

Annual Operation Plan *(2017/2018)*

For

Atlantic Resources Limited


*Forest Management Contract Area "P" (FMC P)
Grand Kru, Maryland and River Gee Counties
REPUBLIC OF LIBERIA*


Presented to:

*Forest Development Authority (FDA)
Monrovia, LIBERIA.*

Submitted by: Atlantic Resources Limited

OFFICIAL ENDORSEMENT

THIS 2017/2018 AOP IS PREPARED BY ARL S.E.U. DEPARTMENT	OFFICIAL STAMP
 Mr. Edwin Cabuga (General Manager ARL)	15 Nov. 2017
	Date:

ENDORSED BY:	Official Stamp
 Mr. Dong Chun Han (Managing Director ARL)	15/Nov. 2017
	Date:


APPROVED BY: FORESTRY DEVELOPMENT AUTHORITY (FDA)	Official Stamp
 Mr. Darlington S. Tuagben (Managing Director FDA)	15/01/18
	Date:

Table of content

i. ACRONYMS

1.0 Executive Summary

2.0 Document Record Sheet

3.0 References

3.1 location of the Annual Coupe on Forest Compartment

3.2 description of the Annual Coupe

3.2.1 Summary of surface area per land cover type on the Annual Coupe.

3.3 Annual Audit

3.3.1. Review of activities during the previous year.

4.0 Pre-harvest enumeration Results

4.1. Methodology

4.2. Criteria for Harvestable tree selection

4.3. Results

4.4. Respect of the Annual Coupe Delineation rules

5.0 Planning of works

5.1 Planning of logging activities

5.2 Planning of other activities

5.3 Activity Planning / Implementation Table

Acronyms

<i>FDA</i>	<i>Forestry Development Authority</i>
<i>ARL</i>	<i>Atlantic Resources Limited</i>
<i>AOP</i>	<i>Annual Operational Plan</i>
<i>FMC</i>	<i>Forest Management Contract</i>
<i>CFDC</i>	<i>Community Forestry Development Committee</i>
<i>MDCL</i>	<i>Minimum Diameter Cut Limit</i>
<i>GOL</i>	<i>Government of Liberia</i>
<i>ESIA</i>	<i>Environmental and Social Impact Assessment</i>
<i>EPA</i>	<i>Environmental Protection Agency</i>
<i>SOP</i>	<i>Standard Operating Procedures</i>
<i>SFMP</i>	<i>Strategic Forest Management Plan</i>
<i>5-FMP</i>	<i>Five-Year Forest Management Plan</i>
<i>SA</i>	<i>Social Agreement</i>
<i>AAY</i>	<i>Annual Allowable Yield</i>
<i>Ltd</i>	<i>Limited</i>

1.0 Executive Summary

The project area for which this Annual Operations Plan is written is called Forest Management Contract Area "P" (FMC P) in River Gee, Maryland and Grand Kru Counties over which a Concession Agreement has been granted by the Forestry Development Authority (FDA) of Liberia to conduct logging operations in such manners that will achieve the stated social-economic objectives of this FMC.

This is the fourth AOP and it is located in compartment one (1). This plan succinctly outlined the process and manner in which this part of the concession will be operated or better still and also describes the mechanisms to be used to achieve the sustainability of the forest.

The total surface area of this coupe is 4,773.76 representing 48 blocks. The result of 24 blocks enumeration shows that a total 34 species with the dominant one being Didilolia (DID) representing 63% of the total tree population in the annual coupe. The total stem enumerated in these 24 blocks is 6,918. That is 288.25 tree per block or better still 2.3 tree per hectare.

The AOP further describes best pre-harvesting, harvesting and post-harvesting practices, forest infrastructure development, construction and maintenance, workers housing and amenities, , EIA and environmental management plan, and mechanism for the protection of cultural sites and wildlife habitats.

The provision of basic social services for affected communities and the impact of logging operations and the environment are also addressed

In short, the plan provides the strategies for the implementation of best forest harvesting practices; proper management of the project area; provision of basic social services while at the same time guaranteeing the health and safety of workers for efficiency and work quality.

2.0 DOCUMENT RECORD SHEET

DESCRIPTION	INFORMATION
Name and contact address of contract holder	Atlantic Resources Limited Rehab Junction, Robertsfield Highway, Paynesville, Liberia
Contract reference number	FMC-004
Strategic Forest Management Plan reference number	First Version
Contract effective date	September 17, 2009
SFMP date of approval	N/A
Five-Year Forest Management Plan Reference number	5-YFMP #02
5-YFMP date of approval	N/A
Annual Operational Plan Reference Number	AOP #04
Period covered by AOP	2017/2018

3.0 REFERENCES

Contact Person

Name : Han Dong Chun
Position : Managing Director
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Name : Edwin Cabuga
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Name : Augustus (Ab) Abrams
Position : Forest Manager
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Location of the Annual Coupe within the Forest Management

1:250,000

Map Source: Geographic Information System & remote sensing of Active Resources Ltd. Ltd.

