

# **LDS QA/QC**

## **Quality Control/Quality Assurance**

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# What is QA/QC?

- **A set of documented procedures that**
  - **outline responsibilities and responsible parties**
  - **documents the methods of data collection**
  - **ensure that the chosen methods actually support the research objectives**
  - **ensure the data are accurate**
  - **produce usable data**
  - **provide for archived, easily accessible data**

# Topics

- **Evolution of the Data Collection process**
- **Evolution of the QA/QC process**
- **QA/QC Products**
- **QA/QC Status**

# Data Collection

entered  proofed

- 2001
  - Paper data sheets

T T0lse 3

UTM EASTING	UTM NORTHING	TIME (PST)	TEMP (°C, 1 cm)	PERP DIST (to 0.1 m)	SEX	MCL (mm)	WEIGHT (g)	POSITION <sup>2</sup>	BEHAVIOR <sup>3</sup>
0491296	3871754	1315	28.5	7.4	F	240	2750	open	WALKING
URTD <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> UNK		LESIONS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> UNK		COMMENTS					
SIGNS		CAR %		PLAS %					

ARCASS 1

UTM EASTING	UTM NORTHING	TIME (PST)	PERP DIST (to 0.1 m)	SEX	MCL (mm) OR SIZE CLASS	POSITION <sup>4</sup>	TIME SINCE DEATH
0490920	3871816	1020	26.8	UNK	128	live	<input type="checkbox"/> < 1 yr <input type="checkbox"/> 2-4 yrs <input checked="" type="checkbox"/> 1-2 yrs <input type="checkbox"/> > 4 yrs
COMMENTS							

ARCASS 2

UTM EASTING	UTM NORTHING	TIME (PST)	PERP DIST (to 0.1 m)	SEX	MCL (mm) OR SIZE CLASS	POSITION <sup>4</sup>	TIME SINCE DEATH
3871849	11028	3.8	F	265	open		<input checked="" type="checkbox"/> < 1 yr <input type="checkbox"/> 2-4 yrs <input type="checkbox"/> 1-2 yrs <input type="checkbox"/> > 4 yrs
COMMENTS							

ARCASS 3

UTM EASTING	UTM NORTHING	TIME (PST)	PERP DIST (to 0.1 m)	SEX	MCL (mm) OR SIZE CLASS	POSITION	TIME SINCE DEATH
							<input type="checkbox"/> < 1 yr <input type="checkbox"/> 2-4 yrs <input type="checkbox"/> 1-2 yrs <input type="checkbox"/> > 4 yrs
COMMENTS							

ARCASS 4

UTM EASTING	UTM NORTHING	TIME (PST)	PERP DIST (to 0.1 m)	SEX	MCL (mm) OR SIZE CLASS	POSITION <sup>4</sup>	TIME SINCE DEATH
							<input type="checkbox"/> < 1 yr <input type="checkbox"/> 2-4 yrs <input type="checkbox"/> 1-2 yrs <input type="checkbox"/> > 4 yrs
COMMENTS							

ARCASS 5

UTM EASTING	UTM NORTHING	TIME (PST)	PERP DIST (to 0.1 m)	SEX	MCL (mm) OR SIZE CLASS	POSITION <sup>4</sup>	TIME SINCE DEATH
							<input type="checkbox"/> < 1 yr <input type="checkbox"/> 2-4 yrs <input type="checkbox"/> 1-2 yrs <input type="checkbox"/> > 4 yrs
COMMENTS							

10 GPS Coordinates x 11 numbers  
= 110 data entry key strokes

# Data Collection

- In 2001 there were as few as 5 GPS points per transect. In 2005 there were as many as 25 per transect.
- In 2001 there were 10 columns of data. In 2005 there were 58 columns of data.
  - Threats-exotics, ravens, roads, canids, etc.
  - Disease-extensive health forms, blood collection
  - Genetics
  - Behavioral
  - etc.

