

## Biological Surveys on Refuges in the Midwest and Northeast Regions of the U.S. Fish and Wildlife Service, FY 2003-2005

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### Abstract

What are the most common biological surveys conducted on refuges and wetland management districts in Region 3 and Region 5 of the National Wildlife Refuge System (NWRS)? Information about current monitoring will set the stage for identifying the most pressing technical and scientific needs for future biological monitoring. We distributed an online survey to NWRS field stations to identify the most common biological inventory and monitoring surveys conducted within the last three years (FY 2003 – FY 2005) on National Wildlife Refuges (NWRs) and Wetland Management Districts (WMDs) in FWS Regions 3 and 5. We asked stations to report all surveys that were conducted at that station by refuge staff, volunteers, or other partners (EPA, USGS, States, etc.). Ninety-six percent of all field stations in the two Regions responded to the survey. Overall, most monitoring was focused on impoundment water levels, grasslands, freshwater marshes, forests, invasive plants, breeding bird surveys of forest, grassland, marsh birds and bald eagles, migration surveys of waterfowl and shorebirds, and winter bird surveys of waterfowl. Frog and toad surveys were also popular, along with participation in regional or national surveys like the Christmas Bird Count, Duck Banding, Woodcock Singing Ground Survey, Mid-winter Waterfowl Survey, and Abnormal Amphibian Monitoring. We anticipate that our survey results will be useful for evaluating future proposals for monitoring and research on refuges, if the intent is to conduct work of interest to a large number of refuges. We can also identify which refuges may have an interest in specific projects, based on their past monitoring activities. Our survey results indicate that technical and science support for current monitoring activities is justified for baseline inventories, invasive species, migrating waterfowl and shorebirds, and amphibians. However, knowledge of past monitoring activities cannot answer the important question of what refuges should be monitoring five to ten years into the future. Monitoring is not an end in itself; the ultimate goal of most resource managers is to continually improve management actions and decisions through an adaptive management process. Monitoring is a critical component of adaptive management. Adaptive management on refuges will be driven by planning efforts now underway that incorporate both a ‘bottom-up’ approach of examining refuge purposes, major habitats, and trust species as well as a ‘top-down’ approach examining the context within which a refuge operates.

### Introduction

What technical and scientific support is needed by refuges conducting biological monitoring? How do refuge biologists and managers evaluate achievement of their wildlife and habitat goals and track the management and conservation of their natural resources through time and space? The Biological Monitoring Team (BMT) is interested in forecasting future inventory and monitoring needs for purposes of providing technical and scientific support where the need is the greatest. Identifying the most commonly conducted inventory and monitoring (I&M) surveys on refuges is the first step in this process. We plan to facilitate coordinated monitoring among refuges that have common

biological monitoring needs. Development of monitoring plans that will improve refuge efficiency, provide information for management decisions, and allow exchange of data among refuges for landscape scale conservation are primary interests of the BMT.

Online surveys are a relatively new and efficient way to conduct surveys of a large number of people (Harewood et al. 2001). The major objective of our survey was to provide information to inform the BMT future work plans with regard to inventory and monitoring (Goal 1 in the BMT Strategic Plan) in U.S. Fish and Wildlife Service (FWS) Regions 3 and 5 (Knutson et al. 2005).

## Methods

The BMT distributed an online survey to NWRs field stations in an effort to identify the most common biological inventory and monitoring surveys conducted within the last three years (2003 – 2005) on National Wildlife Refuges (NWRs) and Wetland Management Districts (WMDs) in FWS Regions 3 and 5 (Appendix A). We asked stations to report all surveys that were conducted at that station by refuge staff, volunteers, or other partners (EPA, USGS, States, etc.). The survey was distributed to refuges on 10 November 2005 by the Regional Refuge Chiefs (Nita Fuller, R3 and Tony Léger, R5) and surveys were returned by 16 December 2005 (Appendix A).