Legend

- Town/Village
- Boundary point
- ARL Constructed Rd
- River
- FMC_P_COMPARTMENT

Road

- Primary Routes
- Tracks
- AOP 2012/13 Boundary
- AOP 2017/18 Boundary
- FMC_P Boundary

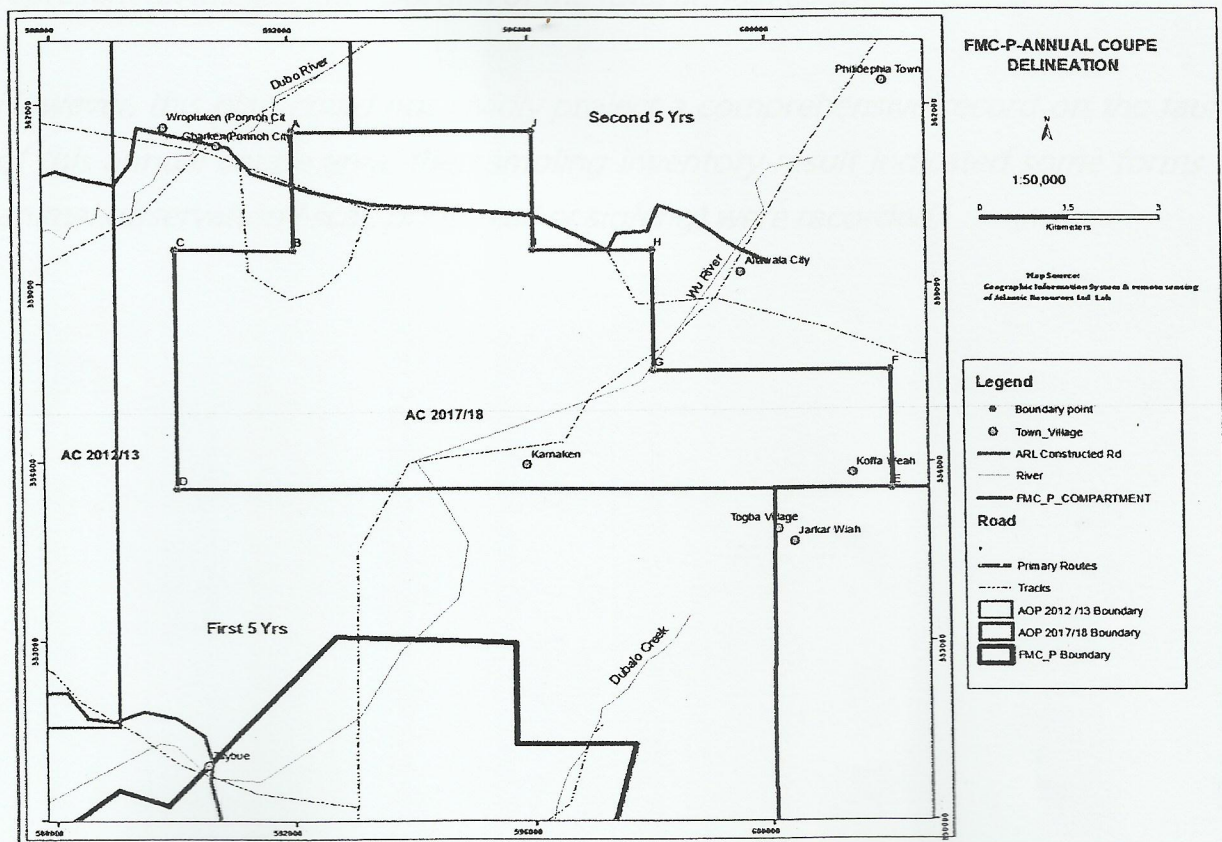
The annual coupe is located in Grand Kru County, in compartment one (1) and bordering compartment two at the north and east and slightly bordering at the south-east by compartment three. At the West is the 2012/2013 Annual Coupe. According to satellite imagery, there are two villages in the Annual coupe (Karmaken and Koffa Weah villages).

3.2 DESCRIPTION OF THE ANNUAL COUPE

Table2: Description of the Annual Coupe

CORNER	X	Y
A	592045	561561
B	592045	559561
C	590045	559561
D	590045	555561
E	602045	555561
F	602045	557561
G	598045	557561
H	598045	559561
I	596045	559561
J	596045	561561

Map2: Annual Coupe delineation



The 2017/2018 annual coupe of Atlantic Resources Contract Area has a total gross area of 4,773.76 hectares . Each block contains 100 hectares measuring 1000 meters x 1000 meters, the equivalence of which is 1 square kilometer.

The main access road (constructed by ARL) to the Annual Coupe is from Gbarken in Grand Kru County, passing between Point A and B at the north-west through blocks N-16; N-17; N-18 and N-19 of the AC and between Point J and I at the North-east and slightly bordering the AC between Point I and H of the AC and to Allawala city in compartment two.

During the inventory in FMC-P and satellite image analysis, it is estimated that 9.5% of the surface area represent the agriculture/ degraded units. There are few human settlements observed in the annual coupe area (Karnaken and Koffa Weah Villages). More so, there are visibility of slope gradients greater than 40% which represent an insignificant portion of the total annual coupe.

However, this plan could not vividly project a comprehensive record on the fauna of this annual coupe area, the sampling inventory result indicated some forms of animal observation (scat, prints, call or sighing) were recorded.

