

# Wetland functions in the Texas rice belt

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# Agenda

- Background
- Down on the 21<sup>st</sup> century rice farm
- Wetland functions defined
- Wetland functions in the Texas rice belt

- *The time needed to grow and harvest two rice crops fits tightly between the average freeze dates in our neck of the woods, which is why the Gulf Coast is only place where two crops are grown.*

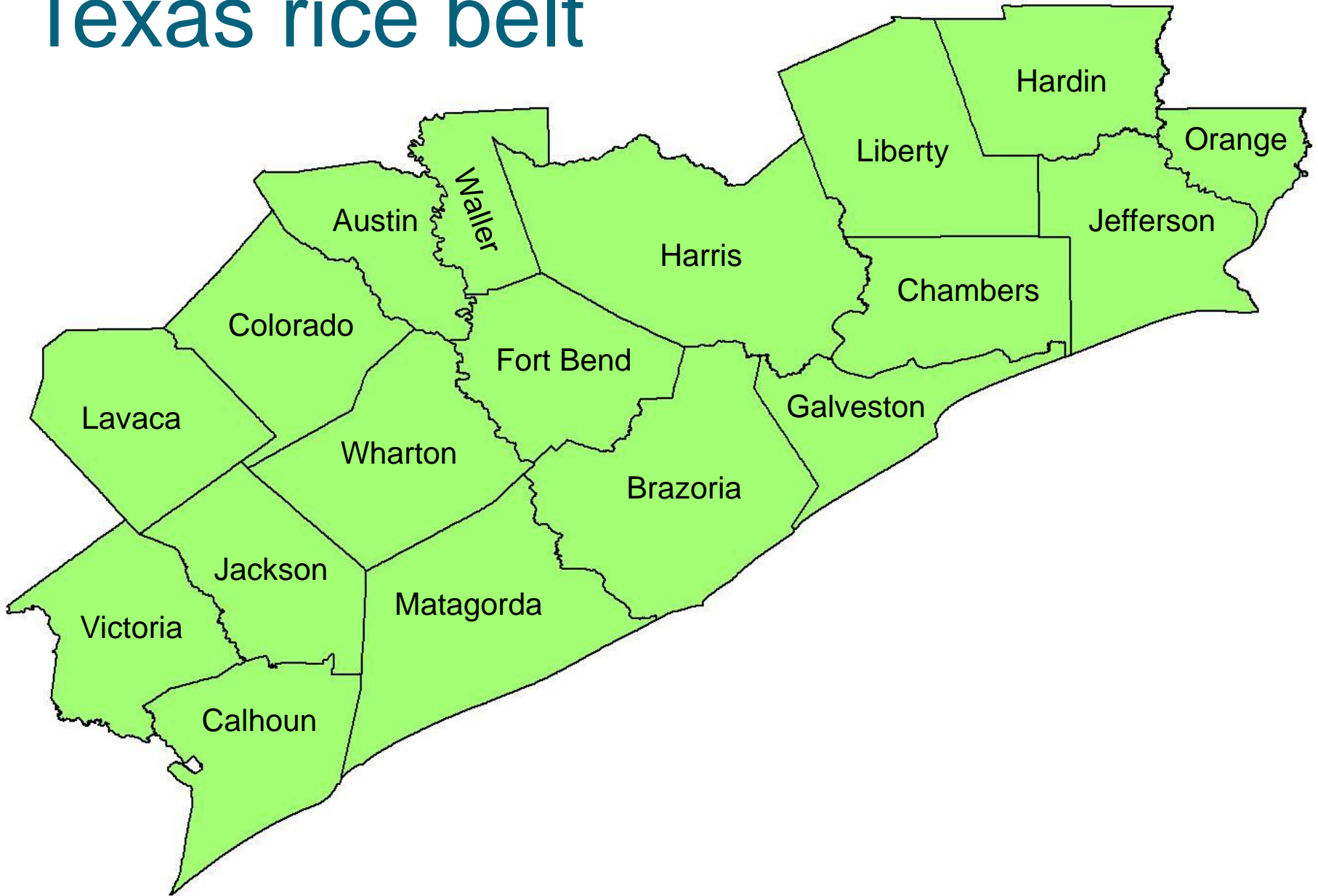
- Glen Minzenmeyer, civil engineering technician, La Grange, Texas



