

CANALS:  
MOST LOUISIANA LANDLOSS IS  
CAUSED BY CANALS AND RESTORING  
CANALS IS SUCCESSFUL

Louisiana Oil and Gas Symposium 2019  
Louisiana Geological Survey

R.E. Turner<sup>1</sup>  
G. McClenachan<sup>2</sup>

<sup>1</sup>Louisiana State University

<sup>2</sup>University of Central Florida

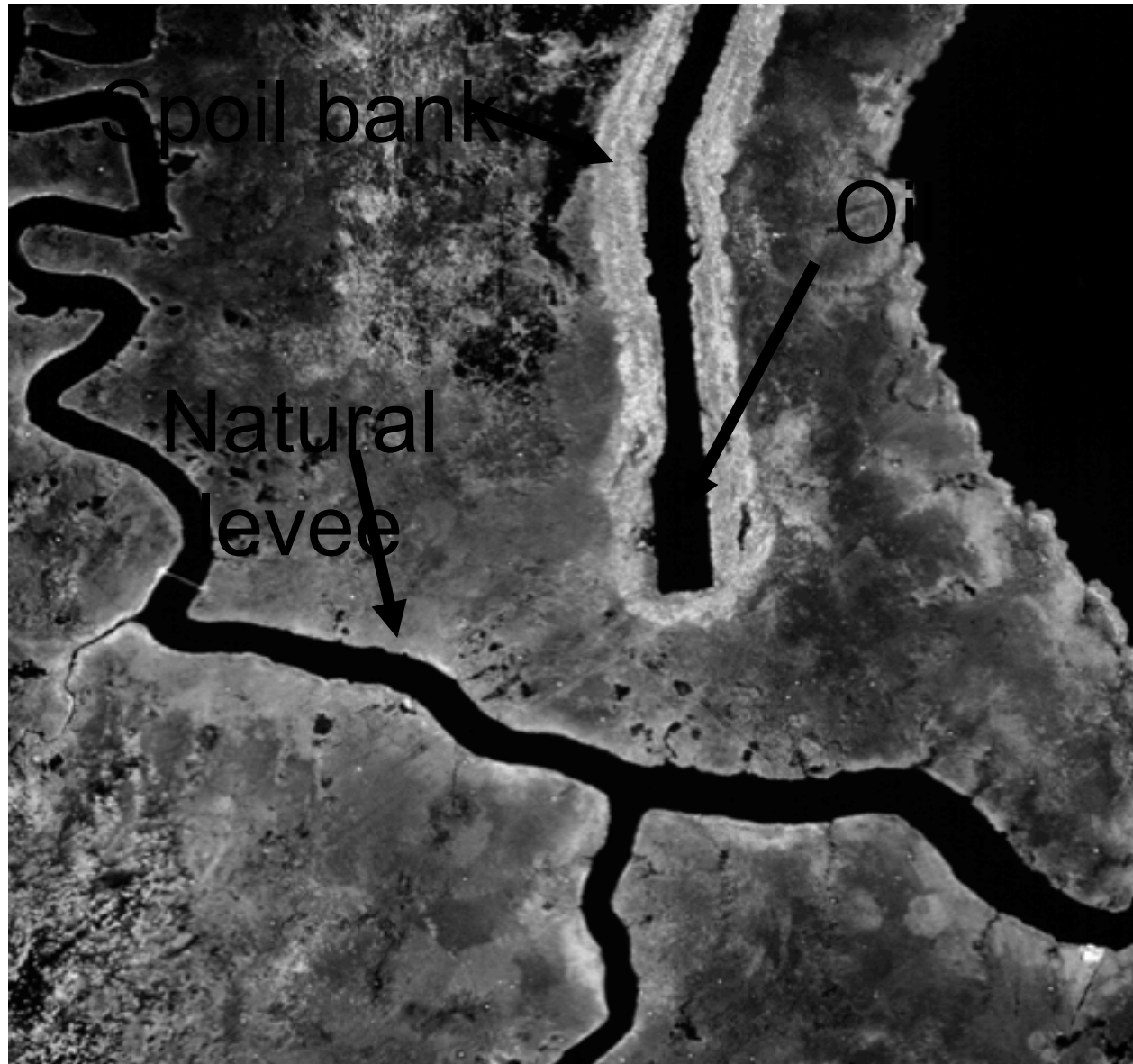
17 April 2019



Spoil bank

Oil well

# What and where are canals and spoil banks?





• Oil well



# Barataria Estuary 2001

Canals  
and  
spoil  
banks



# Interaction of natural and dredged levees



# How do canals and spoil banks cause land loss?

Water exchange interrupted above and belowground: drying and flooding exacerbated