We obtained a list of field stations from the U.S. Fish and Wildlife Service corporate master table database; all field stations with an organization code were asked to respond individually. However, some refuges were linked administratively into groups or complexes and these entities also appeared in the corporate master table. For efficiency, some stations reported as a group rather than individually.

We used online software by Zoomerang® to implement the survey (<http://info.zoomerang.com/>). The majority of questions in the survey required selection from a defined list of possible responses, but some allowed open text input. All responses were compiled into summary tables and some questions were also summarized by the proportion of stations conducting a particular type of survey. Bird survey responses were summarized by season and overall. If a station conducted surveys for bird taxa in one or more seasons, they were counted in the overall summary of bird surveys. The Integrated Taxonomic Information System (ITIS) database was used to resolve text responses that involved species nomenclature.

We expect that refuges that are engaged in planning efforts, especially Comprehensive Conservation Plans (CCP) and Habitat Management Plans (HMP) will be refining their habitat and population management goals and objectives and updating or drafting their Inventory and Monitoring Plans (IMP). Therefore, the habitats and taxa monitored on a particular refuge may change over time. For this report we assume that the overall mix of monitoring activities in the two Regions planned

for the immediate future (1-3 years) is accurately represented in our survey of the recent past (2003-2005).

## Results

Fifty-four stations and seven groups in Region 3 reported for a total of 61 reporting units (Appendix B). In Region 5, 66 stations and 3 groups reported for a total of 69 reporting units (hereafter 'stations',  $n = 130$ , both Regions). The survey had an overall response rate of 96 %; only six stations failed to respond. The survey results for each Region are summarized in Appendix C, unless otherwise noted.

### Abiotic Monitoring

Water levels are monitored by 69 stations in both Regions, followed by water quality monitoring of surface waters (46 stations), and environmental contaminants (41 stations, Figure 1). Few stations monitor air quality (9 stations), ground water quality (17 stations), or soils (22 stations).

### Habitat and Plant Monitoring

Ninety-eight stations report conducting habitat or plant monitoring. Grasslands (67 stations) and freshwater marshes (61 stations) are the focus of most monitoring, followed by deciduous forests (54 stations, Fig. 2). Several types of forest habitat are reported separately, but together they represent a substantial monitoring effort.

Region 3 stations listed eight T&E species, with western prairie fringed orchid (*Platanthera praeclara*) monitored by four stations. Region 5 stations listed 32 T&E species, with three stations each monitoring seabeach amaranth (*Amaranthus pumilus*) and swamp pink (*Helonias bullata*).

Invasive plants are monitored at 99 field stations but only 43 stations reported using standard protocols (Fig. 3). Region 5 appears to have a standard invasive species mapping protocol in place; 14 stations reported using the same regional protocol for monitoring invasive species. The Weed Information Mapping System (WIMS) protocol, developed by The Nature Conservancy (TNC) is used by two stations in Region 3, 11 other stations are using separate protocols. The top five invasive plant species identified by Region 3 were purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris*

*arundinacea*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), and spotted knapweed (*Centaurea stoebe*). For Region 5, the top five invasive plant species were common reed (*Phragmites australis*), purple loosestrife, oriental bittersweet (*Celastrus orbiculatus*), multiflora rose (*Rosa multiflora*), and Japanese knotweed (*Polygonum cuspidatum*).

#### Wildlife and Fish Monitoring

Breeding bird surveys were most frequently conducted for forest birds (72 stations), followed by an equal number of stations monitoring grassland birds (63 stations), and marsh birds (63 stations, Figs. 4-7). Waterfowl surveys (62 stations) topped the list for migration surveys, followed by shorebirds (53 stations). Waterfowl also topped the list of winter bird surveys (49 stations), followed by raptors (22 stations). American woodcock (*Scolopax minor*) were surveyed at 34 stations. Thirty-three stations monitored upland game birds such as ruffed grouse (*Bonasa umbellus*), greater prairie chicken (*Tympanuchus cupido attwateri*), ring-necked pheasant (*Phasianus colchicus*), and wild turkey (*Meleagris gallopavo*).

