

# Lower Mississippi Valley Joint Venture Monitoring and Evaluation Plan

## Introduction

The Lower Mississippi Valley Joint Venture Partnership promotes targeted, outcome-based monitoring that either: 1) evaluates our progress in meeting stated population and habitat objectives for the major bird plans, or 2) tests assumptions made in our biological models regarding population or habitat objectives. The four major bird plans include the North American Waterfowl Management Plan (NAWMP), the Partners in Flight Landbird Plan (PIF), the U.S. Shorebird Conservation Plan (USSCP) and the North American Waterbird Conservation Plan (NAWP). Some of our monitoring needs have systems already established to track metrics, and others need to be developed. Furthermore, we recognize certain technical expectations that represent the desired characteristics of Joint Venture monitoring (Table 1). Under each bird plan section below, we describe how we are achieving content in each area (summarized in Figure 1), provide recommendations for continuing or improving our activities, and briefly describe habitat inventory and monitoring programs and population monitoring programs where appropriate.

Table 1. Technical Expectations for Monitoring excerpted from Desired Characteristics for Habitat Joint Venture Partnerships (Joint Venture “Matrix”).

<i>E l e m e n t</i>	Sub Element/ Product	Technical Expectations	
		Minimal Content-  Expected characteristics and level of performance for newly established and/or minimally-funded Joint Ventures.	Comprehensive Content-  Joint Ventures should move toward this content as a Joint Venture matures and funding levels increase.
<b>M O N I T O R I N G</b>	<b>Coordination / Partnerships</b>	Joint Venture informs and influences partner organizations implementing monitoring programs.	Joint Venture provides a structure and process that generates, attracts, leverages, and implements outcome-based monitoring activities in support of Joint Venture established biological targets.
	<b>Conservation Tracking System</b>	General description of anticipated need for tracking partnership activities (gross partnership accomplishments). A vision for creating that capability among partners. The joint venture office solicits information on accomplishments from joint venture partners, organizes and submits the information to appropriate managers of national databases and Management Board.	Conservation tracking and spatial database system in place. Explicit description of how information will be used to inform decisions (e.g., increasing performance for Program X). Explanation of linkage between tracking system and biological models so that biological accomplishments can be assessed and reported.
	<b>Habitat Inventory &amp; Monitoring Programs</b>	General description of anticipated process that will be employed to inventory and monitor landscape conditions and net habitat change over time and net progress toward habitat objectives (gains and losses).	Documentation of habitat monitoring objectives and habitat parameters that will be inventoried and monitored over time. Expected process (e.g., remote sensing) and time interval for data collection. Explicit description of how information will be used to inform decisions (e.g., refining habitat or population objectives). Assessment of the net change in Joint Venture landscape conditions conducted at <5 year intervals.
	<b>Population Monitoring Program</b>	Description of anticipated process for prioritizing and coordinating monitoring of bird population responses over time.	Documentation of demographic parameters monitored specific to each objective. Expected process (e.g., aerial surveys, nest survival) and time interval for data collection, storage, and management. Explicit description of how new information collected from monitoring programs will be used to inform future planning decisions (i.e., identify the feedback loop).

Figure 1. LMVJV’s “Operational Compass” depicting self-assessment of achievement of Joint Venture Matrix elements for Monitoring.

LMVJV Operational Compass: Habitat Conservation To Sustain Bird Populations Through Science, Technology and Partnerships									
SHC Framework	Element/Product	NAWMP	PIF	USSCP	NAWP	NAWMP	PIF	USSCP	NAWP
	Biological Planning Unit	Mississippi Alluvial Valley				West Gulf Coastal Plains/Ouachitas			
Outcome-based Monitoring	Conservation Tracking System	-	-	-	-	-	-	-	-
	Habitat Inventory and Monitoring Program	++	+	-	-	++	-	-	-
	Population Monitoring Program	+	-	-	-	+	++	-	-

++	Reliable information exists; good mechanisms in place
+	Some reliable information exists, but needs to be updated; mechanisms in development
-	Information exists, but not much or not adopted by JV; needs significant attention; AND/OR lacking in some guilds within the bird group
-	Information absent or of little value; little/no attention paid to this by the JV

