# Cost-efficacy in wetland restoration projects in coastal Louisiana

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Based on the manuscript in review at Wetlands:
Merino, J., C. Aust, D. Johnson, R. Caffey

# CWPPRA mandates cost effectiveness:

*"...coastal wetlands restoration projects in Louisiana (will) provide for the long-term conservation of such wetlands and dependent fish and wildlife populations in order of priority, based on the cost-effectiveness of such projects in creating, restoring, protecting, or enhancing coastal wetlands..."* [Underline added]

# Cost-effectiveness

- CWPPRA uses several cost-effectiveness measures in a complex annual review process.
- Aust (2006) questioned project selection
- The final measure of which is:

$$\frac{\text{Average annual \$}}{\text{AAHU}}$$

  - Results is selected or not selected.

# Our questions?

- Because the data already was …
  I could analyze all data available from the program and ask:

- Selection (funded or not funded) = WHAT ?
- and what influences that?

# The Factors

- AAHU
- Basin
- Cost (total and AA)
- Cost/Benefit
- Parish
- Population
- Region
- Sponsor
- Project acres

- Type (VP, HR, FD, SNT, OM, SD, MC, SP, BI)
- Wetland available
- Year aka PPL

ALL COSTS DEFLATED TO 2003 dollars to account for inflation.

DATA FROM 1991- 2005

Not including DEMOs, CoastWide or deauthorized projects.

# What determines Project Selection?

## Cost/benefit

**Average annual dollar/ average annual habitat unit**

- This model best predicts which projects are NOT selected for funding.

Analysis of Maximum Likelihood Estimates:

| Parameter | DF | Estimate | Standard Error | Wald Chi-Square | Pr > Chi Sq |
|---|---|---|---|---|---|
| Intercept | 1 | 2.0705 | 0.7117 | 8.4641 | 0.0036 |
| cost/benefit | 1 | -0.3176 | 0.0870 | 13.3415 | 0.0003 |

- Cost/benefit is negatively related to a project being selected: as cost/ benefit decreases the likelihood of project selection increases.

# Cost/benefit of all nominees

Using a range of Cost/benefit of all projects (selected and non selected) the calculated probability of selection for:

| | Min | Mean | Max |
|---|---|---|---|
| cost/benefit \| | $82 | $7,850 | $75,837 |
| prob of selection \| | 69% | 38% | 19% |

# DONE?

- This shows that the CWPPRA program does select projects based on cost-effectiveness.
- The next logical question is: can we determine what influences cost-effectiveness i.e. cost/benefit

  …and does that provide anything meaningful?

# So what influences cost/benefit?

- Dump in all remaining factors, you get ….