3.2.1. Summary of surface area per Land Cover Type on the Annual Coupe, calculated by GIS.

Map3: Land Cover and Forest Classes within the Annual Coupe.

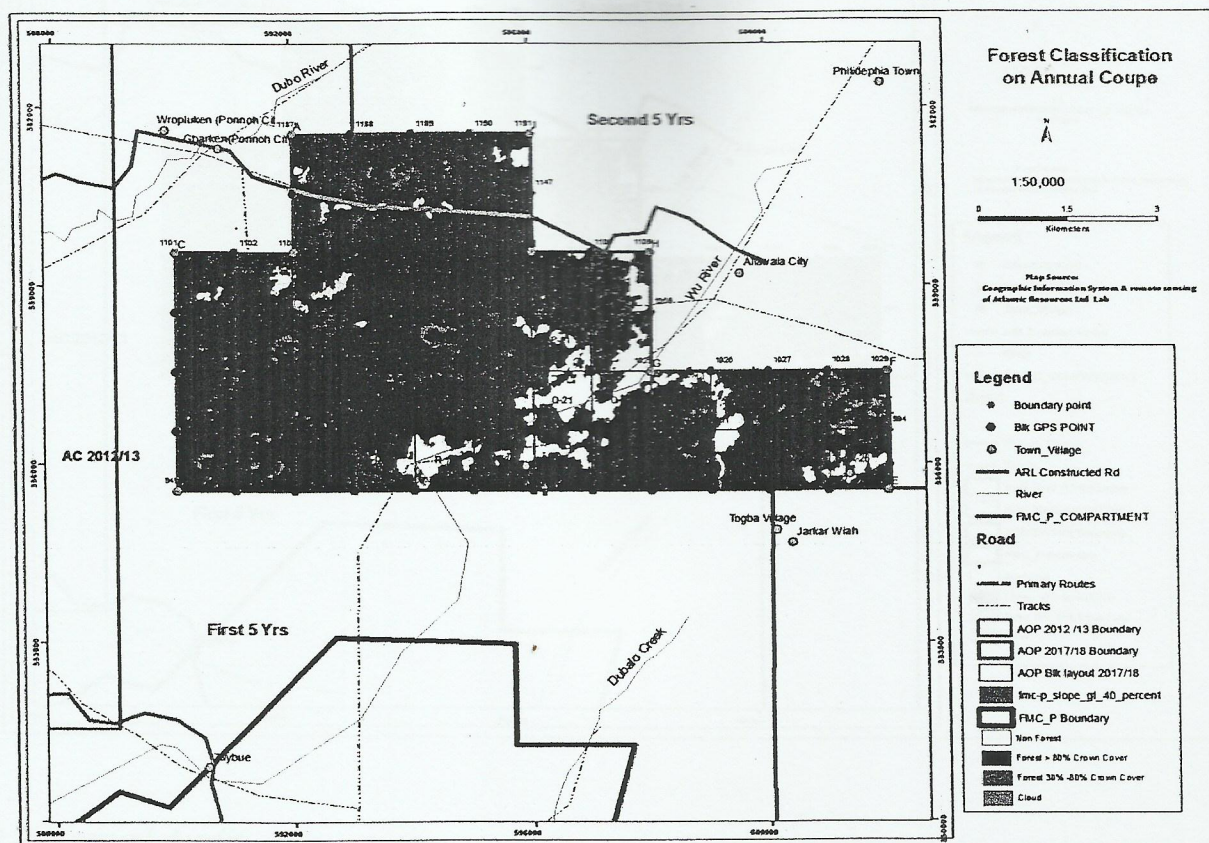
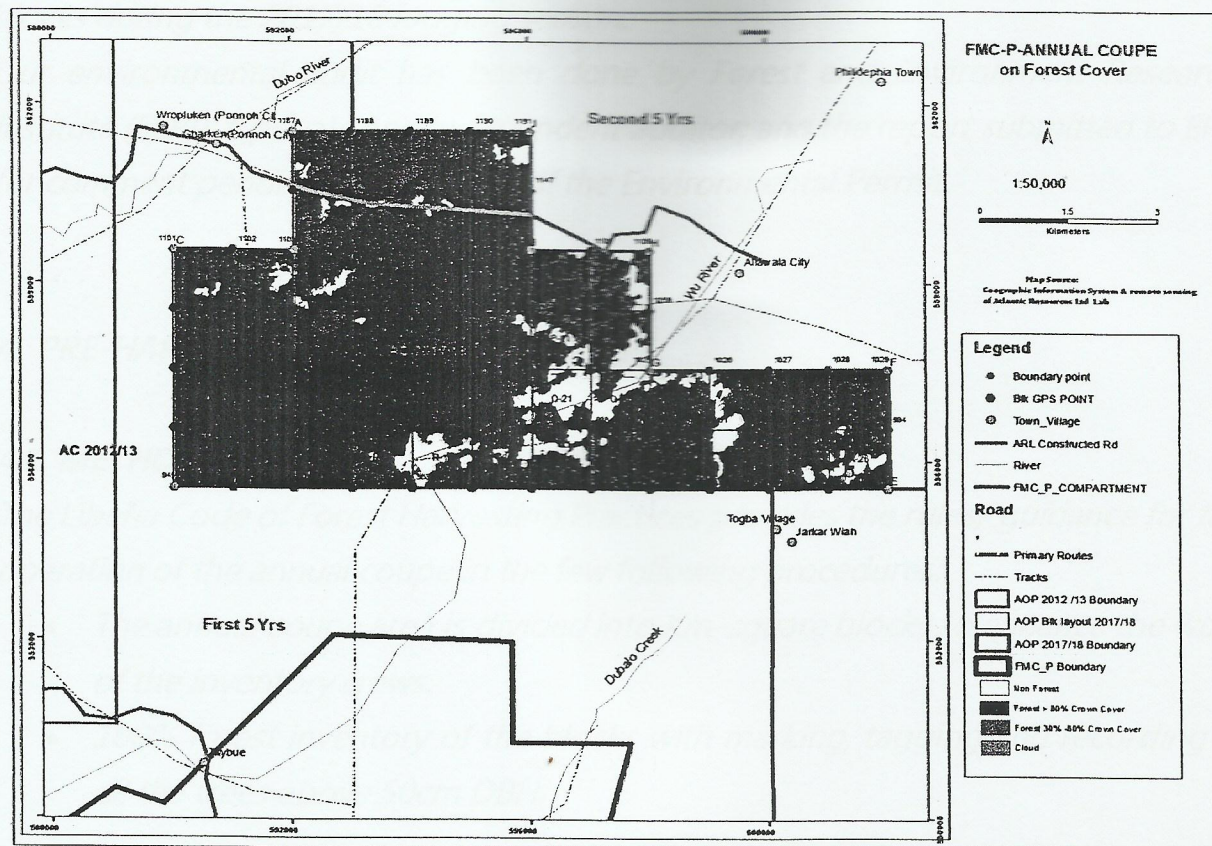