# Economic rice production

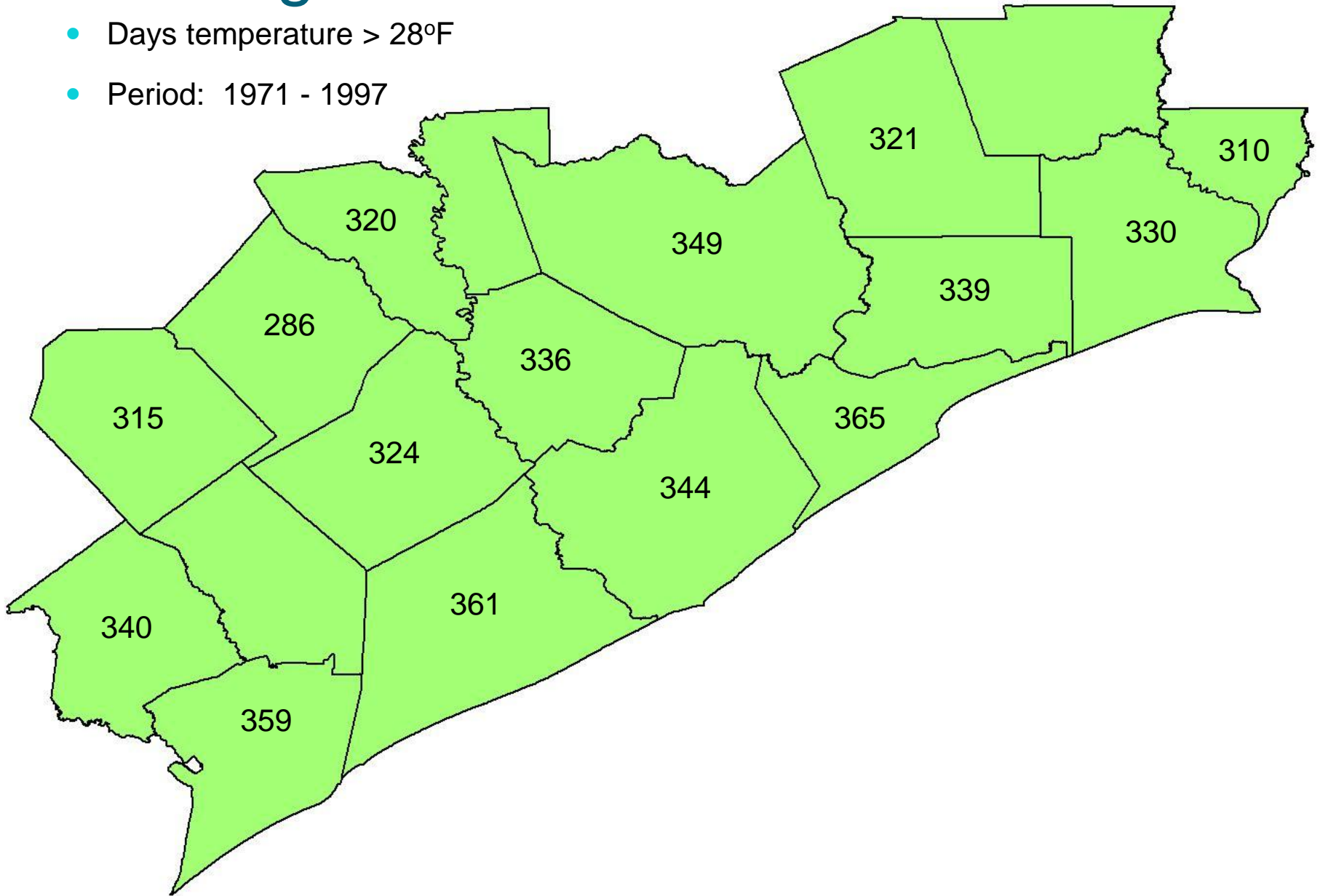
- High average temperatures during growing season
- Plentiful, timely supply of water
- Smooth land surface
  - Uniform flooding and drainage
- Sub-soil hardpan
  - Inhibits percolation of water

