The Invasive Asian Carps in North America:

A Forum to Understand the Biology
and
Manage the Problem

22-23 August 2006

Peoria, IL

CONTAINMENT

Field Assessment of the Electric Dispersal Barrier in the Chicago Sanitary and Ship Canal

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Source: Rasmussen 2002

The critical link

Aquatic Nuisance Species Dispersal Barrier 1 (Demonstration)

OBJECTIVE

Assess ability of Barrier 1 to deter upstream movement of fish

Unique conditions and constraints in the Chicago Sanitary and Ship Canal

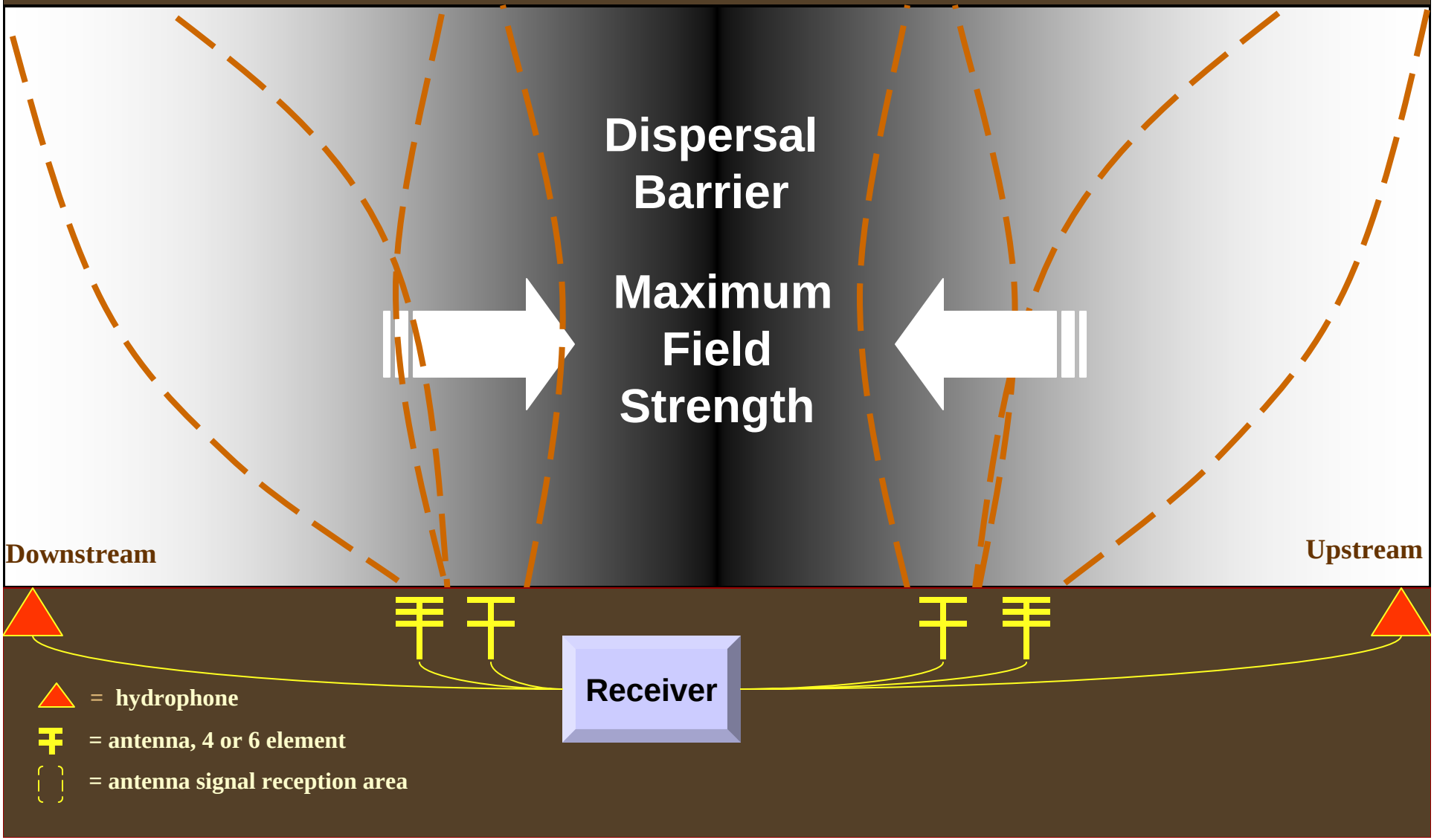
- Large scale
- Periodic high flow rates
- High water conductivity
- Fish move in *two* directions
- Safety of waterway users
- Barge effects on electric field
- ★ Demonstration project, 3-year life