Table 3.

Land Cover Type	Surface (ha)	% of the total area
Total harvestable area (Forest land cover)	4,320.25	90.5
Total non-harvestable area	453.51	9.5
Total	4,773.76	100

Map 4: Annual Coupe map



3.3. Annual Audit

3.3.1. Review of activities during the previous year.

Last season we could not operate for the whole logging season due to so many factors such as the impassability of the Tumbo Bridge in Rivercess County and also the commodity price fall in the world market and others.

During the 2016/17 season, eleven (11) blocks had not completed harvesting (M-4; N-5; L-2; O-5; O-12; R-10; T-9; T-11; U-11; U-12; U-13). We shall continue their harvesting during the 2017/18 logging season.

Moreover, there were 24 blocks approved but not harvested (M-15; M-16; M-17; M-18; N-16; N-17; N-18; N-19; O-14; O-16; O-17; O-18; O-19; O-20; O-21; P-15; P-

16; P-17; P-18; P-19; P-20; P-21; and P-22). We anticipate starting felling these blocks during the 2017/18 logging season.

Our environmental audit has been *done* by Forest and Environment Research Institute (FERI); a private and independent auditor; and the report submitted to EPA for comment pending the issuance of the Environmental Permit.

4. PRE-HARVEST ENUMERATION RESULTS

4.1 METHODOLOGY

The Liberia Code of Forest Harvesting Practices provides the rules/ guidance for the operation of the annual coupe in the few following procedures:

- The annual coupe area is divided into Km-square blocks to enhance the work of the inventory crews.
- 100% forest inventory of the blocks with marking, tagging and recording of all the trees above 50cm DBH.

4.2 CRITERIA FOR HARVESTABLE TREE SELECTION

The general rule is 100% inventory in the blocks earmarked for annual coupe. However, the following criteria are observed in the selection of harvestable trees.

- Diameter cut limit is strictly observed; only trees above the required diameter are harvestable.
- Bad quality trees may not be felled: this is often the decision of the company. Any tree that is felled should be hauled and billed. In such a case we will ignore felling bad quality trees.
- Location of the tree is considered during harvesting(protected areas or buffer/exclusion zones)
- The market demands will play a major role in the selection of species to be harvested.
- The benchmark set by the Liberia Code of Forest harvesting Practices is to harvest a maximum of 30 m³/ ha on each block.

4.3 RESULTS

SPECIES DIAMETER CLASSIFICATION BASED ON 24 APPROVED BLOCKS

(M-15; M-16; M-17; M-18; N-16; N-17; N-18; N-19; O-14; O-16; O-17;
O-18; O-19; O-20; O-21; P-15; P-16; P-17; P-18; P-19; P-20; P-21; and P-
22)