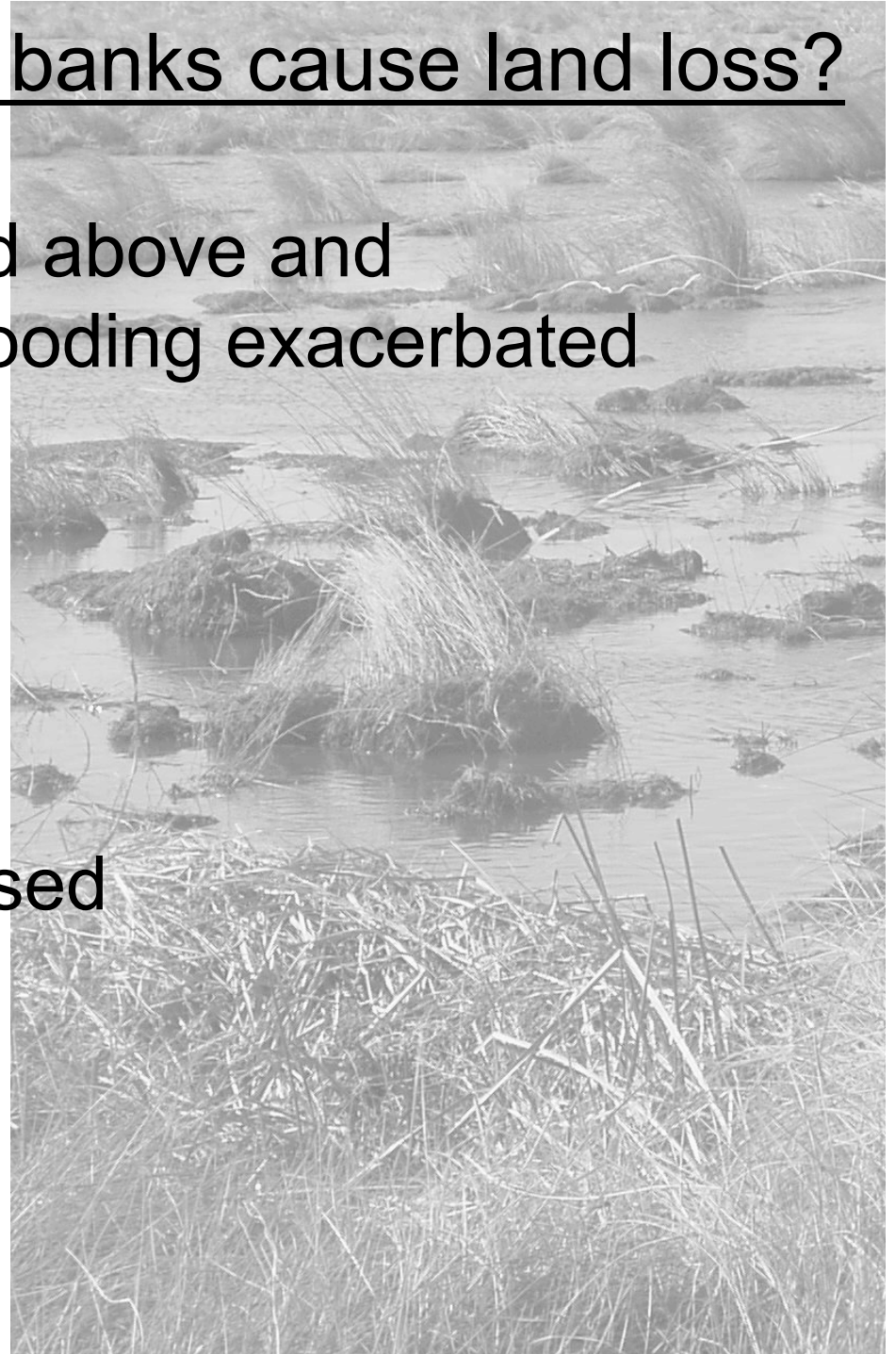
Impoundments form

Soil oxidation

Shallow subsidence increased

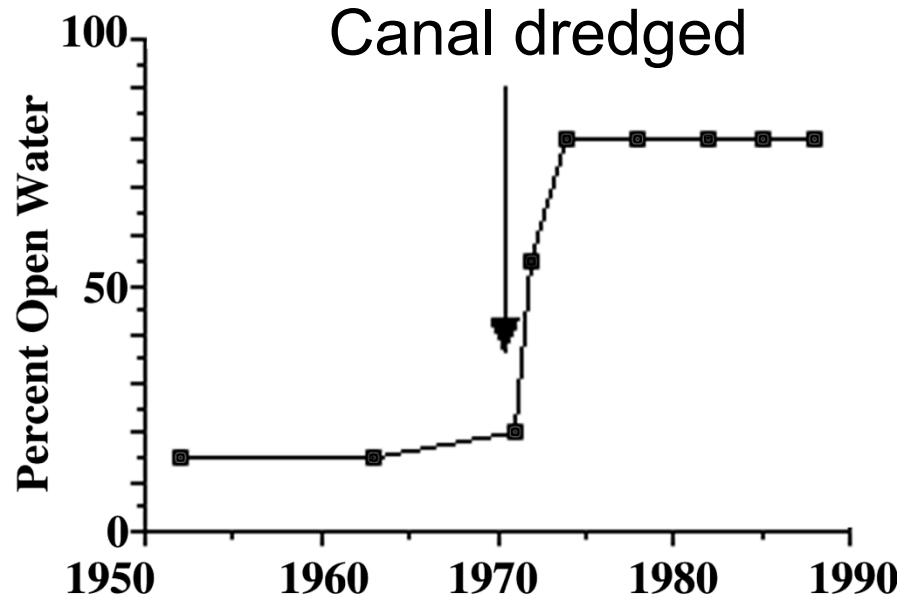
Soil weakens

plant dieback



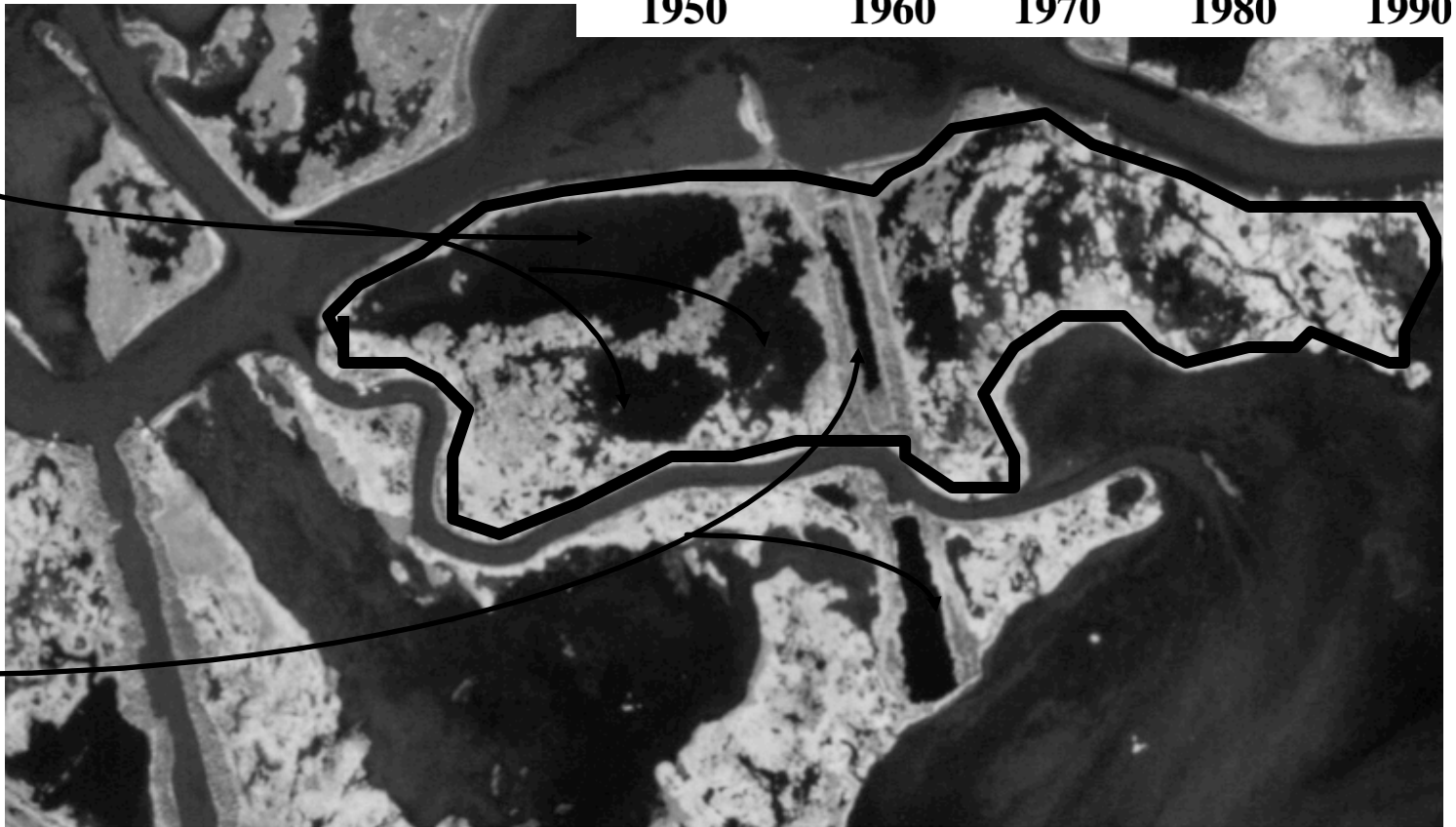


Unexpected  
Indirect  
linkages

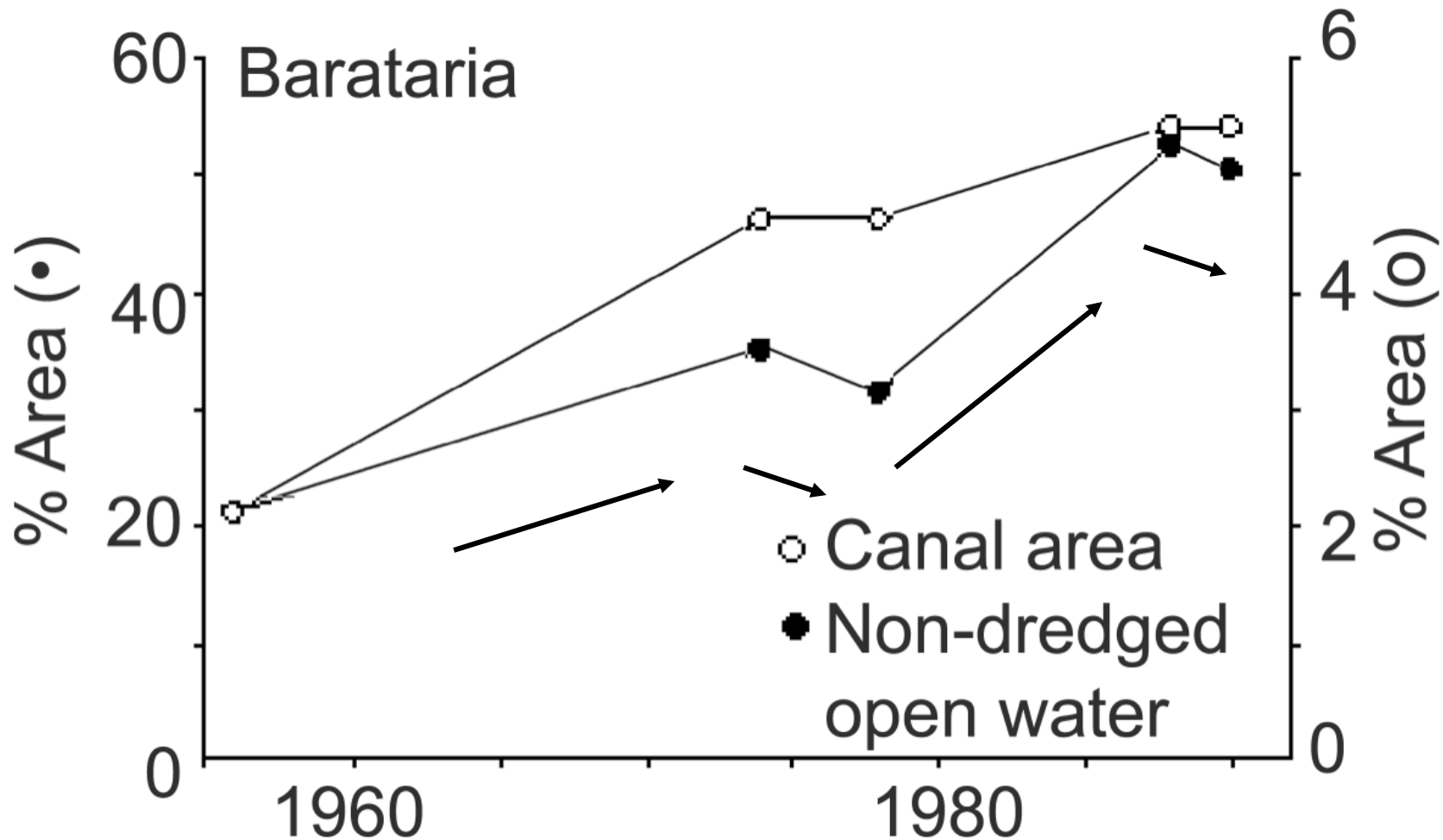


2. and open water formed here