Methods

- Combined acoustic/ radio telemetry system
  - Implant transmitters in common carp, release
  - Fixed and mobile tracking
    - Various seasonal and flow regimes

Source: Lotek Wireless, Inc.

Placement of Hydrophones and Antennas, Chicago Sanitary and Ship Canal



Questions and Concerns

- Would fish approach and probe the barrier?
- Were fish surviving surgery and retaining transmitters?
- What effect would barges have on the electric field and fish movement?

130 fish released

Barrier activated — Apr 2002

Assessment begins, radio only — Nov 2002

Barrier field strengthened — Apr 2003

Angler catch — May 2003

Barge effects study — Jul 2003

Angler catch — Mar 2004

Sentry Transmitter — May 2004

Carp "stacking" witnessed — Jul 2003

15

Tagged fish crosses barrier — Apr 2003

67

Angler catch — May 2003

Oct 2003

15

Hydrophones installed — Mar 2004

21

May 2004

Nov 2004

2005 — Nov 2006 — 2007

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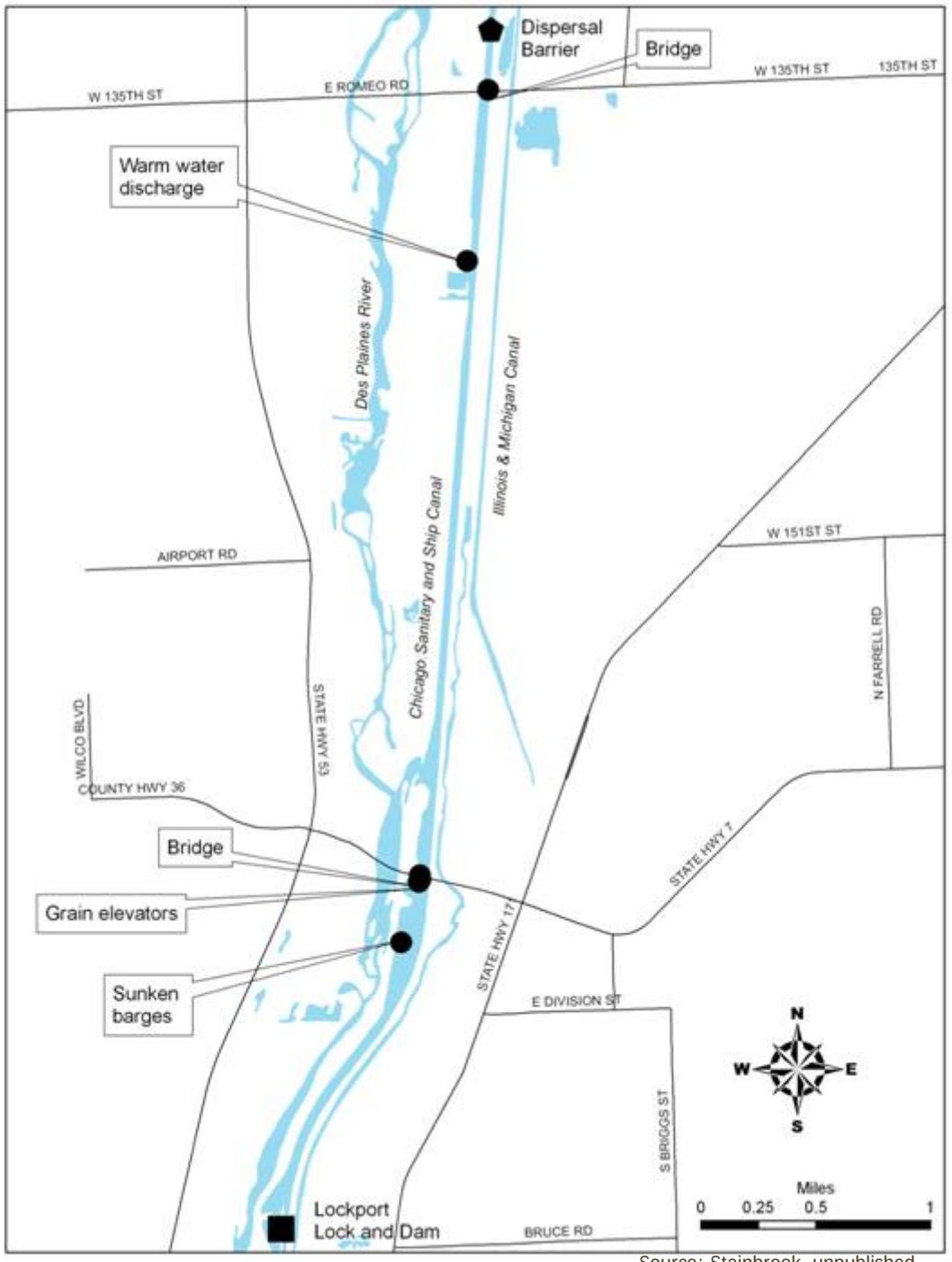
Barrier 2?