# Texas rice belt



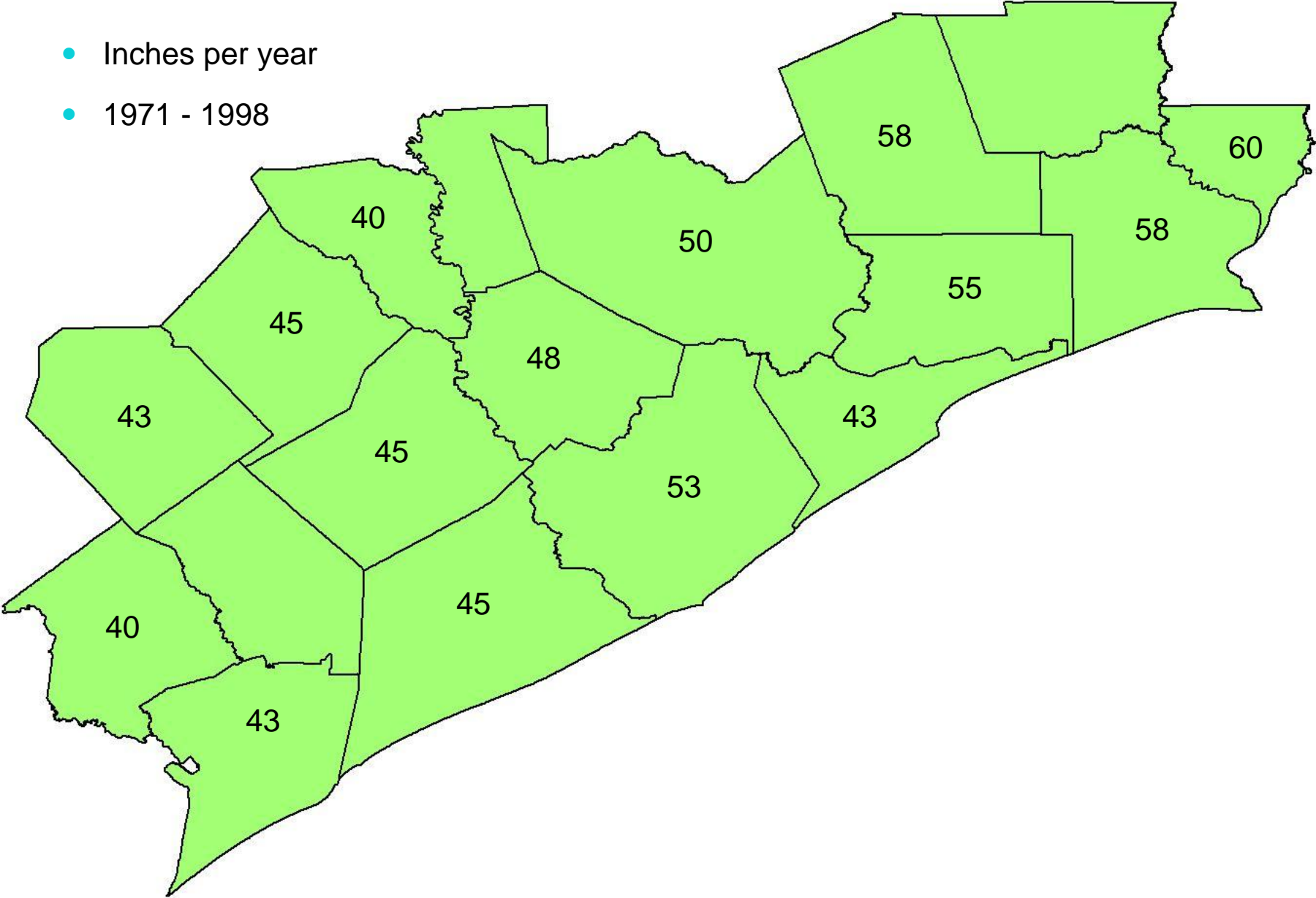
# Growing season

- Days temperature > 28°F
- Period: 1971 - 1997



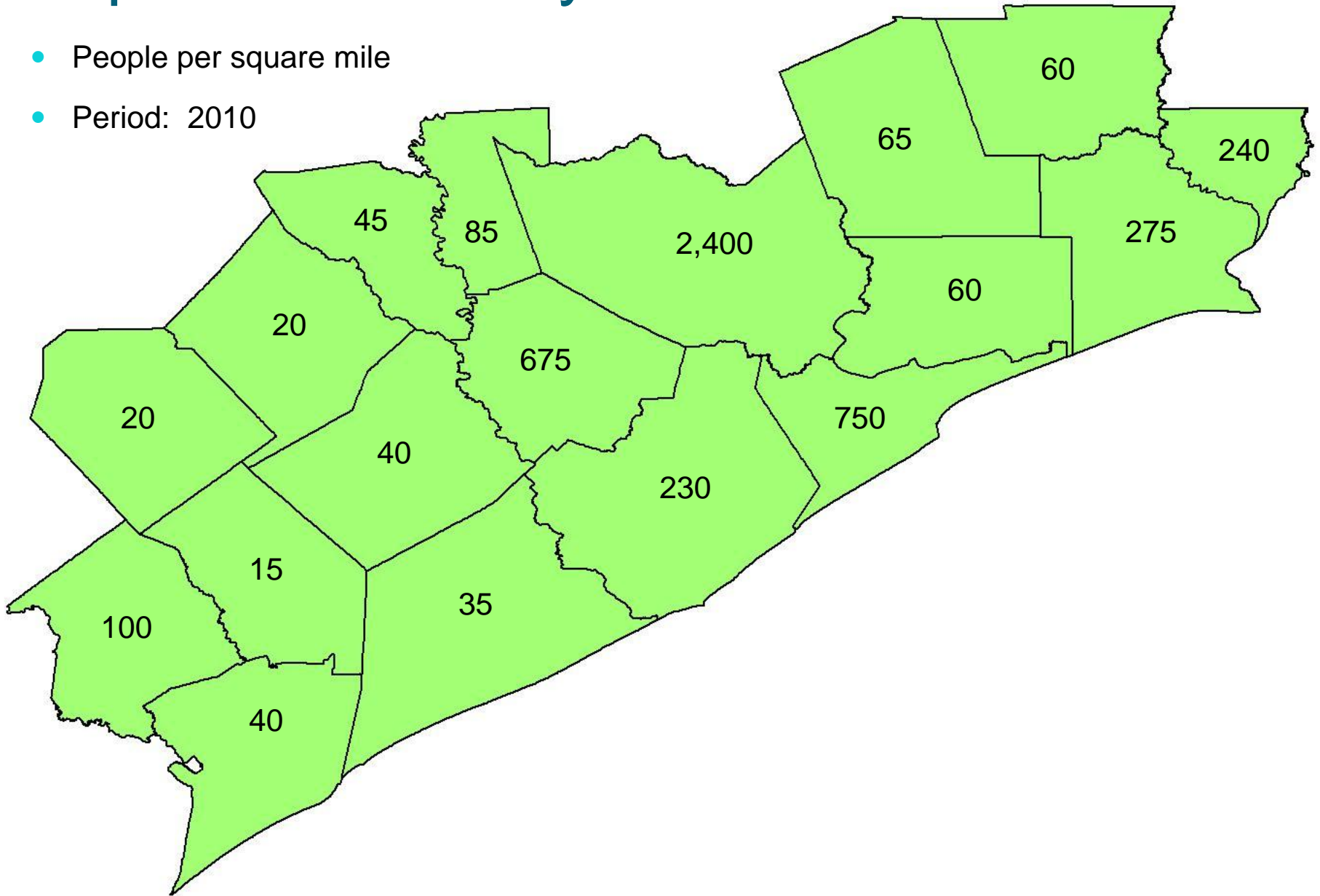
# Rainfall

- Inches per year
- 1971 - 1998



# Population density

- People per square mile
- Period: 2010





# Acres planted: Texas rice belt



# Production cycle in the Texas rice belt

- Land prep (fall – spring)
  - Disk → remove/reduce standing litter
  - Land smoothing
  - Seedbed preparation

