Appendix C

Standard Forest Plan Mitigation of Impacts

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Mitigation of Impacts

A. General Mitigation Measures

(Note: These general mitigating measures apply to all treatment areas; a complete list of standard mitigation is provided in the Forest Plan and its amendments.)

1. This project complies with State-approved "Best Management Practices" (BMPs) during all activities in order to meet State water quality standards. Actual standards and guides as provided in the Forest Plan as amended exceed these standards. Protection within all streamside management zones (SMZs) is summarized in the specific areas of stream type as follows:

Perennial and Intermittent Streams Prohibitions

- Trees are not felled in stream except as necessary and prescribed for fisheries management.
- Slash is not allowed in streams.
- A filter strip is designated which is a minimum of 30 feet plus 1½ feet times the percent slope.
- Woody understory is not removed within five feet of the bank. Stream-bank trees are not harvested.
- Within all first thinning stands, reserve hardwoods shall be marked within drains and riparian zones for retention as well as protection from harvest operations to meet wildlife needs.

2. Visually sensitive areas may require special care to reduce the visual impacts of removal. This may be accomplished by feathering edge lines between treated and untreated areas. In addition, selected hardwoods are retained in major ephemeral drains that traverse the stands.

3. Roads, trails, ditches, and other improvements in the project are maintained free of debris. Any damage is promptly repaired. Protection of improvement is provided for in the timber sale contract.

4. Existing roads or access ways are used whenever possible. Approximately 2.7 miles of reconstruction will be necessary for implementation of any action alternative. Construction and reconstruction requirements are specified in the contracts through mandatory clauses and engineering blueprint drawings. Road specifications include resource protection requirements. Road work is closely monitored by qualified inspectors and documented in diaries that are retained as public records.

5. Potential effects on threatened and endangered species are assessed in the Biological Evaluation. Monitoring included a survey of all suitable RCW habitats on an approximately 10-year interval to determine if undiscovered clusters are present; annually monitoring of known RCW colonies; conducting a population census; and performing maintenance at all known locations, including banding and tracking fledglings to the extent possible. In addition, the annual monitoring and tracking of breeding bird populations has been successful in identifying new clusters: the total number of active clusters on the Homochitto National Forest has doubled over the past 10 years.

   This project does not affect RCW clusters or cavity trees, and may improve forage habitat in thinned stands. The only mitigation required by the recovery plan and associated environmental documentation is that mechanized equipment not be used inside the cluster during the breeding season.

10. Unit locations are established by setting boundaries on manmade features such as roads and trails, and natural features such as ridges and streams. Acreage is estimated from the district Geographic Information System. Total area acreage is often significantly different (larger) than the area where activity is anticipated, because of inclusions for SMZs, visual retention zones, steep slopes, sensitive soils, or protected plant, animal, or cultural resource areas. The estimated total area, over which activities will occur, is well established and documented. In addition to the mitigations listed above, several factors affect the accuracy of acreage estimates:

    - **Mitigation acres:** Coordination such as streamside management zones is included within the stands and total stand acres. Adjustments in treated acres could have a 5% error. Streamside zones are applied, not just based on stream characteristics, but also on terrain and vegetative conditions. The final determination of acreage committed to streamside zones is established during project layout and is not a map exercise.

    - **Topological displacement:** When compared to photos, there is considerable displacement of features such as streams and ridges from the base layer data from the United States Geological Survey (USGS) topographical map. An example of the magnitude of this error is provided by analysis of a large lake currently under construction. The District Computed acreage of the lake using topographical elevations from our GIS layers (USGS Topography). The shoreline analysis indicated acreage of approximately 1200 acres. A controlled cadastral survey was performed to identify the exact shoreline location for clearing the lakebed. The acreage calculated from this controlled survey was just under 1000 acres. The USGS topography lines generated an error of about 20%. An acreage error of + or – 20% would be within the expected range of a site-specific project where a known area was being analyzed. Ortho photo layers were used to correct most of the stand boundaries in this Analysis Unit. While errors will not be as large as those using USGS topography, errors will still be common.

    - **Man-made feature displacement:** When compared to photographs, there is considerable displacement of man-made or drawn features such as roads and stand lines. The primary basis for this is that the topographical maps show roads down centers of ridges. Stand lines are placed at center of ridges or down drainages. Topography line

displacement as noted above adds error. In addition, features with substantial on-the-ground curvature appear relatively straight on the maps, and a pencil line width is approximately 66 feet or one chain.

The second and third errors noted above can add or subtract considerable acreage depending on the size, shape and boundary features of a stand. Very small stands (20 acres or less) are more affected because small shifts produce a large percentage. Errors from 10% to 25% are reasonable, depending on area size and shape. Even though there may be displacement between the map and the ground, the benefit of using topographical features is that roads, streams, well-defined ridges, and drainages can all be easily and reliably identified on the ground.

Both managers and the public can use the maps to locate the actual treatment area. The area analyzed is the identifiable land area between these identifiable features. Even though the acres may vary somewhat, the analysis considers the treatment area. In a large project with a number of units, displacement compensates. Plus or minus 10% would be a reasonable error in estimating forested tract size.

B. Analysis Unit 22 Mitigation and Monitoring

In addition to the mitigation measures listed above, the following measures will be taken in the implementation of the Analysis Unit 22 project.

Monitoring activities are divided into several broad categories: Forest Plan monitoring, routine implementation monitoring, validation monitoring, and project-specific effectiveness monitoring. The National Forest Management Act requires that National Forests monitor and evaluate their forest plans (36 CFR 219.11). The Forest Plan (Chapter 5) includes the monitoring and evaluation activities to be conducted as part of Forest Plan implementation. Monitoring requirements in Chapter 5 of the Forest Plan would be met under all alternatives.

Validation monitoring is considered longer-term research data collection to verify if implementation and effectiveness monitoring assumptions remain valid; no validation monitoring is scheduled for this proposal.