Region 3 stations monitored eight T&E bird species, including bald eagle (*Haliaeetus leucocephalus*, 32 stations), whooping crane (*Grus americana*, 4 stations), common tern (*Sterna hirundo*, 3 stations), and Kirtland's warbler (*Dendroica kirtlandii*), piping plover (*Charadrius melodus*), and trumpeter swan (*Cygnus buccinator*, 2 stations each). Region 5 stations monitored 19 T&E bird species, with the bald eagle (32 stations), piping plover (18 stations), roseate tern (*Sterna dougallii*, 8 stations), and least tern (*Sterna antillarum*, 3 stations) topping the list. Mute swans (*Cygnus olor*) topped the list of exotic or pest bird species monitored (19 stations, both regions).

Ungulates topped the list of mammal surveys (32), followed by carnivores (23) and rodents (19, Fig. 8). The T&E mammal species surveyed included the gray wolf (*Canis lupus*), Indiana bat (*Myotis sodalists*), gray bat (*Myotis grisescens*), Delmarva Peninsula fox squirrel (*Sciurus niger cinereus*), Canada lynx (*Lynx Canadensis*), New England cottontail (*Sylvilagus transitionalis*, proposed for listing), and Virginia flying squirrel (*Glaucomys sabrinus fuscus*). Feral cats (5 stations), pigs (*Sus scrofa*, 3

stations), and nutria (*Myocastor coypus*, 3 stations) are also monitored.

Seventy-two stations conducted frog and toad (anuran) surveys, followed by freshwater turtle surveys (27 stations), salamanders (24 stations), and snakes (15 stations, Fig. 9). Five stations reported surveying vernal pools. Twelve T&E reptile and amphibian species were monitored across both Regions.

Freshwater fish surveys (37 stations) outnumbered estuarine fish surveys (7 stations). Only two stations monitored saltwater fish. Other fish surveys mentioned include research studies of salt marshes and food studies of seabirds. Fourteen T&E fish species were monitored, as well as seven exotic or pest taxa.

Forty stations conducted butterfly/moth surveys, followed by aquatic invertebrates (34 stations, Fig. 10). Fourteen T&E invertebrate species were monitored; the majority were unionid (freshwater) mussels (Unionidae). Seven exotic or pest invertebrate species were monitored, along with mosquitoes.

#### Standardized Surveys and Inventory Needs

Among the standardized regional and national surveys in which refuges participate, the Audubon Christmas Bird Count was the most frequent (61 stations), followed by FWS Duck Banding (34 stations), FWS Woodcock Singing Ground Survey (33 stations), the Mid-winter Waterfowl Survey (32 stations), and the FWS Abnormal Amphibian Monitoring (30 stations) (*Note: some refuges reported conducting National surveys, such as Woodcock Singing Ground Surveys, when the refuge was using the National protocol only to collect local data that were not submitted to the National monitoring effort.*) Refuges participated in a large number of additional standardized surveys, primarily state-sponsored surveys and some research projects.

One hundred seventeen stations reported that they lacked baseline biological inventory data. Those stations provided an impressive list of specific habitat, taxa, or area baseline inventory data that they need. This information is difficult to summarize because it was often listed very generally either by taxa (e.g. reptiles, amphibians, fish) or by habitat type (e.g. floodplain forest, aquatic). Taken together, these responses indicate a high level of unmet biological inventory needs in both regions.

## Discussion

The very high response rate for our survey gives us confidence that the results accurately represent what is currently inventoried and monitored at refuges in the two Regions. The number of reporting units in our survey was comparable with 69 reporting units for Region 3 and 73 reporting units for Region 5 in the 2005 Refuge Annual Performance Plan Database (RAPP) (U.S. Fish and Wildlife Service 2005b). Our survey had fewer reporting units than RAPP partly because more stations reported as a group rather than individually.