1. this canal was dredged



# A dose-response relationship between dredging and wetland loss

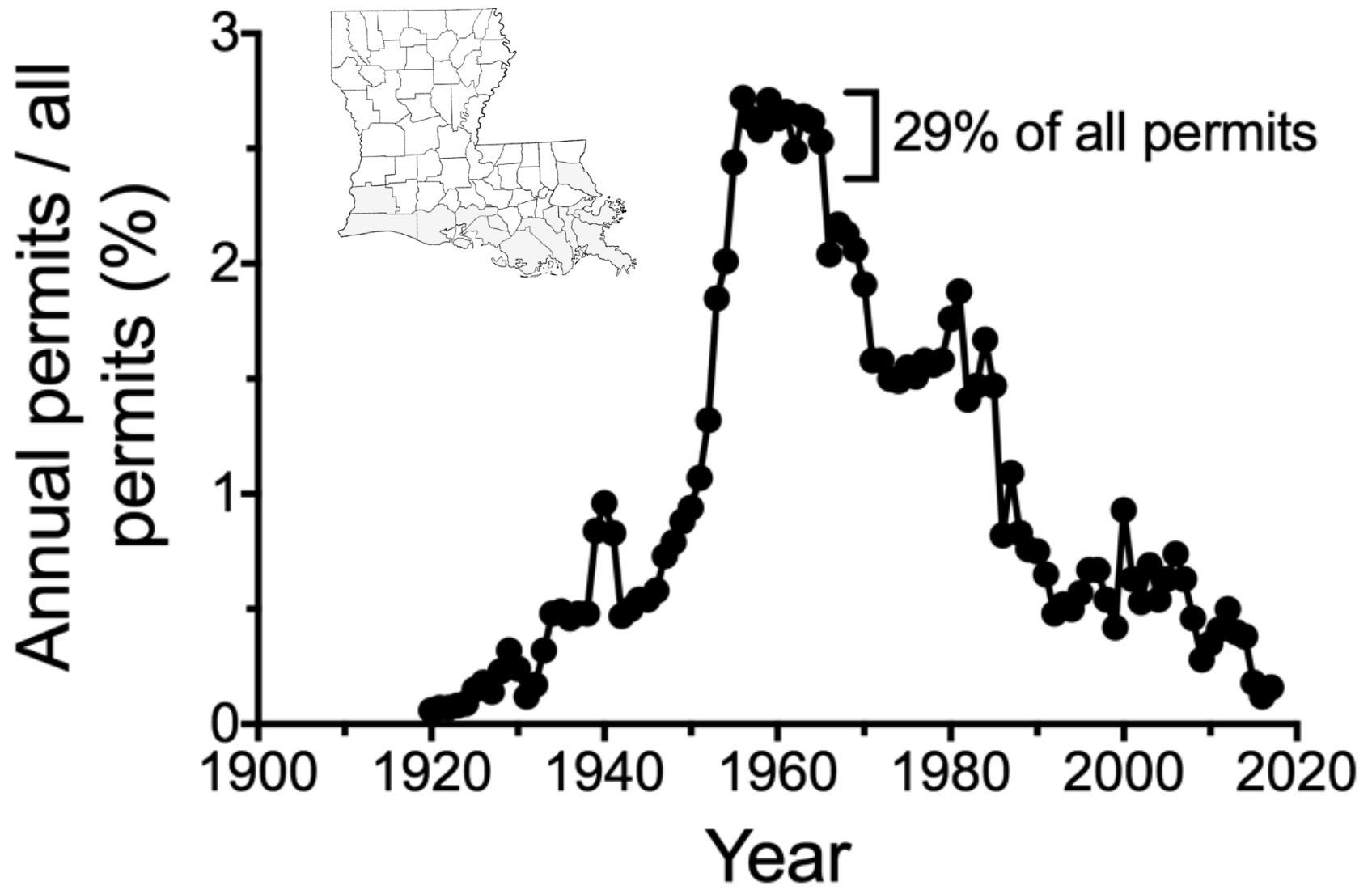


Bass, A. and R.E. Turner 1997. Relationships between salt marsh loss and dredged canals in three south Louisiana estuaries. **J. Coastal Research** 13: 895-903.