Routine implementation monitoring is conducted as part of the administration of a timber sale contract. Trained timber sale administrators and road inspectors ensure that standards and guidelines are being met. Trained State and federal wildlife biologists and botanists would accomplish plant and wildlife monitoring. Soil Scientists would monitor soils and soil properties including productivity. Monitoring would ensure that the appropriate standards and guidelines and mitigation measures are followed to protect water quality, heritage resources, wildlife habitat, and other natural resources.

Monitoring actions that will be developed within this project will gauge the success of implementation actions and identify the effectiveness the actions and mitigation that is completed. Most activity will be documented concurrent with monitoring during the administration of the contract by the sale administrators, contract officer representatives (CORs), and inspectors. Discussed below is a list and explanation of standards, guidelines,

*and mitigation measures which are applied to all activities on the Homochitto National Forest, followed by specific mitigation and monitoring activities planned for Analysis Unit 22(*italicized*)*.

1. Soil and Water

This project complies with State-approved "Best Management Practices" (BMP) during all activities in order to meet State water quality standards. Actual standards and guides as provided in the Forest Plan (as amended) exceed these standards. Protection within all streamside management zones (SMZ) is summarized in the specific areas of stream type as follows:

Perennial and Intermittent Streams Prohibitions

- Trees are not felled in stream except as necessary and prescribed for fisheries management.
- Slash is not allowed in streams.
- Rutting--a furrow, groove, or track made in the ground by the passage of a vehicle or vehicles--is not allowed. Wet weather and seasonal restrictions are provided and where damage occurs, rehabilitation is required.
- A filter strip is designated which is a minimum of 30 feet plus 1½ feet times the percent slope. Mechanized equipment activities are limited to designated stream crossings and activities that result in more than 10% soil disturbance.
- Necessary crossings built to standards in Forest service standard Specifications for Construction of Roads and Bridges.
- Filter zones are not prescribed burned. The forest plan does allow low intensity fires to back into these areas and extinguish to avoid unnecessary line construction.
- Woody understory is not removed within five feet of the bank. Stream-bank trees are not harvested.

Ephemeral Channels Prohibitions

- Rutting in the channel is prohibited as noted above. Wet weather and seasonal restrictions apply.
- Decks, roads, and log landings are not built in ephemeral channels except that roads can cross at designated locations.

The above standards are met through a combination of unit layout, contract specifications, and administration.

Additional Mitigations Associated with Soil and Water

The district extends streamside management zone protection beyond standard mitigation required in the forest plan, and that shown to be effective in meeting soil and watershed protection standards. Lower impact management and different vegetative objectives are instituted within approximately two chains (132') of intermittent streams and approximately 3 chains (198') of perennial streams. The primary purpose of this mitigation is to protect riparian habitats, provide increased protection of special habitats (most sensitive plants on the Homochitto Ranger District are associated with shaded riparian zones), and to retain habitat for riparian dependent fauna. Potentially additional watershed protection is derived as an associated benefit.

Implementation of this mitigation is by prescribing a separate management prescription for streamside zones. Management prescriptions are established prior to any commitment of resources within a project area. Streamside management zone boundaries are painted or flagged during unit layout, and are readily visible as trees are marked and access is planned.

Erosion control measures and revegetation of sites with insufficient groundcover are required after harvest. This work is implemented as soon as possible after project activities. The timber sale contract will contain a clause to this effect, and certified timber sale administrators and inspectors will conduct monitoring for compliance and effectiveness of these and other site-specific soil mitigation measures. These Forest Service employees frequent the sites during and after activities, recording their findings in a "Timber Sale Spot Check" report. These records become part of the timber sale and silvicultural contracts, which are used to achieve the desired future conditions.

2. Visual Quality

Visually sensitive areas may require special care to reduce the visual impacts of tree removal. This may be accomplished by feathering edge lines between treated and untreated areas; cutting slash to lie on the ground; using a chipper/shredder and/or removing slash; and protecting hardwood leave trees. Visual Quality Objective (VQO) is a term that describes or categorizes several levels of visual sensitivity. The most protective and least disturbing is **"Retention"** followed by **"Partial Retention," "Modification,"** and **"Maximum Modification."**

Regeneration sites selected in the Proposed Action are located in areas identified as Modification or Maximum Modification. Mitigation for regeneration within these areas will be:

a. Establish irregular stand shapes, avoiding straight lines or geometric forms except as necessary along landlines (follow natural land features).

b. Reduce openings along roadways to as narrow as possible (1/4 mile preferred maximum).

Areas and stands selected for thinning have either a Modification or Maximum Modification VQO. Modification visual objective mitigation within these areas includes (Forest Plan 4-4):

a. Lop and scatter slash to within two feet of ground within 50-foot zone beyond ROW edge (in seen area).

b. Direct felling cuts away from travelway or lake within lop and scatter zone and adjacent trees that may fall into lop and scatter zone.

c. Log landings no closer than 200 feet from edge of travelway except where terrain or other resources dictate.

Mitigation of visual impacts will be accomplished through sale layout. The Forest Service approves locations of all landings, temporary roads, and skid trails prior to construction. This is required under the contract and implemented through required pre-entry meetings for each harvest unit, which are documented in the sale records. Certified timber sale administrators and inspectors will conduct monitoring of compliance and effectiveness of the mitigation measures listed above. These Forest Service employees frequent the sites during and after activities, recording their findings in a "Timber Sale Spot Check" report. These records become part of the timber sale and silvicultural contracts, which are used to achieve the desired future conditions.

3. Historic Resources

In accordance with the terms of the "Memorandum of Understanding" with the State Historic Preservation Officer (SHPO), surveys for cultural resources have been conducted in all areas proposed for actions. *Sites have been marked that require protection. All protected sites will appear as "Special Areas" on sale maps.* Location of these sites is not public record, in accordance with the National Historic Preservation Act.

The frequent presence of timber sale administrators and inspectors insures compliance of the protection measures set forth, as well as initializing and ensuring site protection if previously undocumented archaeological or historical resources are encountered during project activities. If such undocumented cultural resources are identified, the administrator/inspector will require that all work in that area cease until the full nature and extent of the resources can be evaluated and consultation with SHPO can be completed. The timber sale contract will contain a clause to this effect to ensure the cooperation of contractors with the protection measures.