Our survey results were also comparable with the large number of inventory and monitoring surveys refuges reported in the 2005 RAPP. Thirty stations in the two Regions reported having approved inventory and monitoring plans, an additional 104 stations plan to complete them (U.S. Fish and Wildlife Service 2005b; Knutson et al. 2006). The large majority of stations in both regions conducted population monitoring. A whopping 1,387 inventory and monitoring surveys were conducted on refuges in Regions 3 and 5 in 2005 and 106 populations had targeted population goals defined in an approved plan. In addition, 429 research studies were conducted in 2005 in both regions, not including T&E species, water quality, or contaminant studies. However, our survey provided more details about the specific taxa and habitats refuges are monitoring than RAPP.

Overall, most monitoring focused on water levels, grasslands, freshwater marshes, forests, invasive plants, breeding bird surveys of forest, grassland, marsh birds and bald eagles, migration surveys of waterfowl and shorebirds, and winter bird surveys of waterfowl. Frog and toad surveys were also popular, along with standardized surveys like the Christmas Bird Count, Duck Banding, Woodcock Singing Ground Survey, Mid-winter Waterfowl Survey, and Abnormal Amphibian Monitoring. The current projects undertaken by the Biological Monitoring Team (BMT) will address some needs associated with these frequently-conducted surveys. The BMT is currently working to have standardized protocols and well-designed and managed databases for marsh birds and landbirds (including forest, shrub, and grassland birds), and a database for managing water level monitoring data (Knutson et al. 2005). We anticipate that our survey results will be useful for evaluating future

proposals for monitoring and research on refuges, if the intent is to conduct work of interest to a large number of refuges. We can also identify which refuges may have an interest in specific projects, based on their past biological monitoring activities.

Our survey results indicate that technical and science support for current monitoring activities can be justified for baseline inventories, habitat monitoring of grasslands, freshwater marshes, and forests, monitoring of invasive species, breeding forest, grassland, and marsh birds, migrating waterfowl and shorebirds, wintering waterfowl, and amphibians. Justification could be made for many other I&M needs as well, but these activities were simply the most frequent in the two Regions.

If we put the inventory and monitoring activities of refuges in context with other challenges facing the NWRS, including flat budgets and the expected wave of staff retirements over the next 10 years, it seems unavoidable that refuges will need to set priorities for inventory and monitoring that match the available resources. Even though some of the biological surveys we report were conducted by volunteers or other agencies, refuges still must prepare Comprehensive Conservation Plans (CCP), Habitat Management Plans (HMP), and Inventory and Monitoring Plans (IMP), train and supervise volunteers or contractors, process special use permits, manage the refuge biological databases, arrange for analysis and reporting of refuge biological data, and incorporate information derived from biological surveys into management decisions. Managing this process for just one carefully planned and implemented survey on a refuge can be daunting; refuges are typically managing, on average, about 10 surveys per year. It follows that refuges will need to work together in the future to leverage available resources for monitoring activities and take advantage of the breadth of experienced biologists from all FWS programs, the specialized services of statisticians, database managers, and taxonomic and habitat specialists.

Some important information about monitoring was beyond the scope of this survey. We did not evaluate how refuges are using the data to evaluate achievement of objectives or guide refuge management decisions. We did not gather information relative to the quality or

efficiency of existing data collection efforts to address management needs. These are important questions that will guide the BMT in providing technical assistance for monitoring programs.

### Future Monitoring Needs

One purpose of conducting the survey was to clarify refuge needs for technical and scientific support for monitoring (Goal 1 in the Strategic Plan). However, knowledge of past monitoring activities cannot address the important question of what refuges should be monitoring five to ten years into the future.