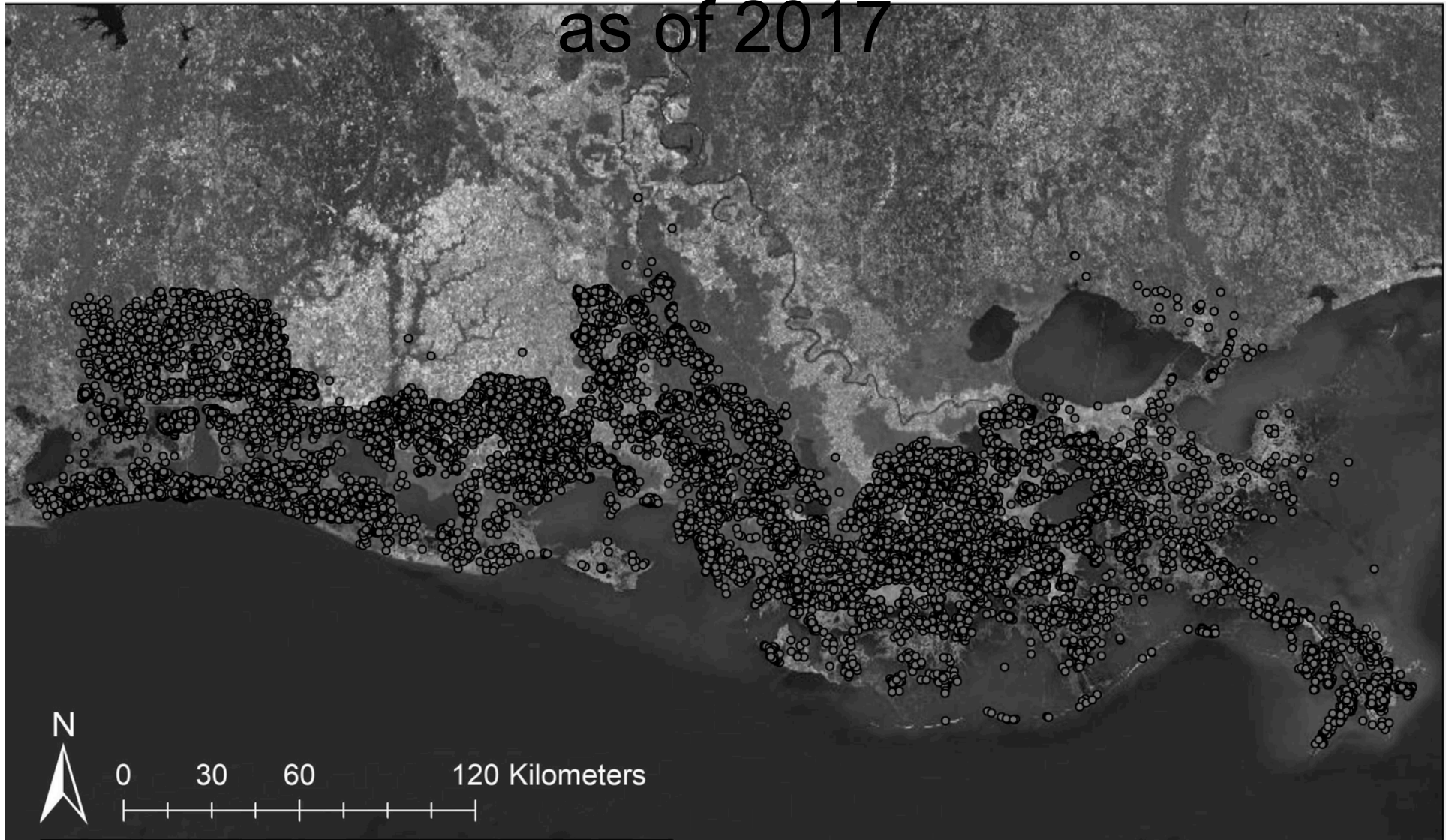
# How many canals?

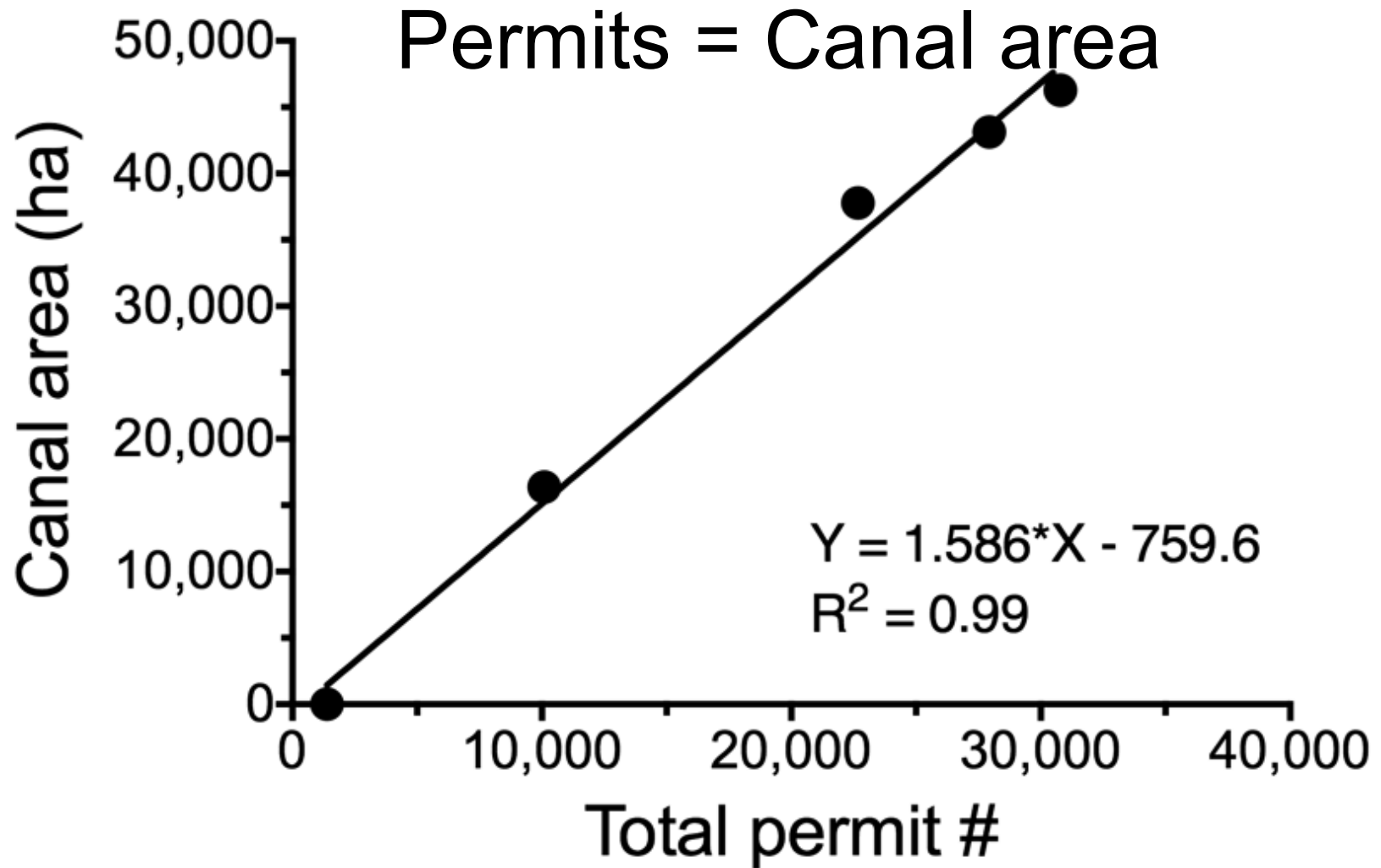
DNR permit files for 14 coastal parishes  
from 1900 to 2017:

- 76,247 permits
  - 35,163 on land as of 2010
    - 27,483 officially abandoned



# Abandoned and plugged wells on land as of 2017





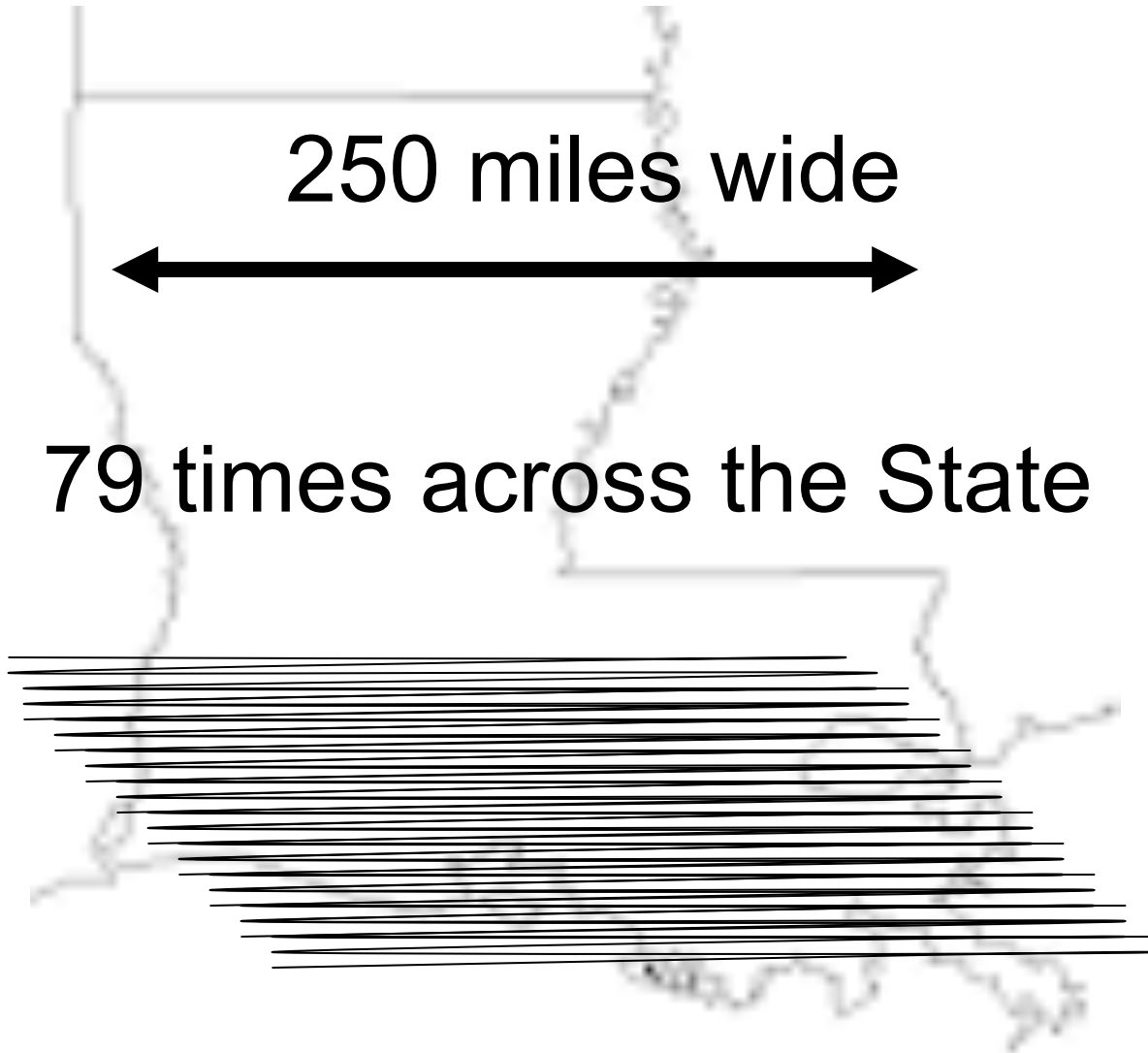
Divide by width = length

10,000 miles of canals =  
20,000 miles of spoil bank

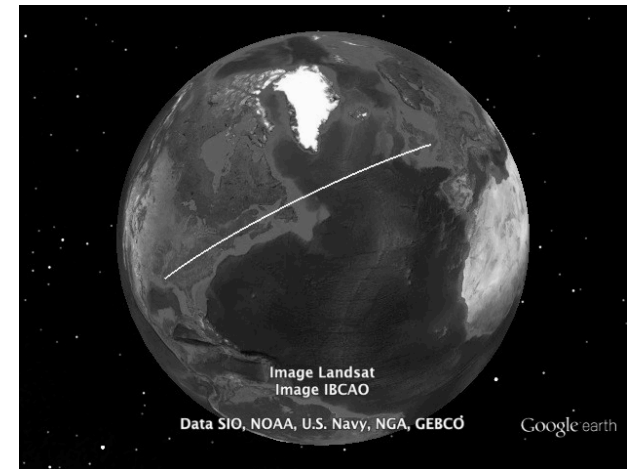
250 miles wide



79 times across the State



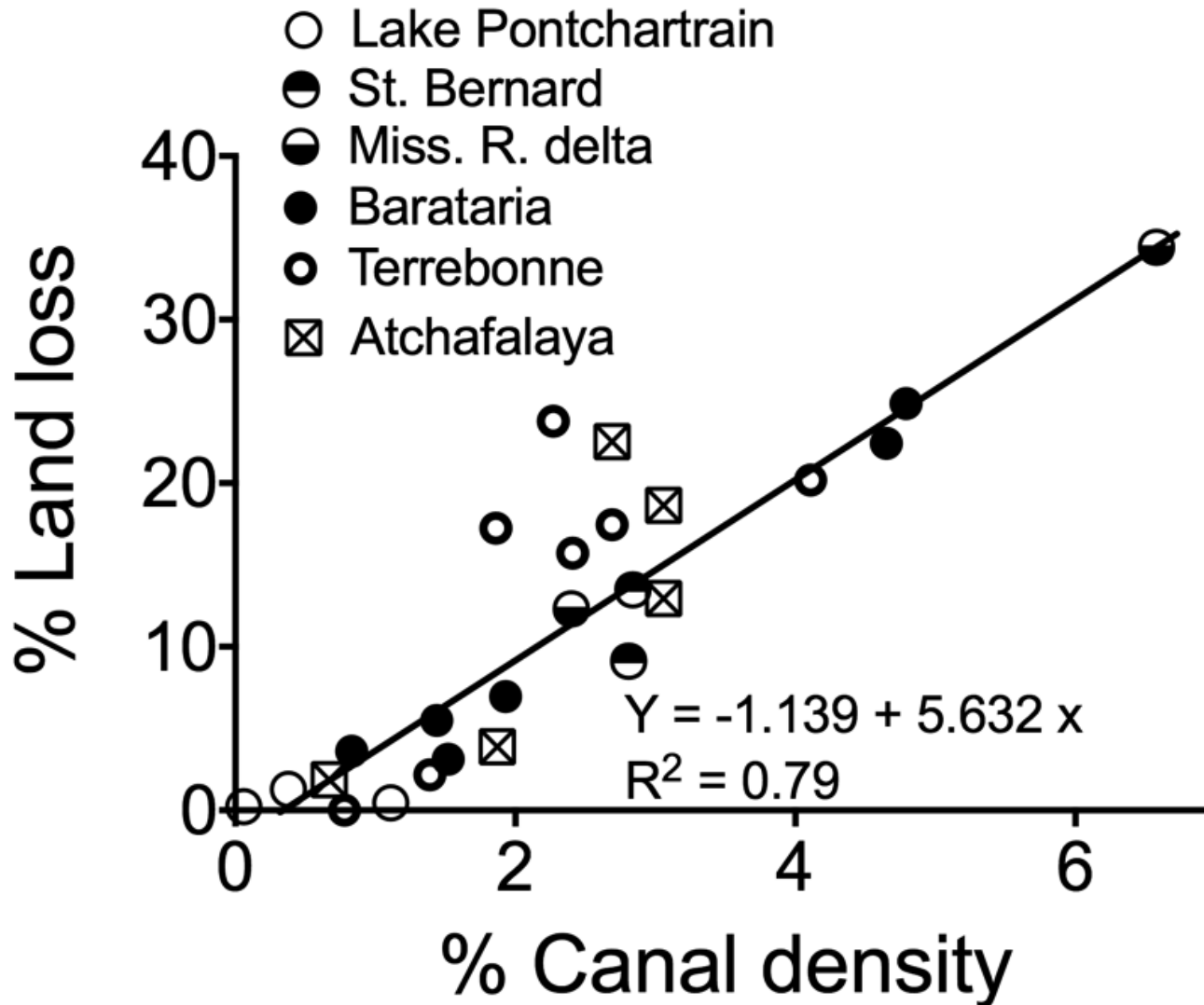
20K miles = 2  
*round* trips from  
Louisiana to Switzerland



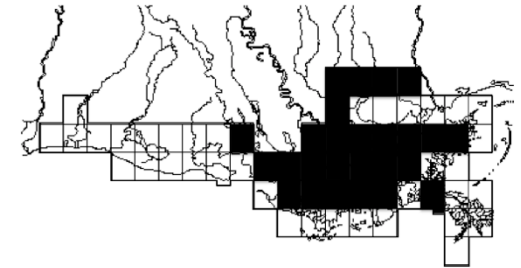
Distance around the  
equator = 24,901 miles