# Production cycle in the Texas rice belt

*Main  
crop*

- Plant → March
- Flush
- Flood → 4-6 weeks post-emergence
- Drain → 2 weeks pre-harvest
- Harvest → July-August

*Ratoon  
crop*

- Flood
- Drain
- Harvest → October















# Wetland functions

- Normal, characteristic activities taking place in wetland ecosystems
- Process or series of processes taking place within a wetland
- Things wetlands do
- Wide variety of functions from simple to complex
  - Water storage
  - Maintenance of ecological integrity
    - Encompasses all components and processes in wetland ecosystem

# Gulf coast rice production

- Unique among American rice-growing areas
  - Two rice crops – same field, same growing season
- Main (first) crop normally harvested July-August
  - Field fertilized-flooded to encourage new growth from standing stubble
- Second or “ratoon” crop harvested October-November
  - ↓ yields ∴ ↓ harvesting efficiency with ratoon harvest
    - Weather and rutting → un-harvested areas
  - Less time to sprout, decompose, etc., before wintering water-fowl arrive

# Rice fields flooded after harvest

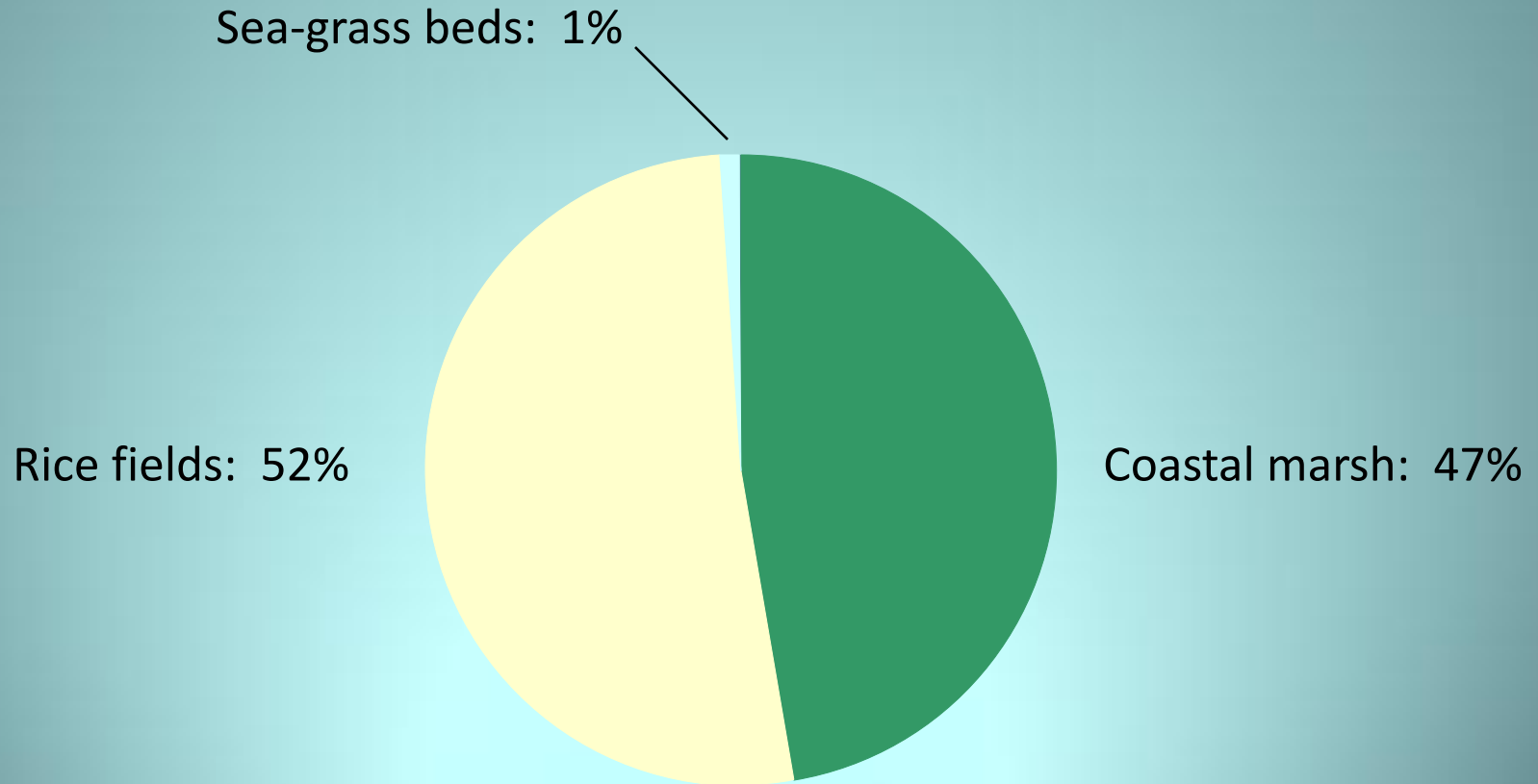


# Dabbling ducks wintering along Gulf Coast

- Long-term winter survey data
  - 20 percent of dabbling ducks in U.S.
  - Plus water-fowl food availability in flooded rice fields
    - 35 percent of available food resources

# All ducks and geese

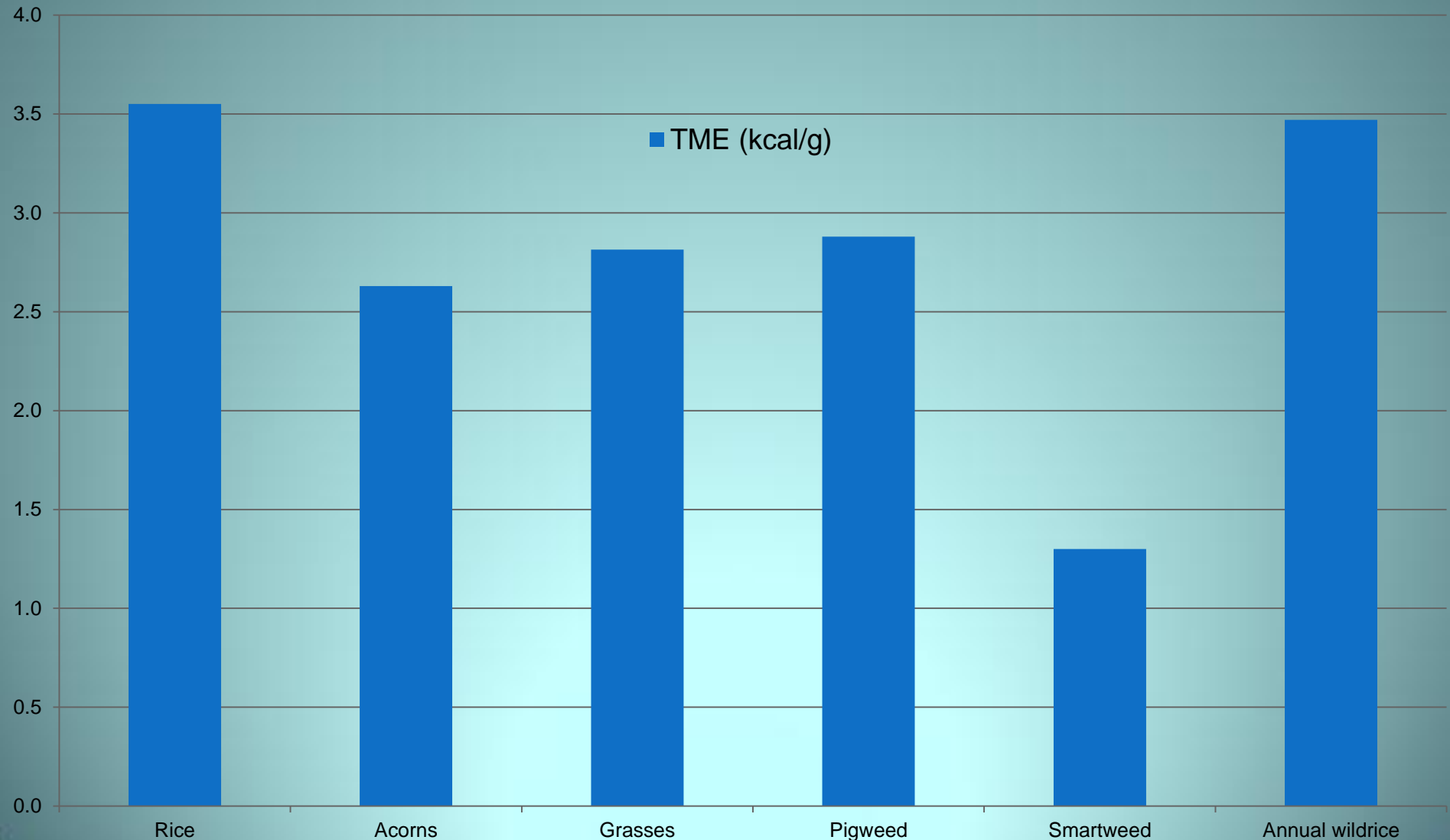
- Habitat providing food resources along Texas coast
  - Four million wintering ducks and geese