## North American Waterfowl Management Plan

### Coordination/Partnerships

The Lower Mississippi Valley Joint Venture has a chartered Waterfowl Working Group that provides a structure to implement monitoring when needed. Coordination of monitoring activities is provided through the LMVJV Science Coordinator. The Working Group is chartered to ensure that “population and habitat monitoring programs are supporting the progressive refinement of waterfowl conservation goals and objectives.” Thus, the Working Group should ensure that Joint Venture planning is coordinated with NAWMP goals and objectives concerning monitoring and evaluation activities.

***Recommendation: Periodically evaluate membership and subcommittees of Waterfowl Working Group with regards to monitoring needs***

### Conservation Tracking System

Conservation Tracking consists of periodically asking partners to provide the JV Coordinator with accomplishments (acres, dollars), based on sideboards of geography (MAV and WGCP), time span (one year), and connection to LMVJV objectives and priorities, primarily to meet USFWS reporting requests. The Management Board has determined that the “cost” in time and resources (JV Office and Partner

staff) required to develop and maintain a more rigorous process and database outweighs the benefits of such information to the partnership's mission.

***Recommendation: Status quo***

**Habitat Inventory and Monitoring Program**

**Monitoring and Evaluation Need:**

The role of the Lower Mississippi Valley Joint Venture in this regard is to assess JV partner contributions to NAWMP population goals during the non-breeding season. We function on the premise that waterfowl populations are food (energy) limited during the non-breeding season. Therefore, our Joint Venture has implemented monitoring and evaluation through the web-based Wetlands Management Tool on public lands that delineates Water Management Units (hereafter WMU database), and remote sensing on private lands that focuses on calculating energy provided on the landscape for waterfowl. Upkeep of the WMU database is provided through the LMVJV GIS Applications Biologist and partner staff. The WMU database was completed in 2011, and improved in 2020. Improvements include the ability to track multiple habitat types within an impoundment, the ability to qualify moist-soil productivity, and an additional shorebird habitat module.

**Type of Data Collected:**

We collect geospatial data from public land managers that includes detailed waterfowl habitat information for impounded wetlands. We then convert these data to Duck Energy Days (DEDs) through a bioenergetics model. Additionally, we use remote sensing of water on the landscape coupled with land cover data (National Agricultural Statistics Service CropScape and National Land Cover Database) to assess potential waterfowl habitat on private land.

**Purpose and Use of Data:**

The data are used to calculate surplus/deficit energy needs within each state to assess overall Joint Venture contributions to NAWMP goals. Data are accessed and used by the LMVJV staff, and data can be made available to partners through request to the LMVJV GIS Applications Biologist. We additionally provide a 'view only' option for partners wanting to utilize the data.

**Methodology for Data Collection:**

***Public land***

In 2020, we updated our Wetlands Management Tool application and WMU database:

<https://gisweb.ducks.org/wmu/>

The WMU database now provides for the ability to track each habitat that occurs within a water management unit. Hence, there now exist three separate and unique polygon layers to utilize in providing data: a water management unit polygon, a waterfowl unit polygon, and a shorebird unit polygon. Once users delineate a water management unit polygon (or if a water management unit polygon persists in the database from previous data entry), a polygon template for defining the waterfowl habitat or shorebird habitat within that water management unit polygon is automatically created. Users apply the polygon edit tools to more precisely define the distinct areas of each habitat within the water management unit.

Detailed instructions for using the Wetlands Management Tool and WMU database can be found here:

<https://gisweb.ducks.org/wmu/docs/WMUHelp.pdf>

### *Private land and natural flooding*

Private lands enrolled in the Wetland Reserve Easement program are geospatially delineated based on information from the Protected Areas Database. Additionally, naturally flooded areas (i.e., not actively managed) are identified based on where water is present on the landscape. We overlay the private lands and natural flood geospatial data layers with National Land Cover Database or National Agriculture Statistic Service geospatial data layers to determine the habitat type. We additionally use a flood frequency model (Allen 2016) to determine where water is on the landscape. The combination of layers – protected area, land cover, and flood frequency are combined to determine available habitat type. Private lands are given a conservative value of 20% red oak if forested wetland, or a harvested crop value if cropland.