Table4

NO	SPECIES	DIAMETER CLASS								TOTAL	Est. Vol.
		50-59	60-69	70-79	80-89	90-99	100-119	120-129	130-above		
1	GUA	1	2	4	6	3				16	104
2	IRV		3	7	3					13	84.5
3	KLA		20	42	18	3	3			86	559
4	LOV		17	53	49	29	1			149	968.5
5	MAM			2		2				4	26
6	NAU		10	30	31	9				80	520
7	NEW			1						1	6.5
8	OLD	1	10	23	19	2				55	357.5
9	ONG		1	7	6	1				15	97.5
10	UNK			1		1				2	13
11	LOP	7	36	69	89	50	7			258	1677
12	DID	100	679	1273	1613	639	63	1		4368	28392
13	PIP		44	130	135	25	3			337	2190.5
14	PAR	4	45	80	74	6	1			210	1365
15	TAR	26	59	20	2					107	695.5
16	RHO				1					1	6.5
17	ENTA		3	13	13	1				30	195
18	ANH	9	40	76	21	1				147	955.5
19	AFZ		2		1					3	19.5
20	ERY		11	32	31	8				82	533
21	GIL	8	136	179	71	4				398	2587
22	TEI		4	10	17	5	3			39	253.5
23	TES	1	1	1	1					4	26
24	ANO		20	44	25	7	1			97	630.5
25	ANT			6	10					16	104
26	CHL		9	11	13	1				34	221
27	COM		3	5	6	1				15	97.5
28	COP			4	7	2				13	84.5
29	CYN	4	60	106	47	2				219	1423.5

30	DIS		1	4	2	1				8	52
31	ARA		6	6	8	2	20	1		43	279.5
32	BRA	2	10	16	16					44	286
33	PTE		11	9	2					22	143
34	TIE						1		1	2	13
											0
TOTAL		163	1243	2264	2337	805	103	2	1	6918	44967

4.4 RESPECT OF THE ANNUAL COUPE DELINEATION RULES

Atlantic shall seek to achieve proper management of the project area for the following purposes and objectives:

- *Production of merchantable timber on sustainable basis while at the same time for the protection of the inherent forest resources for environmental, social and economic benefits for all stakeholders;*
- *Plan, construct and maintain forest infrastructure such as roads, bridges, culverts, skid-trails and log landings where required;*
- *Observe environmentally sensitive areas for protection (e.g. river, buffer zones and wildlife habitats) that may be identified during pre-harvesting survey works;*
- *Application of best timber harvesting techniques for efficiency and cost effectiveness while eliminating or minimizing the adverse impacts of logging;*
- *Application of appropriate environmental-friendly management practices and monitoring for impact mitigation.*

ARL intends to sustainably manage the forest resources of the contract area in order to enable the forest resources to continue providing environmental, social and economic benefits to all stakeholders including future generations.

5. PLANNING OF WORKS

5.1 PLANNING OF LOGGING ACTIVITIES

Currently, there is block cutting and enumeration on-going and we anticipate resuming felling operation this season.

Several villages and settlements appear within and outside the annual coupe area of the Contract area.

A local professional consultancy firm. F.E.R.I (Forest and Environment Research Institute) carried out detailed Environmental and Social Impact Assessment (ESIA) in the contract area. The impacts of logging, both favorable and adverse, would be identified, and appropriate mitigation measures put in place in order to reduce adverse logging impacts. Appropriate monitoring mechanism would be incorporated into the project management Standard Operating Procedures (SOP) during the next revision of the AOP for subsequent years. At the time of writing this AOP, the ESIA has already been submitted to EPA for review and approval.

Existing public roads leading from Greenville to the contract area are being used as much as possible. These roads are being up-graded to strengthen their capacity to withstand the heavy equipment and logging trucks associated with logging operations. New road networks are being constructed in the contract area to enable efficient logging activities. Periodic maintenance of the road network would be carried out for as long as ARL continues to operate in the contract area.

Furthermore, merchantable trees which had been marked during the 100% tree enumeration shall be felled on a block-by-block basis. Trees will be cut at the base about 0.3m from the ground or immediately above the highest buttress. The general rule is to cut as low as practicable to minimize waste and pulling of wood fibers. In cutting the trees, directional felling will be employed to minimize damage to the nearby residuals and to allow easy skidding. The felled trees will then be bucked at the furthest top to produce the longest log length. If the log is damaged during the process of felling, it will be bucked at the least damaged portion. Log

tags shall be affixed to both the stumps and the logs to be skidded out to enable log tracking mechanism to work. Only skilled and experience local tree fellers would be employed, and appropriate training would be provided for directional felling as well as safety awareness.

5.2 PLANNING OF OTHER ACTIVITIES

Atlantic Resources will start the construction of additional housing units for her employees on the camp in November 2017. Some of the social responsibilities like secondary roads and bridges building for the affected communities in November. Also the erection/ construction of water pumps in March to April 2018 and some other activities.

5.3 ACTIVITY PLANNING / IMPLEMENTATION CHART

Table 7: Activity Forecast/Implementation Chart: 2016/2017

[illegible]

588000

592000

596000

Dubo River

Wropluken (Ponnoh Crt)

Sbarken (Ponnoh Crt)

1188

1189

1190

1191J

Seco

1147

1101C

1102

1103

1108

AC 2017/18

AC 2012/13

Q-21

R-1

First 5 Yrs

Taybue

Dubalo

600000 000000

nd 5 Yrs

Philidephia Town

562000
559000
556000
553000

Wu River

Allawala City

1109H

1059

1025G

1026

1027

1028

1029F

991

994

R-26

E

Togba Village

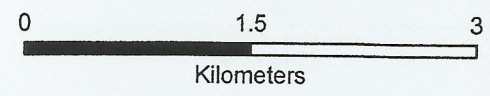
Jarkar Wiah

Creek

Forest Classification on Annual Coupe



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Map Source:
Geographic Information System & remote sensing
of Atlantic Resources Ltd Lab