# YEAR

# Project Acres

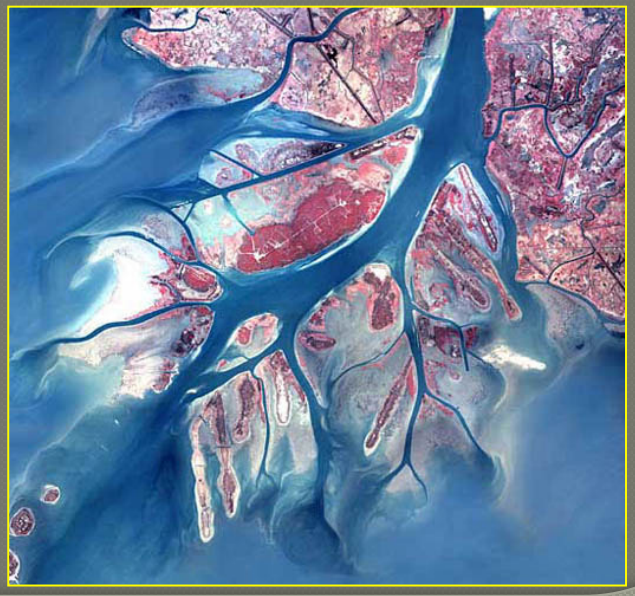
and

# TYPE

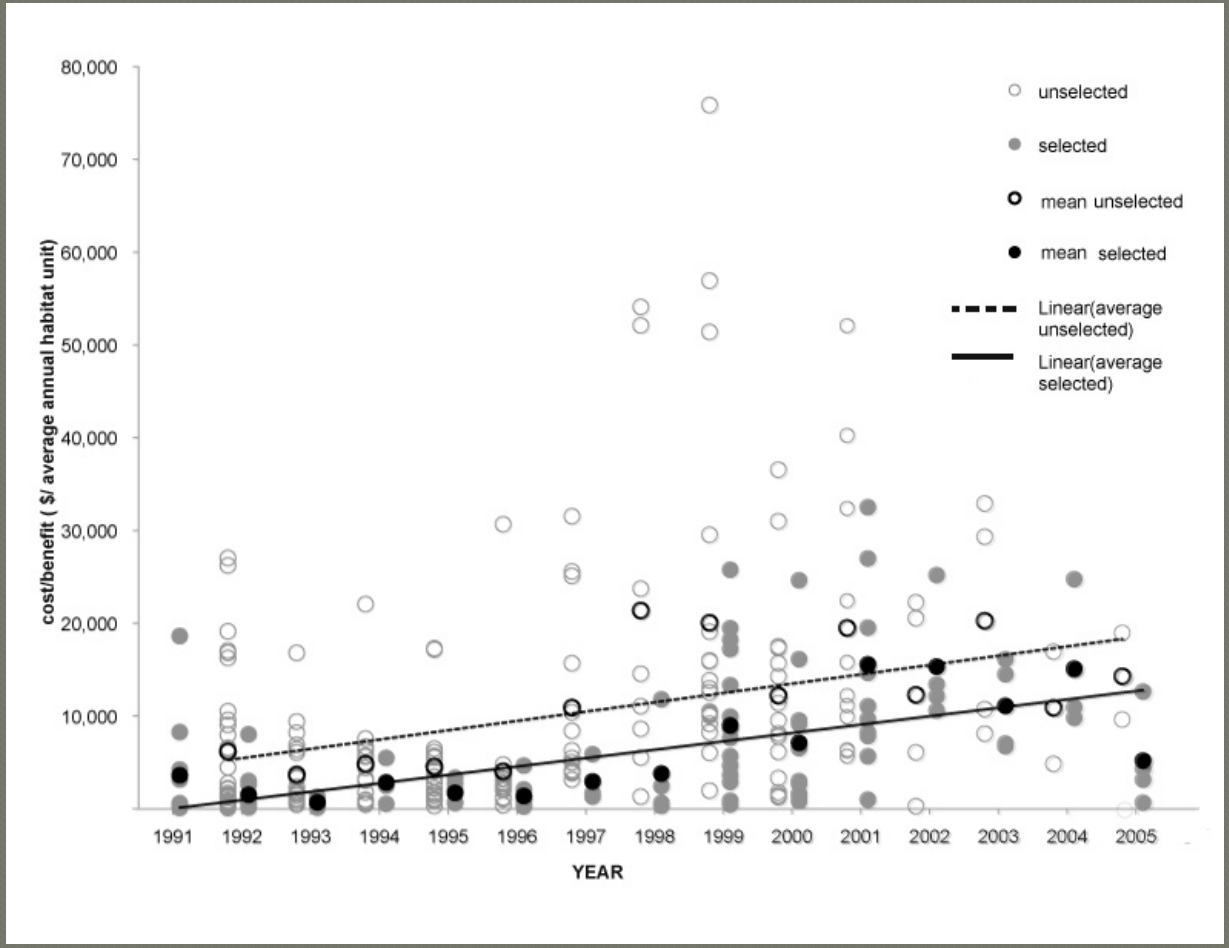
| Variable | | Parameter Estimate | SE | t value | Pr > \|t\| | significant |
|---|---|---|---|---|---|---|
| Intercept | | 10.324 | 0.680 | 15.190 | <0.0001 | * |
| Year | 1991 | -1.419 | 0.448 | 3.160 | 0.002 | * |
| Year | 1992 | -0.803 | 0.378 | 2.120 | 0.035 | * |
| Year | 1993 | -1.315 | 0.415 | 3.170 | 0.002 | * |
| Year | 1994 | -0.813 | 0.417 | 1.950 | 0.053 | * |
| Year | 1995 | -0.580 | 0.389 | 1.490 | 0.137 | |
| Year | 1996 | -0.263 | 0.397 | 0.660 | 0.508 | |
| Year | 1997 | 0.022 | 0.408 | 0.050 | 0.958 | |
| Year | 1998 | 0.075 | 0.432 | 0.180 | 0.861 | |
| Year | 1999 | 0.080 | 0.386 | 0.220 | 0.830 | |
| Year | 2000 | 0.370 | 0.405 | 0.920 | 0.357 | |
| Year | 2001 | 0.820 | 0.409 | 2.010 | 0.046 | |
| Year | 2002 | 0.696 | 0.472 | 1.48 | 0.141 | |
| Year | 2003 | 0.711 | 0.483 | 1.47 | 0.143 | |
| Year | 2004 | 0.505 | 0.518 | 0.98 | 0.330 | |
| Year | 2005 | 0.000 | . | . | . | |
| Project acres | | -0.543 | 0.050 | 10.85 | <0.0001 | * |
| TYPE | BI | 2.476 | 0.518 | 4.78 | <0.0001 | * |
| TYPE | FD | 1.481 | 0.520 | 2.85 | 0.005 | * |
| TYPE | HR | 0.944 | 0.511 | 1.85 | 0.066 | |
| TYPE | MC | 1.643 | 0.512 | 3.21 | 0.002 | * |
| TYPE | OM | 1.465 | 0.615 | 2.38 | 0.018 | * |
| TYPE | SD | 1.270 | 0.559 | 2.27 | 0.024 | * |
| TYPE | SNT | 1.088 | 0.578 | 1.88 | 0.061 | |
| TYPE | SP | 1.865 | 0.508 | 3.67 | 0.000 | * |
| TYPE | ST | 0.698 | 0.776 | 0.9 | 0.370 | |
| TYPE | VP | 0.000 | . | . | . | |
| Overall model significance p<0.0001, f=24.53, df=23, $R^2$=0.686 | | | | | | |

