

# Mission Report – Republic of Congo

4 July 2005 through 15 July 2005

## “GIS Support for Protected Area Landcover”

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## **Mission Abstract**

The Forest Service mission team carried out a three-day long information needs assessment (INA) upon its arrival in Congo. The Wildlife Conservation Society (WCS) hosted the INA at their Congo headquarters office in Brazzaville, and provided an interpreter for the team's entire stay.

All parties closely involved in the management of Congo's Protected Areas were represented at the meeting. The assembled group identified information requirements and gaps, and prioritized them in the areas of land cover and vegetation maps, law enforcement, and wildlife management. Information needs for land cover and vegetation mapping were assessed with more detail than the law enforcement and wildlife components, because a substantial amount of land cover data is already on hand.

For the duration of the mission, the team worked at the CNIAF GIS laboratory to become familiar with current operations there, and to assess opportunities to provide assistance. The CNIAF GIS team has made excellent progress since the Forest Service's previous mission in October 2004. The quality of the mapping work remains high, and the CNIAF team is operating very efficiently. CNIAF personnel are coordinating well with WCS, The Kinshasa GIS Lab (University of Maryland), and other stakeholders in the CNIAF database. The first version of the CNIAF GIS database (with boundaries, transportation and rivers) could well be ready for official use before March 2006.

The INA work conducted during this mission, with some follow-up work, charts out the new database content that would be added to the second version of the GIS database, perhaps as soon as September 2006. These dates compare favorably with the schedule cited in the first USFS mission report.

However, much of the high priority work to be done, as identified in the INA, depends on the acquisition of 30-meter resolution or better imagery in the southern half of Congo. This imagery must be cloud-free, and no such satellite imagery exists in current data sources. Finding alternate sources and acquiring the required imagery may take months to complete. Therefore, the phased or incremental development of the database is a wise course. The first version of the database will be useful immediately, as the first official definitive GIS database in the country.

The Forest Service team witnessed excellent collaboration between the Ministry, CNIAF, WCS, Ecosystèmes Forestiers en Afrique Centrale ( ECOFAC) and University of Maryland (Kinshasa Lab), all demonstrating a shared partnership vision of being contributors to, and customers of, this new integrated database.

The mission team has assembled its findings and recommendations into six focus areas, described here. Suggested actions for each of these six areas are described later in the **Recommended Actions** section of this document. These focus areas are:

Focus Area 1 - Complete Version 1 of the official CNI AF database by June 2006. Boundaries, hydrography (rivers, streams and lakes) and transportation (roads and railroads) layers will be included in this first released version. Cloud-free imagery of the southern portion of the country must be obtained to refine the database in those areas currently obscured by clouds. These refinements, along with an additional hydrology network layer and other new layers (see focus areas 3 and 4) should be included in subsequent database versions.

Focus Area 2 - Convert the current database's independent layer structure into an ESRI "Geodatabase" structure, to enable easier data sharing and day-to-day maintenance. With the help of ESRI personnel, this could be accomplished by August 2006.

Focus Area 3 - Develop land cover layers from cloud-free satellite imagery or aerial photography, which is currently not available from Landsat for the southern half of the country. Land cover layers can be used for wildlife habitat delineation, vegetation community designation, human community use mapping, and a wide variety of planning analyses. It might be late 2006 or early 2007 before suitable satellite imagery might be acquired.

Focus Area 4 - Develop new "business" layers to support wildlife conservation, law enforcement, forestry concession administration, and social/community mapping. These layers will involve field collection of data in the day-to-day businesses of forest management. Wildlife and law enforcement business layers could be defined and developed by June 2006.

Focus Area 5 - Set up internal processes for sharing and using data within the Ministry, and with external cooperators and the public. Such processes are already being discussed by CNI AF and its partners, and would be in place when the Version 1 database is delivered in June 2006.

Focus Area 6 - Integrate the CNI AF database with the existing Ministry forestry operations database, and develop data sharing procedures between the Ministry and forestry concession companies. These procedures would be defined after the delivery of the Version 1 database in June 2006, and could be implemented before June 2007.

### **Critical Management Issues**

There are two strategic critical management issues that should be addressed to ensure project success:

- Complete Version 1 of the CNIAF database and convert it to the Geodatabase format. This format is an extremely efficient way to manage GIS data and share it inside the Ministry and externally.
- Acquire cloud-free satellite or aerial imagery for the southern half of the Republic of the Congo. This data is currently not available from public sources and may have to be purchased. Without this data, the CNIAF database cannot be completed to the needed precision, and complete land cover layers, necessary for Protected Area management, cannot be created.

Please see the **Recommended Actions** section below (Focus Areas 1 and 2) for more detailed discussions of these issues.

## General Findings

This mission's terms of reference specify two in-country tasks: completion of an Information Needs Assessment (INA), and an activity and results report.

***In-country task (Terms of Reference Task #2):*** Completion of an INA identifying precisely what kinds of data need to be collected in order to create the desired protected area mapping capabilities, how this data should be used, and how it can be integrated with CNIAF's other work. A concept of this required data should be spelled out in a written document ahead of the USFS team's arrival. The USFS team can then expand on this as necessary.

Please see the body of this report for the results of the INA for Protected Area data needs.

***In-country task (Terms of Reference Task #4):*** Produce a report detailing activities during the mission and all results and findings of the work toward the accomplishment of those objectives listed above. This report will include the identification and prioritization of additional equipment, software, and training needs for CNIAF employees. A prioritized list of future tasks that should be addressed in advancing the process of mapping protected areas should also be included, as well as any future role for USFS technical assistance.

Please see Appendix 3 for the program of work for the mission.

The first part of the INA focused on identifying the different customer groups who would use the CNIAF database. Led by Monsieur MPATI, the discussion identified four categories of users.

Type 1 – the Ministry of Forestry. The Ministry has the general direction responsibility of forest lands, including general administrative, ecological, economic, and technical management. Administering international concession logging operations is a major function. Internal Ministry groups carry out monitoring and audits covering the entire range of management. Law enforcement for forest operations and wildlife management also fall within the Ministry's responsibilities.

Type 2 – Other Public Service Ministries. The CNIAF database will be used by at least the Ministries of Agriculture, Tourism, Interior, Health and Commerce. Responsibilities of these other Ministries include community livelihoods, promotion of tourism, international border protection, management of human diseases, and the development and maintenance of commercial markets.

Type 3 – External Consumers. Users of the CNIAF database in this category include conservation organizations (international, national and local), universities and research organizations, potential donors for fund-raising activities, and the general international public.

Type 4 – Local Communities. Governance in Republic of Congo is in the process of being decentralized into local parliaments. Local communities will need CNIAF data to help manage their local issues. They are the first protectors of wildlife, and are engaged in forest conservation on the ground every day. Forest health is tied to social and economic well-being, which is a prime concern for local governments.

## **Recommended Actions**

### Focus Area 1 - Complete Version 1 of the official CNIAF database.

Complete the digitization of the boundaries, hydrography (streams, rivers and lakes) and transportation (roads and railroads) layers for the first officially released version of the database. This data is being digitized from 30-meter Landsat satellite imagery, the most cost-efficient process available. However, no cloudless Landsat scenes have been found for the southern portion of the country. Cloud-free satellite imagery or high-elevation aerial photography must be obtained from other image sources, or data for the missing areas must be collected using alternate means. These alternate means include on-the-ground GPS, M3DADI or other aircraft imaging, and special tasked satellite images. Spot Image, ASTER and the European Space Agency's Envisat ESR are potential data sources for satellite images.

The World Resources Institute (WRI) has proposed a project for high resolution 3 dimensional imaging (M3DADI) for the Congo. This project could provide a substantial amount of the needed data, if funded.

In a later database version, a new hydrology layer in which rivers are represented by single lines versus multiple lines, should be generated for hydrologic network analysis. This layer can be generated from converted from 30-meter elevation data, if it can be acquired.

Actions:

- Acquire cloud-free satellite imagery for the southern portion of ROC, suitable for land cover classification and road and river digitizing. Consider ASTER, Landsat, Spot, Envisat, ESR, etc. All current cooperators should search for available imagery and coordinate their efforts. Some licensing agreements allow for free or reduced-cost acquisition, if the data is used for non-commercial purposes. If no suitable satellite imagery is currently available, consider funding high-elevation digital photography.
- Acquire 30-meter satellite radar images (digital elevation data) if available. This data can be used many ways, from generating 3-dimensional terrain surfaces to stream networks. USFS is trying to acquire this data from the Space Shuttle SRTM database. 90-meter SRTM data is already available on the Internet. Other 30-meter resolution radar and digital elevation sources are ESA's ESR and Envisat ASAR.
- Complete road and stream digitization in areas obscured by clouds, by acquiring aircraft imagery or by field collection via ground personnel using GPS recorders. CNIAF and concessionaires are the main cooperators for this task.

#### Focus Area 2 - Convert the current database's independent layer structure into an ESRI Geodatabase.

The current shape file structure of the database should be converted into a "Geodatabase" structure, to facilitate sharing of the data and day-to-day maintenance. During this conversion, it is recommended to develop data standards for each layer. To ensure consistent data, all data collection efforts will follow these standards. The standards include attribute and geometry standards, as well as the minimum metadata required for data sharing.

Actions:

- Convert CNIAF database into an ESRI Personal Geodatabase structure. This conversion should be performed by ESRI-trained GIS specialists, and delivery of the new database should be coordinated with two weeks of CNIAF

Geodatabase training in Brazzaville. This would assure a quick and efficient transition. ESRI provides this same service to the US Forest Service.

- Provide further training for CNIAF GIS personnel in Geodatabase implementation and spatial analysis techniques. This training would best be provided by ESRI certified trainers.
- Complete data standards descriptions for each data layer in the database, building upon the existing CNIAFGIS data dictionary.

### Focus Area 3 - Develop land cover layers.

Collect existing land cover data and integrate into one layer for the entire ROC. Work with all potential users to determine the attributes, resolution and level of detail necessary to support their business needs and retain these in the consolidated layer. Lack of cloud-free satellite imagery for the southern half of ROC is the critical issue for completion of land cover layers.

#### Actions:

- Using existing examples of simple and complex approaches tried in ROC and its neighbors, agree on a usable standard for the Congo Basin. WCS and other international NGO's in the Basin are in the best position to lead this task. The land cover assessment and gap report work done in the mission INA (see Appendix) is a good first step.

### Focus Area 4 - Develop new "business" layers.

Design information layers to support the core business needs of the Ministry and partners. These layers will include patrol areas and observations, wildlife sightings, wildlife habitat areas, forest inventories, logging activities, or habitat restoration activities. The source of these layers will be mostly field collection of data in the day-to-day businesses of forest management. Each layer should have a designated Data Steward.