# The outcome:

1930s to 1990

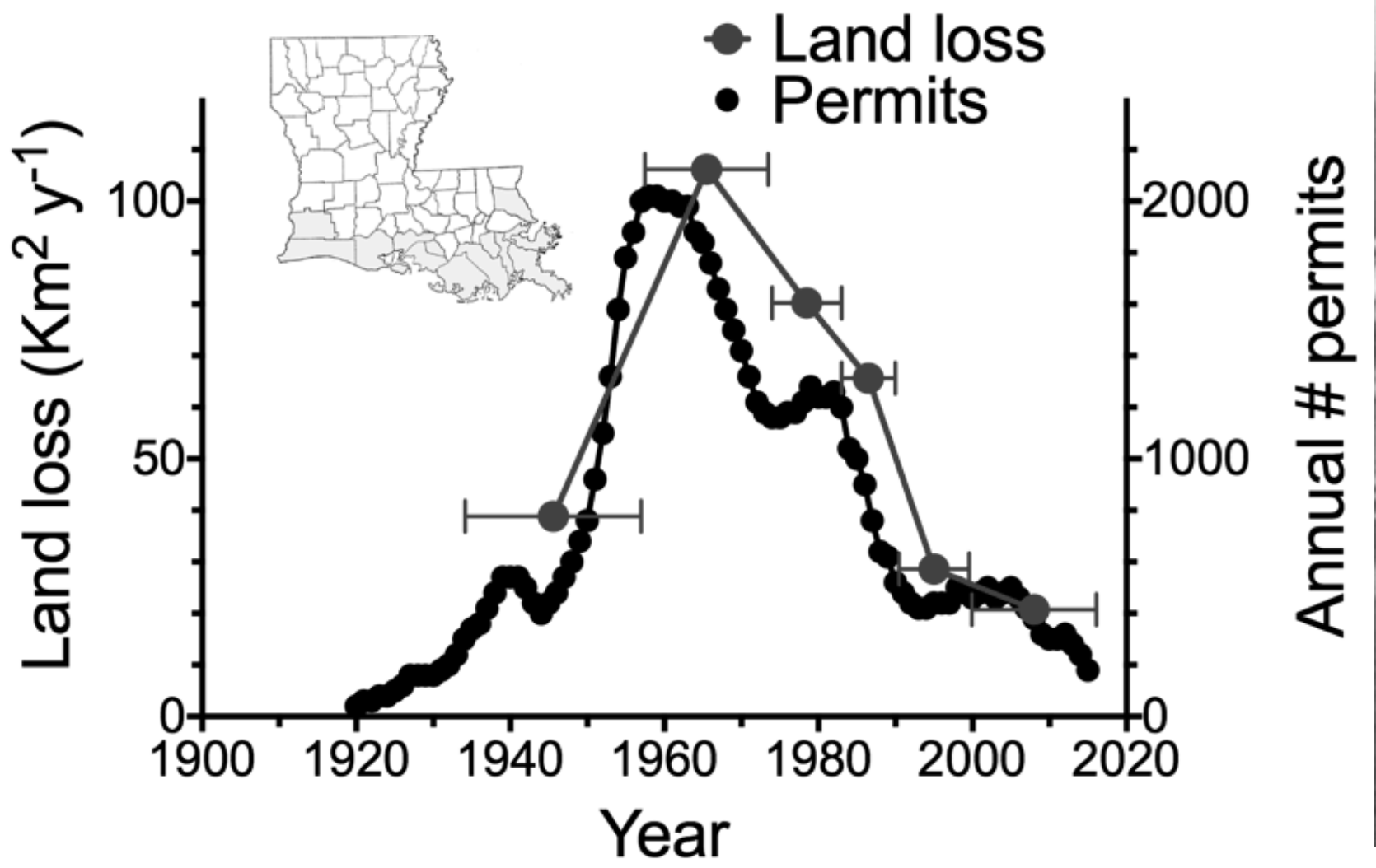


4.6 ha of  
land lost per  
ha of canal

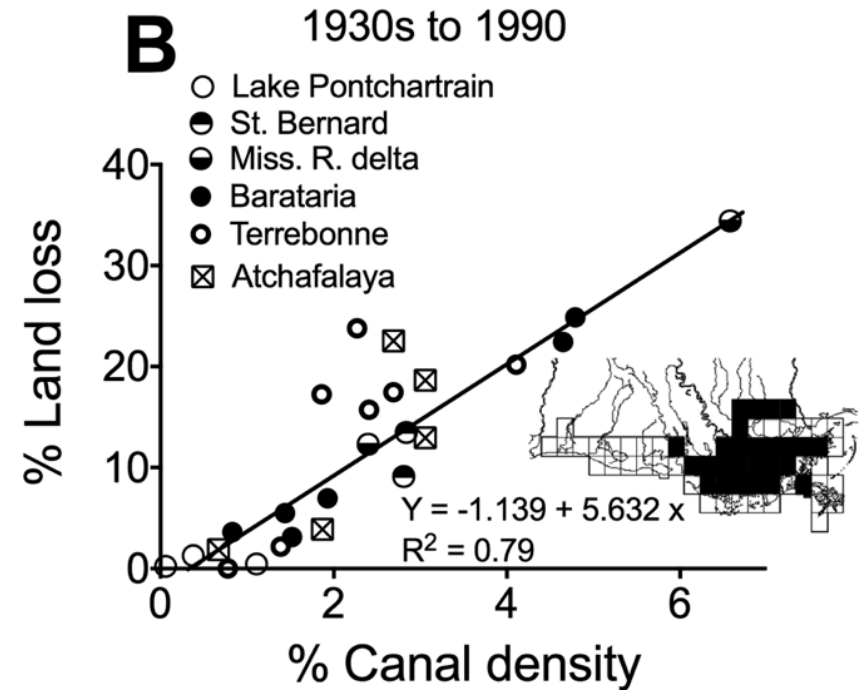
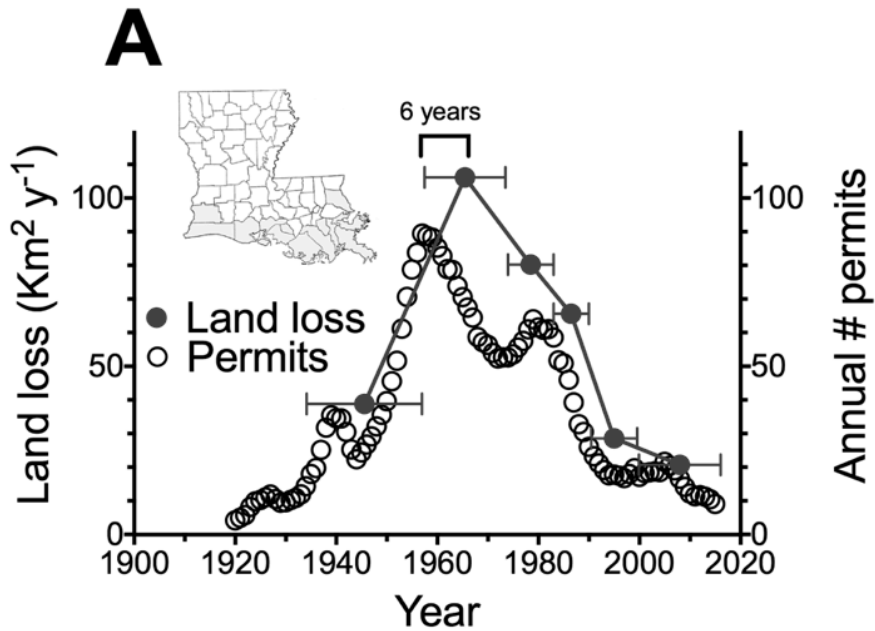


15 min quadrangle  
maps that include  
77% of the deltaic  
plain; maps with  
<25% marsh are  
excluded