Monitoring is not an end in itself; the ultimate goal of most resource managers is to continually improve management actions and decisions to achieve specific conservation goals and objectives through a process called adaptive management (Schreiber et al. 2004; U.S. Department of the Interior 2006). Monitoring is a critical component of adaptive management. Although most resource managers and biologists embrace the concept of adaptive management, few have fully implemented it on the ground. Therefore, we need to identify the habitats, taxa, and native systems that are conservation targets on refuges and other conservation lands as well as define an adaptive management process that uses monitoring as a way to evaluate progress towards specific objectives.

Decisions about what to monitor are integral to the planning process. Such decisions will need to incorporate both a 'bottom-up' approach of examining refuge purposes, major plant community types, and T&E species as well as a 'top-down' approach examining the context within which a refuge operates. There are expectations from partners and the conservation community that refuges will participate in national, regional, and state monitoring efforts. How does a refuge decide what monitoring takes priority and which national, regional, and state monitoring programs to participate in? Is there a way to engage partners, such as the state Bird Conservation Initiatives, to help with monitoring?

Guidance on conservation planning and developing habitat management goals and objectives is available from a number of sources (Groves 2003; Adamcik et al. 2004; Noss 2004; Tear et al. 2005) (U.S. Fish and Wildlife Service 2002, 2005a). It is beyond the scope of this report to define a landscape-scale conservation planning

process for refuges. However, the U.S. Fish and Wildlife Service recently adopted an approach to landscape scale conservation planning, Strategic Habitat Conservation (SHC) (NEAT 2006). Refuge case studies will likely be needed to demonstrate the full cycle of adaptive management decision-making on the ground and test the assumption that adaptive management is a self-sustaining process that is practical to implement within the existing resources of the NWRS. Conservation planning and clarifying conservation goals and objectives is an important first step.

Clues to future needs may be found in the completed CCPs, HMPs, and IMPs in both regions, but questions will remain. Do the completed plans comprise a representative sample of all refuges in the Region? Are they outdated? Do the existing plans incorporate enough 'top-down' conservation planning, given the dearth of landscape scale conservation guidance available for taxa other than birds? Do the existing plans outline a prioritization process that will ultimately focus refuge monitoring effort on a few high-priority needs? Are there budget estimates for the highest priority objectives so that the NWRS can clarify the budget requirements associated with their plans? Both Regions will need to develop a process for prioritizing their monitoring needs and identifying areas where technical assistance is needed.

Our hope is that the information from this report and the future vision and scoping activities underway in both Regions will result in timely technical support for biological monitoring on refuges in Regions 3 and 5 over the next 5 years. The BMT is ready to assist as needed in this process.

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**Percentage of Stations Conducting Abiotic Surveys or Monitoring by Type**

