Pre Proposal August 23, 2010

Arizona Wildlife Forensics Unit & Laboratory [AWFUL]

Vision

To provide forensic investigation services to the state of Arizona, and other regional collaborations, on wildlife crime investigations and research via use of best available global standards in forensic science.

Need

The persistent demand for wildlife specimens, parts, and products continues to stimulate illegal take of wildlife via unlawful activities operated by knowledgeable and skillful criminals. Investigations on wildlife crime cases are essential to wildlife protection legislature and law enforcement, and often require detailed information on events leading to a crime and its consequences. To enhance this investigative process, a specialized unit that consists of a dedicated service laboratory will be instrumental, particularly in generating and providing robust science-based evidence to strengthen presentations in court trials. Prosecution or defense of a wildlife criminal is often based on critical pieces of evidence brought about by analysis of the chain of evidence in custody. A unit specializing in wildlife forensics will provide integral services in this analysis. Moreover, the increasing demand for investigative services, such as sample testing and identification, will be met at high efficiency and a reasonable cost by a laboratory.

Description

The Arizona Wildlife Forensics Unit & Laboratory will provide investigative services (e.g. species, sex, individual, and source identification) primarily for wildlife crime cases identified by law enforcement personnel associated with the Arizona Game & Fish Department and collaborating agencies* (See Fig. 2).

The unit will comprise of specialists in the field of forensic science and wildlife forensics. These specialists will supervise and provide their expertise in the practice of forensic investigation methods of analysis, namely:

1. Analytical chemistry
2. Morphology
3. Criminalistics
4. Genetics
5. Pathology
6. Presentation of evidence

The unit will base inferences, and provide such evidence to crime cases as needed, via the use of best available scientific tools, technology, and global standards in the aforementioned methods (Cooper *et al.* 2009). The unit will also serve as a database of wildlife crime case files that will be referenced in future research for global advancement of wildlife forensic science.

Objectives

The objectives of the AWFUL as a state service initiative will be:

1. To provide answers to investigative questions in wildlife crime cases with best practice science, high efficiency (fast processing time) and low costs.
2. To develop, establish, and improve investigative methods and protocols in identification and monitoring of wildlife crime elements.
3. To serve as a liaison between state and federal agency laboratories dealing with detection and prosecution of wildlife crime worldwide.
4. To be a premier service laboratory cited in the global context of standards in applied wildlife forensic science.

Laboratory Type and Operation

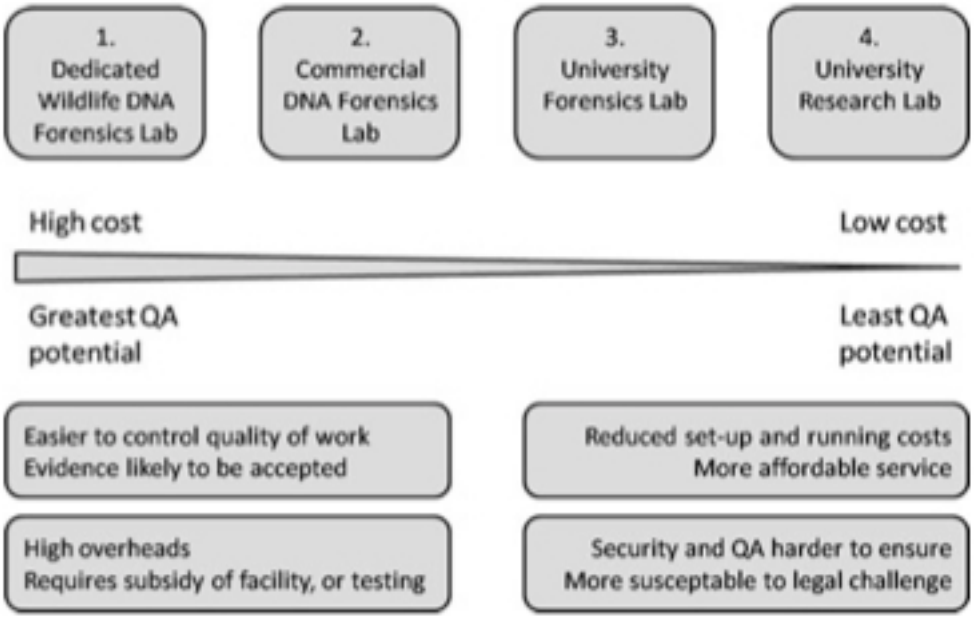

Fig. 1 As presented above, AWFUL will be of Type 1. (Ogden 2010).