#### Actions:

- Designate a Data Steward for each layer in the database. The Data Steward is the person responsible for the quality of their database layer(s) – that is, for data accuracy, currency, consistency, and completeness. Data Stewards are typically people who collect and/or use his kind of information. Examples of data stewards would be: WCS personnel for wildlife habitat, Ministry personnel for wildlife observations and law enforcement, and CNIAF personnel for hydrology, boundary and transportation. CNIAF lab personnel would also be responsible for the technical quality, availability and security of the data, and for Geodatabase data entry and editing.

- Design database layers for wildlife management and law enforcement. A general purpose wildlife approach is recommended – one that can record observations, survey and monitoring of all animal and plant species. See Appendix 5 for an example of a working U.S. Government wildlife GIS database. The CNIAF version could be a simpler, more compact version of this. USFS personnel could provide assistance in designing this layer. It might be practical to initially combine both wildlife and law enforcement into a single “events” layer to reduce complexities.
- Develop field data recorder programs for collection of wildlife and law enforcement data, using GPS and GIS technology. Costs of these recorders with GPS is currently \$400 to \$800 USD, including waterproof cases. USFS could provide recommendations for purchase, based on our experience with dozens of types of these units. For example, Dell Axim PDR in a waterproof Otter Box, with ESRI ArcPad GIS software and a Holux GPS unit is one popular combination.

Focus Area 5 - Set up internal processes for sharing and using data.

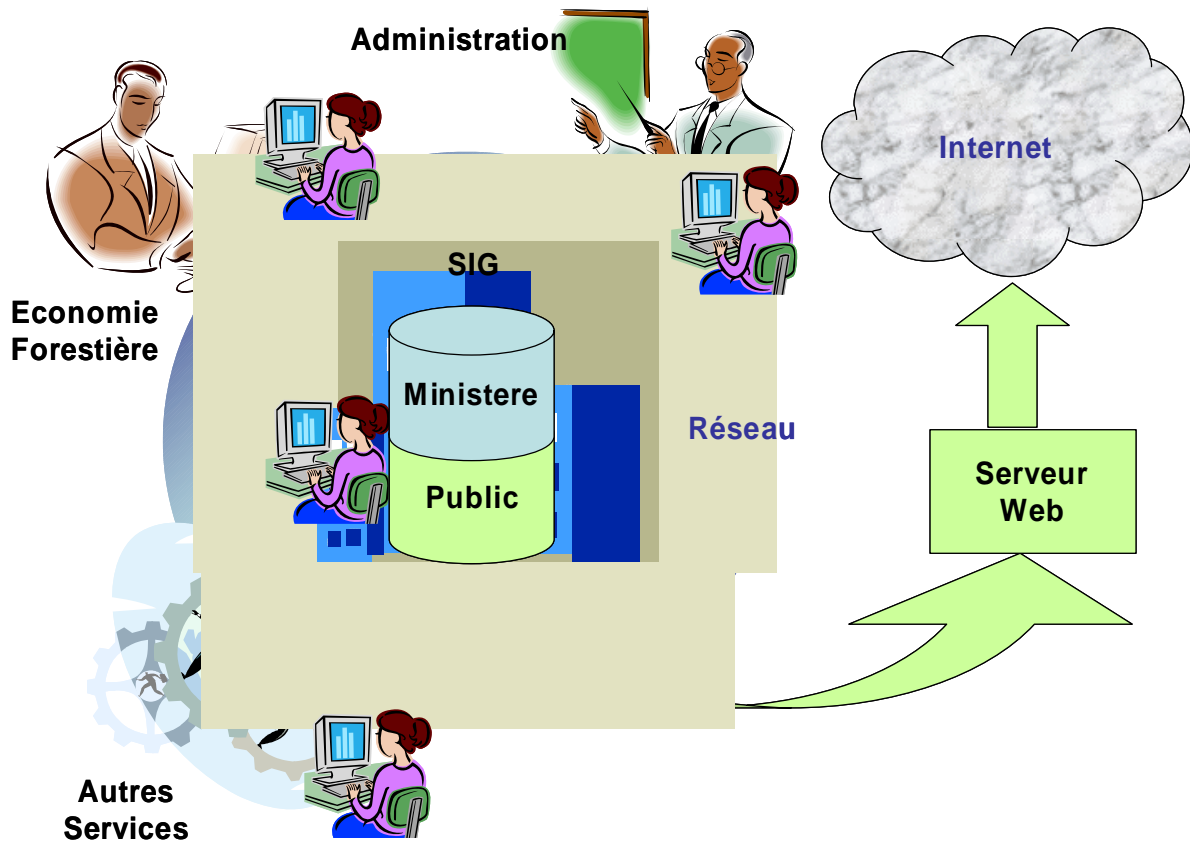
Set up internal processes and infrastructure for sharing data within the ministry and with external partners and the public. The key initial component is the installation of an internal Ministry computer network, connected to the CNIAF GIS database.

Actions:

- Install internal computer network connection between CNIAF Lab and the rest of the Ministry. This will allow the CNIAF Lab to begin publishing data from the database to internal web sites, for use by analysts and managers.
- Repair the Hewlett-Packard large format plotter in the CNIAF Lab. Plotting maps for visual inspection of data is a critical database quality control function. Large maps are also essential for displaying GIS analysis results, as well as for graphics for meetings, etc.



- Here is an illustration of proposed CNIAF data sharing:



Focus Area 6 - Integrate the CNIAF database with the existing Ministry forestry operations database.

Forestry Concessionaire companies produce GIS products in their planning and management activities. These products could be routinely delivered to CNIAF for validation and inclusion in the CNIAF database. Ministry forestry and audit personnel would be Data Stewards for this type of data, to ensure accuracy.

Actions:

- Develop a process for integrating GIS data produced by Forestry Concessionaires as part of their planning requirements, into the CNIAF database. Please see the USFS report on the CNIAF database dated October 2004 for more details.

## Recommended Action Summary

1. Acquire cloud-free imagery for the southern portion of ROC, suitable for land cover classification and road and river digitizing. Satellite-based imagery would be the most economical source, but tasked aircraft photography could be used at greater costs. Consider ASTER, Landsat, Spot, Envisat, ESR, etc. All current cooperators should search for available imagery and coordinate their efforts, such as the WRI proposal for M3DADI aerial imagery. Some licensing agreements allow for free or reduced-cost acquisition, if the data is used for non-commercial purposes.
2. Acquire 30-meter satellite radar images (digital elevation data) if available. This data can be used many ways, from generating 3-dimensional terrain surfaces to stream networks. USFS is trying to acquire this data from the Space Shuttle SRTM database. 90-meter SRTM data is already available on the Internet. Other 30-meter resolution radar sources are ESA's ESR and Envisat ASAR. If no radar data is available, consider other sources of digital elevation data.
3. Convert CNIAF database into an ESRI Personal Geodatabase structure. This conversion should be performed by ESRI-trained GIS specialists, and delivery of the new database should be coordinated with two weeks of CNIAF Geodatabase training in Brazzaville. This would assure a quick and efficient transition. ESRI provides this same service to the US Forest Service.
4. Install internal computer network connection between CNIAF Lab and the rest of the Ministry. This will allow the CNIAF Lab to begin publishing data from the database to internal web sites, for use by analysts and managers.
5. Repair the Hewlett-Packard large format plotter in the CNIAF Lab. Plotting maps for visual inspection of data is a critical database quality control function. Large maps are also essential for displaying GIS analysis results, as well as for graphics for meetings, etc.
6. Provide further training for CNIAF GIS personnel in Geodatabase implementation and spatial analysis techniques. This training would best be provided by ESRI certified trainers.
7. Complete data standards descriptions for each data layer in the database, building upon the existing CNIAFGIS data dictionary.
8. Collaborate and agree on a usable land cover classification standard for the Congo Basin, using existing examples of simple and complex approaches tried in ROC and its neighbors. WCS and other international NGOs in the Basin are in the best position to lead this task. The land cover assessment

and gap report work done in the mission INA (see Appendix) is a good first step.

9. Designate a Data Steward for each layer in the database. The Data Steward is the person responsible for the quality of their database layer(s) – that is, for data accuracy, currency, consistency, and completeness. Data Stewards are typically people who collect and/or use his kind of information. Examples of data stewards would be: WCS personnel for wildlife habitat, Ministry personnel for wildlife observations and law enforcement, and CNIAF personnel for hydrology, boundary and transportation. CNIAF lab personnel would also be responsible for the technical quality, availability and security of the data, and for Geodatabase data entry and editing.
10. Design database layers for wildlife management and law enforcement. A general purpose wildlife approach is recommended – one that can record observations, survey and monitoring of all animal and plant species. See Appendix 5 for an example of a working U.S. Government wildlife GIS database. The CNIAF version could be a simpler, more compact version of this. USFS personnel could provide assistance in designing this layer. It might be practical to initially combine both wildlife and law enforcement into a single “events” layer to reduce complexities.
11. Develop field data recorder programs for collection of wildlife and law enforcement data, using GPS and GIS technology. Costs of these recorders, with GPS, is currently \$400 to \$800 USD, including waterproof cases. USFS could provide recommendations for purchase, based on our experience with dozens of types of these units. For example, Dell Axim PDR in a waterproof Otter Box, with ESRI ArcPad GIS software and a Holux GPS unit is one popular combination.
12. Develop a process for integrating GIS data produced by Forestry Concessionaires as part of their planning requirements, into the CNIAF database. Please see the USFS report on the CNIAF database dated October 2004 for more details.