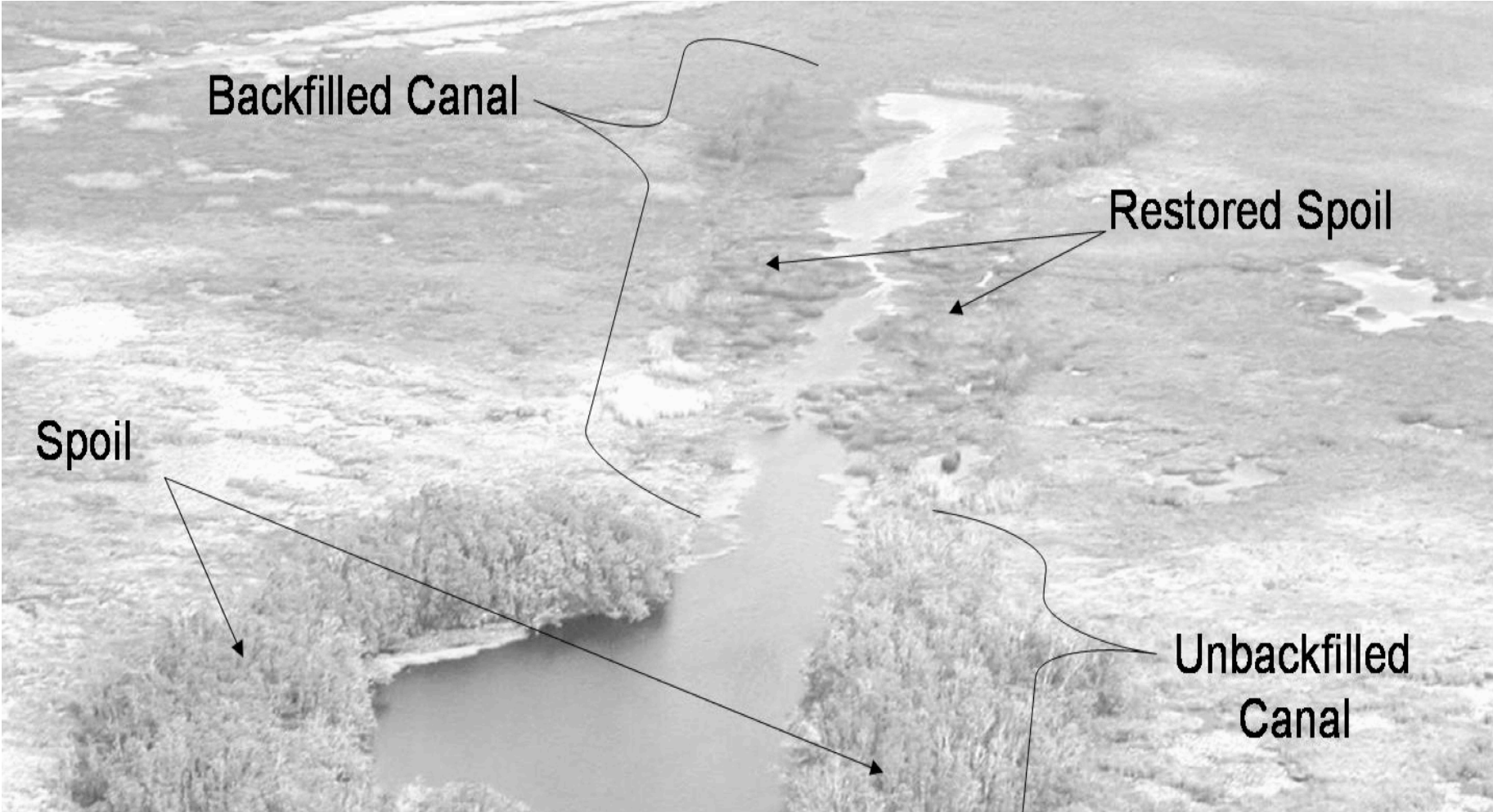


# Concurrence of land loss in time and space



Can the damage be reversed?

