

# **Citizen Science**

## **The Benefits and Problems of Messy Data**

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# TPWD Mission



Life's Better Outside

**“To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.”**

# **In A Perfect World**

- **Great big piles of money**
- **30-hour days and lots of clones**
- **Widespread public support**
- **No pointy-haired bosses and bean counters looking over our shoulders**

# **In The Real World**

- **Limited money and manpower**
- **Bosses, legislators, and bean counters never go away**
- **We have to divide our attention**

# **A Possible Solution**

- **The public will help you do your job for free and thank you for the opportunity**

# Citizen Science in Texas

- **Internet, Mail, and Registration Surveys**
- **Master Naturalist**
- **Cowbird Trapping**
- **Predator Sightings**
- **Texas Nature Trackers**

# Surveys

- **Mail harvest surveys to 80,000 licensed hunters / year**
- **Occasional internet surveys**
- **6,500 self-registrations at state leased small game hunting areas / year**

# Master Naturalist

- **Started in 1997**
- **42 chapters in TX; in 28 other states**
- **7,000 members, 1,428,000 volunteer hours, value of \$28.9M**
- **250+ individuals have provided over 1,000 hours, 20+ at 5,000, and 2 at >10,000**

# Cowbird Trapping

[www.tpwd.state.tx.us/huntwild/wild/nuisance/cowbird](http://www.tpwd.state.tx.us/huntwild/wild/nuisance/cowbird)

- **177,185 cowbirds,  
356 trappers**
- **Federal reporting  
requirement**



# Lions, Tigers, and Bears, Oh My!

- **1,003 mountain lion sightings going back to 1990; bear sightings not entered yet**
- **Sightings increasing, in part because of trail cameras**
- **Sightings interest the public, but also scare them**

# Texas Nature Trackers



**Texas  
Horned  
Lizard  
Watch**

**Texas  
Black-tailed  
Prairie Dog  
Watch**



**Texas  
Hummingbird  
Roundup**



**Texas Mussel  
Watch**

**Texas  
Box Turtle  
Survey**



**Texas  
Amphibian  
Watch**



**Tarpon Observation  
Network**

TEXAS PARKS AND WILDLIFE

TEXAS

NATURE  
TRACKERS

YOU CAN MAKE A DIFFERENCE

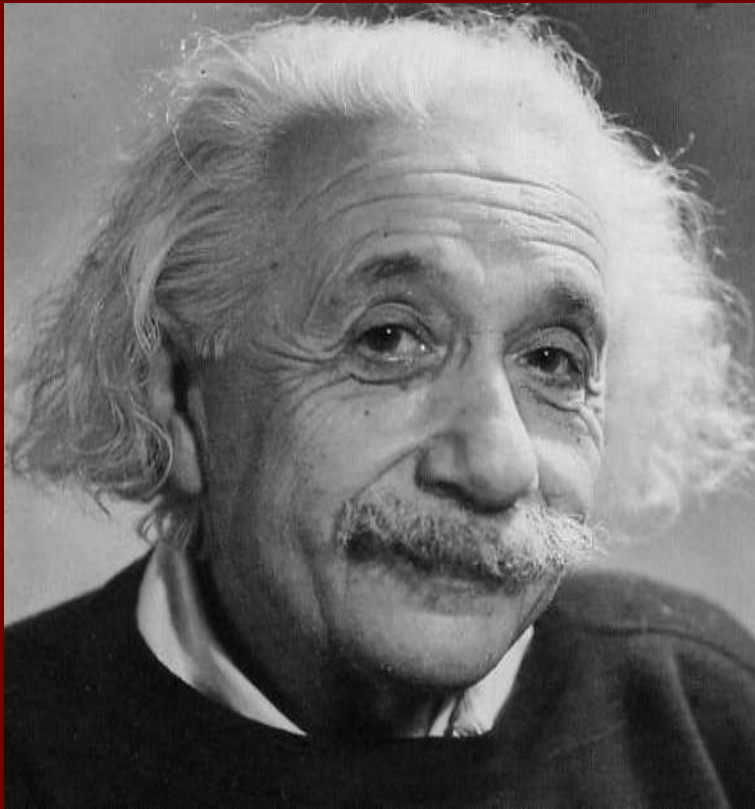
**“Texas Nature Trackers is a citizen science monitoring effort designed to involve volunteers of all ages and interest levels in gathering scientific data on species of concern in Texas through experiential learning.”**

# Texas Nature Trackers

[www.tpwd.state.tx.us/learning/texas\\_nature\\_trackers/index.phtml](http://www.tpwd.state.tx.us/learning/texas_nature_trackers/index.phtml)

- **87 people, 7,000 amphibians**
- **621 people, 1,521 box turtles**
- **3,307 people, 77,572 hummingbird**
- **154 people, 1,495 mussel**
- **264 people, 717 tarpon**

# Who Designs the Project?



# Keep the Amateurs Away

- **Don't even start until you know what output you will need**
- **Biologists know the questions that need answered, but often do not know how to ask the question**
- **Design the database and data entry in conjunction with the forms**

# Low Expectations

- **A thousand monkeys at a thousand typewriters....may be where your data comes from**
- **Hope for the best, but assume the worst**



# Help Them Help You

- **Tell them why you want the data**
- **Train them ahead of time**
- **Give clear instructions**
- **Design the form to prevent mistakes**

# Database Solutions

- **Database rules are your friend**
- **Critical data means required fields**
- **Assume missing data**
- **Store data in raw form, with minimal corrections and categorization**

# Problem Prevention

- **Minimize personal questions**
- **Always have a general comments section**
- **Auto-fill fields whenever possible**
- **Drop-down lists are your friend**
- **Include unknown or no answer categories**

# Before Analysis

- **Look for obvious outliers**
- **Require biologist to verify records**
- **If the data is worthless, don't use it**
- **Run power analysis**

# Analysis of Messy Data

- **Combine with other data sets when appropriate**
- **Group data into categories**
- **Stick with descriptive statistics**

# Questions?