**Appendix 1**  
**Team Contacts**

Monsieur ETEKA	Directeur du Cabinet
François NTSIBA	Directeur du CNIAF
Basile MPATI	Asst. Dir. CNIAF-Pi
Innocent NGANGA	CNIAF Wildlife
Paul Elkan	WCF Admin.
Ekondzo DAMASE	AFAP
Sarah Elkan	WCF Admin.
Dr. Emma Stokes	WCS Research Leader
Gaspard LEMBE	CNIAF GIS Lab Leader
Antoinette NKABI	Cabinet / HEFE
Ikonga MOKOKO	WCF
Nazaire MASSAMBA	WCF Lac Tele / translator
Joseph MOUMBOUILOU	Direction des Forêts
Jean-Jaurth Gabriel DIAMONIKA	Wildlife, Protected Areas Inspection, ECOFAP
Dr. Felix KOUBOUANA	CNIAF GIS Lab
Tedy NTOUNTA	CNIAF GIS Lab
Chérubins-Brice OUISSIKA	CNIAF GIS Lab
Marcel IBARA	CNIAF GIS Lab

**Appendix 2**  
**Programme de travail previsionnel de la mission d'assistance technique en appui au CNIAF du 5 au 15 juillet 2005**

	Activites	taches	acteurs	resultats	date	observations
0	Prise de contact avec les missionnaires	- elaboration d'un plan de travail	- CNIAF - Cabinet - DFAP, - WCS	- debriefing sur l'objet de la mission - elaboration d'un plan previsionnel de travail	Mardi (1 jour)	WCS
1	Table ronde sur les utilisateurs des donnees sur les aires protegees	1 – identification des besoins prioritaires en cartographie  2 – disponibilite des donnees	- gestionnaires - experts - decideurs	Determination des besoins en information sur les aires protegees	Mercredi ( 2 heures)	Lieu de reunion WCS
II	Etat des lieux de la cartographie des aires proteges	1- liste des aires protégées 2 - textes juridiques 3 – disposition pratiques 4 – validation des limites 5 – determination des besoins en couverture vegetales 6 – identification des GAPS et methodologie de correction	-CNIAF; -Experts -ECOFAC; - WCS; - DFAP; - etc.	- Carte de reference des aires protégées - determination et priorisation des besoins en cartographie des aires protegees	Mercredi; Jeudi Vendredi Samedi Lundi ( 4,5 jours)	Laboratoire CNIAF  Bureau technique CNIAF
III	Etat des lieux des donnees en faune	1 – donnees socio economiques ecologiques et techniques sur les aires protégés 2- determination des GAPS et methodologie de correction	CNIAF; -Experts -ECOFAC; - WCS; - DFAP; - etc	- Priorisation des inventaires et des informations sur la base de donnees a confectionner	Mardi (1 jour)	WCS, CNIAF
IV	Reflexion et elaboration de la base de donnees sur la faune (table ronde)	1 – disponible 2 – vision 3 – determination des GAPS	CNIAF; -Experts -ECOFAC; - WCS; - DFAP; - etc	Priorisation des information sur la bases des donnees	Mercredi (2 heures)	WCS, CNIAF
V	Planification court, moyen long terme	1 - formation 2 – systeme 3 – appui a l'expertise	CNIAF; -Experts -ECOFAC; - WCS; - DFAP; - etc	Approche du plan d'intervention	Jeudi ( 1 jour)	WCS, CNIAF)

Programme de travail previsionnel de la mission d'assistance technique en appui au CNIAF du 5 au 15 juillet 2005



### Appendix 3 Calendar of milestones and needs

Calendrier des travaux de cartographie et besoin en formation jusqu'à la fin juin 2005. (draft)

<i>Activités cartographiques - Formation</i>	<i>Dates prévues de réalisation</i>
<ul style="list-style-type: none"> <li>• Organisation des données dans les répertoires appropriés sur la base des données inventoriées, du personnel en place et des logiciels disponibles.</li> </ul>	Fait
<ul style="list-style-type: none"> <li>• Adoption d'une méthodologie de travail, d'une codification pour la saisie des éléments et définition des différents domaines de valeurs.</li> </ul>	Fait
<ul style="list-style-type: none"> <li>• Saisie des éléments et codification préliminaire pour les thématiques constituant les UFA (hydrographie linéaire, limites administratives, autres limites du domaine forestier permanent) et les routes publiques/forestières pour la partie nord Congo (au-dessus du Greenwich).</li> </ul>	Septembre à Décembre 2004
<ul style="list-style-type: none"> <li>• Formation sur les GPS</li> <li>• Établissement d'une méthodologie pour les vérifications cartographiques (layout et validation des codes).</li> </ul>	Décembre 2004
<ul style="list-style-type: none"> <li>• Première vérification cartographique (interprétation, codification) des éléments.</li> </ul>	Janvier 2005
<ul style="list-style-type: none"> <li>• Vérification terrain des informations interprétées</li> </ul>	Janvier - Février 2005
<ul style="list-style-type: none"> <li>• Formation sur l'intégration de données - établissement d'une méthodologie.</li> </ul>	Mars 2005
<ul style="list-style-type: none"> <li>• Correction des données descriptives et à intégration des nouvelles données recueillies sur le terrain.</li> </ul>	Mars -Avril 2005
<ul style="list-style-type: none"> <li>• Formation sur les étapes de nettoyage et de construction de la topologie (ArcInfo ou Géodatabase)</li> </ul>	Mai 2005
<ul style="list-style-type: none"> <li>• Nettoyage des données et organisation de la structure topologique.</li> </ul>	Mai - Juin 2005
<ul style="list-style-type: none"> <li>• On procède à la vérification finale de l'ensemble (codification, interprétation) et correction finale.</li> </ul>	Juin 2005
<ul style="list-style-type: none"> <li>• Complément de formation sur les bases de données - intégration de données.</li> </ul>	
<ul style="list-style-type: none"> <li>• Saisie/intégration des données descriptives supplémentaires pour le domaine forestier permanent.</li> </ul>	Juin-Juillet 2005
<i>Formation à venir pour la prochaine année d'activités</i>	
<ul style="list-style-type: none"> <li>• Formation sur le traitement des images avec le logiciel ERDAS pour la partie Sud Congo.</li> </ul>	Août 2005
<ul style="list-style-type: none"> <li>• Formation sur les fonctionnalités d'ArcGis en matière de géodatabase.</li> </ul>	Août 2005
<ul style="list-style-type: none"> <li>• Intégration des données dans la géodatabase finale. Lorsque la partie la partie sud sera complétée uniquement.</li> </ul>	Dans les derniers 3 mois du projet (novembre, décembre 2006, janvier 2007)

## Appendix 4

### Land cover assessment and gaps

#### Situation Cartographique des Aires Protégées

Aire Protégées	Superficie	Partenaire	Localisation	Date de Création	Données cartographiques	Logiciels cartographiques	Problèmes	Données disponibles	Observations
Parc National Nounabale-Ndoki NP	419.314	MEFE/WC	Sangha Likouala	1993 2003 extension.	- Limites WCS - Carte de végétation disponible à wcs.	Arview, IGN 1/200, landsat, gps verification	* limite sud-est partie terme firme avec concession forestière	- données de patrouilles ; - données suivi éco. - données socio-éco	Un nouveau decret en attente 2003
Réserves Communautaires du Lac Télé	438.960	MEFE/WC	Likouala	2001	- Limites WCS - Carte de végétation disponible à wcs.	Arview, IGN, gps	*Finger w/touk	- données de patrouilles ; - données suivi éco. - données socio-éco	
Parc National d'Odzala-Kokoua	1.354.600	MEFE/EC OFAC	Cuvette et Sangha	1935 2003 extension.	- Limites WCS - pas de carte de végétation ?	Arview, IGN 1/200, landsat, gps verification Cybertracker	Route nationale n°2 à l'est a grignoté AP *Présence d'une poche dans la partie nord-ouest *limite ligne imaginaire	- données de patrouilles ; - données suivi éco. - données socio-éco	
Parc National de Conkouati Ndouli	504.950	MEFE/WC	Kouilou	2000	- Limites WCS - Pas de carte de végétation -manque des images sat claires dans la partie sud	Arview, IGN 1/200,000 landsat, besoin de verification gps	*frontière avec le gabon *marine demarcation *roads limites east et nord *MFT exploitation inside	-données de patrouilles ; - données suivi éco. - données socio-éco	Application video aerienne Winrock project. besoin de verification gps besoins des nouvelles milites



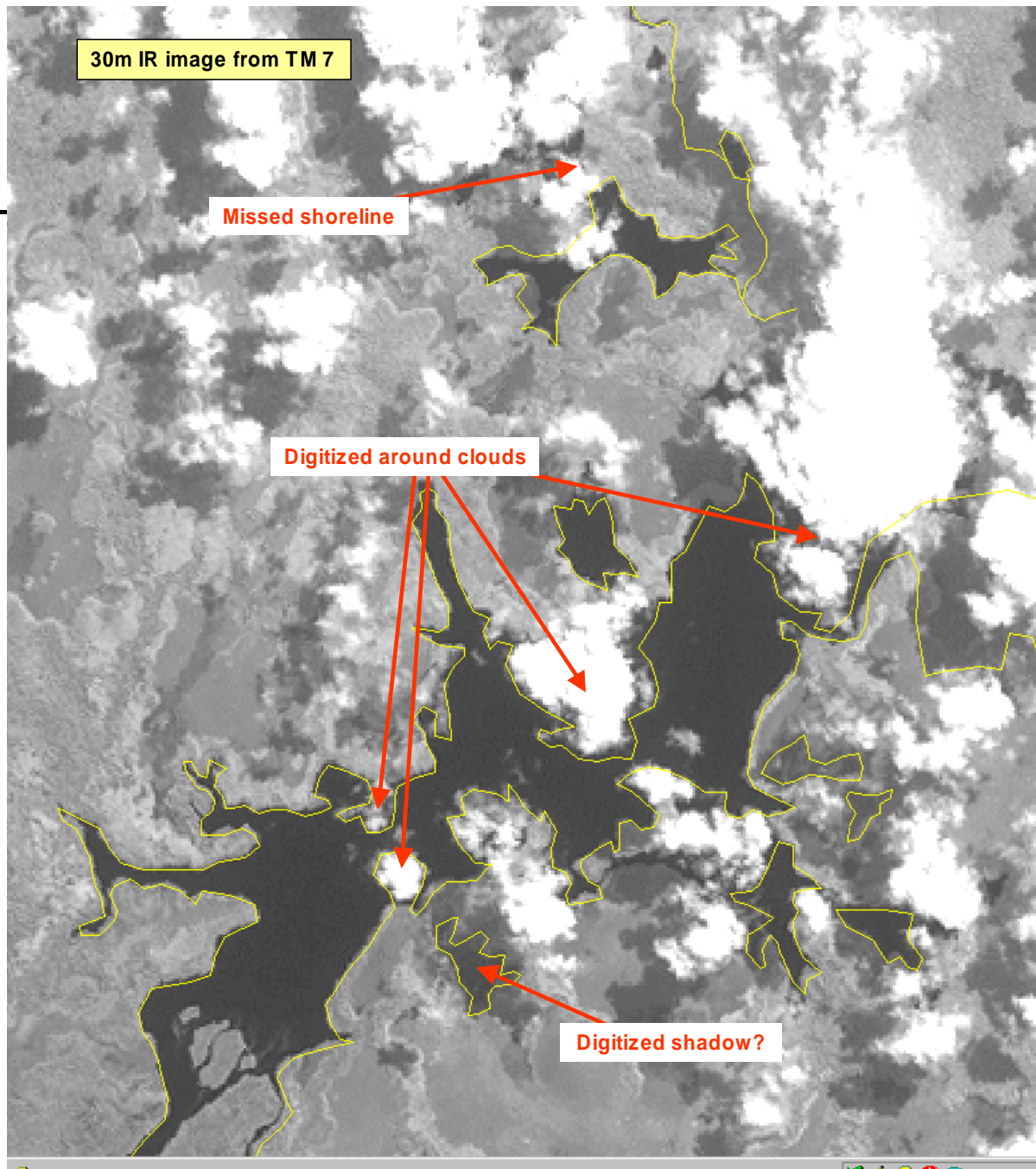
Reserve de la Lefini	630.000	MEFE	Pool et Plateaux	Création de réserve de chasse Transformation réserve faune Parc National 2006 ? il faut redefinir l'AP	-Limites non adequates pour le moment - besoins d'une numérisation plus Claire (shape). - Pas de carte de végétation. limit not dquately defined in shape file (need east extents) -landcover no	IGN 1/200,000	*Route nationale *limite actuelle ne reprend pas aux priorites de la conservation need to revise limits * besoin d'une extension dans la partie sud.	- données sur le suivi des gorilles -données de patrouilles	* Questions des statuts et définition des Reserve de Faune et Domaine de Chasse, autre categorie Aprort
Sanctuaire Lesio-Louna	44.000	MEFE/PP G	Pool	2004 extension	- nouvelles limites pas disponibles. -CNIA F dispose de vieux shapex. - pas de carte de vegetation	IGN 1/200,000			Un nouveau decret est attendu avec les limites de l'extension.
sanctuaire Lossi	35.000	MEFE/EC OFAC	Cuvette ouest		- nouvelles limites pas disponibles. -CNIA F dispose de vieux shapex. - pas de carte de vegetation	Arview, IGN 1/200, landstat, gps verification Cybertracker		- données sur le suivi des gorilles -données de patrouilles	
Reserve faune De la Tsoulou	30.000	MEFE	Niari		CNIAF un vieux shapex - Problème de limite se pose avec acquitité.	IGN ?	*frontiere nationale *rivers between		Limits Need to be carefully examined. -aerial surveys of status of areas before
Reserve faune Mont Fouari	15.600	MEFE	Niari						