Legend

- Boundary point
- ◆ Blk GPS POINT
- Town_Village
- ARL Constructed Rd
- River
- FMC_P_COMPARTMENT

Road

- ▬ Primary Routes
- - - Tracks
- ▭ AOP 2012 /13 Boundary
- ▭ AOP 2017/18 Boundary
- ▭ AOP Blk layout 2017/18
- ▨ fmc-p_slope_gt_40_percent
- ▭ FMC_P Boundary
- Non Forest
- Forest > 80% Crown Cover
- ▨ Forest 30% -80% Crown Cover
- Cloud

588000 000000

592000 000000

596000 000000

Dubo River

Wropluken (Ponnoh Cit

Gbarken (Ponnoh City

A

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AC 2017/18

AC 2012/13

Karnaken

D

First 5 Yrs

Taybue

Dubalo

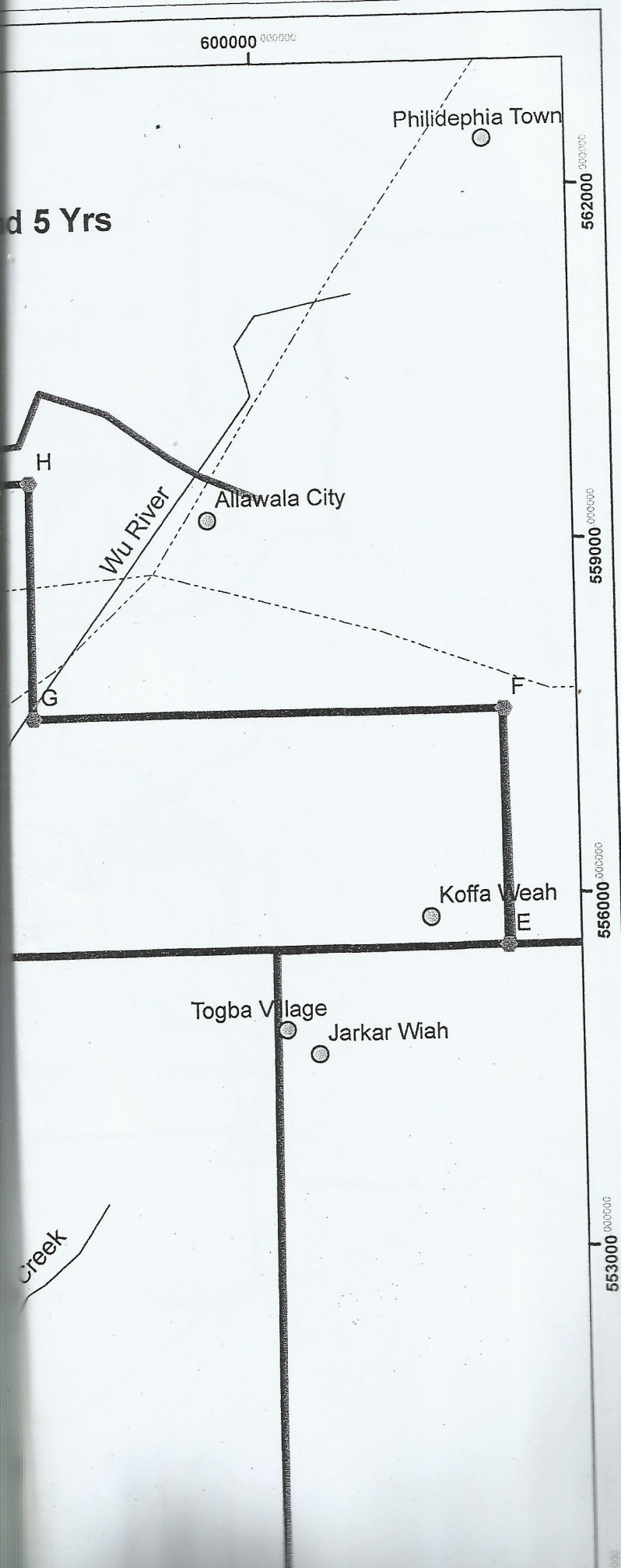
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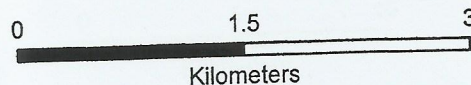
d 5 Yrs



FMC-P-ANNUAL COUPE DELINEATION



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Map Source:
Geographic Information System & remote sensing
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Legend

