
Status and Future Direction of NatureServe's Management of Observation Data

April 20, 2009



NatureServe

Managing Observations

- Where we are now
- Survey results
- Known challenges
- Discussion: *Moving forward*



Where We Are Now

We have:

- Spatial methodology for handling EOs and component source features
- A provisional Observational Data Standard
- Kestrel software for managing observational data



NatureServe Network Survey

- May 2008 survey – Program Data Management: EOs and Observations
- Purpose: Obtain information on issues related to observation and EO data management practices in NatureServe member programs
- Funding provided by Environment Canada



Survey Components

- ▶ Introduction
- ▶ Element Occurrences
- ▶ Observations
- ▶ Observation / EO Relationships
- ▶ Observation Data Management
- ▶ Observation Definition



Observation Definition

An Observation is the **presence, historical presence, or confirmed absence of species or ecological elements in an area**, indicated by the **collection of information**.

Observations are **not evaluated in terms of potential persistence according to standards**, but encompass a broad range of **different quantitative and qualitative information types useful for assessing locations, or potential locations**, of elements, and

may serve as the basis for creating source features that can be used to develop Element Occurrences.



Element Occurrence Definition

An Element Occurrence (EO) is an **area of land and/or water** in which a **species or ecological element is, or was, present, and**

is developed using standards to define locations of the element that have the potential to persist if current conditions prevail.

Consistency in EOs throughout the range of an element **is achieved through the application of standard minimum data criteria and rules of separation** specific to that element or group of similar elements.



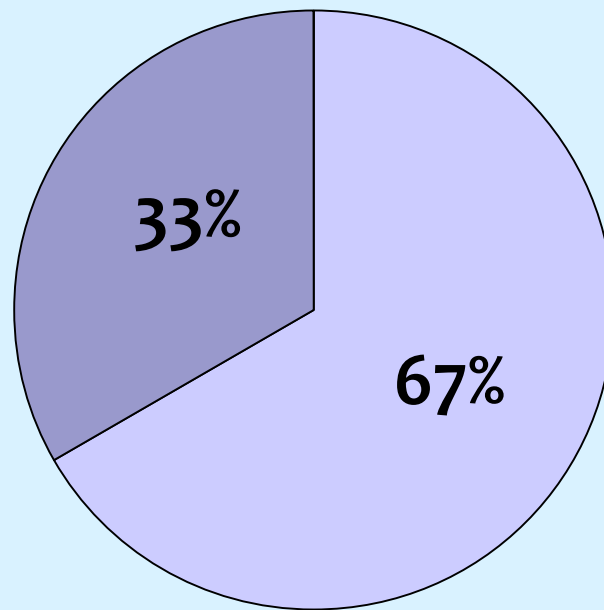
Element Occurrences

- **Five survey questions on this subject**
 - ▶ How does your program create and manage EOs?
 - ▶ If your program uses a modified version of the EO methodology or is no longer creating/managing EOs, please provide the reason(s) for this.
 - ▶ If your program uses a modified version of the EO methodology, please describe how it has been modified.
 - ▶ Please rate each of the following possible challenges you face creating EOs. (listed)
 - ▶ What other challenges does your program face in managing and using EO data? (listed)



Element Occurrences

- ▶ Do programs utilize EO spatial methodology?