# Water-fowl food abundance

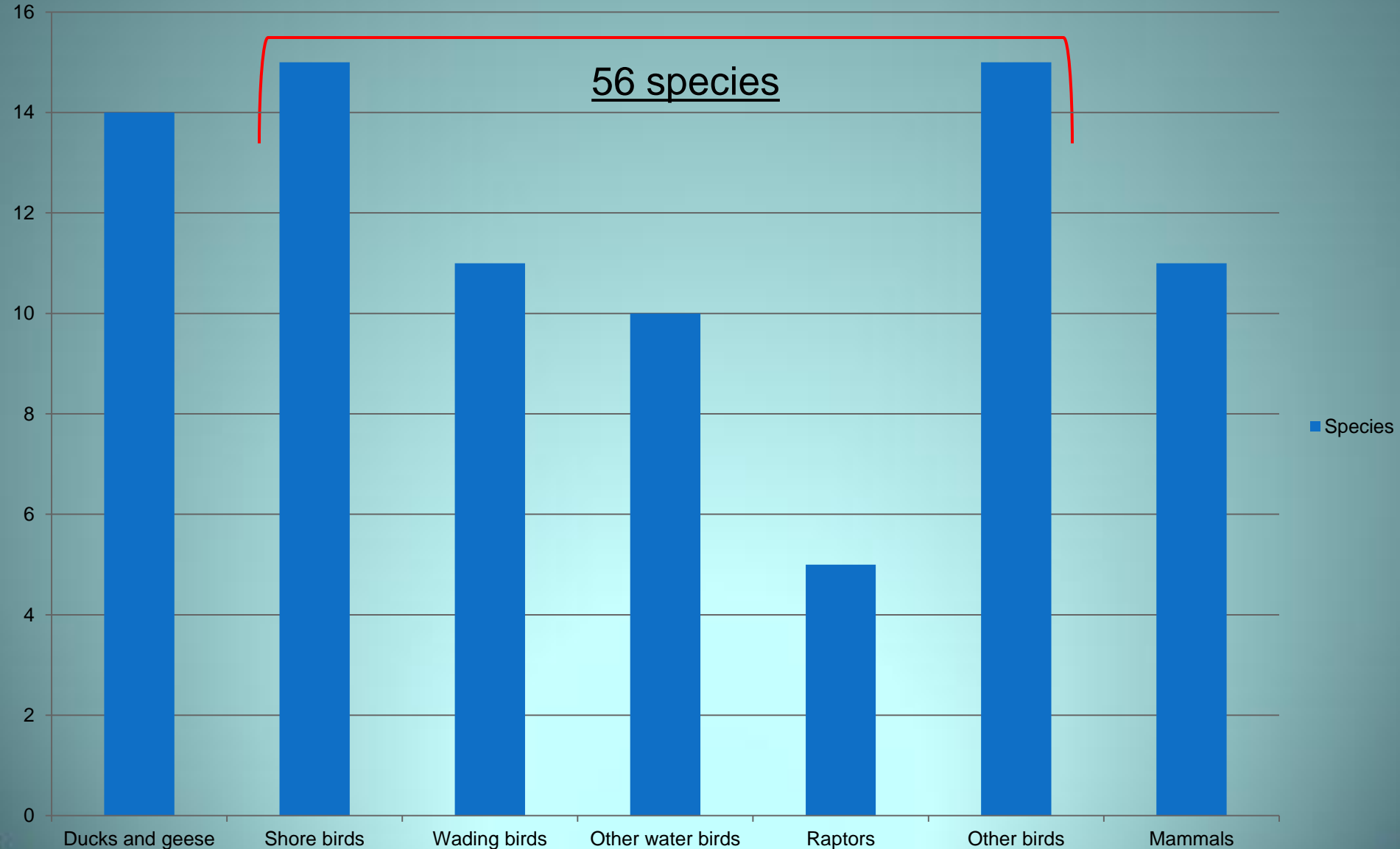


# Caloric value: rice vs moist-soil seeds





# Common wildlife in or associated with Gulf Coast rice fields









- Flooded rice fields may provide safer habitat
  - Predator presence in flooded rice fields lower than in natural wetlands



# Irrigation canals

- Viewed as hydrological infrastructure that supports agriculture
- Biological communities
- Eco-system function
  - Water quality
  - Pollination
  - Habitat

- Invertebrate diversity
  - Comparable to small lakes, semi-natural wetlands











# Rice fields in Texas rice belt

- Water-fowl wintering habitat
- Habitat for birds, mammals
- Irrigation canals
  - Habitat
  - Eco-system function

# References

- Brasher, M., PhD. 2012. Personal communication. Gulf Coast Joint Venture, Lafayette, LA.
- Census bureau. Accessed May 2012. State and county quick facts. <http://quickfacts.census.gov/qfd/states/48000.html>.
- Economic research service. Accessed April-May, 2012. Rice briefing room. <http://www.ers.usda.gov/Briefing/Rice>.
- Elphick, C.S. 2000. Functional equivalency between rice fields and semi-natural wetland habitat. *Conservation Bio.* 14:181-191.
- Herzon, I. , and J. Helenius. 2008. Ag drainage ditches, biological importance & functioning. *Biol. Conservation* 141:1171-1183.
- Manley, S.W. 2008. Conservation in rice-lands of North America. Rice Foundation. Stuttgart, AR.
