2

- LOCATIONS:

  ON TOP OF FISH LADDER

  IN FISH WEIR IN STREAM

METHODS 3

- MACRO INVERT SAMPLING
  - AIRLIFT
    - 70 CM PVC TUBE, 5 CM DIAMETER
    - 500 Um mesh bag
    - .096m2 quadrat

Red Bear

SHERWOOD
ALUMINUM
80

METHODS 4

- ZOOPLANKTON
  - 80 uM mesh
  - 5 locations
  - 30 ft vertical tows

METHODS 5

- WATER CHEMISTRY
  - YSI INSTRUMENTATION
  - BOD WITH SEWAGE TREATMENT LAB
  - PHOSPHORUS IN-HOUSE, HACH DIGITAL BLOCK REACTOR 200
  - GENYSIS 20 SPECTROPHOTOMETER

Freezer

CHALLENGES

- COMMERCIAL FISHING ORDINANCE
- ENFORCEMENT
- OUTREACH
- EDUCATION