# Cost/benefit =

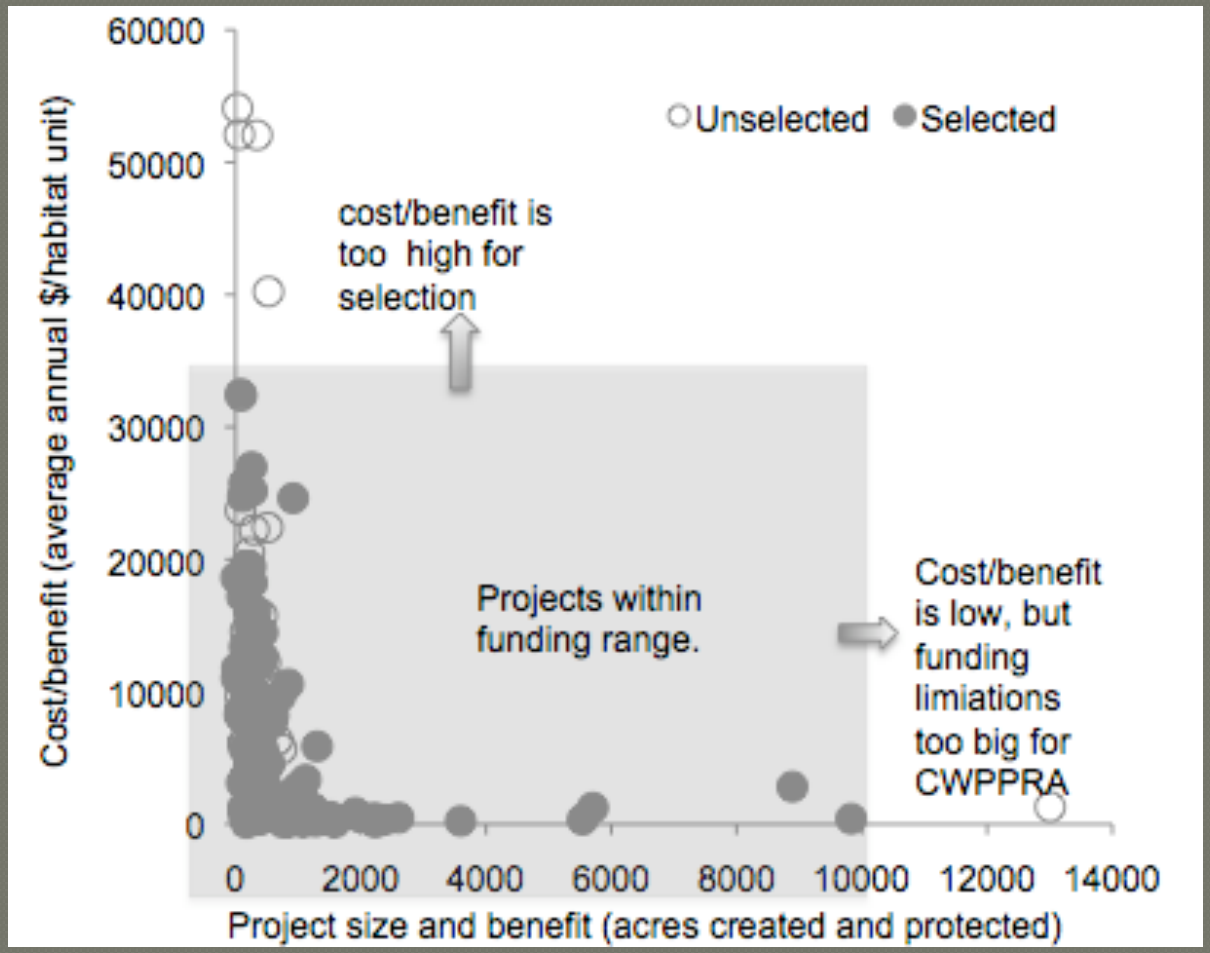
- YEAR
- PROJECT ACRES
  (created and benefited)
- PROJECT TYPE