# Data Collection

- Composed of a large number of records

<b>Characteristic</b>	<b>Yearly variation</b>
<b>Total records</b>	<b>12,000 to 24,000</b>
<b>Observers</b>	<b>50 to 100</b>
<b>Transects</b>	<b>700 to 2,200</b>
<b>Total km walked</b>	<b>3,000 to 9,500</b>
<b>Waypoints</b>	<b>9,000 to 22,000</b>
<b>Observations</b>	<b>1,500 to 2,100</b>

# Data Collection

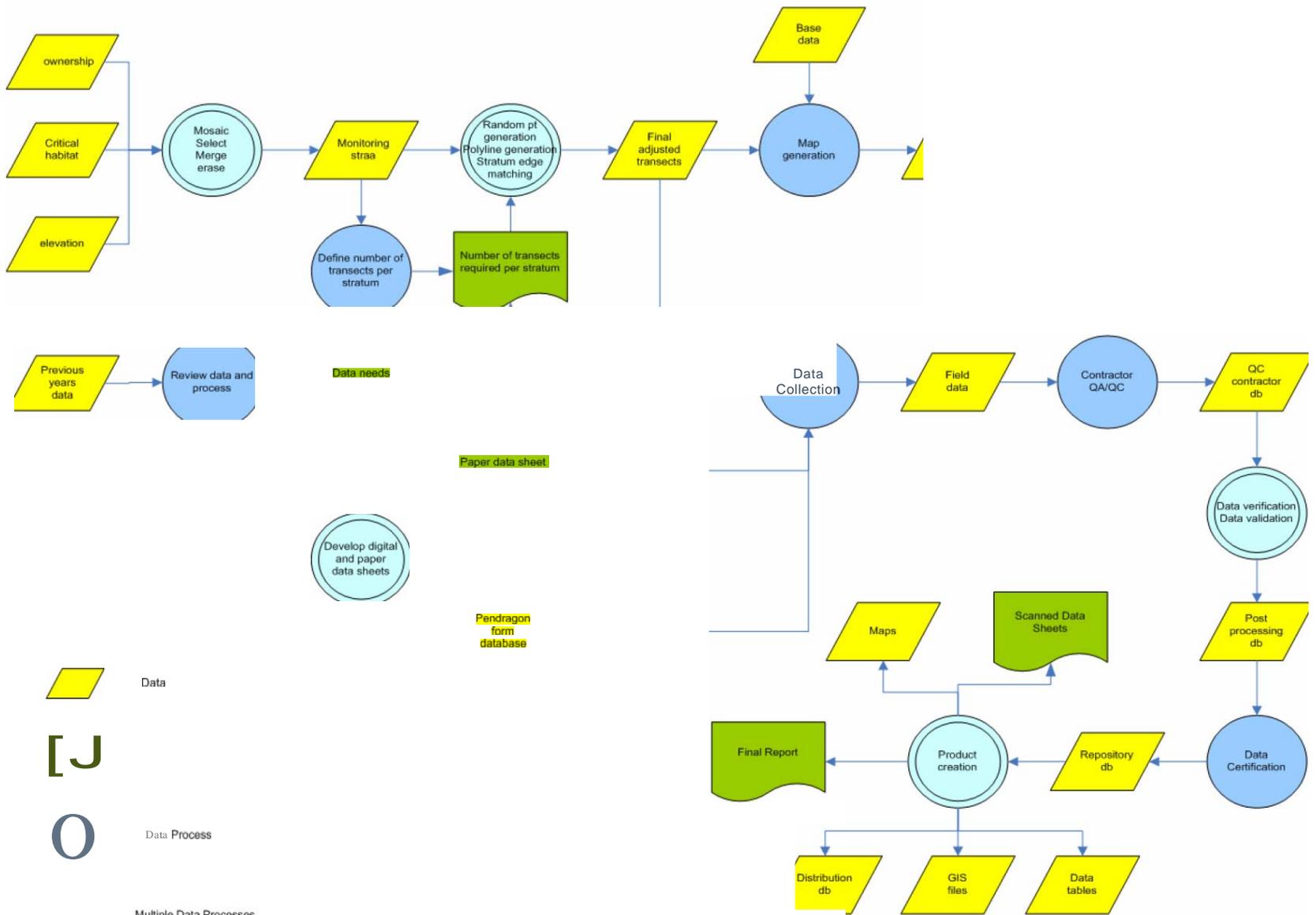
- 2002-2005
  - Paper data sheets
  - PDA



# Need for QA/QC

- **The need for a formal Data Management Plan and QA/QC process were identified after the 2003 sample season.**
- **A Data Management Plan and QA/QC Process were implemented simultaneously/retroactively with the 2004 sampling year.**