□ Use NatureServe spatial methodology

■ Use modified methodology

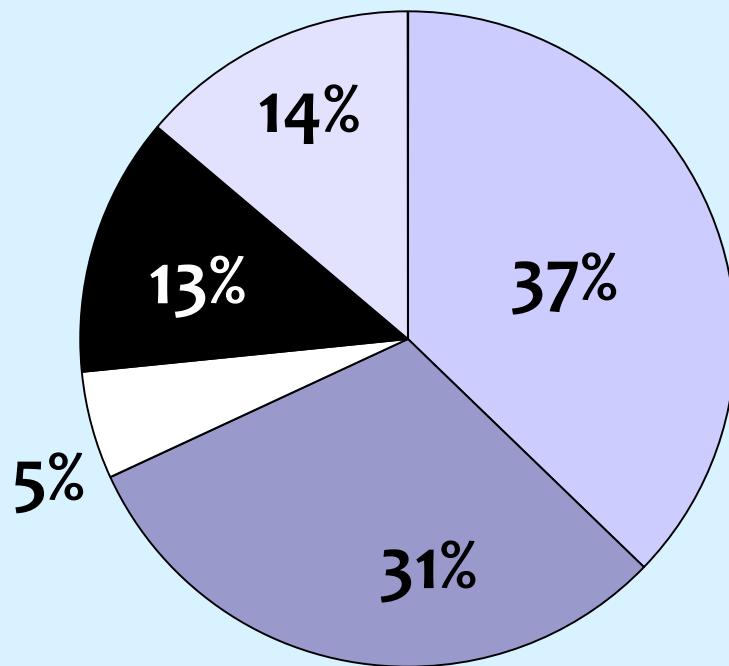


Challenges to Using Methodology

- Lack of resources / staff time
- Management of occurrences outside of Biotics (including not using Biotics)
- Data processing limitations of Biotics
- Need to create other spatial data features and products that better meet the needs of their clients
- Tracking observations instead of EOs



Challenges to Creating EOs



- Lack of staff/money
- Lack of time
- Lack of ability to bulk upload EOs
- Incomplete EO specs
- Other

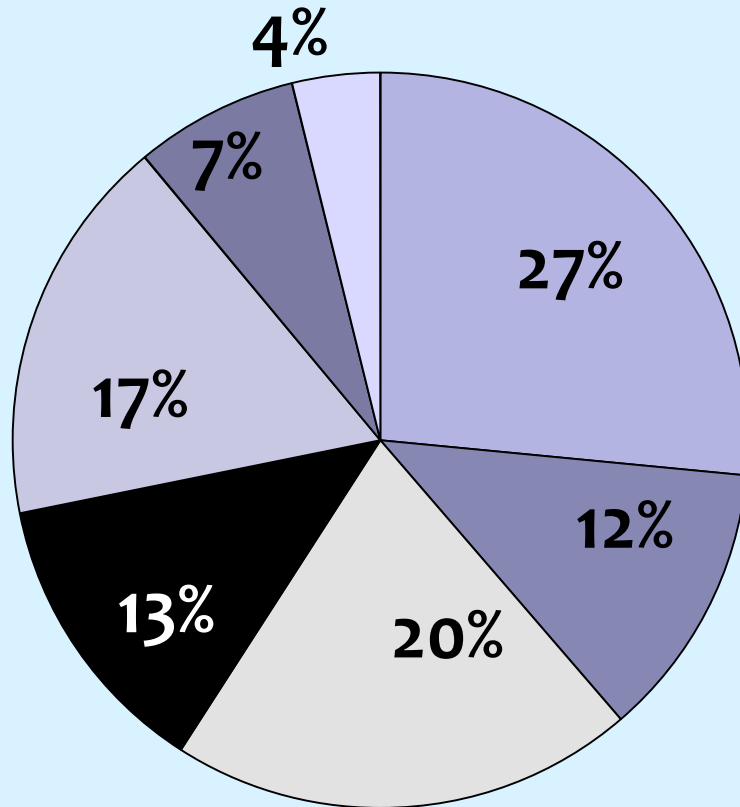


Observations

- **Eleven survey questions on**
 - ▶ The types of observations collected and managed
 - ▶ Who collects the observations (e.g., program scientists, external sources)
 - ▶ How observations are collected (e.g., surveys, incidental observations) and georeferenced
 - ▶ The types of surveys (e.g., plots, county inventories), and whether structured monitoring occurs
 - ▶ How observation data are used by programs
 - ▶ Concerns with providing observation data as an external product



How are Observations Used?