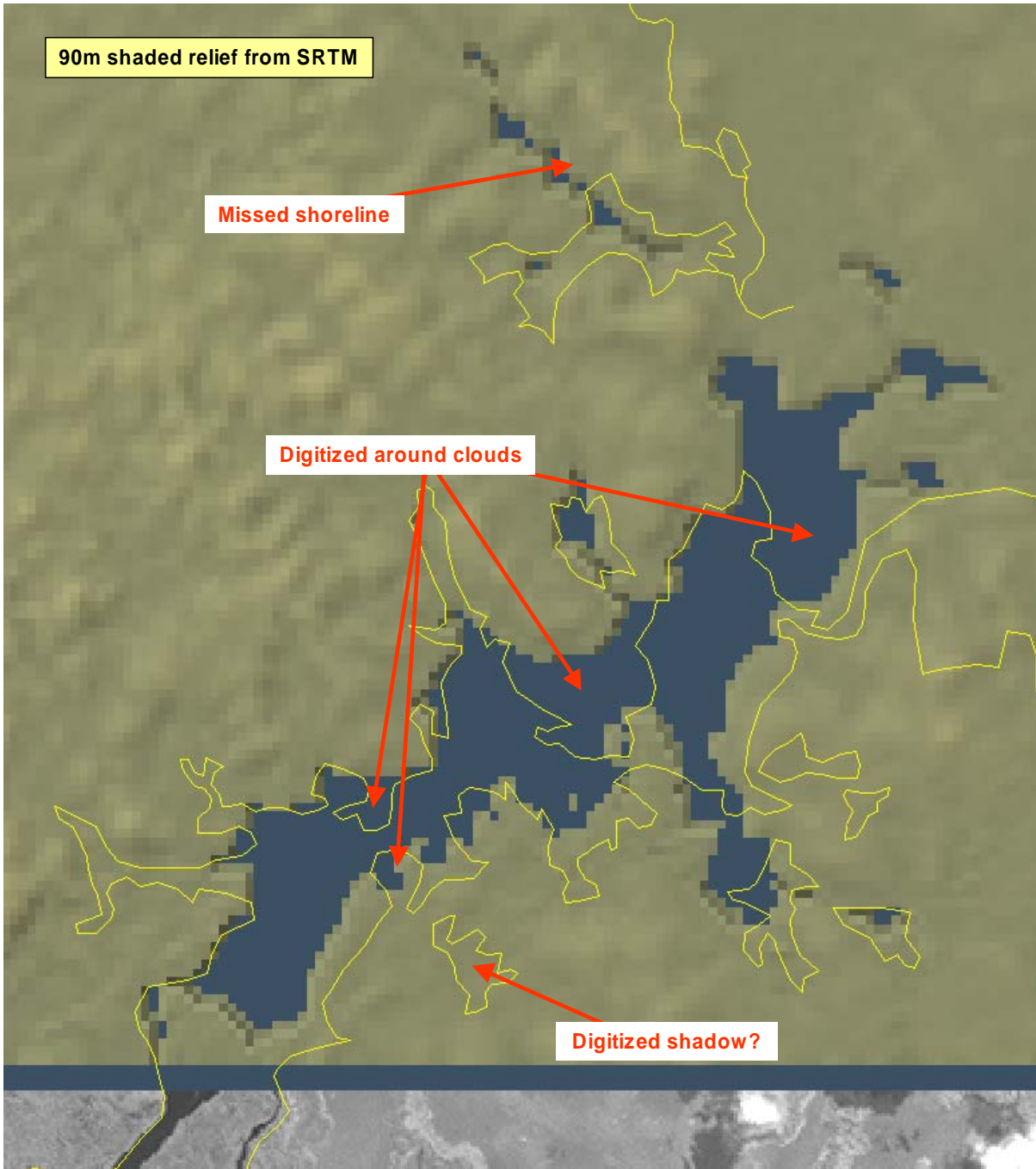


Dom chasse Nyanga Sud	23.000	MEFE	Niari								
Dom chasse de Mont Mavounbou	42.000	MEFE	Niari								
Reserve Faune Tsolou	30.000	MEFE	Niari	Shapes dispo. au CNIAP	IGN					Faire de mission de terrain avant de décider de la suite.	
Reserve Faune Dimonka	136.000	MEFE	Kouilo	Pas de shapes pour le limites en dehors de la route nationale	?	*exploitation concession adjacents *expl. D'ore					
Sanctuaire Tchimpounga	7.000	MEFE/JGI	Kouilo								
AP pot Garbindzam	?			Shape file zone étude WWF	Arview, IGN 1/200,000 landsat,					Mission MEFE/ WWF	
AP pot Niokou-Pikounda	?			Shape file wcs	Arview, IGN 1/200,000 landsat,					WCS/MEFE	
AP pot. Bambama-Lekana	?			Shape wcs	Arview, IGN 1/200,000 landsat,					WCS/MEFE	
AP pot Chaillu	?			Pas de shape dispo	Arview, IGN 1/200,000 landsat,					A planifier par WCS	
Territoir de Ibolo Boundounou	Environ 6.800 ha	MEFE, CFC Oyo		Pas de shapes ?							

## Appendix 5 Digitizing under clouds, using Space Shuttle Radar image

Even with the best equipment and trained personnel, it is impossible to see rivers and streams through clouds (first image). The second image shows how radar images (SRTM) see through clouds – USFS is attempting to acquire 30 meter resolution images for the Republic of Congo from U.S. Government sources.





**Appendix 6**  
**Example Wildlife Data Dictionary**  
**(USFS Fauna)**

**Wildlife**

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The Wildlife theme includes the following layers:

- Wildlife Observations
- Wildlife Surveys
- Wildlife Features

*Status:* This is the release of the data dictionary for Version 1.3.1 of NRIS Fauna.

**Layer: Wildlife Observations**

This layer describes the spatial location of wildlife observations, including Federally listed and sensitive species. The Wildlife Observations layer contains the following coverages:

- wild\_obs\_pt
- wild\_obs\_pl

**Coverage Name: *wild\_obs\_pt***

<b>Abstract / Description:</b>	<p>This coverage contains information related to terrestrial wildlife observations. A basic observation is a detection, or evidence of an individual or group of animals of a known species, at a particular point in time and geographic location. <b>The coverage is automatically generated and maintained by the NRIS Fauna application.</b> There is currently a one to one correspondence between spatial features and Oracle records. <b>For ease of use the data in Oracle is automatically joined to the coverage.</b> The Oracle view, WILDLIFE_OBSERVATION_VW, described in this dictionary is used to populate the feature attribute table of the coverage.</p> <p>Associated National Application: NRIS</p>
<b>References:</b>	NRIS: <a href="http://www.fs.fed.us/emc/nris/fauna">http://www.fs.fed.us/emc/nris/fauna</a>
<b>Spatial Data Source:</b>	Best available local source with a target scale of 1:24000 for continental U.S., 1:25000 for Puerto Rico, and 1:63360 for Alaska.
<b>Horizontal Accuracy:</b>	<p>Accuracy testing must use NSSDA testing guidelines or be reported based on compiled, published test reports appropriate for the data collection method and equipment.</p> <p>The method of determining accuracy should be documented in the process step of the dataset metadata record. If published accuracy results are used, use the statement 'Compiled to meet ___ (meters, feet) horizontal accuracy at 95% confidence interval' in the metadata record, and identify the testing source used. If accuracy is locally tested to NSSDA standards, the statement 'Tested to meet ___ (meters, feet) horizontal accuracy at 95% confidence interval' should be added to the metadata record.</p> <p>Accuracy for legacy data may be reported according to the accuracy standard in</p>

	place at the time of data collection (typically National Map Accuracy Standards). Document the standard used in the metadata record.  (For more information, see: <a href="http://www.fgdc.gov/standards/documents/standards/accuracy/chapter3.pdf">http://www.fgdc.gov/standards/documents/standards/accuracy/chapter3.pdf</a> )
<b>Spatial Reference Information:</b>	Forest appropriate. A complete ArcInfo projection file is required including horizontal coordinate system, datum, and distance units. Include vertical coordinate system information where necessary.
<b>Feature Type:</b>	point
<b>Precision:</b>	Coverages are created in double precision.