# Workflow



# Spatial Data Needs Assessment

Feature classes	Feature types	Need/Question	Mechanism to address	QC process
waypoints, transects	point, line	waypoints should be coincident with transect lines. Should not be more than 'x' waypoints on one transect. Check data to determine the value of x.	Use geodatabase topology rule points must be covered by line	Validate topology
waypoints, transects	point, line		Specify cardinality in relationship class. Check to see if exceptions can exist	Validate.
			Store buffered sites and use geodatabase topology rule for waypoints: must be properly inside polygons Create a custom relationship class extension or a geoprocessing script to check that the points are within the correct site. If possible, check for 25 m, but allow up to 50.	If rei class extension: validate
waypoints, transects, site waypoints	point, line, poly point	Transects and waypoints should be within a buffer (50m) of the site (monitoring strata).		If script validate + run script
observations	point	Add elevation from NED	Create geoprocessing script.	Run script.
observations	point	Add elevation from NED	Create geoprocessing script.	Run script.
observations	point	Observations should be within a buffer (50m or 100m) of the transect.	Create a custom relationship class extension or a geoprocessing script.	Validate or run script

# Data Dictionary

## 2004 LOS: Master Data List of Entities and Attributes

### Information describing transects

<p><b>Transects</b></p> <p>transect number site year date observer1 observer2 start_time end_time coordinates comments</p> <p><b>Waypoints</b></p> <p>transect number waypoint numbe. lead observer follow observer time e" stng northing elevation gps grab (yes/no) gps_errm comments</p>	<p>Sites</p> <p>abbreviation name</p>	<p><b>Groups</b></p> <p>name address city state zip phone contact person</p> <p><b>Datasheets</b></p> <p>transect number PDF li" name</p>	<p><b>Teams</b></p> <p>group observers</p> <p><b>Observers</b></p> <p>team first name last name</p> <p>Photos</p> <p>transect number habitat description file name</p>
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### Observations of live tortoises and carcasses

<p>Observations</p> <p>transect number observation number last waypoint time observer observer position perp distance tortoise state MCI gt 180mm (yes/no) MCL sex easting northing elevation gps grab (yes/no) gps error comments</p>	<p>Observatioo_measurements</p> <p>observation number Intended bearing local bearing azimuth radial distance comments</p> <p><b>Tortoises</b></p> <p>observation number position behavior mass exudate eyes abnormal beak/forelimbs dirt behavior normal cutaneous dyskeratosis shell slate bone scute luster blood sample type number cap tubes comments</p>
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### GsubO Data

<p>GsubO</p> <p>GsubO number site date observer comments</p>	<p><b>Gsub0_observations</b></p> <p>GsubO number GsubO observation number time visible position behavior easting northing elevation gps grab (yes/no) gps error comments</p>	<p><b>Gsub0_tortoises</b></p> <p>Gsub0 tortoise number sex transmitter number other</p>
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### Notes:

This master list 01 entities and attributes addresses objects from the user needs perspective. It does not represent final database tables and attributes, Attributes are listed with the main entity (object) with which they are most directly related. The names 01 entities and attributes are user-friendly names, not specific names that will be used in a database. It also does not specifically address internal numbers or other attributes that may be necessary to establish relationships. Those will be addressed during the database design phase

ISTS data should be extracted to a separate db (will include red# and white#) and are not represented in this diagram

On Tortoises entity table, the attribute named 'BloodSampleTaken' (yes, no) is represented by 'blood sample type' (none, filter paper, capillary tubes)

On Tortoises entity table, the attribute named 'SamplesTaken' (filter paper, cap 1, cap 2, cap 3) is represented by 'number cap tubes' (0, 1, 2, 3)

The GSubOTortoises entity table is a new table that could be used to track information about the GsubO tortoises

Bold represents required attributes



# QA/QC 101

- **General QA/QC process**
  - Establish a set of rules to flag potential errors
  - Identify violations (records that broke the rules)
  - Review and resolve violations (1000's per year)
- **Three levels of QA/QC**