- Create EOs
- Develop Watch list
- Identify future survey areas
- Predictive modeling distribution/spread
- Data products for clients
- Develop veg classifications
- Map veg for training use

Observations

Comments on uses of observation data

- ▶ “Most data users (consultants, agencies) want observation data; provides another level of detail for clients”
- ▶ “We retain the raw data in the format we received it. Don't believe it is feasible or even desirable to convert observations into a standard database format, given the diversity of taxa & database designs dictated by the original data collection goals.”
- ▶ “I see EOs continuing to have its place and observations as another type of info.”



Observation / EO Relationships

- **Six survey questions on this subject**
 - ▶ How are observations data used to create EOs?
 - ▶ How are data on existing EOs used in combination with observations?
 - ▶ Can you link observations managed outside Biotics to the EOs that are based on them?
 - ▶ If yes, describe how they are linked.
 - ▶ In what situations does the use of observations work better than EOs?
 - ▶ What are some of the reasons you would provide observation data as a product?



Observations and Source Features

One-to-one or one-to-many relationship?

- Respondents equally divided on whether they developed each observation into a Source Feature or grouped several observations to form a Source Feature
- Many recognized the need to do both
 - ▶ “both, depending on the data provided/collected”
 - ▶ “depends on the spatial distribution”



Observations and Source Features

Best overall answer:

“Observations may be developed into a source feature, may be grouped to create a source feature, or may be used to update an existing source feature.”

And then:

“If appropriate the source feature is integrated into or becomes an EO.”



Observations v. Observation Tab

Carex aurea - (Source Feature Species)

Identifiers Mapping **Observations** QC Other Spatial Attr

Observations

Observer	Date	Data
Cynthia Turner	2001-11-01	50-100 plants, juveniles present, no reproduction
Cynthia Turner	2002-06-14	75 plants, 60% reproductive, juveniles present
Ken Klick	2003-06-17	12 plants, fruiting & flowering, juveniles present

Observation Details

Observer: Cynthia Turner

Date: 2001-11-01

Data: 50-100 plants, juveniles present, no reproduction

Observations v. Observation Tab

- “Observations” entered in the Source Feature record do not have their own spatial identity
- Unable to map observations separately from Source Features in Biotics
- Precise location data (e.g., coordinates) not available in Biotics unless observation becomes a Source Feature or data is stored in text field