4. Protection of Improvements

Roads, trails, ditches, and other improvements in the project area are maintained free of logs, slash, and debris. Any damage is promptly repaired. Protection of all improvements is provided under the contract, and is monitored by timber sale administrators and inspectors. Monitoring information is included in the inspection reports and become part of the sale record.

Existing roads or access ways are used whenever possible. Construction is typically only used to provide access where rights-of-way cannot be obtained on the historic access route, or if there is no access route available. The timber sale contract specifies work to be done under the contract on all roads to be constructed or reconstructed. Road plans are provided as an attachment to the contract. A "plan in hand" conducted prior to the completion of the contract insures and documents that the road meets standards and the needs of the project. Engineering personnel inspect the work to insure that specifications are met, and that implementation complies with the design and contract.

Contracted miles may not correspond with the amounts of construction and reconstruction identified in the environmental assessment. Typically roads are "spot reconstructed." Road lengths between reconstructed sites are maintained to a level that would otherwise be identified as "purchaser maintenance". Purchaser maintenance may include surfacing (addition of new gravel), brushing and clearing, grading, drainage improvements and additions, and other work. Reconstruction more typically refers to adjusting grade, minor relocations, replacing major crossings, and similar work. To avoid conflicts between maintenance contractors and reconstruction contractors, maintenance requirements for roads that require construction, reconstruction, or spot reconstruction are performed under the contract. The level of work remains maintenance as analyzed under Chapter 3. The contract represents only an administrative control process, and does not change the actual impacts to be analyzed.

Temporary roads will be returned to a forested condition after use as part of the project work. Certified timber sale administrators and inspectors will conduct monitoring of compliance and effectiveness of this mitigation measure. These Forest Service employees frequent the sites during and after activities, recording their findings in a "Timber Sale Spot Check" report. These actions are accomplished through the revegetation and erosion control clauses in the timber sale and silvicultural contracts, which are used to achieve the desired future conditions.

6. Threatened and Endangered Species

Potential effects on threatened or endangered species are assessed in the Biological Evaluation. Monitoring is completed through sale administration (oversight of timber sale administrators and inspectors, and documentation) to ensure that the mitigation measures written into the Environmental Assessment and any contracts takes place.

7. Protection of Residual Trees

In a typical thinning operation, trees can be designated in a manner that will provide access for equipment while protecting particular trees of special interest, such as reserve trees, wildlife den trees, etc. To protect residual trees, the sales administrator will enforce a 50-foot log length limitation. Damage or removal of a protected tree is forbidden, and penalties for such action are included in the timber sale contract. The sales administrator will accomplish enforcement of this requirement during frequent site evaluations. Documentation will be recorded in the diaries prepared at each site visit, and filed in the sale folder.

8. Prescribed Burning

Prior to conduction a prescribed burn, a burn plan is developed and documented by the district Fire Management Officer. This plan identifies areas to be protected, parameters under which a burn can be initiated, and contingency plans, as well as other specific data and requirements. This plan is reviewed and signed prior to ignition. The burn plan and firing parameters must comply with the requirements of the State of Mississippi Forestry Commission, and no prescribed burns are initiated without first obtaining a burning permit from the State. Inherent in the permitting system is the protection of air quality standards and public safety. The district Fire Management Officer, through post-burn checks to ensure that the desired results are achieved, carries out implementation monitoring of prescribed burning. Close compliance with standards is assured through supervision and review of performance.

C. Prior/Continuing Validation and Implementation Monitoring

No new validation monitoring is indicated for the Analysis Unit 22 proposal; however, several past and ongoing validation and/or implementation monitoring studies were used in analysis of the alternatives, and will be used to continue monitoring the effectiveness of the program activities and mitigation measures.

Prior to implementing regeneration, actual harvest areas, exclusive of external coordination such as SMZ areas, is measured by GPS or string box survey. This area is compared to the analyzed acreage in accordance with OIG guidelines (based on the above, expected variations). Greater differences in acreage are reviewed to determine the cause. The governing consideration is the area within identified ground features, and allocation to streamside zones and other special protection areas within those specific features. In the absence of regeneration or well-defined thinning areas, generalized area estimates are considered adequate for the project.

The district has conducted water quality and aquatic habitat monitoring of a number of major streams on an approximately 5-year interval for the past 10 years. In FY 2000, 12 streams were monitored. Data indicates the presence of multiple management indicator species in all monitored streams within this project area. Additional streams were being monitored in FY 2001. These streams are representative of most streams on the Homochitto National Forest and provide information that can be compared to activities within the watershed and accurately assess the potential for maintaining water quality and aquatic habitat.

Avian management indicator species are monitored annually through a series of breeding bird surveys at established listening points. The district installed 20 new points in FY 2000 bringing the total number of listening points to approximately 260 for the District. In a typical year, 160 to 180 points are surveyed. Points are representative of all habitat types and are well distributed across the District. The District also conducts an annual turkey brood survey by recording employee sightings. Records are maintained on the district. Northern bobwhite and Eastern wild turkey research is ongoing on the District. Discussions related to

bird indicator species and past and present research are summarized as a basis for the "Management Indicator Species" section in Chapter 3. Information is analyzed for trends that might lead to declines or listing. Annual surveys represent implementation monitoring. Substantial information is also available from breeding bird survey routes in the vicinity of the Homochitto National Forest. Some of this information is graphed below.