#### **Frequency of Data Collection:**

Data calls for input into WMU database as needed for public land, and remote sensing landscape analysis on private land as needed. The Waterfowl Working Group intends to collect public lands data on a yearly basis beginning in 2020.

***Recommendation: Continue public lands data collection in Wetlands Management Tool and remote sensing assessment of private lands for a bionergetics model update.***

***Recommendation: Update, as needed, Wetlands Management Tool to reflect current needs of Waterfowl Working Group to track waterfowl habitat on public land***

### **Population Monitoring Program**

Population objectives are stepped down to our geography, using harvest data, from continental breeding population objectives (see Fleming et al. 2017). The LMVJV supports coordinated mid-winter aerial survey efforts conducted primarily by our State partners. This is identified as a priority in our LMVJV Science Priorities (LMVJV 2015) because data can be linked to landscape level factors that may influence waterfowl distribution on the landscape.

Currently, we have no demographic monitoring in place. However, partners are interested in assessing the current winter body condition of waterfowl and comparing to body condition indices from the 1980s. Such temporal comparisons should be useful to assess if waterfowl wintering in the LMVJV geography are maintaining good body condition during winter and potentially returning to the breeding grounds in good body condition.

An additional component of understanding non-breeding waterfowl population distribution and dynamics relative to habitat features is the impacts of sanctuary on body condition, survival, and habitat selection. This is a recommendation based on a joint effort between the Gulf Coast Joint Venture and LMVJV Waterfowl Working Groups. One potential means of elucidating the relationship is through an agent-based model. Such a model could simulate the landscape of the LMVJV and duck response to disturbances, habitat types, etc. for evaluating different management scenarios.

***Recommendation: Actively encourage coordination and use of mid-winter aerial survey data in research projects and to evaluate waterfowl response to the landscape***

***Recommendation: Actively encourage periodic evaluation of winter waterfowl body condition***

***Recommendation: Actively encourage efforts to model the impacts of landscape composition, including sanctuary, on waterfowl distribution and demographics***

## U.S. Shorebird Plan

### Coordination/Partnerships

The Lower Mississippi Valley Joint Venture maintains an *ad hoc* LMVJV Shorebird Working Group that could provide the structure to implement monitoring when needed. This group completed a LMVJV Shorebird Plan in 2018. Coordination for monitoring activities is provided through the LMVJV Science Coordinator. At a larger scale, a mid-continent shorebird business plan has been suggested and involvement in this process could benefit the LMVJV.

***Recommendation: Continue working with representatives of the U.S. Shorebird Plan and provide appropriate support to a mid-continent shorebird plan***

### Conservation Tracking System

Conservation Tracking consists of periodically asking partners to provide the JV Coordinator with accomplishments (acres, dollars), based on sideboards of geography (MAV and WGCP), time span (one year), and connection to LMVJV objectives and priorities, primarily to meet USFWS reporting requests. The Management Board has determined that the “cost” in time and resources (JV Office and Partner staff) required to develop and maintain a more rigorous process and database outweighs the benefits of such information to the partnership’s mission.

***Recommendation: Status quo***

### Habitat Inventory and Monitoring Program

#### Monitoring and Evaluation Need:

The role of the Lower Mississippi Valley Joint Venture in this regard is to assess JV partner contributions to shorebird population goals during the non-breeding season, specifically migration. We function on the premise that shorebird populations are energy limited during migration and that fall is the most limiting time period. Therefore, our Joint Venture supports monitoring and evaluation that focuses on calculating how much habitat is provided on the landscape for shorebirds. We are currently beta testing a habitat tracking module for public lands within the Wetlands Management Tool specifically for shorebirds. We make the assumption in our planning that fall shorebird habitat is most controllable on public managed lands through provision of drawdowns. Upkeep of the Wetlands Management Tool will be provided through the LMVJV GIS Applications Biologist.