● Boundary point

● Town_Village

— ARL Constructed Rd

— River

— FMC_P_COMPARTMENT

Road

— Primary Routes

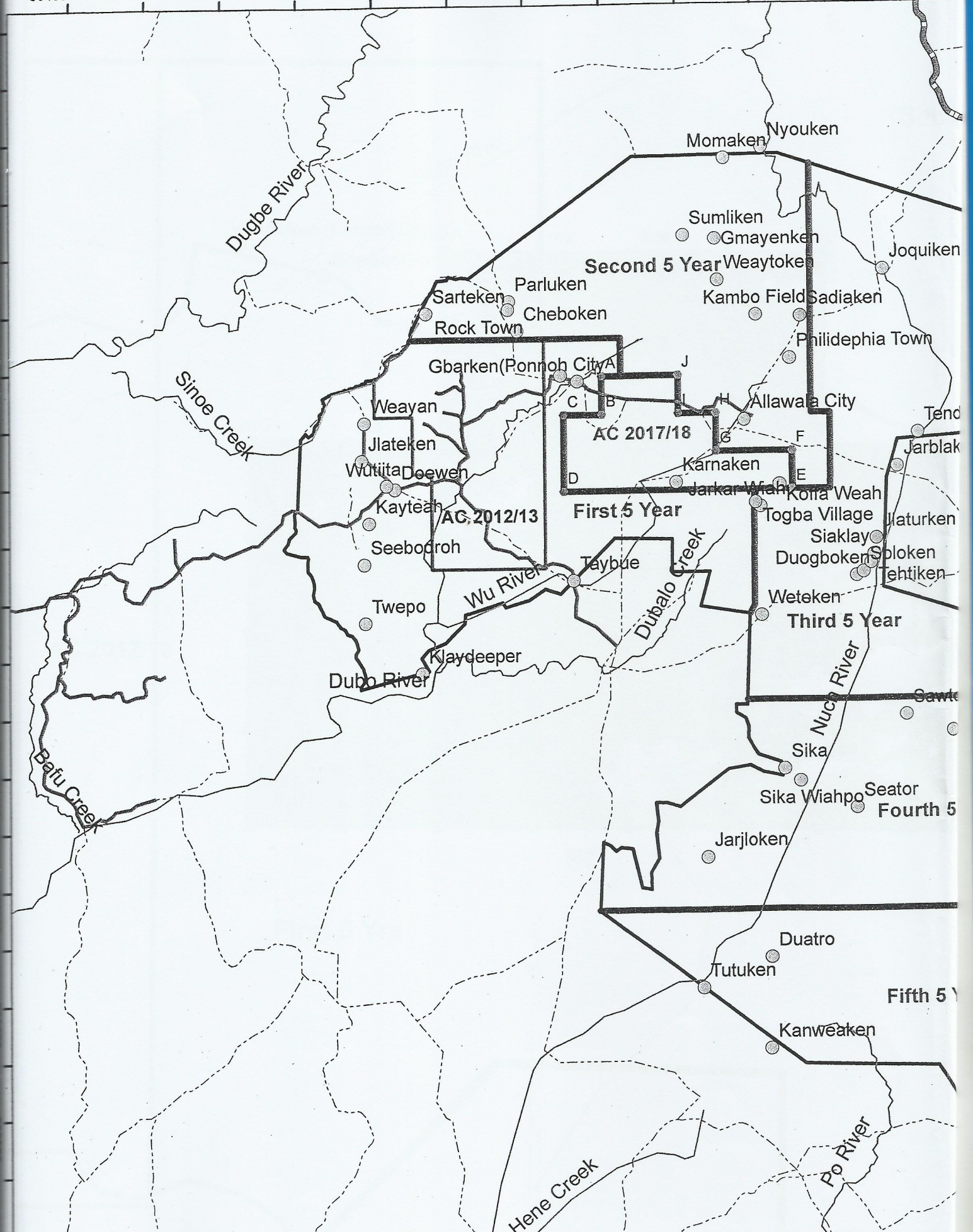
--- Tracks

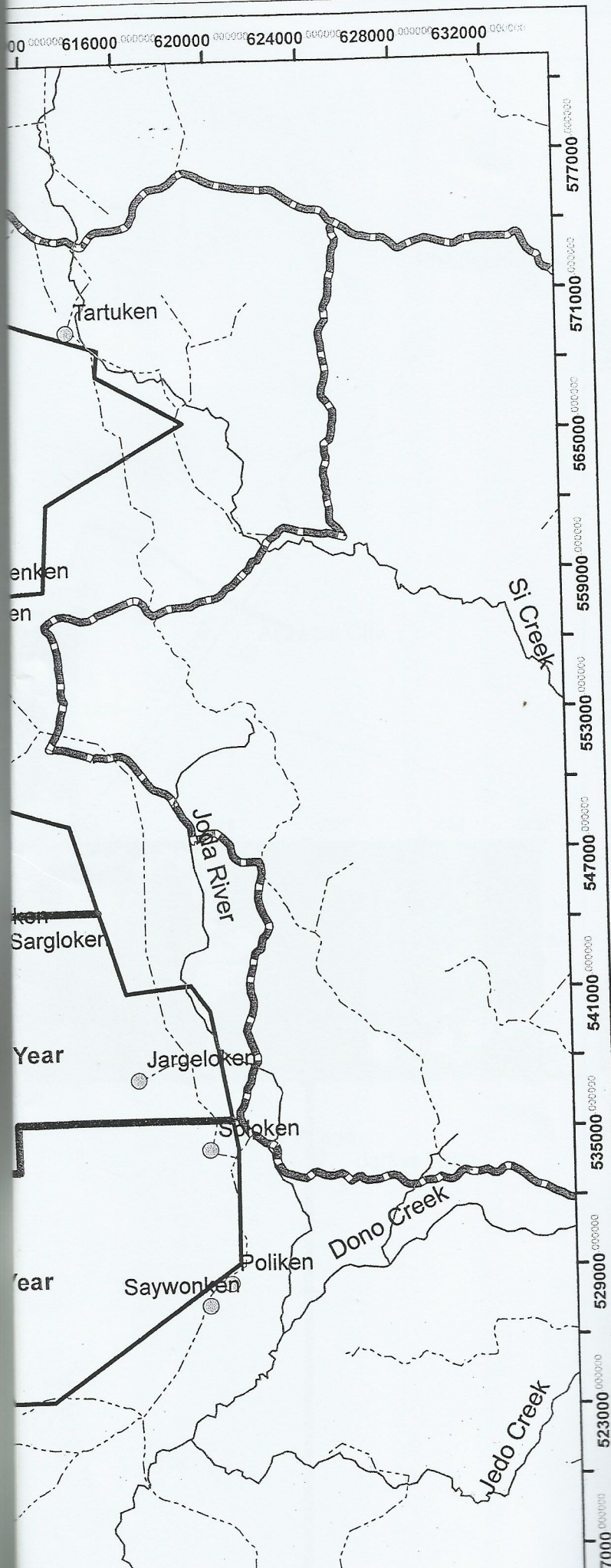
□ AOP 2012 /13 Boundary

□ AOP 2017/18 Boundary

□ FMC_P Boundary

564000 568000 572000 576000 580000 584000 588000 592000 596000 600000 604000 608000 612000

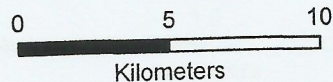




Location of the Annual Coupe within the Forest Management



1:250,000



Map Source:
Geographic Information System & remote sensing
of Atlantic Resources Ltd Lab

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Dubo River

Wropluken (Ponnoh Cit 1187A