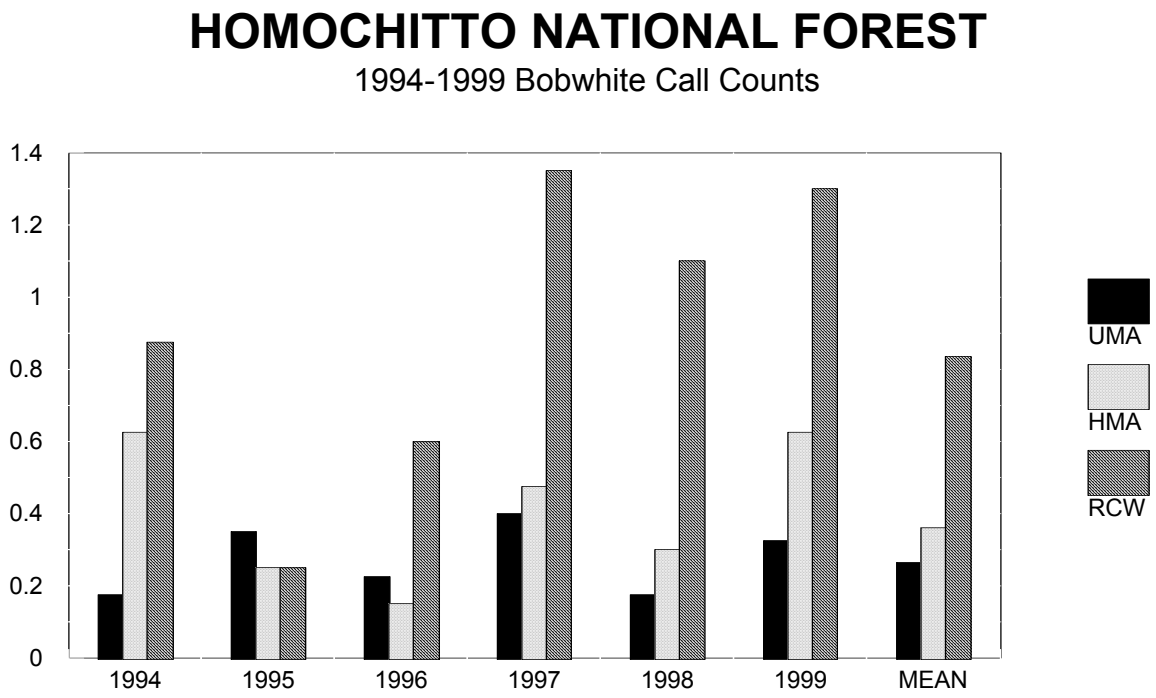
Implementation monitoring of red-cockaded woodpecker is accomplished through the continuous monitoring record that is maintained for each RCW cluster. All suitable habitat within a project area is inventoried for undiscovered clusters each time a proposal is expected to remove trees associated with habitat. Annual monitoring records are maintained and the results reported in the annual Monitoring and Evaluation Report for the National Forests in Mississippi. This is a published document made available to the public on request.

Examples of Monitoring Data from Surveys Conducted on the Homochitto National Forest

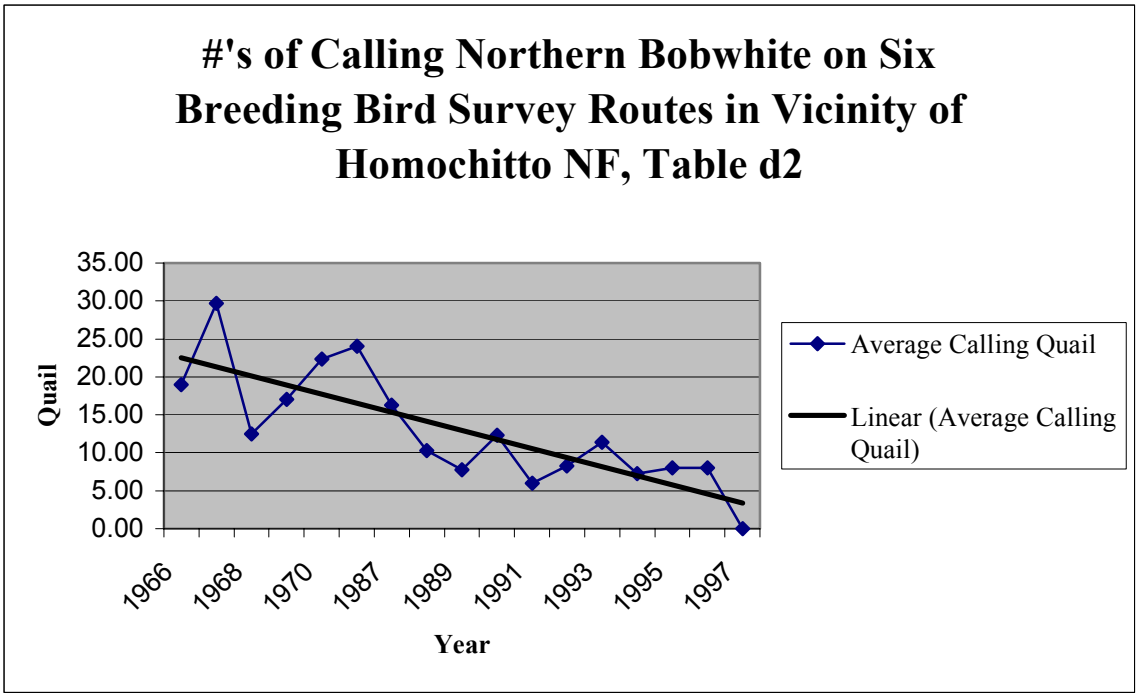
The following tabular data was developed in connection with the discussion in Chapter 3 concerning management indicator species. This data was collected from various surveys and studies conducted on the Homochitto National Forest. Tables d1 through d6 consist of information demonstrating population trends for various avian management indicator species as a result of management practices on the Homochitto National Forest.