#### Type of Data Collected:

We will collect geospatial data from partners focused on shallow water/mudflat habitat on public land. Data will be collected in a similar manner to the waterfowl.

#### Purpose and Use of Data:

The data will be used to calculate surplus and deficit shorebird habitat needs for public land in each state.

#### Methodology for Data Collection:

Within the WMU application, the shorebird module enables partners to delineate mudflat habitat. Managed shorebird habitat is defined as follows:

*Shorebird unit polygons should be delineated within a water management unit polygon to depict the total area of drawdown (the mudflat) that will gradually be exposed for shorebird management during the late summer shorebird migration timeframe. This is not to include the mudflat exposed by evaporation, but is meant to show the area of annual active management for shorebirds.*

See <https://gisweb.ducks.org/wmu/docs/WMUHelp.pdf> for instructions on using the Wetlands Management Tool application.

#### Frequency of Data Collection:

Data will be collected as the LMVJV Shorebird Plan is updated, approximately every 5 years.

***Recommendation: Continue to maintain the shorebird module to track shorebird habitat for tracking quantity and availability of shorebird habitat***

***Recommendation: Continue to explore ways to assess available shorebird habitat on private land through remote sensing***

#### Population Monitoring Program

There is no systematic shorebird population monitoring program in place in the LMVJV. Current LMVJV Shorebird Plan objectives are derived from estimates provided by the USSCP (B. Andres, unpubl.). eBird data have been utilized to develop migration curves for our bioenergetics model and split objectives between Bird Conservation Regions.

***Recommendation: Scope the cost in terms of time and effort to perform a population 'blitz' count to potentially validate population estimates and document use of public lands***

***Recommendation: Continue to encourage data input to eBird to help with migration chronology and splitting of population objectives between Bird Conservation Regions***

### Partners in Flight Landbird Plan

#### Coordination/Partnerships

Each Bird Conservation Region [Mississippi Alluvial Valley (MAV) and West Gulf Coastal Plain/Ouachitas (WGCPO)] has *ad hoc* working groups that can facilitate monitoring and evaluation activities.

The *ad hoc* MAV Landbird Working Group, and a formally chartered Forest Resources Conservation Working Group, both provide potential structure to implement monitoring when needed. In fact, members of these groups have helped conduct monitoring of forest songbird response to Desired Forest Conditions for Wildlife.

The WGCPO partners assembled two *ad hoc* landbird working groups that developed the Open Pine and Forested Wetland Plans for the region. Additionally, the Northeast Texas (NETX) Conservation Delivery Network has organized a core working group (*ad hoc* monitoring group) and larger review team for developing a Northeast Texas bird monitoring protocol. The NETX CDN Steering Committee will evaluate the progress and recommendations of the *ad hoc* group. Formal committee development was postponed until year 2 results and will be established in Fall 2020.

***Recommendation: Maintain and re-energize ad hoc technical teams/working groups as needed to develop and implement priority monitoring efforts***

***Recommendation: Support formation of NETX CDN monitoring group; consider similar monitoring groups in other CDNs***

#### Conservation Tracking System

Conservation Tracking consists of periodically asking partners to provide the JV Coordinator with accomplishments (acres, dollars), based on sideboards of geography (MAV and WGCPO), time span (one year), and connection to LMVJV objectives and priorities, primarily to meet USFWS reporting requests. The Management Board has determined that the "cost" in time and resources (JV Office and Partner

staff) required to develop and maintain a more rigorous process and database outweighs the benefits of such information to the partnership's mission.

***Recommendation: Status quo***

**Habitat Inventory and Monitoring Program**

**Monitoring and Evaluation Need:**

One role of the Lower Mississippi Valley Joint Venture is to assess Joint Venture partner contributions to landbird population goals during the breeding season. We function on the premise that breeding bird populations respond both to the quantity and quality of forested habitat on the landscape. Therefore, our Joint Venture supports monitoring and evaluation that focuses on calculating the amount and structure of forested habitat that is provided on the landscape for breeding landbirds.