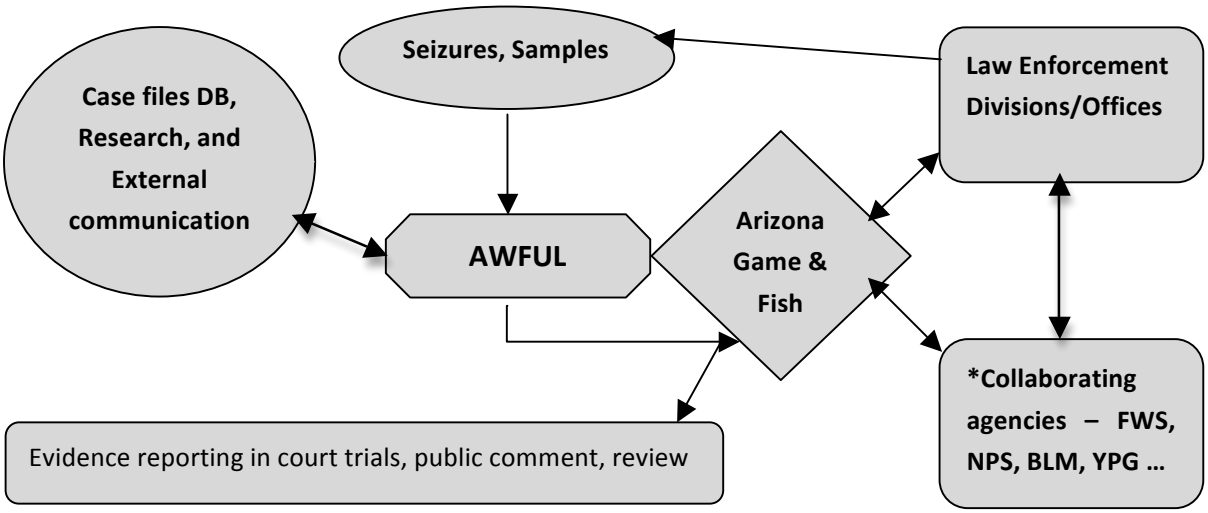

Fig. 2 AWFUL's *modus operandi*.

Budget of Initial Investment for a DNA Forensics Laboratory

DNA Manipulation - LAB 'A'			**PCR, DNA Sequencing, Analysis - LAB 'B'**		
ONE-TIME INVESTMENTS			*ONE-TIME INVESTMENTS*		
Equipment	**Type, Qty.**	**Cost**	**Equipment**	**Type, Qty.**	**Cost**
Centrifuge	Mini, 2	$1,400	Computer	Mac/PC, 3	$9,600
Centrifuge	Cooling, 1	$3,000	Centrifuge	Plate, 1	$2,600
DNA Extractor	Auto, 1	$92,600	Freezer	Storage, 2	$11,000
Freezer	Storage, 2	$11,000	Gel doc. Unit	UV+Cam, 1	$7,400
Freezer Mill	SPEX, 1	$7,500	Glassware	Asstd., 2 sets	$600
Glassware	Asstd., 2 sets	$600	Heat block	Temp Ctrl, 1	$300
Heat block	Temp Ctrl, 1	$300	Microfilter H2O	Distil. Unit, 1	$7,000
Incubator	Temp Ctrl, 1	$3,500	Microwave	Regular, 1	$100
Laminar Flow	Hood, 2	$13,000	Pippettor	Asstd., 2 sets	$6,000
Microfilter H2O	Distil. Unit, 1	$7,000	Refrigerator	Storage, 2	$14,000
Pipettor	Asstd., 2 sets	$6,000	Scale	Micro., 1	$300
Refrigerator	Storage, 2	$14,000	Sequencer	3730 XL, 1	$158,700
Safety wear	Body Kit, 4	$2,000	SLR Camera	Kit+Lens, 1	$14,000
Scale	Micro., 1	$300	Thermocycler	BioRAD, 4	$32,000
UV lights	Tubes, 1 set	$2,000	UV lights	Tubes, 1set	$2,000
Vortexer	Mini, 2	$300	Vortexer	Mini, 2	$300
		$164,500			**$265,900**
Total Equipment Cost		**$430,400**			
RECURRING INVESTMENTS (YEARLY)			*RECURRING INVESTMENTS (YEARLY)*		
Equipment		**Yearly Cost**	**Equipment**		**Yearly Cost**
DNA Kits		$9,200	PCR Kits		$14,800
Chemicals		$4,000	Chemicals		$6,000
Consumables		$14,000	Consumables		$12,000
Service/Repair		$2,000	Service/Repair		$5,000
		$29,200			**$37,800**
Total Annual Cost		**$67,000**			
SALARIES (PER ANNUM)					
Laboratory Supervisor (PhD)		**$70,000**			
Lab Research Technician (MS)		**$50,000**			
Lab Research Technician (MS)		**$50,000**			
Total Annual Employment Cost		**$170,000**			

References

Cooper JE, Cooper ME, Budgen P. 2009. Wildlife crime scene investigation: techniques, tools and technology. *Endang Species Res.* 9:229–238.

Ogden R. 2010. Forensic science, genetics and wildlife biology: getting the right mix for a wildlife DNA forensics lab. *Forensic Sci Med Pathol.* 6:172–9.