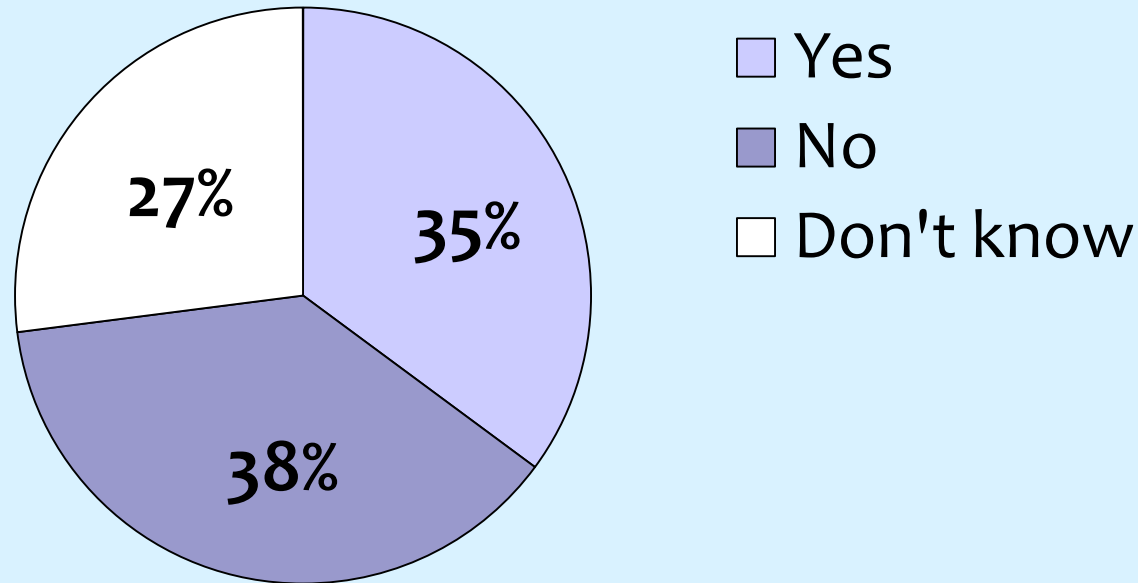
Incorporating Observations in EOs

- Common answer: “Observations are used to update existing EOs.”
- Other answers:
 - ▶ “We basically make EOs out of all our observations.”
 - ▶ “They are not often intermingled. EORs are generated for some species and independent source features (observations) are maintained for others.”



Linking non-Biotics Obs to EOs

- ▶ Are you able to identify precisely which observations (managed outside Biotics) were used to create a particular EO?



Linking non-Biotics Obs to EOs

If ‘yes’, how are they linked?

- Manually (“not ideal”)
 - ▶ Observation ID added in a Source Feature text field
 - ▶ Source feature ID, EO ID, and/or EO Num added in observation record
 - ▶ Observation record becomes an EO reference
- Spatially
 - ▶ “use ArcGIS to do intersect with existing EOs”



Observations v. EOs

- Why use observations instead of EOs?
 - ▶ Better for certain types of data
 - “Observations work best for common things or elements that will never make mapping priorities for whatever reason.”
 - “for wide ranging animals, collar GPS data”
 - “don't have adequate info to make an EO”
 - ▶ Better for certain types of analysis
 - Distribution modeling, critical habitat mapping



Why Maintain Observations?

- Easier to work with than SFs/ EOs
 - ▶ “Ability to bulk load the observations without any ‘human interpretation’ allows the data to get out more quickly.”
 - ▶ “Separation distances created unwieldy EOs and were often too large to be of use (or to understand the TONS of associated data) to data requestors.”
 - ▶ Lumped data in EO text fields makes analysis difficult



Why Maintain Observations?

“Observations are demanded by many of our clients/partners.”

This is the most common reason cited for providing observation data as a product.



Why Distribute Observations?

- ▶ “To alleviate doubt that we're withholding information from the users.”
- ▶ “People do not always want a modelled up product; they want the base data.”
- ▶ “Scale of products being produced—polygons aren't always visible on a map”

But: Several respondents indicated they do NOT distribute observations



Observation Data Management

- Sixteen survey questions on:
 - ▶ Number and types of observation databases maintained
 - ▶ Field data collection methods
 - ▶ Custom applications design details and capabilities
 - ▶ Observation tracking in Biotics



Observation Data Management

■ Selected Findings

- ▶ 24 programs manage more than one observations database
- ▶ Multiple data management systems are often used in the same programs for different types of observations
- ▶ Custom applications range from spreadsheets to databases to web-based tools



Observation Data Management

Future plans/needs:

- ▶ Integration of observations management systems with Biotics
- ▶ Expanded use of hand-held devices for field data collection
- ▶ Web-based tools for observations data entry and delivery
- ▶ Improved collection and integration of negative data



Observation Data Management

Future plans/needs (continued):

- “Encourage underlying standards for collection of observations.”
- “Observation collection should be integrated into single application ... which can then flow into Biotics.”
- “We are open to using Kestrel when it is available. Ideally this will be compatible with Biotics to share data between the two.”



Some Pithy “Observations”

- “We don’t want to see observations replace EOs as the primary form of data to manage.”
- “I like observational data and think that the complicated EO system approaches pseudo-science.”
- “I don’t see EOs and observations as separate issues... it is not an ‘either/or’ situation.”
- “Here's an analogy - think of the EO as the earth and the Observation as the sun. There was once a time when people thought the sun revolved around the earth, but now we know it's the other way around!”