Forest Quantity

In the MAV, we developed our own classification of bottomland hardwood forest (Mitchel et al. 2016). This assessment provides us the ability to assess forest outside the 5-year timeframe of NLCD. However, an updated version of NLCD was released since our 2012 classification. So we have been using 2016 NLCD until we update our classification.

In the WGCPO we use NLCD to track net landscape change of forested habitat (both bottomland hardwood and pine) on the landscape. Additionally, we need a reliable mechanism to track fire activity on both public and private land. One of our Science Priority recommendations is to monitor the location, acres, and frequency of prescribed fire activities and other metrics relevant to desired open pine conditions. An effort in Florida ("Mapping Fire in Florida") potentially could be expanded to benefit the WGCPO for tracking fire. Tall Timbers Research, Inc. initiated development of this robust spatial database for more precise mapping and tracking of fire occurrence in Florida, using satellite-based products. Currently the database is expanding into the Southeast.

Forest Structure

We are also interested in tracking forest structure. The Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative had constructed a Forest Characterization database to track Desired Forest Conditions for bottomland hardwood forest. However, this database was not completed, nor was there a strong partner desire to use it. There still may be utility for such a database if it can be pushed to completion with additional funding.

For open pine forest, we would greatly benefit from better means to assess forest structure and composition through remote sensing. Currently, Forest Inventory and Analysis (FIA) data offers the only means to collect forest structure data at large scales. However, these data are of limited utility at the finer scales useful to our delivery efforts.

**Type of Data Collected:**

**Forest Quantity**

**MAV (Bottomland Hardwood)**

We use object-based image analysis with Random Forest classification to quickly and accurately classify forest cover. See Mitchell et al. (2016) for complete details. We collect information on 'core-forest', patch size, and extent of forest on the landscape.

**WGCPO (Bottomland Hardwood)**

We use NLCD to track net landscape change of woody wetland habitat across the landscape.

## WGCP (Open Pine)

We currently do not track net landscape change of open pine habitat on the landscape because available remotely sensed structural data (especially canopy cover) is insufficient. Much of the pine timber classified through NLCD is industrial pine plantation. We need a system to catalogue the number of acres burned through partner and CDN programs, such as the NE Texas Habitat Incentive Program.

## Forest Structure

We currently do not have a regular, systematic assessment of forest structure. However, forest structure assessments have been conducted through various projects. In the Mississippi Alluvial Valley, forest structure has been collected through Twedt and Wilson (2017), and federal and state partners collect these data as part of their forest inventory. In the West Gulf Coastal Plain, Dr. Dan Saenz with the Southern Research Station is conducting stand structure information on longleaf pine stands and other shortleaf/loblolly pine stands where songmeters are being placed.

## Purpose and Use of Data:

### Forest Quantity

#### Bottomland Hardwood

MAV Forest Assessment and NLCD woody wetlands data are used to calculate changes in landscape composition and acreage of bottomland hardwood forest. Calculations of amount of forest-core habitat will be used to assess partner contributions to increasing forest-core for breeding landbirds in the MAV.

#### Open Pine

A decision support tool was developed by LMVJV partners for open pine habitat to provide information on strategically sighting open pine management prescriptions (e.g., enhancement, prescribed fire) and protection activities in locations where they have the greatest chance of supporting viable populations of priority bird species. Thus, developing protocols and procedures for reporting the locations of prescribed activities on the landscape would help partners better implement effective management actions. Once desired conditions are achieved in these habitats, monitoring should ensure desired results are being achieved and maintained over time. An online database would facilitate the analysis of such data.

## Methodology for Data Collection:

We used object-based image analysis with Random Forest classification to quickly and accurately classify forest cover in the MAV. We used Landsat band, band ratio, and band index statistics to identify and define similar objects as our training sets instead of selecting individual training points. This provided a single rule-set that was used to classify each of the 11 Landsat 5 Thematic Mapper scenes that encompassed the Mississippi Alluvial Valley. Additionally, we burn Wetland Reserve Easement Program (WREP) data into the forest classification. See Mitchell et al. (2016) for complete details.