## INFO Attribute Tables

### wild\_obs\_pt.pat

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	ALTERNATE NAME	INDEXED?
-	AREA	-	-	-	-	-	-
-	PERIMETER	-	-	-	-	-	-
-	WILD_OBS_PT#	-	-	-	-	-	-
-	WILD_OBS_PT-ID	-	-	-	-	-	-
-	DET_SID	36	36	C	-	-	-
-	TARGET_TAXA	100	100	C	-	-	-
-	TARGET_TAXA_LVL	15	15	C	-	-	-
-	COMMON_NAME	100	100	C	-	-	-
-	SPECIES_CODE	10	10	C	-	-	-
-	TSN	10	10	C	-	-	-
-	TAXONOMIC_ORDER	50	50	C	-	-	-
-	TAXONOMIC_FAMILY	50	50	C	-	-	-
-	OBSERVATION_TIME	4	4	C	-	-	-
-	OBSERVATION_DATE	10	10	C	-	-	-
-	TIME_DATE_ACCUR	20	20	C	-	-	-
-	OBS_METHOD	20	20	C	-	-	-
-	OBSERVER_NAME	50	50	C	-	-	-
-	OBSERVER_QUALS	25	25	C	-	-	-
-	TOTAL_NUMBER	6	6	I	-	-	-
-	REPRO_STATUS	35	35	C	-	-	-
-	GROUP_TYPE	20	20	C	-	-	-
-	LOC_ACCUR_METERS	5	5	I	-	-	-
-	COMMENTS	320	320	C	-	-	-
-	DATA_SOURCE	25	25	C	-	-	-
-	PROTOCOL_NAME	100	100	C	-	-	-
-	LOCAL_ID	254	254	C	-	-	-
-	SURVEY_SID	36	36	C	-	-	-

wild\_obs\_pl.patwild\_obs\_pl

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	ALTERNATE NAME	INDEXED?
-	AREA	-	-	-	-	-	-
-	PERIMETER	-	-	-	-	-	-
-	WILD_OBS_PL#	-	-	-	-	-	-
-	WILD_OBS_PL-ID	-	-	-	-	-	-
-	RINGS_OK	-	-	-	-	-	-
-	RINGS_NOK	-	-	-	-	-	-
-	DET_SID	36	36	C	-	-	-
-	TARGET_TAXA	100	100	C	-	-	-
-	TARGET_TAXA_LVL	15	15	C	-	-	-
-	COMMON_NAME	100	100	C	-	-	-
-	SPECIES_CODE	10	10	C	-	-	-
-	TSN	10	10	C	-	-	-
-	TAXONOMIC_ORDER	50	50	C	-	-	-
-	TAXONOMIC_FAMILY	50	50	C	-	-	-
-	OBSERVATION_TIME	4	4	C	-	-	-
-	OBSERVATION_DATE	10	10	C	-	-	-
-	TIME_DATE_ACCUR	20	20	C	-	-	-
-	OBS_METHOD	20	20	C	-	-	-
-	OBSERVER_NAME	50	50	C	-	-	-
-	OBSERVER_QUALS	25	25	C	-	-	-
-	TOTAL_NUMBER	6	6	I	-	-	-
-	REPRO_STATUS	35	35	C	-	-	-
-	GROUP_TYPE	20	20	C	-	-	-
-	LOC_ACCUR_METERS	5	5	I	-	-	-
-	COMMENTS	320	320	C	-	-	-
-	DATA_SOURCE	25	25	C	-	-	-
-	PROTOCOL_NAME	100	100	C	-	-	-
-	LOCAL_ID	254	254	C	-	-	-
-	SURVEY_SID	36	36	C	-	-	-

**Domain for INFO tables, Wildlife Observations Layer**

**ITEM NAME:** Description

Item name	Description
<b>COMMENTS:</b> The comments that the observer collected during the detection, including key words/phrases. When moving from Oracle to Info, Info truncates the 2000 character field to 320.	
Example: Cave: four bats were observed entering an abandoned mine shaft.	
<b>COMMON_NAME:</b> The unique common name of the species.	
Example: Little Brown Bat	
<b>DATA_SOURCE:</b> Data is collected by the Forest Service or a non-Forest Service organization.	
Forest Service	Data is collected by the Forest Service.
Non-Forest Service	Data is not collected by the Forest Service. (e.g. State Heritage, BLM, Private Timber Companies, etc.) Describe in comments the originator of the data.
<b>DET_SID:</b> The unique spatial ID generated by the Fauna application, attached to detection point features and attributes during PC client data entry, prior to their being committed to the corporate dataset. This field may be used as a geospatially unique link between GIS features and their tabular attributes.	
Example: FNOBPT33.8693117.448513062000937158	

**Domain for INFO tables, Wildlife Observations Layer**

**ITEM NAME:** Description

<b>Item name</b>	<b>Description</b>
<b>GROUP_TYPE:</b> The description of the size and relationship of the animal group observed.	
Single	Only one animal was observed. The animal was not part of a pair or family group.
Pair	The animals observed were considered a pair due to protocol rules or professional judgment.
Family Type	The group of animals observed was a family type or part of one or more than two adults or two adults with young
Group	The group of animals observed was a congregation of singles, pairs, family groups, or a mix of types (e.g. herd, flock, swarm, etc).
Not Applicable	The group type of the animal was not relevant at the time of the observation.
Unknown	Group type could not be determined due to lack of evidence.
<b>LOC_ACCUR_METERS:</b> The estimated or known maximum distance the actual point could be from the GIS feature.	
Example: 100	
<b>LOCAL_ID:</b> Locally supplied identifier used for linking to data sources outside of Fauna	
Example: 3248fc	
<b>OBS_METHOD:</b> How the animal was detected.	
Aural	The animal was detected by hearing it.
Camera Set	The animal was detected by remotely triggered photography or videography.
Capture	Animal was physically examined in hand and identified via measurements and close inspection (e.g. mist netting, live trapping).
Check Station	The location and identification of the animal was determined by interview at a hunter check station.
Electronic Detection	The animal was detected by electronic device (e.g. anabat recorder, counter, etc).
Excrement	Evidence of the animal was found in the form of excrement – scat, regurgitated pellets, etc.
Found Dead	The animal detected was found dead.
Image	The animal was identified by inspecting a photograph or video.
Radio Telemetry	The animal was detected by the use of radio telemetry.
Track	Evidence of the animal was found in the form of a track (e.g. foot print, drag pattern of a body part, etc).
Visual	The animal was detected by seeing it.
Visual and Aural	The animal was detected by seeing it and hearing it.
Voucher Specimen	A specimen collected for identification in a laboratory or for submission to a taxon expert. May or may not be retained in a voucher collection.
Other	Evidence of the animal was detected by means other than those above (e.g. hair snare, track plate, antler run, etc). Describe in comments.

**Domain for INFO tables, Wildlife Observations Layer**

<b>ITEM NAME:</b> Description	
<b>Item name</b>	<b>Description</b>
<b>OBSERVER_NAME:</b> The name of the observer.	
Example: Cathy Taylor	
<b>OBSERVER_QUALS:</b> The qualifications of the observer to accurately identify the correct species associated with the detection. Education and field experience generally define the level.	
Taxon Expert	A person who has extensive field and research level experience with the species detected.
Experienced	A person who has extensive field experience with the species detected.
Limited Experience	A person with limited field experience with the species detected. Capable of making identifications among similar species or subspecies, or other species.
No Experience	A person with no field experience identifying the wildlife species. Species identification made from description.
Unknown	The experience level of the observer is unknown. Species identification is made from the description.
<b>OBSERVATION_DATE:</b> The date the detection occurred.	
Example: 01-JAN-2002	
<b>OBSERVATION_TIME:</b> The time the detection occurred in 24-hour local time.	
Example: 1403	
<b>PROTOCOL_NAME:</b> The name of the survey protocol followed, or "Incidental Observation" if no protocol was involved.	
Example: Basic Survey (single field sample)	Parent survey protocol name, if the detection resulted from a survey.
<b>REPRO_STATUS:</b> The reproductive status of the animal detected, if known.	
Reproducing	The animal or group observed shows evidence of current season reproduction. Some evidence of partial reproductive failure may be present.
Non-Reproducing	The animal or group observed was capable of reproduction but did not engage in reproductive behavior.
Failed Reproduction	The animal or group observed shows evidence of reproduction that has failed - e.g. dead young, abandoned eggs, etc.
Unknown	Reproduction status cannot be determined.
Not Applicable	The animal or group was observed outside of its reproductive season.
<b>SPECIES_CODE:</b> The unique code assigned to a species (e.g. the American Ornithological Union codes for birds).	
Example: 07610	This field contains the nationally-stewarded code, if available.
<b>SURVEY_SID:</b> The unique foreign key link to the survey feature, if present.	
Example: FNOBPT33.8693117.448513062000937158	The logical link between detection and parent survey, if the detection resulted from a survey.
<b>TARGET_TAXA:</b> The scientific name of the species or taxonomic group for the detection.	
Example: Myotis lucifigus	
<b>TARGET_TAXA_LVL:</b> Target Species TAXA for the Detection.	
Example: Species	



**Domain for INFO tables, Wildlife Observations Layer**

<b>ITEM NAME:</b> Description	
<b>Item name</b>	<b>Description</b>
<b>TAXONOMIC_FAMILY:</b> The common name for the taxonomic family to which the species belongs.	
Example: Vespertilionid Bats	
<b>TAXONOMIC_ORDER:</b> The common name for the taxonomic order to which the species belongs.	
Example: Bats	
<b>TIME_DATE_ACCUR:</b> The precision of the time and date measurements.	
Exact	The time and date are exact to the minute for the detection.
Hour	Only the exact hour, day, month, and year is known.
Day	Only the exact day, month, and year is known.
Month	Only the exact month and year is known.
Year	Only the exact year is known.
Previous Year	Only the previous year is known.
<b>TOTAL_NUMBER:</b> The number of individuals with which the detection is associated.	
Example: 4	
<b>TSN:</b> The unique ITIS (USGS Integrated Taxonomic Information System) taxonomic serial number that is assigned to each species' scientific name.	
Example: 16542	