Confinement Experiment

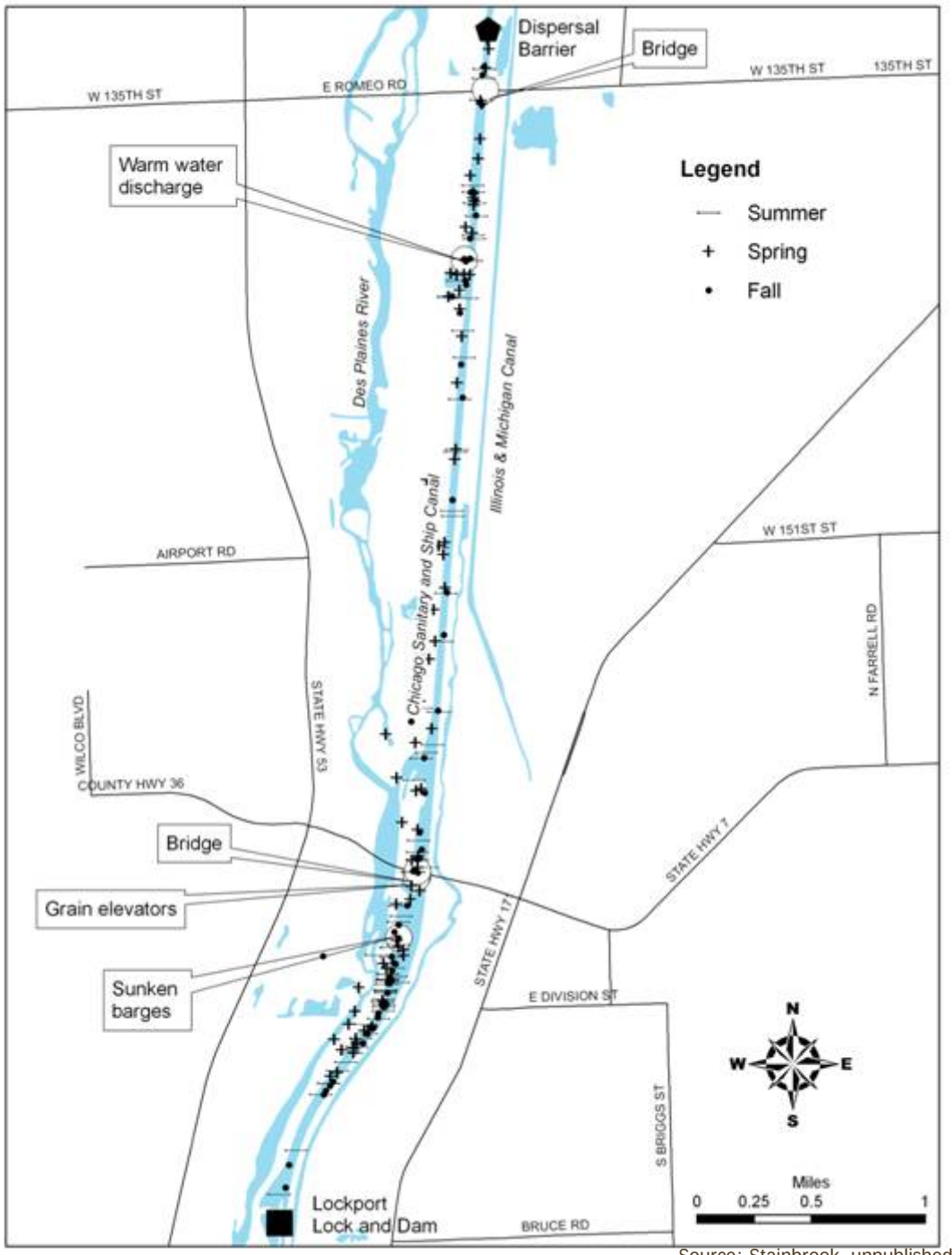
Important Habitat Features



Source: Stainbrook, unpublished

Mean Seasonal Transmitter Positions

Spring, Summer, Fall 2002-2004

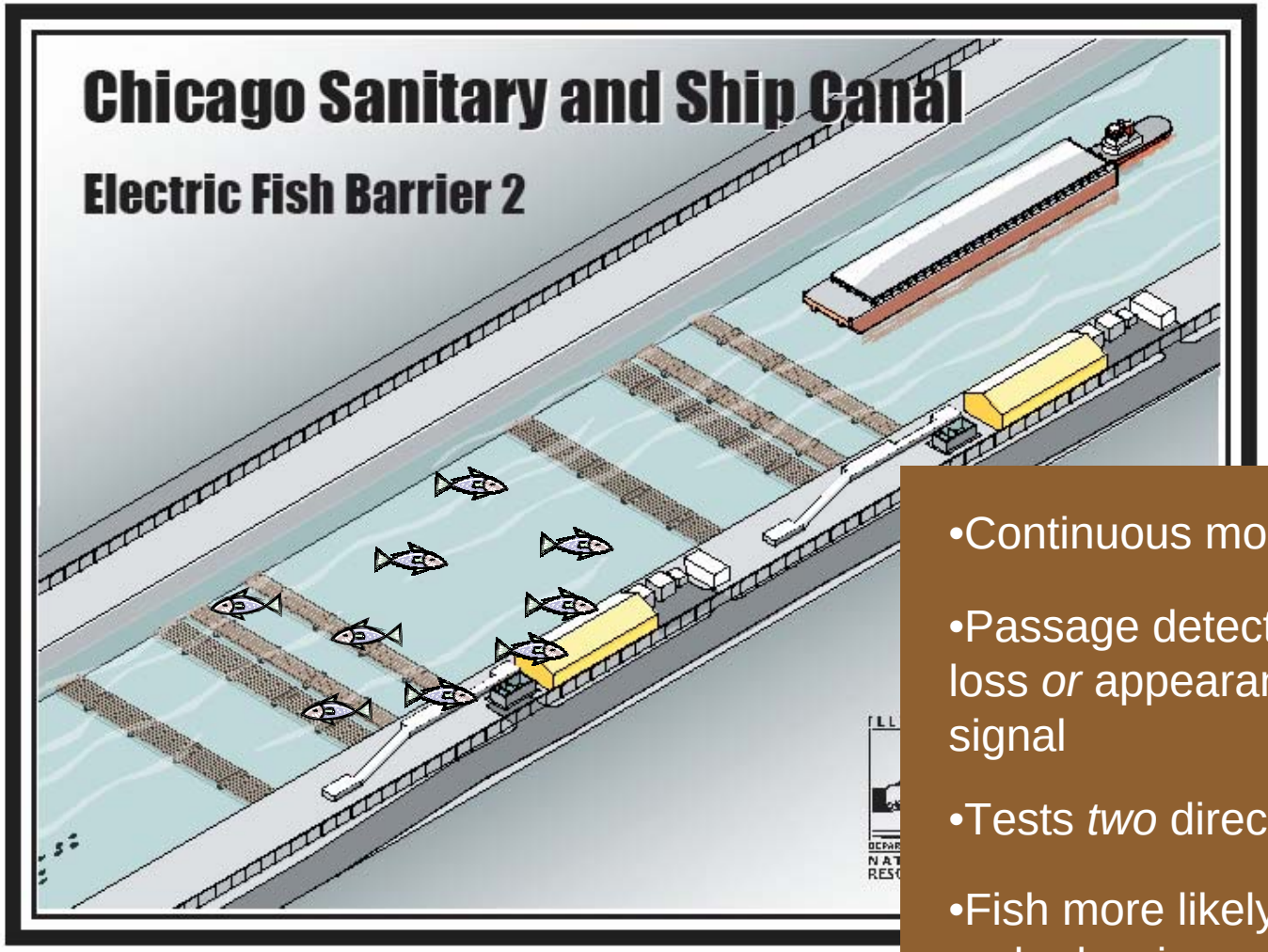


Source: Stainbrook, unpublished

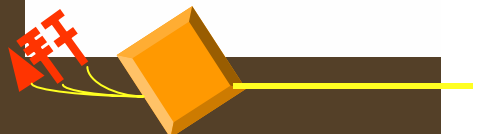
Findings/ Observations

- Fish survive surgery
- Fish are challenging barrier
- Initial electric field may not have been strong enough
- Barges disrupt electric field; may aid fish passage
- Tows up to 5 barges long traveling in canal; important for length of electric field

Improved Two-Barrier System



- Continuous monitoring
- Passage detection by loss *or* appearance of signal
- Tests *two* directions
- Fish more likely to probe barrier