## Frequency of Data Collection:

#### Bottomland Hardwood

Our MAV Forest Assessment can be collected as needed; there currently is no prescribed frequency of assessment. NLCD data is made available, approximately every 5 years, so forest in the WGCP can be assessed roughly at that frequency.

#### Open Pine

When means to collect prescribed fire data are made available, data should be collected every year and assessed every 5 years.



***Recommendation: Revisit validation of FIA data with empirical data; contact USFS regarding updated FIA data for Bottomland Hardwood and Open Pine structure***

***Recommendation: Investigate means for Open Pine fire tracking within WGCPO CDNs on public and private land***

***Recommendation: Continue assessment of forested wetland acreage and core-forest habitat through MAV Forest Assessment as needed, or NLCD analysis every 5 years as appropriate***

***Recommendation: Continue assessment of acres of prescribed fire in Open Pine habitat, as appropriate, on public and private land***

***Recommendation: Continue to explore effective ways of obtaining remotely sensed pine canopy cover***

### **Population Monitoring Program**

One role of the Joint Venture is to assess partner contributions to reversing population declines for breeding species of continental and regional importance. Currently, the only large-scale monitoring program available to track breeding bird trends is the Breeding Bird Survey. In the Texas portion of the West Gulf Coastal Plain, partners are conducting specialized waterborne surveys for breeding birds of forested wetlands. Additionally, bird response to NE TX Habitat Incentive Program prescribed fire is being recorded via song meters.

***Recommendation: Assess regional Breeding Bird Survey trends at 5-year intervals for priority bird species***

***Recommendation: Continue support of waterborne surveys in Texas for bottomland hardwood species and consider the applicability to other geographies***

***Recommendation: Continue support of monitoring bird response to prescribed fire through the NE TX HIP***

## **North American Waterbird Plan**

### **Coordination/Partnerships**

Currently, the Lower Mississippi Valley Joint Venture does not have an *ad hoc* LMVJV Waterbird Working Group that could provide the structure to implement monitoring when needed, although one is being formed regarding King Rail (secretive marshbirds) planning. There is no National Waterbird Coordinator, so tapping into larger-scale national efforts is difficult. However, regional efforts show promise. The Midwest Secretive Marshbird Working Group provides useful support for its partners and may be a useful model to replicate in our region. Secretive marshbirds are among the most poorly monitored groups of birds in North America.

***Recommendation: Continue formation of LMVJV Waterbird Working Group***

***Recommendation: Discuss need for “Southeast” Secretive Marshbird Working Group with partners and neighboring Joint Ventures***

### **Conservation Tracking System**

Conservation Tracking consists of periodically asking partners to provide the JV Coordinator with accomplishments (acres, dollars), based on sideboards of geography (MAV and WGCPO), time span (one year), and connection to LMVJV objectives and priorities, primarily to meet USFWS reporting requests. The Management Board has determined that the “cost” in time and resources (JV Office and Partner

staff) required to develop and maintain a more rigorous process and database outweighs the benefits of such information to the partnership's mission.

***Recommendation: Status quo***

### **Habitat Inventory and Monitoring Program**

We currently do not have a habitat inventory and monitoring program for waterbird habitat. Ideally, we will implement a database that can track provision of secretive marshbird habitat on public land (similar to waterfowl and shorebird habitat). We are currently discussing developing our own classification of permanent emergent marsh in the MAV, as it seems that NLCD and NWI do a poor job of depicting this habitat in our geography.

***Recommendation: Scope development of a secretive marshbird module to track King Rail habitat***

***Recommendation: Continue to develop and iteratively update classification of permanent emergent marsh habitat to assess secretive marshbird habitat***

### **Population Monitoring Program**

We currently do not have a population monitoring program for either secretive marshbirds or colonial nesting waterbirds. One identified LMVJV Science Need is to assess the need for a coordinated inventory of wading bird colonies.

***Recommendation: The feasibility of surveying and monitoring wading birds in the MAV and WGCPO will be discussed with regional waterbird experts. If a coordinated inventory appears reasonable and feasible and other datasets are inaccurate, the LMVJV will form a working group dedicated to this task.***