

# Data Driving Conservation:

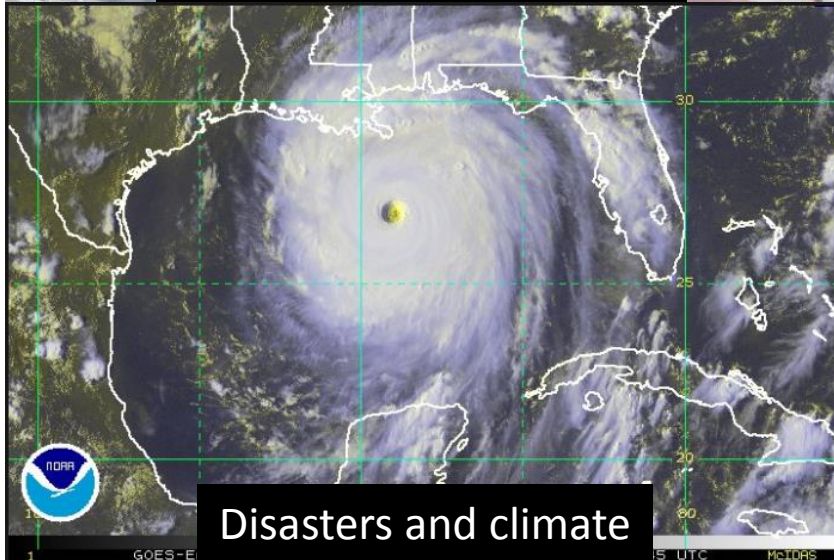
## *Sources of collaboration and inspiration*

Mary Klein, External Advisory Board



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# Landscape Scale Change



# Examples of common questions:



## What specimens can show...

- Changes in species distribution
- Genetic history
- Spatial analyses of species protection

## Conservation information need...

- Species declines (need help)
- Spread of invasive species
- Evidence of climate impacts
- Manage population health
- Gap analysis – what is protected, and what is not?
- Conservation planning



Figure 1. Earliest record of *F. vulgaris* from Pennsylvania- collector Gress. (Image Source: Emily Wood, GH).

“Herbarium records are the most reliable primary source of information to reconstruct introduction and colonization history of a species when detailed historic data are not available (Strother and Smith 1970; Mack 1991; Barney 2006). Herbarium specimen labels provide valuable information that can be used to document the time of introduction of non-native plants (Wester 1992; Woods et al. 2005; Valliant et al. 2007), the number of independent introductions (Barney 2006), the early invasion pathways in the introduced range (Lavoie et al. 2007; Stuckey 1980)...”

## Spread of invasive *Falcaria vulgaris* (sickleweed) in the U.S.

Sarbottam Piya, Madhav P. Nepal, Achal Neupane, Gary E. Larson and Jack L. Butler. **Inferring introduction history and spread of *Falcaria vulgaris* Bernh. (Apiaceae) in the United States based on herbarium records.** *Proceedings of the South Dakota Academy of Science*, 2012; 91:113-129.

"The value of museum collections for answering important questions when considering population translocations and species' reintroductions cannot be overstated," says D'Elia. "They provide a direct window into a population's history and as new genetic and genomic tools continue to be developed the value of these specimens only increases."

Specimens show that California Condors have lost 80% of their genetic diversity

Photo Credit: J. D'Elia



## California Condor's Genetic Bottleneck

Jesse D'Elia, Susan M. Haig, Thomas D. Mullins, Mark P. Miller. **Ancient DNA reveals substantial genetic diversity in the California Condor (*Gymnogyps californianus*) prior to a population bottleneck.** *The Condor*, 2016; 118 (4): 703 DOI: 10.1650/CONDOR-16-35.1

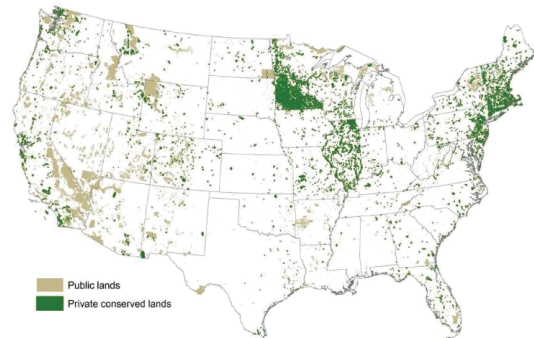


Figure 1 (partial): Conservation areas within the United States. Conservation areas are defined as lands and waters designated as GAP status 1 or 2 (USGS-GAP 2012).



Figure 2: Natura 2000 sites across the European Union make up a network of habitat conservation areas (EEA 2014).

Key steps to develop a national conservation system:

- Common vision; measurable goals
- Assessment of current state
- Implement strategies in the plan
- Monitor and report on progress

Specimens play a vital role in:

- Documenting where species are protected, and where they are not
- Understanding historic ranges (e.g., restoration potential)
- Capturing genetic diversity

## Planning a National Habitat Conservation System

Jocelyn L. Aycrigg, Craig Groves, Jodi A. Hilty, J. Michael Scott, Paul Beier, D. A. Boyce, Jr., Dennis Figg, Healy Hamilton, Gary Machlis, Kit Muller, K. V. Rosenberg, Raymond M. Sauvajot, Mark Shaffer, and Rand Wentworth. **Completing the System: Opportunities and Challenges for a National Habitat Conservation System.** *BioScience* 2016 : biw090v2-biw090.

# How can we increase awareness that leads to more collaboration?

- Email list or blog, targeting conservation organizations and agencies
  - Describe holdings of at-risk or invasive species
  - Advertise particularly good coverage of a certain geography or species
- Journal paper on ecological / conservation uses of data
- Plenary talk or panel at meetings with potential partners
- Workshops with target audiences
- Celebrate and acknowledge existing partnerships (Spotlight)



*Shelley James presents iDigBio at NatureServe annual conference 2016*

# Thank you!



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