## **Contractor QA/QC**

**Identify and correct common, easily corrected errors**

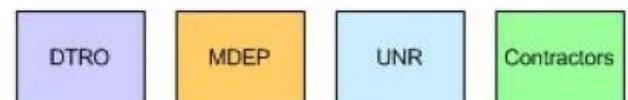
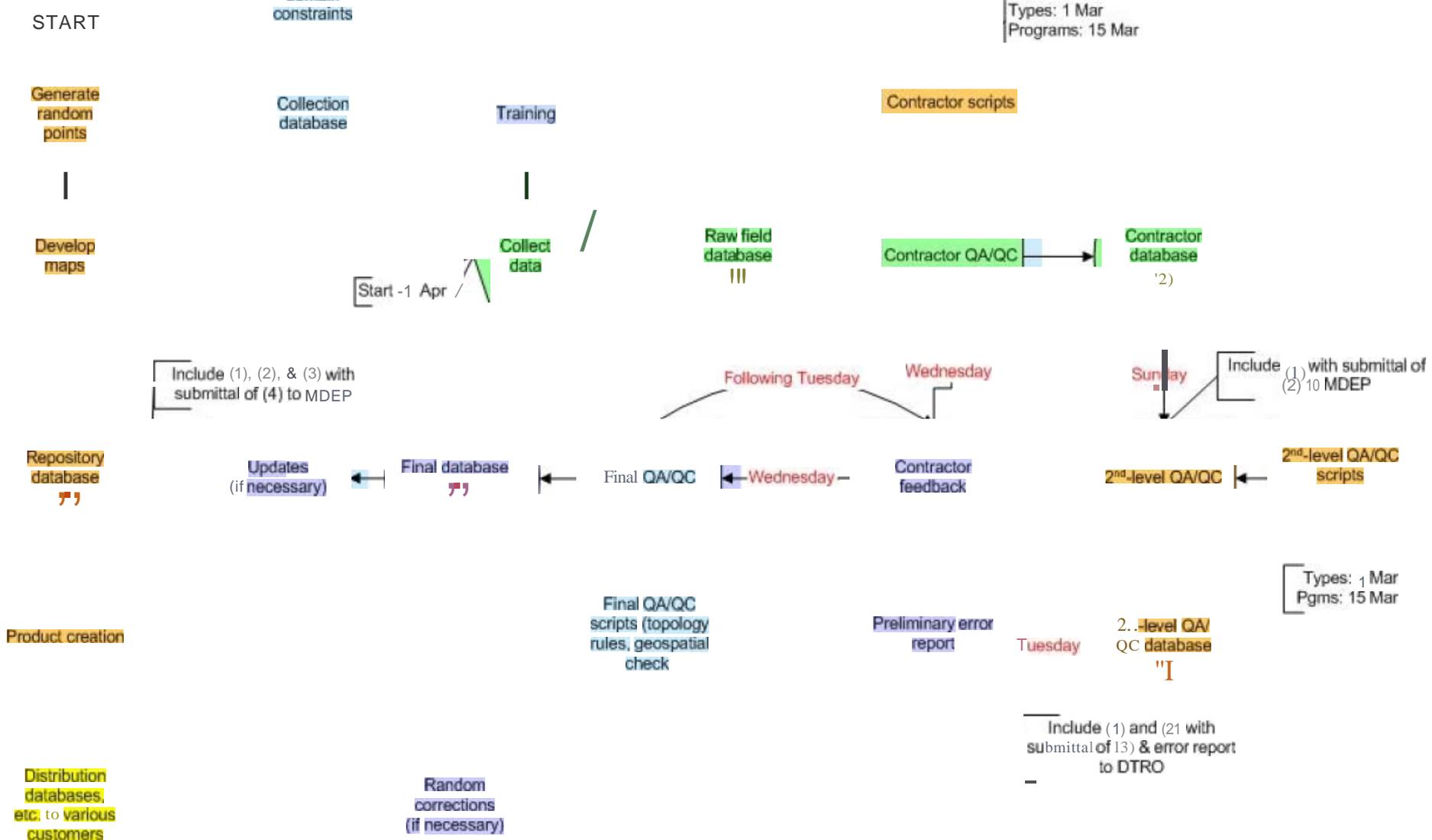
## **2<sup>nd</sup> Level QA/QC**

**Combine contractor databases  
Verify contractor QA/QC  
Identify/correct complex errors**

## **Final QA/QC**

**Verify other levels of QA/QC  
Identify/correct complex errors  
Ensure final consistency throughout entire database  
Create final usable products**

# 2005 Workflow



# QA/QC Products

- **GIS files (Geodatabase, Shapefiles, FGDC compliant metadata)**
  - transects
  - observations
  - threats
  - health status
  - any supporting data (monitoring strata, random start points, available sample area, etc.)
  - $G_0$
  - etc.
- **Scanned copies of any paper datasheets**
- **Microsoft Access Database**
- **Microsoft Excel files**

# QA/QC Status

- 2001-2004 Beta release
- 2005 Beta scheduled for mid April
- Beta versions do not include
  - data sheets
  - FGDC metadata
  - $G_0$