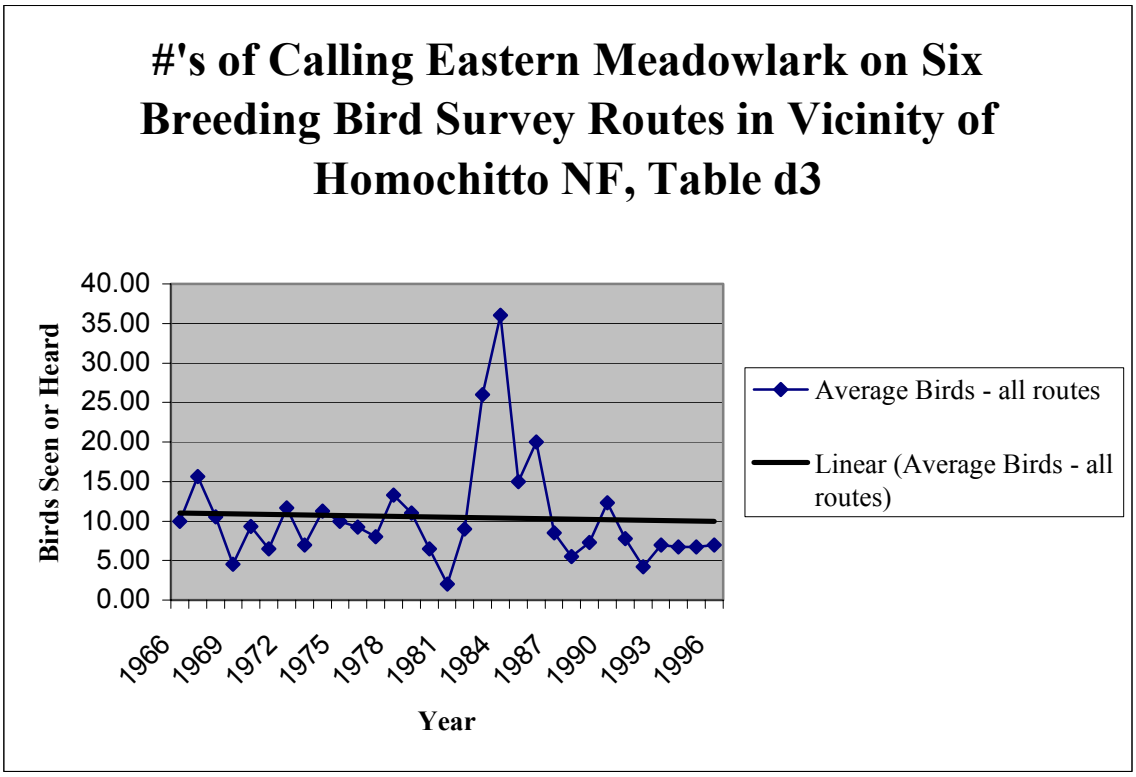
Tables d7 through d10 demonstrate an index to populations of game species. This was calculated by dividing harvest by hunter days of effort to produce a harvest per unit effort index. This index can act as a useful tool for observing game populations over time.

Table d1

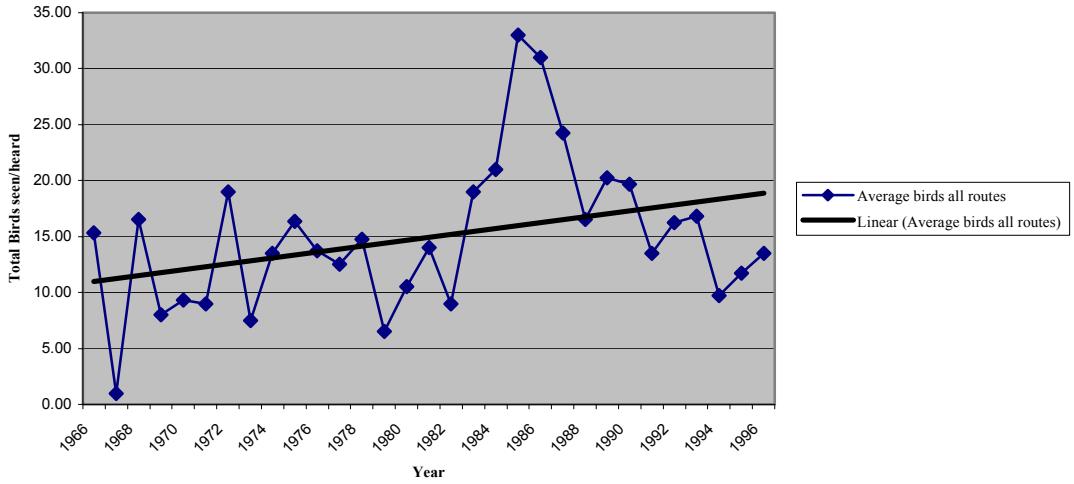


(W. Burger, Department of Wildlife and Fisheries, Mississippi State University, unpub. Data)