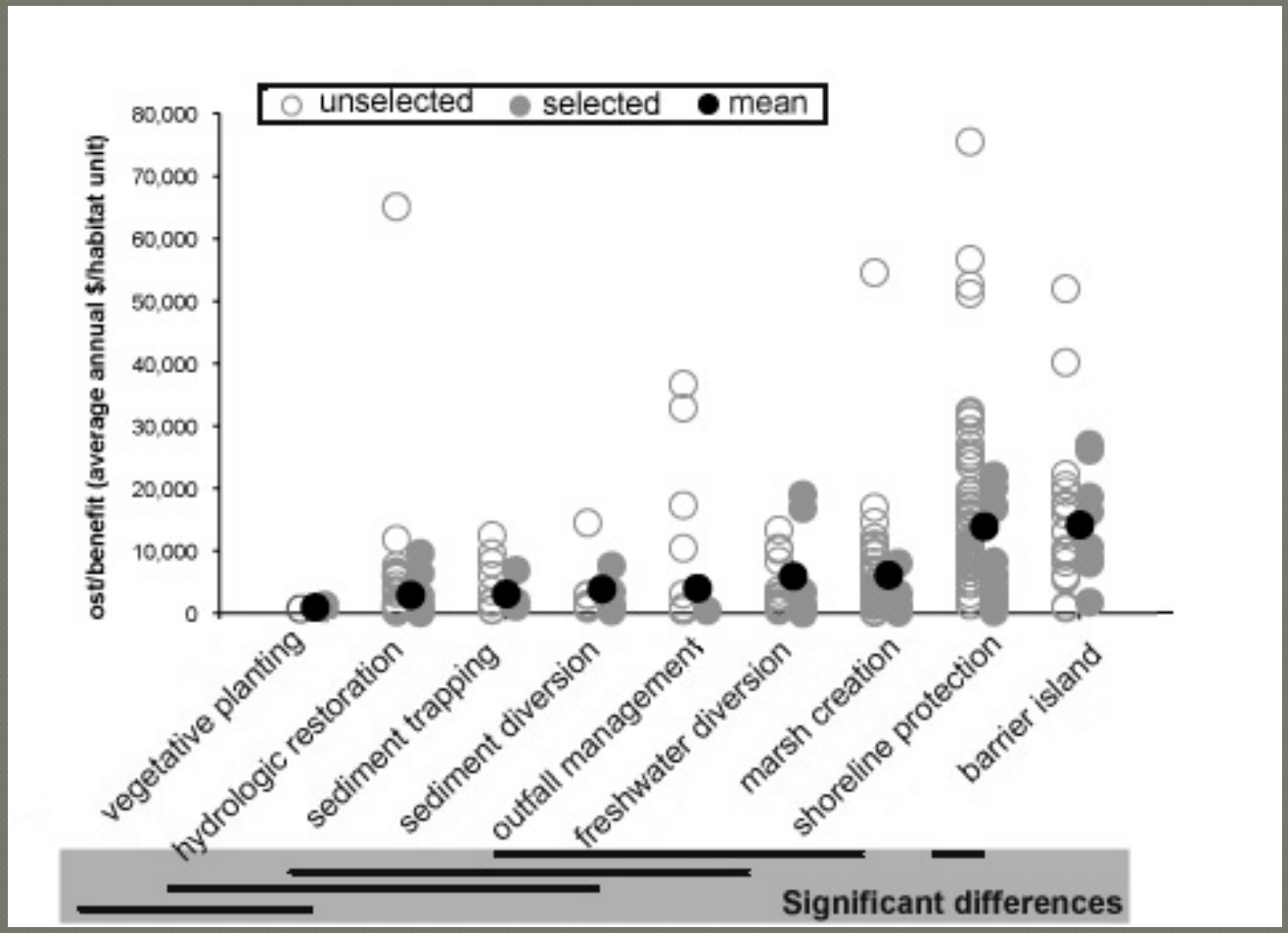
# YEAR


80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
cost/benefit ( $/ average annual habitat unit)
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
YEAR
unselected
selected
mean unselected
mean selected
Linear(average unselected)
Linear(average selected)