Partially --- the looming sea level rise rates are game changers



**Backfilled Canal**

**Restored Spoil**

**Spoil**

**Unbackfilled Canal**

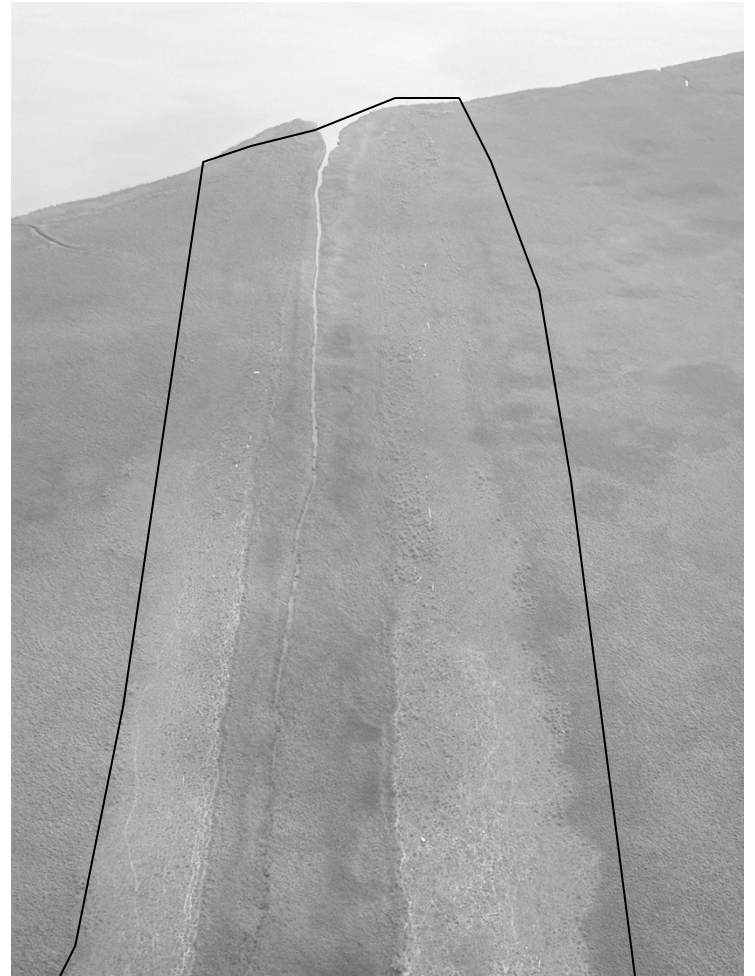
Some don't recover



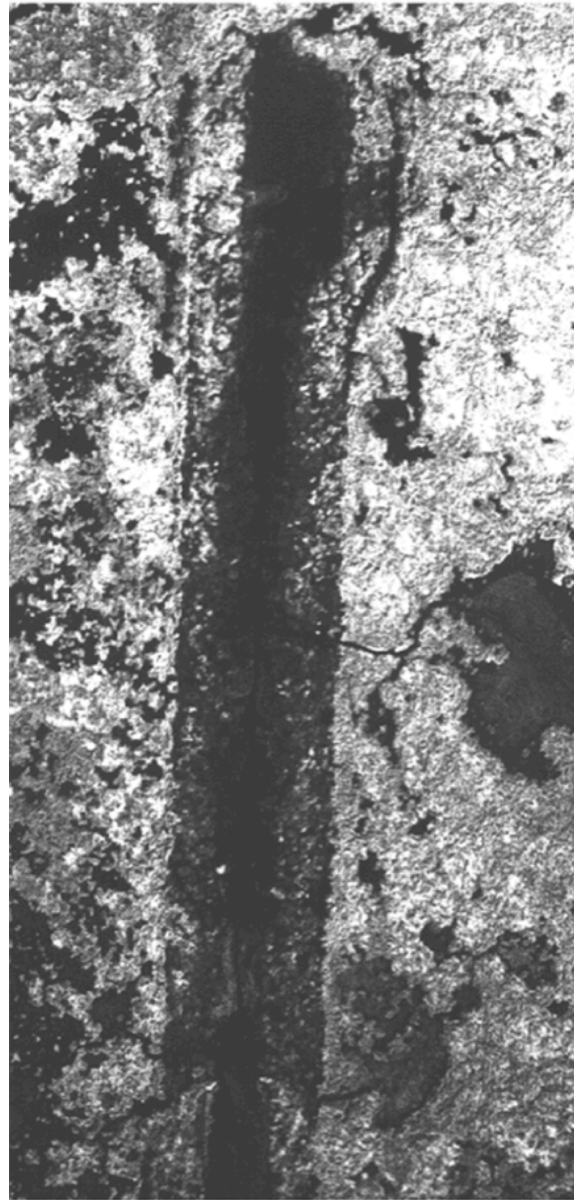
Some do recover



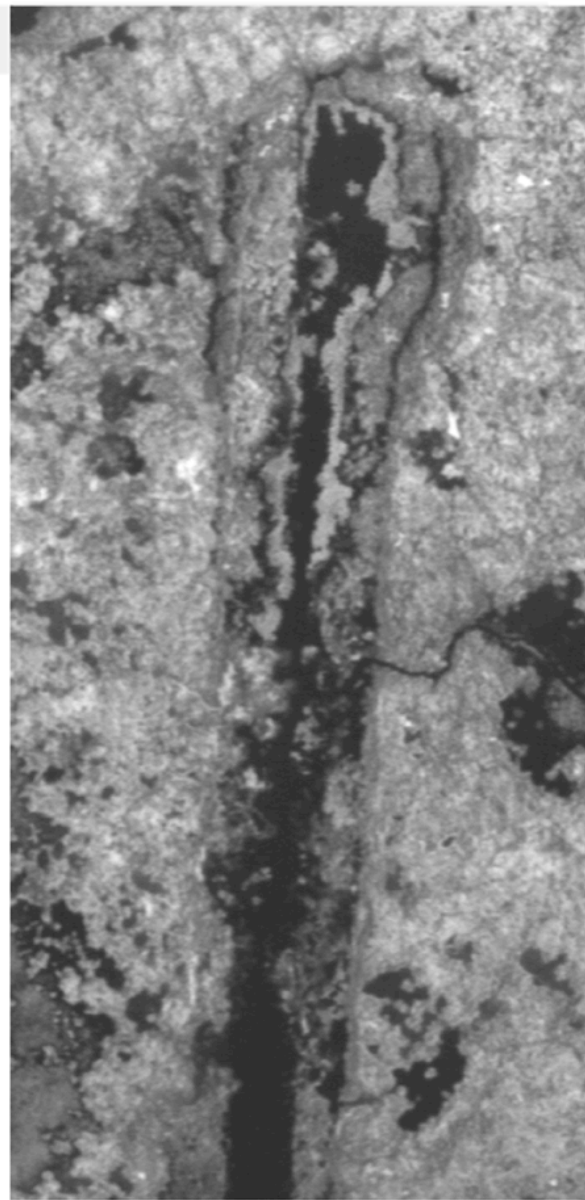
# Examples



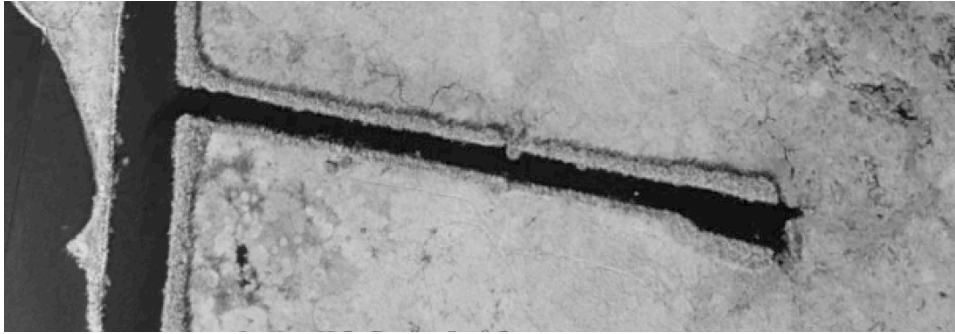
#6 4.8 ha



1990



2000



1998



2018

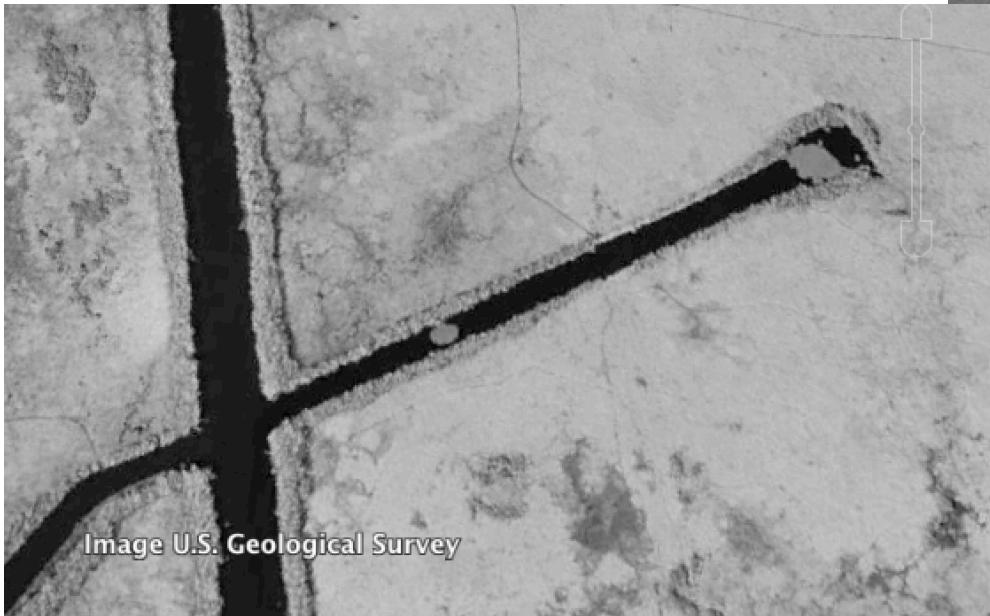
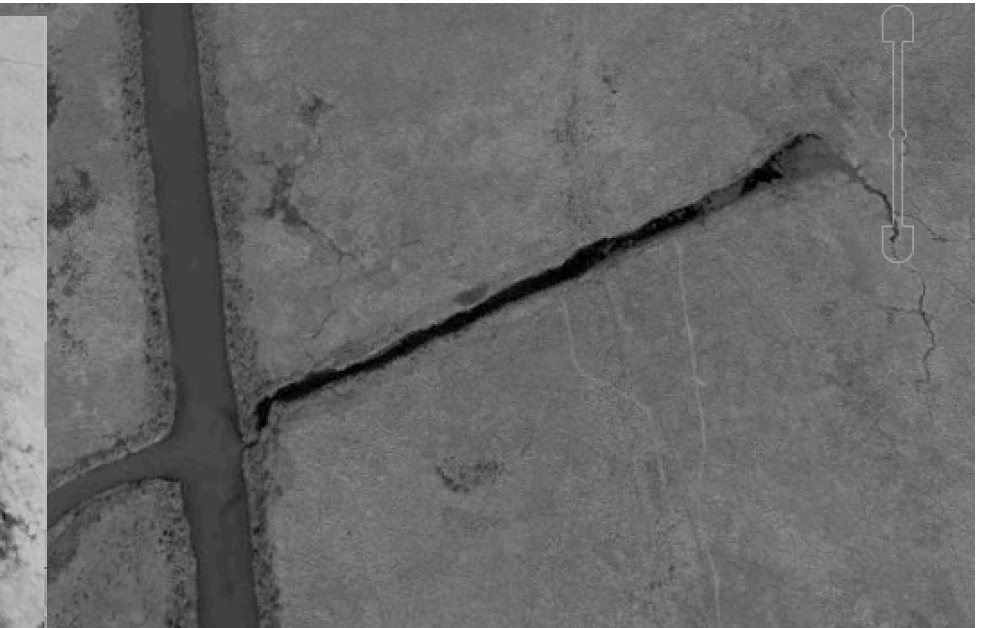


Image U.S. Geological Survey





## Backfilling cost:

@ \$12,224 ha<sup>-1</sup>

= \$335 million for ALL canals

= 0.67% of \$50 billion dollar

restoration cost in Louisiana's  
'Master Plan'

1% of the canals dredged = 260 canals

= \$3.5 million restoration cost

= 65 X more than already backfilled

*Thank you!*

*Questions? Comments?*