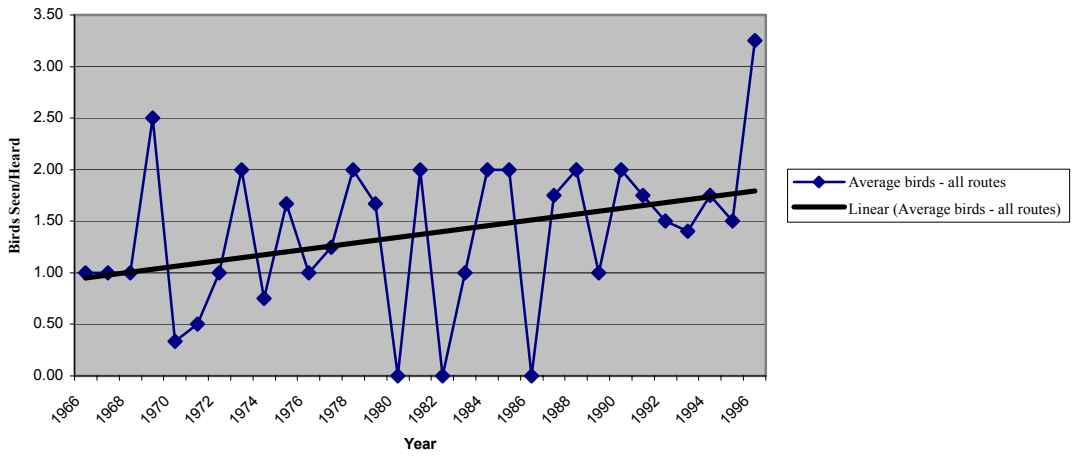


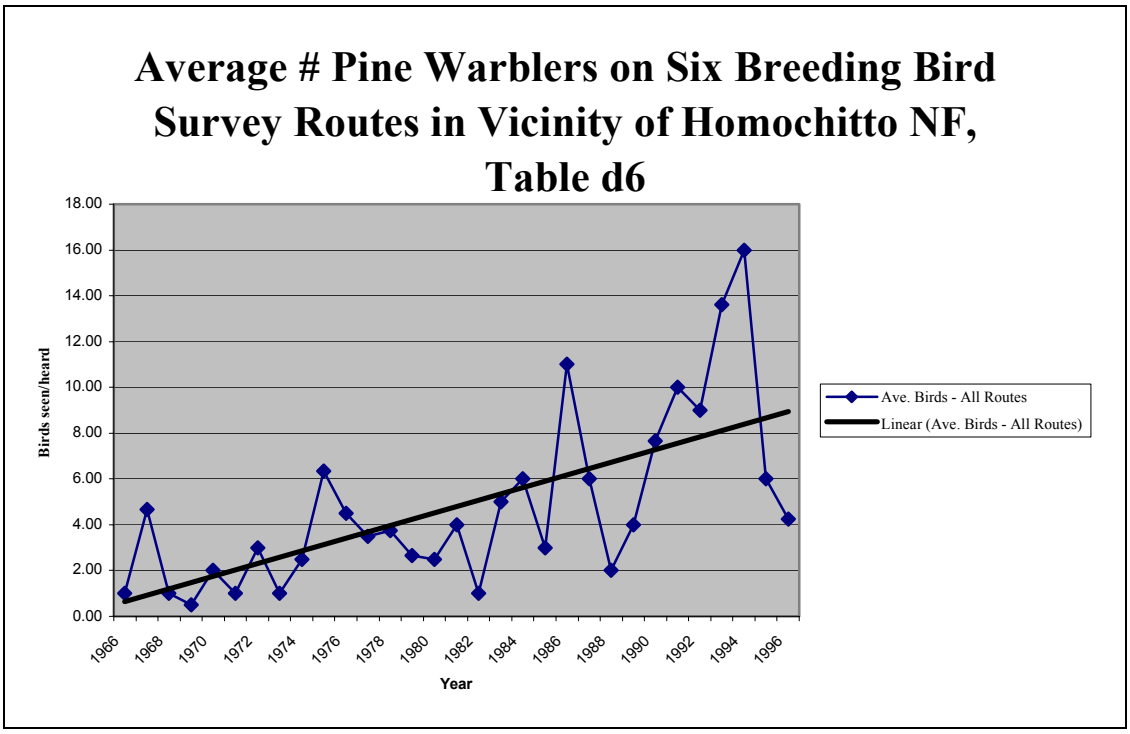

#'s of Calling Eastern Meadowlark on Six Breeding Bird Survey Routes in Vicinity of Homochitto NF, Table d3
Birds Seen or Heard
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996
Year
Average Birds - all routes
Linear (Average Birds - all routes)

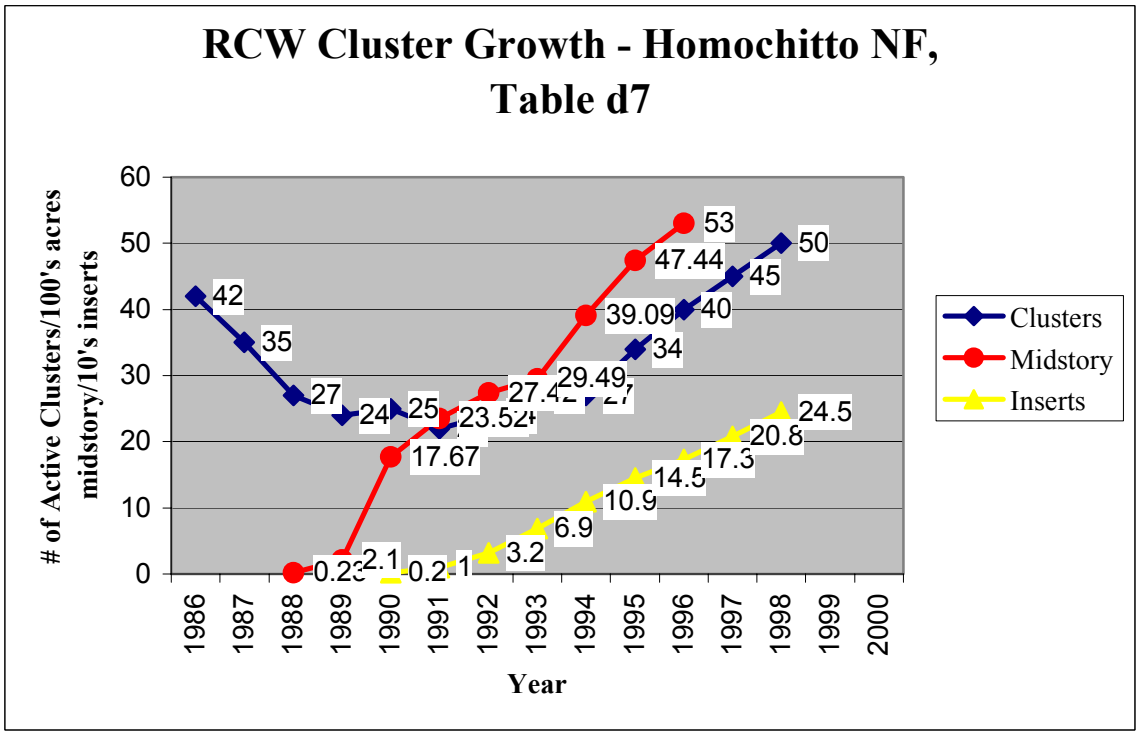
Breeding Bird Survey - Rufous-sided Towhee, Table d4