Gbarken (Pon

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AC 2017/18

AC 2012/13

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R-1

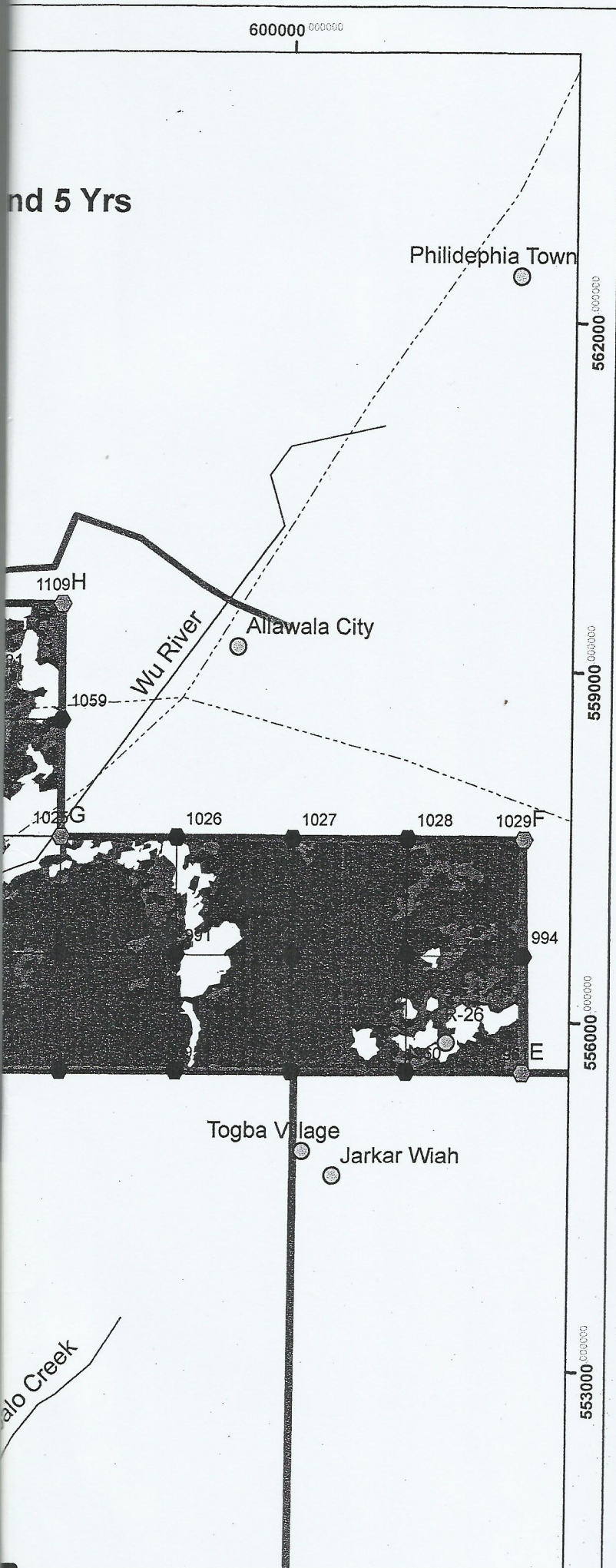
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First 5 Yrs

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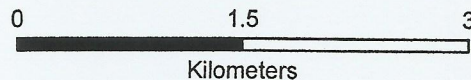
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FOREST COVER ON ANNUAL COUPE



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Map Source:
Geographic Information System & remote sensing
of Atlantic Resources Ltd Lab

Legend

- Boundary point
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