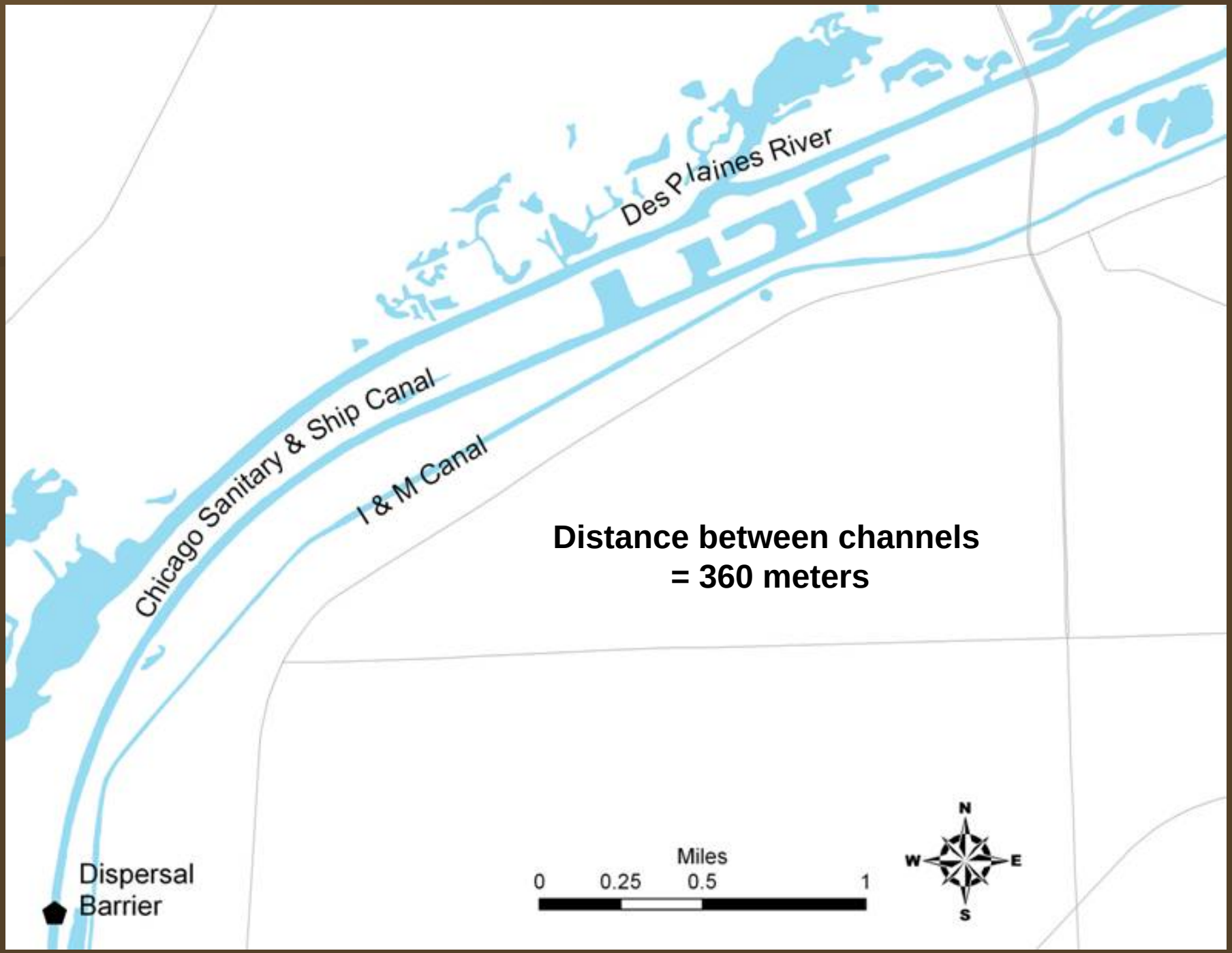
Fixed telemetry monitoring station

Current Issues

- Barrier I
  - Has reached design life of 3-5 years, is deteriorating
  - Continued operation will require upgrades
  - No federal authority to continue
  - Being pursued in WRDA
- Barrier II
  - Behind schedule
    - Initial projection: July 2005… now 2007?
  - Safety tests need to be completed
  - Oversight for operation and maintenance?
- Bypasses

Bypassing the barrier

- Hitchhiking on watercraft


Des Plaines River
Chicago Sanitary & Ship Canal
I & M Canal
Distance between channels
= 360 meters
Dispersal
Barrier
Miles
0
0.25
0.5
1
N
W
E
S

Bypassing the barrier:
Human Intervention

Bait Transfer

Cultural-based releases from live fish market

Intentional Release

Lessons Learned

- **There is no substitute for field testing/observation**
  - Electrical field strength
  - Effect of barges
  - Safety hazards
  - Barge operation

- **Choose wording carefully**
  - “Demonstration barrier”
  - “Barriers 2a and 2b”

- **Long term protection requires long term commitment**
  - Political will, funding

- **Risk remains**
  - Bypasses

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