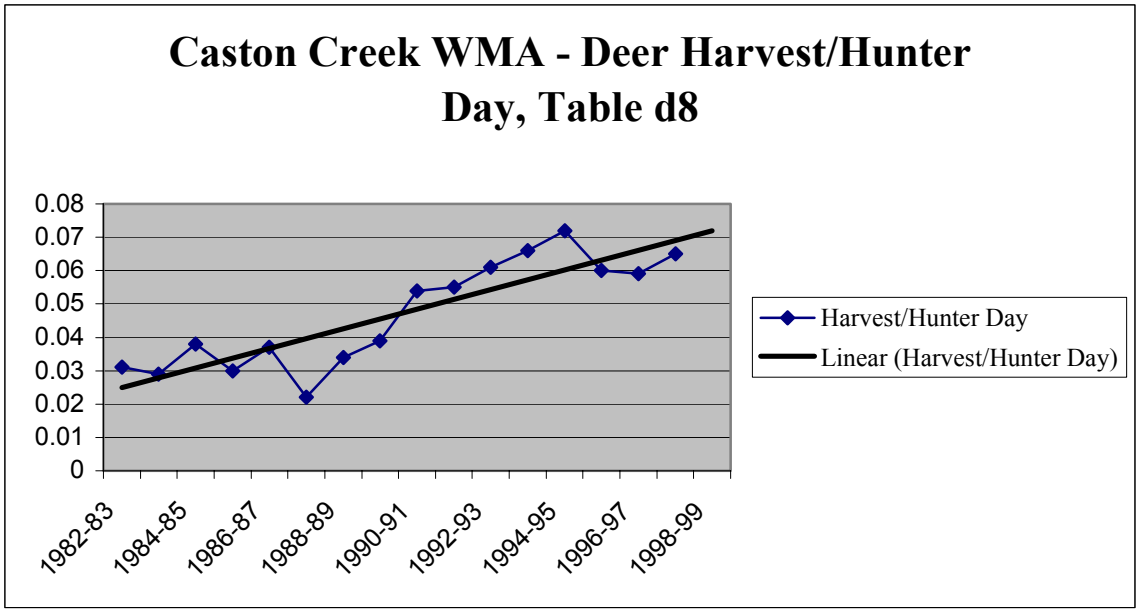


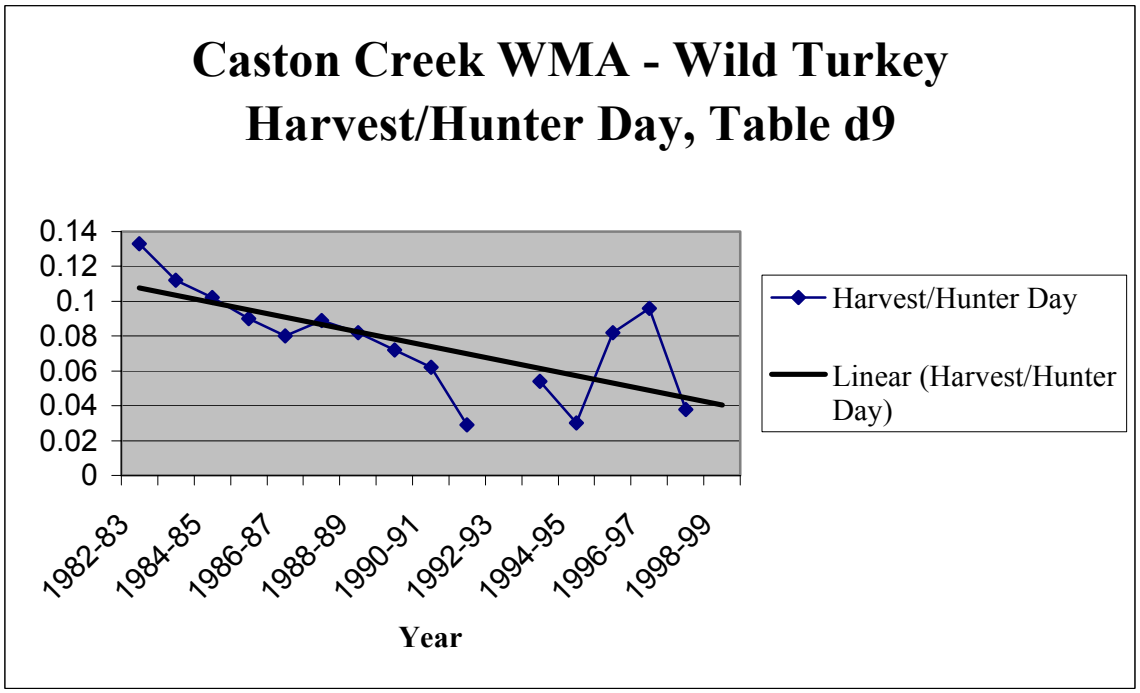
Average # Pileated Woodpeckers on Six Breeding Bird Survey Routes in Vicinity of Homochitto NF, Table d5