**ORACLE View:**

**WILDLIFE\_OBSERVATION\_VW**

<b>NAME</b>	<b>Null?</b>	<b>Type</b>
DET_SID	Not Null	Varchar2(36)
TARGET_TAXA	Not Null	Varchar2(100)
TARGET_TAXA_LVL	Not Null	Varchar2(15)
COMMON_NAME	Not Null	Varchar2(100)
SPECIES_CODE	Null	Varchar2(10)
TSN	Null	Varchar2(10)
TAXONOMIC_ORDER	Not Null	Varchar2(50)
TAXONOMIC_FAMILY	Not Null	Varchar2(50)
OBSERVATION_TIME	Not Null	Varchar2(4)
OBSERVATION_DATE	Not Null	Varchar2(10)
TIME_DATE_ACCUR	Not Null	Varchar2(20)
OBS_METHOD	Not Null	Varchar2(20)
OBSERVER_NAME	Not Null	Varchar2(50)
OBSERVER_QUALS	Not Null	Varchar2(25)
TOTAL_NUMBER	Not Null	Number(6,0)
REPRO_STATUS	Not Null	Varchar2(35)
GROUP_TYPE	Not Null	Varchar2(20)
LOC_ACCUR_METERS	Not Null	Number(5,0)
COMMENTS	Null	Varchar2(2000)
DATA_SOURCE	Not Null	Varchar2(25)
PROTOCOL_NAME	Not Null	Varchar2(100)
LOCAL_ID	Null	Varchar2(254)
SURVEY_SID	Null	Varchar2(36)

*Domains as found in DOMAIN for INFO Tables, listed above.*

## Layer: Wildlife Surveys

This layer describes the spatial location of wildlife surveys. The Wildlife Surveys layer contains the following coverages:

- wild\_survs\_pl
- wild\_survs\_pt

### Coverage Names: *wild\_survs\_pl* and *wild\_survs\_pt*

<b>Abstract / Description:</b>	The coverages in this layer display terrestrial wildlife survey points and polygons. <b>Resource attributes for the two coverages are identical.</b> A <b>wildlife survey</b> is a <u>completed</u> search for an animal or group of animals carried out at a location and over a period of time. It may employ a national protocol or methodology. A survey point relates to something with no area. Examples are call and camera points. Examples of a survey polygon are a timber stand or meadow. <b>The coverage is automatically generated and maintained by the NRIS Fauna application.</b> There is currently a one to one correspondence between spatial features and Oracle records. <b>For ease of use the data in Oracle is automatically joined to the coverage.</b> The Oracle view, WILDLIFE_SURVEYS_VW, described in this dictionary is used to populate the feature attribute tables of the coverages.
<b>References:</b>	NRIS: <a href="http://www.fs.fed.us/emc/nris/fauna">http://www.fs.fed.us/emc/nris/fauna</a>
<b>Spatial Data Source:</b>	Best available local source with a target scale of 1:24000 for continental U.S., 1:25000 for Puerto Rico, and 1:63360 for Alaska.
<b>Horizontal Accuracy:</b>	<p>Accuracy testing must use NSSDA testing guidelines or be reported based on compiled, published test reports appropriate for the data collection method and equipment.</p> <p>The method of determining accuracy should be documented in the process step of the dataset metadata record. If published accuracy results are used, use the statement 'Compiled to meet ____ (meters, feet) horizontal accuracy at 95% confidence interval' in the metadata record, and identify the testing source used. If accuracy is locally tested to NSSDA standards, the statement 'Tested to meet ____ (meters, feet) horizontal accuracy at 95% confidence interval' should be added to the metadata record.</p> <p>Accuracy for legacy data may be reported according to the accuracy standard in place at the time of data collection (typically National Map Accuracy Standards). Document the standard used in the metadata record.</p> <p>(For more information, see: <a href="http://www.fgdc.gov/standards/documents/standards/accuracy/chapter3.pdf">http://www.fgdc.gov/standards/documents/standards/accuracy/chapter3.pdf</a>)</p>
<b>Spatial Reference Information:</b>	Forest appropriate. A complete ArcInfo projection file is required including horizontal coordinate system, datum, and distance units. Include vertical coordinate system information where necessary.
<b>Feature Type:</b>	point, polygon
<b>Precision:</b>	All coverages are created in double precision.

## INFO Attribute Tables

### wild\_survs\_pt.pat

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	ALTERNATE NAME	INDEXED?
-	AREA	-	-	-	-	-	-
-	PERIMETER	-	-	-	-	-	-
-	WILD_SURVS_PT#	-	-	-	-	-	-
-	WILD_SURVS_PT-ID	-	-	-	-	-	-
-	SRVY_SID	36	36	C	-	-	-
-	PROTOCOL_NAME	100	100	C	-	-	-
-	SURVEY_NAME	100	100	C	-	-	-
-	TARGET_TAXA	100	100	C	-	-	-
-	TARGET_TAXA_LVL	15	15	C	-	-	-
-	SURVEY_RESULTS	20	20	C	-	-	-
-	START_DATE	10	10	C	-	-	-
-	START_TIME	4	4	C	-	-	-
-	COMPLETE_DATE	10	10	C	-	-	-
-	COMPLETE_TIME	4	4	C	-	-	-
-	TIME_DATE_ACCUR	20	20	C	-	-	-
-	SURVEY_STEWARD	50	50	C	-	-	-
-	PRIMARY_SURVEYOR	50	50	C	-	-	-
-	SURVEYOR_QUALS	25	25	C	-	-	-
-	COMMENTS	320	320	C	-	-	-
-	DATA_SOURCE	25	25	C	-	-	-
-	LOC_ACCUR_METERS	5	5	I	-	-	-
-	LOCAL_ID	254	254	C	-	-	-

### wild\_survs\_pl.patwild\_survs\_pl

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	ALTERNATE NAME	INDEXED?
-	AREA	-	-	-	-	-	-
-	PERIMETER	-	-	-	-	-	-
-	WILD_SURVS_PL#	-	-	-	-	-	-
-	WILD_SURVS_PL-ID	-	-	-	-	-	-
-	RINGS_OK	-	-	-	-	-	-
-	RINGS_NOK	-	-	-	-	-	-
-	SRVY_SID	36	36	C	-	-	-
-	PROTOCOL_NAME	100	100	C	-	-	-
-	SURVEY_NAME	100	100	C	-	-	-
-	TARGET_TAXA	100	100	C	-	-	-
-	TARGET_TAXA_LVL	15	15	C	-	-	-
-	SURVEY_RESULTS	20	20	C	-	-	-
-	START_DATE	10	10	C	-	-	-
-	START_TIME	4	4	C	-	-	-
-	COMPLETE_DATE	10	10	C	-	-	-
-	COMPLETE_TIME	4	4	C	-	-	-
-	TIME_DATE_ACCUR	20	20	C	-	-	-
-	SURVEY_STEWARD	50	50	C	-	-	-
-	PRIMARY_SURVEYOR	50	50	C	-	-	-
-	SURVEYOR_QUALS	25	25	C	-	-	-
-	COMMENTS	320	320	C	-	-	-
-	DATA_SOURCE	25	25	C	-	-	-
-	LOC_ACCUR_METERS	5	5	I	-	-	-
-	LOCAL_ID	254	254	C	-	-	-

Domain for INFO tables, Wildlife Surveys Layer	
Item name	Description
<b>COMMENTS:</b> The comments that the observer collected during the detection, including key words/phrases. When moving from Oracle to Info, Info truncates the 2000 character field to 320.	
Example: Cave: four bats were observed entering an abandoned mine shaft.	
<b>COMPLETE_DATE:</b> The date the survey was completed.	
Example: 01-JAN-2002	
<b>COMPLETE_TIME:</b> The time the survey was completed in 24-hour local time.	
Example: 2042	
<b>LOC_ACCUR_METERS:</b> The estimated or known maximum distance the actual point could be from the GIS feature.	
Example: 100	
<b>PRIMARY_SURVEYOR:</b> The name of the primary surveyor conducting the survey.	
Example: C. Ima Birder	
<b>PROTOCOL_NAME:</b> The name of the survey protocol followed, from a standard list.	
Example: NRIS Bat Trap/Net Survey	
<b>SRVY_SID:</b> The unique spatial ID generated by the Fauna application, attached to survey polygon features and attributes during PC client data entry, prior to their being committed to the corporate dataset. This field may be used as a geospatially unique link between GIS features and their tabular attributes.	
Example: FNSVPY34.0293083.948513062000606811	
<b>START_DATE:</b> The date the survey was started.	
Example: 01-JAN-2002	
<b>START_TIME:</b> The time the survey was started in 24-hour local time.	
Example: 1630	
<b>SURVEY_NAME:</b> The unique name for the survey area, entered by the user	
Example: Sky High Mine Bat Survey	
<b>SURVEY_RESULTS:</b> Signifies if there was a detection of some evidence for a target taxon during a survey.	
Species Detected	There was at least one detection of the target taxon.
(NULL)	There were no detections of the target taxon.
<b>SURVEY_STEWARD:</b> The name of the steward of the survey data.	
Example: Ben A. Sceloporus	
<b>SURVEYOR_QUALS:</b> The qualifications of the surveyor to conduct the survey using the specified survey protocol or methodology. Education and field experience generally define the level.	
Experienced	A person who has extensive field experience conducting surveys using the specified survey protocol or methodology.
Limited Experience	A person with limited field experience conducting surveys using the specified survey protocol or methodology. This person may have experience using other related survey protocols or methodologies.
No Experience	A person with no field experience conducting surveys using the specified survey protocol or methodology.
Unknown	The experience level of the surveyor is unknown.
<b>TARGET_TAXA:</b> The scientific name of the species or taxonomic group for which the survey was conducted.	
Example: Chiroptera	
<b>TARGET_TAXA_LVL:</b> Target Species TAXA for the Survey.	
Example: Order	
<b>TIME_DATE_ACCUR:</b> Indicates the precision of the time and date measurements.	