- Maltchik, L., A.S. Rolon, C. Stenert, I.F. Machado, and O. Rocha. 2011. Can rice field channels contribute to biodiversity conservation in southern Brazilian wetlands? *Rev. Biol. Trop. (Int. J. Trop. Biol.)* 59(4):1985-1914.
- Minzenmeyer, G.W. 2012. Personal communication. USDA-NRCS, La Grange, TX.
- National water and climate center. Accessed 2012. Climate information retrieval. <http://www.wcc.nrcs.usda.gov/climate>.
- Petrie, M., M. Brasher, and J. Tirpak. 2011. A banquet for ducks. Ducks Unlimited.
- Smith, R. D., A. Ammann, C. Bartoldus, and M. Brinson. 1995. An approach for assessing wetland functions using hydrogeomorphic classification, reference wetlands, and functional indices. WES, Vicksburg, MS.
- Stenert, C., R.C. Bacca, L. Maltchik, and O. Rocha. 2009. Can hydrologic management of rice fields contribute to macro-invertebrate conservation in southern Brazil wetlands? *Hydrobiologia* 635:339-350.
- USGS. Accessed May 2012. National water summary on wetland resources. <http://water.usgs.gov/nwsum/WSP2425/functions>.
- Verdonschot, R.C.M., H.W. Keizer-Vlek, and P.T.F. Verdonschot. 2011. Biodiversity value of agricultural drainage ditches. *Aquatic Conserv: Mar. Freshw. Ecosyst.* 21:715-727.
- Verhoeven, J.T., and T. Setter. 2009. Agricultural use of wetlands: opportunities and limitations. *Annals of Botany* 105:155-163.
- Wilson, L.T., Y. Yang, J. Wang, B. Morace, G.N. McCauley, and D. Humphrey. 2011. Texas Rice Crop Survey. <http://beaumont.tamu.edu/CropSurvey>.

# Thank you

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