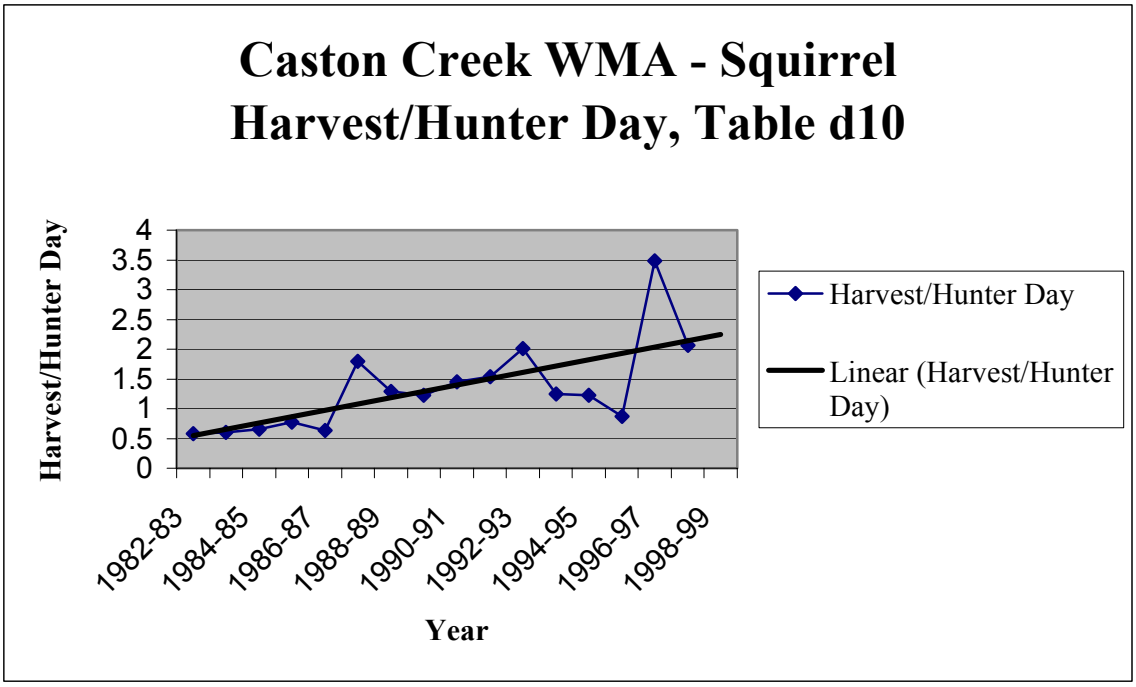


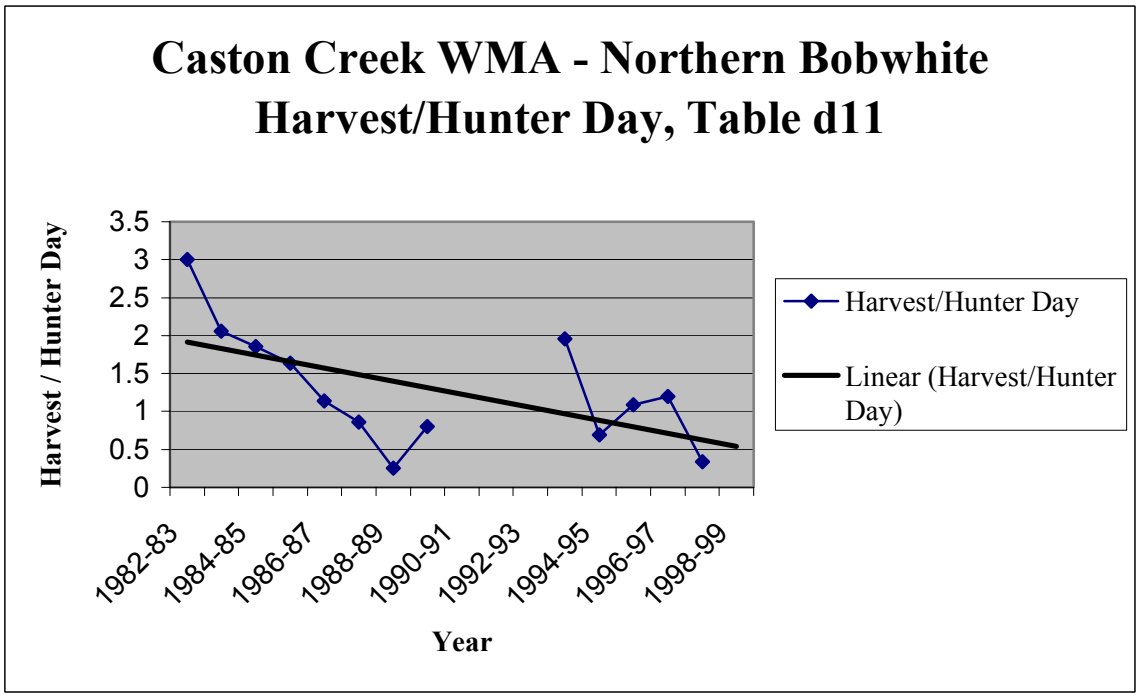

Average # Pine Warblers on Six Breeding Bird Survey Routes in Vicinity of Homochitto NF, Table d6
Birds seen/heard
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
Year
Ave. Birds - All Routes
Linear (Ave. Birds - All Routes)


RCW Cluster Growth - Homochitto NF, Table d7
# of Active Clusters/100's acres
midstory/10's inserts
60
50
40
30
20
10
0
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Year
42
35
27
24
25
17.67
0.2
2.1
0.2
1
3.2
6.9
10.9
14.5
17.3
20.8
24.5
34
40
45
50
53
47.44
39.09
29.49
Clusters
Midstory
Inserts


Caston Creek WMA - Deer Harvest/Hunter Day, Table d8
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1982-83
1984-85
1986-87
1988-89
1990-91
1992-93
1994-95
1996-97
1998-99
Harvest/Hunter Day
Linear (Harvest/Hunter Day)


Caston Creek WMA - Wild Turkey Harvest/Hunter Day, Table d9
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1982-83
1984-85
1986-87
1988-89
1990-91
1992-93
1994-95
1996-97
1998-99
Year
Harvest/Hunter Day
Linear (Harvest/Hunter Day)


Caston Creek WMA - Squirrel
Harvest/Hunter Day, Table d10
Harvest/Hunter Day
4
3.5
3
2.5
2
1.5
1
0.5
0
1982-83
1984-85
1986-87
1988-89
1990-91
1992-93
1994-95
1996-97
1998-99
Year
Harvest/Hunter Day
Linear (Harvest/Hunter Day)


Caston Creek WMA - Northern Bobwhite
Harvest/Hunter Day, Table d11
Harvest / Hunter Day
3.5
3
2.5
2
1.5
1
0.5
0
1982-83
1984-85
1986-87
1988-89
1990-91
1992-93
1994-95
1996-97
1998-99
Year
Harvest/Hunter Day
Linear (Harvest/Hunter Day)