Exact	The time and date are exact to the minute for the survey
Day	Only the exact day, month, and year is known
Hour	Only the exact hour, day, month, and year is known

**ORACLE View:**

**WILDLIFE\_SURVEYS\_VW**

<b>NAME</b>	<b>Null?</b>	<b>Type</b>
SRVY_SID	Not Null	Varchar2(36)
PROTOCOL_NAME	Not Null	Varchar2(100)
SURVEY_NAME	Not Null	Varchar2(100)
TARGET_TAXA	Not Null	Varchar2(100)
TARGET_TAXA_LVL	Not Null	Varchar2(15)
SURVEY_RESULTS	Null	Varchar2(20)
START_DATE	Not Null	Varchar2(10)
START_TIME	Not Null	Varchar2(4)
COMPLETE_DATE	Not Null	Varchar2(10)
COMPLETE_TIME	Not Null	Varchar2(4)
TIME_DATE_ACCUR	Not Null	Varchar2(20)
SURVEY_STEWARD	Not Null	Varchar2(50)
PRIMARY_SURVEYOR	Not Null	Varchar2(50)
SURVEYOR_QUALS	Not Null	Varchar2(25)
COMMENTS	Null	Varchar2(2000)
DATA_SOURCE	Not Null	Varchar2(25)
LOC_ACCUR_METERS	Not Null	Number(5,0)
LOCAL_ID	Null	Varchar2(254)

***Domains as found in DOMAIN for INFO Tables, listed above.***

## Layer: Wildlife Features

This layer describes the spatial location of wildlife features. The Wildlife Features layer contains the following coverages:

- wild\_ftr\_pl
- wild\_ftr\_pt
- wld\_ftrhst\_pl
- wld\_ftrhst\_pt

### Coverage Names: *wild\_ftr\_pl, wild\_ftr\_pt, wld\_ftrhst\_pl, wld\_ftrhst\_pt*

<b>Coverage Description:</b>	The coverages in this layer display terrestrial wildlife feature points and polygons. <b>Resource attributes for the four coverages are identical.</b> A wildlife feature is a mapable object that is important to terrestrial wildlife. It has locational, relational, temporal and tabular characteristics, and is typically re-evaluated (visited) over time. As a GIS point or polygon, a feature can move, change shape, change attributes, disappear and reappear. The wild_ftr coverages contain current features and the wld_ftrhst coverages contain historical features.
	<b>The coverage is automatically generated and maintained by the NRIS Fauna application.</b> There is currently a one to one correspondence between spatial features and Oracle records. <b>For ease of use the data in Oracle is automatically joined to the coverage.</b> The Oracle view, WILDLIFE_FEATURES_VW, described in this dictionary is used to populate the feature attribute tables of the coverages.
<b>References:</b>	NRIS: <a href="http://www.fs.fed.us/emc/nris/fauna">http://www.fs.fed.us/emc/nris/fauna</a>
<b>Spatial Data Source:</b>	Best available local source with a target scale of 1:24000 for continental U.S., 1:25000 for Puerto Rico, and 1:63360 for Alaska.
<b>Horizontal Positional Accuracy:</b>	Accuracy testing must use NSSDA testing guidelines or be reported based on compiled, published test reports appropriate for the data collection method and equipment. The method of determining accuracy should be documented in the process step of the dataset metadata record. If published accuracy results are used, use the statement 'Compiled to meet ___ (meters, feet) horizontal accuracy at 95% confidence interval' in the metadata record, and identify the testing source used. If accuracy is locally tested to NSSDA standards, the statement 'Tested to meet ___ (meters, feet) horizontal accuracy at 95% confidence interval' should be added to the metadata record. Accuracy for legacy data may be reported according to the accuracy standard in place at the time of data collection (typically National Map Accuracy Standards). Document the standard used in the metadata record. (For more information, see: <a href="http://www.fgdc.gov/standards/documents/standards/accuracy/chapter3.pdf">http://www.fgdc.gov/standards/documents/standards/accuracy/chapter3.pdf</a> )
<b>Spatial Reference Information:</b>	Forest appropriate. A complete ArcInfo projection file is required including horizontal coordinate system, datum, and distance units. Include vertical coordinate system information where necessary.
<b>Feature Types:</b>	point, polygon
<b>Precision:</b>	All coverages are in double precision.

## INFO Attribute Tables

wild\_ftr\_pt.pat

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	ALTERNATE NAME	INDEXED?
-	AREA	-	-	-	-	-	-
-	PERIMETER	-	-	-	-	-	-
-	WILD_FTR_PT#	-	-	-	-	-	-
-	WILD_FTR_PT-ID	-	-	-	-	-	-
-	FTR_SID	36	36	C	-	-	-
-	FTR_FID	36	36	C	-	-	-
-	LOCAL_NAME	100	100	C	-	-	-
-	CATEGORY_TYPE	20	20	C	-	-	-
-	TARGET_TAXA	100	100	C	-	-	-
-	TARGET_TAXA_LVL	15	15	C	-	-	-
-	FTR_START_DATE	10	10	C	-	-	-
-	FTR_START_TIME	4	4	C	-	-	-
-	FTR_END_DATE	10	10	C	-	-	-
-	FTR_END_TIME	4	4	C	-	-	-
-	DATA_SOURCE	25	25	C	-	--	-
-	FTR_TME_DTE_ACR	20	20	C	-	-	-
-	ORIGINATOR	50	50	C	-	-	-
-	LOC_ACCUR_METERS	5	5	I	-	-	-
-	LOCAL_ID	254	254	C	-	-	-
-	REFERENCE	240	240	C	-	-	-
-	COMMENTS	320	320	C	-	-	-
-	ADM_FEATURE_TYPE	50	50	C	-	-	-
-	ADM_NEXT_VISIT	10	10	C	-	-	-
-	BIO_FEATURE_TYPE	50	50	C	-	-	-
-	BIO_NEXT_VISIT	10	10	C	-	-	-
-	BIO_ORIGIN	15	15	C	-	-	-
-	BIO_ORIG_METHOD	20	20	C	-	-	-
-	BIO_ORIG_QUALS	25	25	C	-	-	-
-	BIO_HISTORY	20	20	C	-	-	-
-	UA_FEATURE_TYPE	50	50	C	-	-	-
-	VST_START_DATE	10	10	C	-	-	-
-	VST_START_TIME	4	4	C	-	-	-
-	VST_COMP_DATE	10	10	C	-	-	-
-	VST_COMP_TIME	4	4	C	-	-	-
-	VST_TME_DTE_ACR	20	20	C	-	-	-
-	FTR_STATUS	30	30	C	-	-	-
-	FTR_CONDITION	15	15	C	-	-	-
-	FTR_USE	50	50	C	-	-	-

wild\_ftr\_pl.patwild\_ftr\_pl

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	ALTERNATE NAME	INDEXED?
-	AREA	-	-	-	-	-	-
-	PERIMETER	-	-	-	-	-	-
-	WILD_FTR_PL#	-	-	-	-	-	-
-	WILD_FTR_PL-ID	-	-	-	-	-	-
-	RINGS_OK	-	-	-	-	-	-
-	RINGS_NOK	-	-	-	-	-	-
-	FTR_SID	36	36	C	-	-	-
-	FTR_FID	36	36	C	-	-	-
-	LOCAL_NAME	100	100	C	-	-	-
-	CATEGORY_TYPE	20	20	C	-	-	-
-	TARGET_TAXA	100	100	C	-	-	-
-	TARGET_TAXA_LVL	15	15	C	-	-	-
-	FTR_START_DATE	10	10	C	-	-	-
-	FTR_START_TIME	4	4	C	-	-	-
-	FTR_END_DATE	10	10	C	-	-	-
-	FTR_END_TIME	4	4	C	-	-	-
-	DATA_SOURCE	25	25	C	-	-	-
-	FTR_TME_DTE_ACR	20	20	C	-	-	-
-	ORIGINATOR	50	50	C	-	-	-
-	LOC_ACCUR_METERS	5	5	I	-	-	-
-	LOCAL_ID	254	254	C	-	-	-
-	REFERENCE	240	240	C	-	-	-
-	COMMENTS	320	320	C	-	-	-
-	ADM_FEATURE_TYPE	50	50	C	-	-	-
-	ADM_NEXT_VISIT	10	10	C	-	-	-
-	BIO_FEATURE_TYPE	50	50	C	-	-	-
-	BIO_NEXT_VISIT	10	10	C	-	-	-
-	BIO_ORIGIN	15	15	C	-	-	-
-	BIO_ORIG_METHOD	20	20	C	-	-	-
-	BIO_ORIG_QUALS	25	25	C	-	-	-
-	BIO_HISTORY	20	20	C	-	-	-
-	UA_FEATURE_TYPE	50	50	C	-	-	-
-	VST_START_DATE	10	10	C	-	-	-
-	VST_START_TIME	4	4	C	-	-	-
-	VST_COMP_DATE	10	10	C	-	-	-
-	VST_COMP_TIME	4	4	C	-	-	-
-	VST_TME_DTE_ACR	20	20	C	-	-	-
-	FTR_STATUS	30	30	C	-	-	-
-	FTR_CONDITION	15	15	C	-	-	-
-	FTR_USE	50	50	C	-	-	-



<b>Domain for INFO tables, Wildlife Features Layer</b>	
<b>ITEM NAME:</b> Description	
<b>Item name</b>	<b>Description</b>
<b>ADM_FEATURE_TYPE:</b> Type of administrative feature	
Survey Area	A defined area intended to search for a specific species or group of species.
Survey Point	A point defined for the purpose of collecting species or multiple species information (e.g. call points, hair snare, camera set, etc).
Management Area	An area that has specific guidelines, standards, directions or recommendations assigned to it for a species or multiple species or their habitat (e.g. recovery zones, nest zones, Forest Plan defined area).
Other	The Administrative Feature was defined by other means than listed above. Describe in comments.
<b>ADM_NEXT_VISIT:</b> Date of next planned visit if feature type is administrative	
Example: 12/01/2002	
<b>BIO_FEATURE_TYPE:</b> Type of biological feature	
Bridge	A structure spanning and providing passage over an obstacle, as a waterway
Burrow or Den	A shelter or retreat for a wild animal; a lair (e.g. bear).
Cave	An underground hollow, often having an opening in the side of a hill or cliff
Cavity	A hollow or hole used by a species for shelter.
Cliff	A high, steep, or overhanging rock face.
Log	The trunk of a fallen tree.
Mineral Lick	A known mineral concentration used by animals.
Nest	A place in which young are reared (e.g. birds, insects).
Opening or Clearing	An unobstructed passage or area of sparse vegetation adjacent to an area of denser vegetation.
Scrape or Rub	An area of ground altered by animals, usually by removing the surface material (e.g. tree, post, pole, building)
Snag	A tree or part of a tree that protrudes above the surface, generally dead.
Trail	A trail created or dominantly shaped or maintained by animal movement.
Tree	A tall, woody plant having comparatively great height and usually a single trunk, generally living.
Wallow	The depression or pit used by a species in which to rub, roll, or dust bathe.
Other	The Biological Feature was defined by other means than listed above. Describe in comments.
<b>BIO_HISTORY:</b> History of the Biological Feature	
New	Originated in the current biological year (relevant to the biology of the species).
Unknown	The origin date is unknown.
<b>BIO_NEXT_VISIT:</b> Date of next planned visit if feature type is biological	
Example: 12/01/2002	
<b>BIO_ORIG_METHOD:</b> How the Biological Feature was discovered.	
Direct	The Feature's origination was directly observed (e.g. visual, aural, physical evidence, etc).
Reported	The Feature's origination was reported.
Unknown	The method of origination for the Feature is unknown or historic.