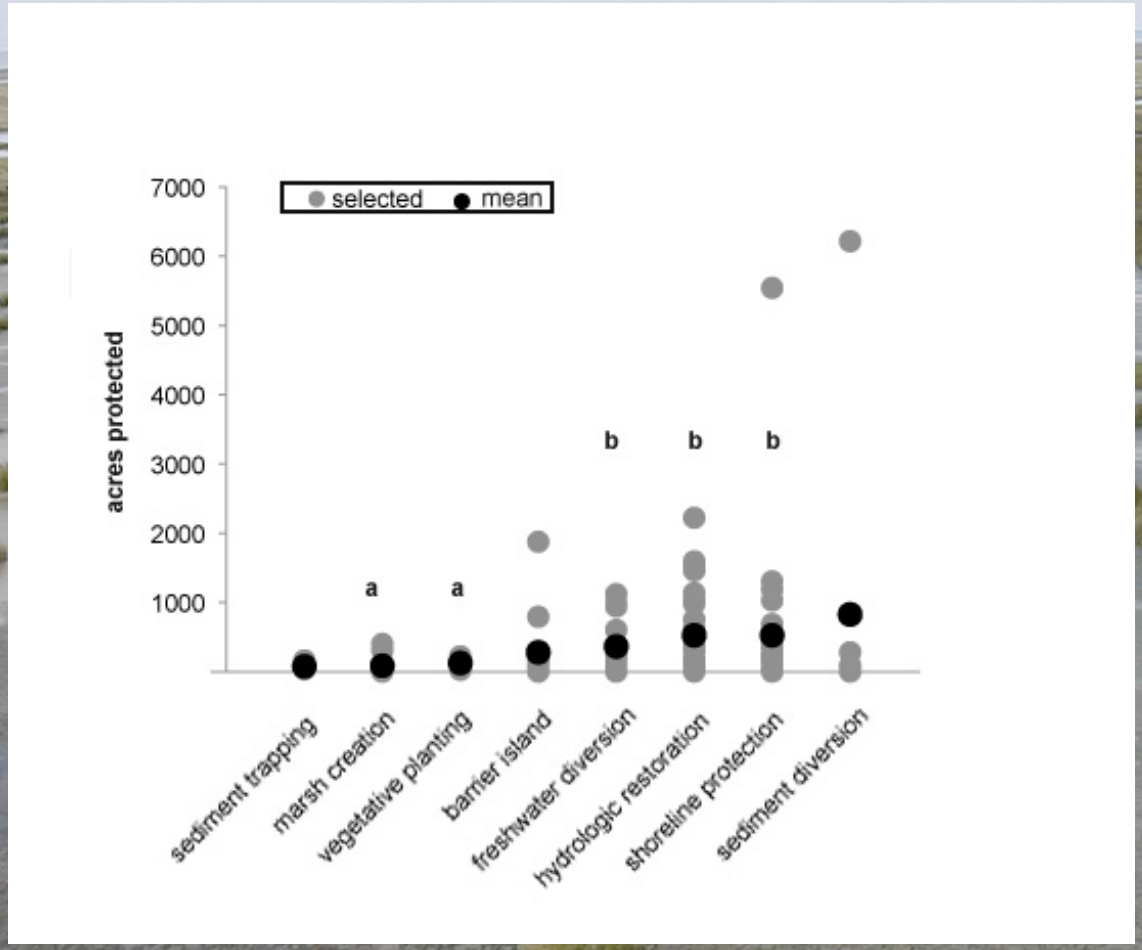
# Project size or benefit



# Project Type



# Acres protected



# So why are we paying for barrier islands?

- Benefits estimates need work?
- no.
- but we are limited by data. These are relatively new, so no data to use to estimate benefits. Also, new technologies tend to cost more while we figure out the kinks.

# worth mention

Public demand

for the “first line of defense”

No other program

to address the need.

# Why pay for barrier islands? 3

- Cost savings?!
- high loss + high cost = act now!
- or pay more,

Or…

# Why pay for barrier islands? 4

- Have no option to restore…

The losses make barrier islands less feasible to restore with time.

e.g., re-creation of barriers rather than restoration.

# Conclusion:

- CWPPRA is cost-effective
  …even with barrier island projects
- But a reminder of it's mandate can't hurt.
- Other funding sources –dedicated barrier island work would help.
- So will data

www.lacoast.gov