**Domain for INFO tables, Wildlife Features Layer**

**ITEM NAME:** Description

Item name	Description
Other	The origination method for the feature was detected by means other than those above. Describe in comments.
<b>BIO_ORIGIN:</b> Origin of Biological Feature (Natural, Artificial).	
Natural	The Origin for the Biological Feature is Natural.
Artificial	The Origin for the Biological Feature is Artificial.
<b>BIO_ORIG_QUALS:</b> The qualifications of the observer to accurately identify the feature. Education and field experience generally define the level.	
Experienced	A person who has extensive field experience and knowledge of wildlife features.
Limited Experience	A person with limited field experience and knowledge of wildlife features.
No Experience	A person with no field experience or knowledge of wildlife features.
Unknown	The experience level of the originator is unknown.
<b>CATEGORY_TYPE:</b> Type of Feature (Administrative, Biological, Use Area)	
Biological	Biological Features have inherent biological meaning, which is usually derived from direct observation or inferred from observed signs of wildlife use.
Administrative	Administrative Features may have no inherent biological meaning or may have implied biological meaning. They are defined purely for administrative or investigative purposes.
Use Area	Use Area Features have inherent biological meaning, although that meaning is designated and usually interpreted based upon life history information, the environment, and managerial needs and may not represent true biological use.
<b>COMMENTS:</b> The comments that the observer collected during the visit, including key words/phrases. When moving from Oracle to Info, Info truncates the 2000 character field to 320.	
<b>DATA_SOURCE:</b> Data is collected by the Forest Service or a non-Forest Service organization.	
Forest Service	Data is collected by the Forest Service.
Non-Forest Service	Data is not collected by the Forest Service. (e.g. State Heritage, BLM, Private Timber Companies, etc.) Describe in comments the originator of the data.
<b>FTR_CONDITION:</b> Condition of the Feature at the time of the Visit (Usable, Unusable)	
Usable	The feature is usable.
Unusable	The feature is no longer useable.
Unknown	The condition of the feature cannot be determined.
Not Applicable	The condition of the feature is not relevant
<b>FTR_END_DATE:</b> The date the Feature is no longer current.	
Example: 12/01/2002	
<b>FTR_END_TIME:</b> The time the Feature is no longer current	
Example: 2042	
<b>FTR_FID:</b> The unique system generated identifier for the feature. This identifier persists for the life of the feature	
Example: FNA_FTR34.0293083.948513062000606811	
<b>FTR_SID:</b> The unique system generated identifier for the spatial object. A new FTR_SID is generated if the feature moves or changes shape. The combination of FID and SID are the primary key for the record.	
Example: FNAFTPT34.0293083.948513062000606811	

**Domain for INFO tables, Wildlife Features Layer**

**ITEM NAME:** Description

Item name	Description
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**FTR\_START\_DATE:** The date the feature started.

Example: 01-JAN-2002	
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**FTR\_START\_TIME:** The time the feature started.

Example: 2042	
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**FTR\_STATUS:** The Status of the Feature at the time of the Visit.

List of Values	Feature Category	Description
Active	ADM	Administrative Feature is actively being managed.
Inactive	ADM	Administrative Feature exists but is not currently actively managed.
Closed	ADM	Administrative Feature no longer exists.
Retired	ADM	The Administrative Feature has been retired and only appears in the Historic Wildlife Features layer.
Retired, Later Reinstated	ADM	The Administrative Feature was retired and then later reinstated.
Unknown	ADM	It cannot be determined if the Administrative Feature exists.
Not Applicable	ADM	The status of the Administrative Feature is not relevant.
Active	BIO	Biological Feature is actively being managed or being used by species.
Inactive	BIO	Biological Feature exists but is not currently actively managed or not being used by species.
Non-Extant	BIO	Biological Feature no longer exists or has been destroyed or lost.
Not Found	BIO	Biological Feature could not be found or located.
Retired	BIO	The Biological Feature has been retired and only appears in the Historic Wildlife Features layer.
Retired, Later Reinstated	BIO	The Biological Feature was retired and then later reinstated.
Not Applicable	BIO	The status of the Biological Feature is not relevant.
Unknown	BIO	It cannot be determined if the Biological Feature exists.
In use	USE	Use Area Feature is in use.
Not in use	USE	Use Area Feature is not in use.
Non-Extant	USE	Use Area Feature no longer exists or has been destroyed or lost.
Retired	USE	The Use Area Feature has been retired and only appears in the Historic Wildlife Features layer.
Retired, Later Reinstated	USE	The Use Area Feature was retired and then later reinstated.
Not Applicable	USE	The status of the Use Area Feature is not relevant.
Unknown	USE	It cannot be determined if the Use Area Feature exists.

**FTR\_TME\_DTE\_ACR:** Indicates the precision of the time and date measurements for starting and ending of the feature.

Exact	The time and date are exact to the minute for the visit
Day	Only the exact day, month, and year is known
Hour	Only the exact hour, day, month, and year is known

**FTR\_USE:** The Biological Feature Use Type at the time of the Visit.

Basking or Loafing	Lying in the sun or open air.
Hibernating	Shelter for a hibernating animal (e.g. bears, bats, etc).
Hive	Housing bees or other invertebrates.
Marking	Marking by an animal to leave a territorial or behavioral scent to influence

**Domain for INFO tables, Wildlife Features Layer**

**ITEM NAME:** Description

Item name	Description
	other animals (e.g. scrapes, rubbings, clawing, etc).
Migratory	Used for migrating species.
Perch or roost	Used by an animal for resting or sitting (e.g. tree, cliff, branch, etc).
Plucking	Used as a perch during prey handling (e.g. tree, branch, log, etc).
Reproducing	Used by an animal for nesting, courtship, birthing, hatching, and brooding young.
Seasonal	Used by a species during a particular season.
Shelter	Used by an animal as a refuge.
Other	The Biological Feature use was defined by other means than listed above. Describe in comments.
Unknown	The Biological Feature use is unknown.

**LOCAL\_ID:** Locally supplied identifier used for linking to data sources outside of Fauna

Example: 1527

**LOCAL\_NAME:** Local name of the Feature.

Example: Duck Box 2517

**LOC\_ACCUR\_METERS:** The estimated or known maximum distance in meters the actual point could be from the GIS feature.

Example: 50

**ORIGINATOR:** Name of the person who initially discovered or identified the feature.

Example: John Q. Biologist

**REFERENCE:** Reference for Feature

Example: 12/01/2002

**TARGET\_TAXA:** The scientific name of the species or taxonomic group for which the survey was conducted.

Example: Chiroptera

**TARGET\_TAXA\_LVL:** Target Species TAXA for the Feature; i.e. Family, Genus, etc.

Example: Order

**UA\_FEATURE\_TYPE:** Type of use area feature.

Breeding	An area used primarily to provide habitat used for reproductive habitat.
Calving or Fawning	An area used for calving or fawning.
Critical Habitat (FWS)	Legally defined area. Designated under the Endangered Species Act.
Fen	A type of wetland that accumulates peat deposits; less acidic than bogs.
Foraging	An area used specifically or primarily for feeding.
Individual Territory	The area known or assumed to be used by an individual or reproductive unit to meet its habitat needs for all or a critical portion of its life.
Migration Route	An area used by an animal while moving between seasonal use areas. Usually used on a seasonal basis and for short duration.
Population or Herd Boundary	The area that bounds the expected or known distribution of individuals that comprise the population or herd. Usually interpreted and not a definitive boundary unless fenced or physically constrained (e.g. by rivers or other impassible features).
Potential Habitat	Habitat that has the potential to support the species based upon a defined set of habitat attributes.
Security	An area used to shelter or hide from weather or predators.
Summer Range	The area used primarily to provide habitat during the summer season. Usually only defined for species that have distinct areas of seasonal occupancy.
Winter Range	The area used primarily to provide habitat during the winter season. Usually only defined for species that have distinct areas of seasonal occupancy.
Yearlong Range	The area used primarily to provide habitat during the entire year.

**Domain for INFO tables, Wildlife Features Layer**

**ITEM NAME:** Description

Item name	Description
Other	The Use Area Feature was defined by other means than listed above. Describe in comments.
<b>VST_COMP_DATE:</b> The date the latest visit to the feature was completed.	
Example: 12/01/2002	
<b>VST_COMP_TIME:</b> The time the latest visit to the feature was completed.	
Example: 2042	
<b>VST_START_DATE:</b> The date the latest visit to the feature started.	
Example: 01-JAN-2002	
<b>VST_START_TIME:</b> The time the latest visit to the feature started.	
Example: 2042	
<b>VST_TME_DTE_ACR:</b> Indicates the precision of the time and date measurements for starting and ending of the latest visit to the feature.	
Exact	The time and date are exact to the minute for the visit
Day	Only the exact day, month, and year is known
Hour	Only the exact hour, day, month, and year is known

**ORACLE View:**

**WILDLIFE\_FEATURES\_VW**

NAME	Null?	Type
FTR_SID	Not Null	Varchar2(36)
FTR_FID	Not Null	Varchar2(36)
LOCAL_NAME	Null	Varchar2(100)
CATEGORY_TYPE	Not Null	Varchar2(20)
TARGET_TAXA	Not Null	Varchar2(100)
TARGET_TAXA_LVL	Not Null	Varchar2(15)
FTR_START_DATE	Not Null	Varchar2(10)
FTR_START_TIME	Not Null	Varchar2(4)
FTR_END_DATE	Null	Varchar2(10)
FTR_END_TIME	Null	Varchar2(4)
DATA_SOURCE	Not Null	Varchar2(25)
FTR_TME_DTE_ACR	Not Null	Varchar2(20)
ORIGINATOR	Not Null	Varchar2(50)
LOC_ACCUR_METERS	Not Null	Varchar2(5)
LOCAL_ID	Null	Number(254)
REFERENCE	Null	Varchar2(240)
COMMENTS	Null	Varchar2(2000)
ADM_FEATURE_TYPE	Null	Varchar2(50)
ADM_NEXT_VISIT	Null	Varchar2(10)
BIO_FEATURE_TYPE	Null	Varchar2(50)
BIO_NEXT_VISIT	Null	Varchar2(10)
BIO_ORIGIN	Null	Varchar2(15)
BIO_ORIG_METHOD	Null	Varchar2(20)
BIO_ORIG_QUALS	Null	Varchar2(25)
BIO_HISTORY	Null	Varchar2(20)
UA_FEATURE_TYPE	Null	Varchar2(50)
VST_START_DATE	Null	Varchar2(10)
VST_START_TIME	Null	Varchar2(4)

VST_COMP_DATE	Null	Varchar2(10)
VST_COMP_TIME	Null	Varchar2(4)
VST_TME_DTE_ACR	Null	Varchar2(20)
FTR_STATUS	Not Null	Varchar2(30)
FTR_CONDITION	Null	Varchar2(15)
FTR_USE	Null	Varchar2(50)