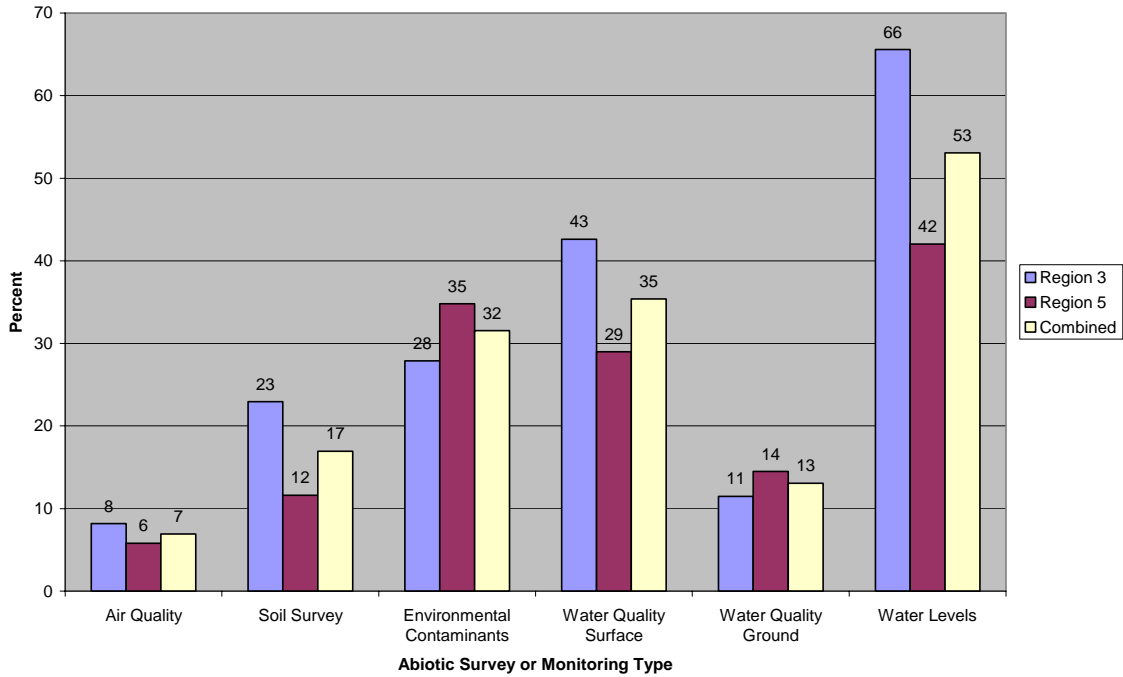


Figure 1. Percentage of stations conducting abiotic surveys or monitoring by type.

**Percentage of Stations Conducting Habitat Surveys by Type**

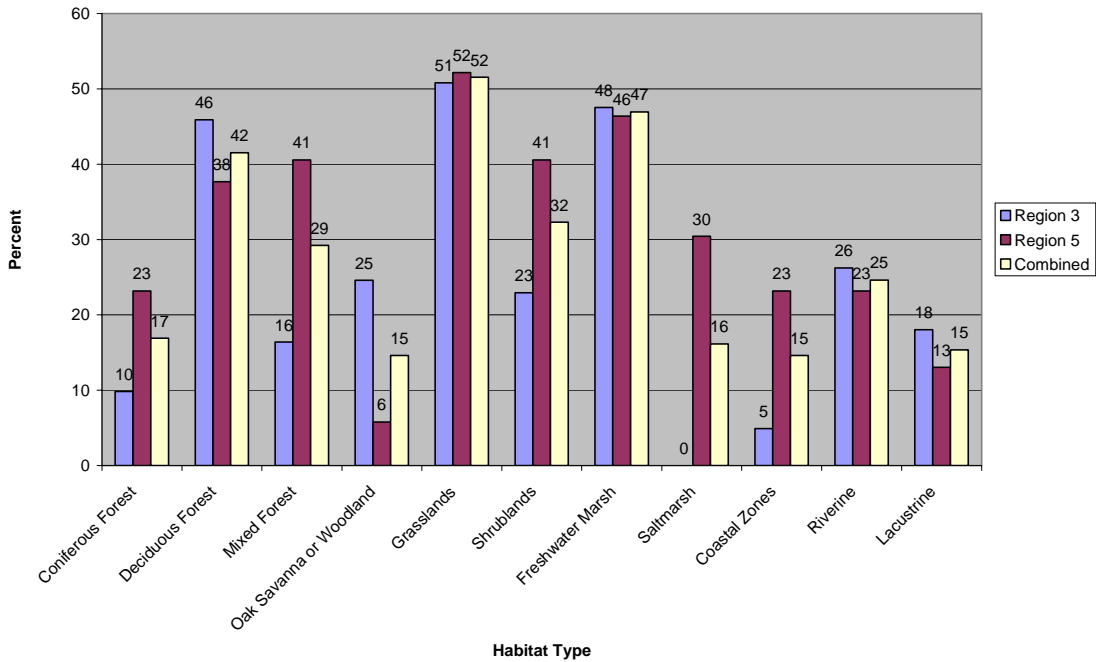


Figure 2. Percentage of stations conducting habitat surveys by type.



### Invasive Plant Species Survey and Monitoring

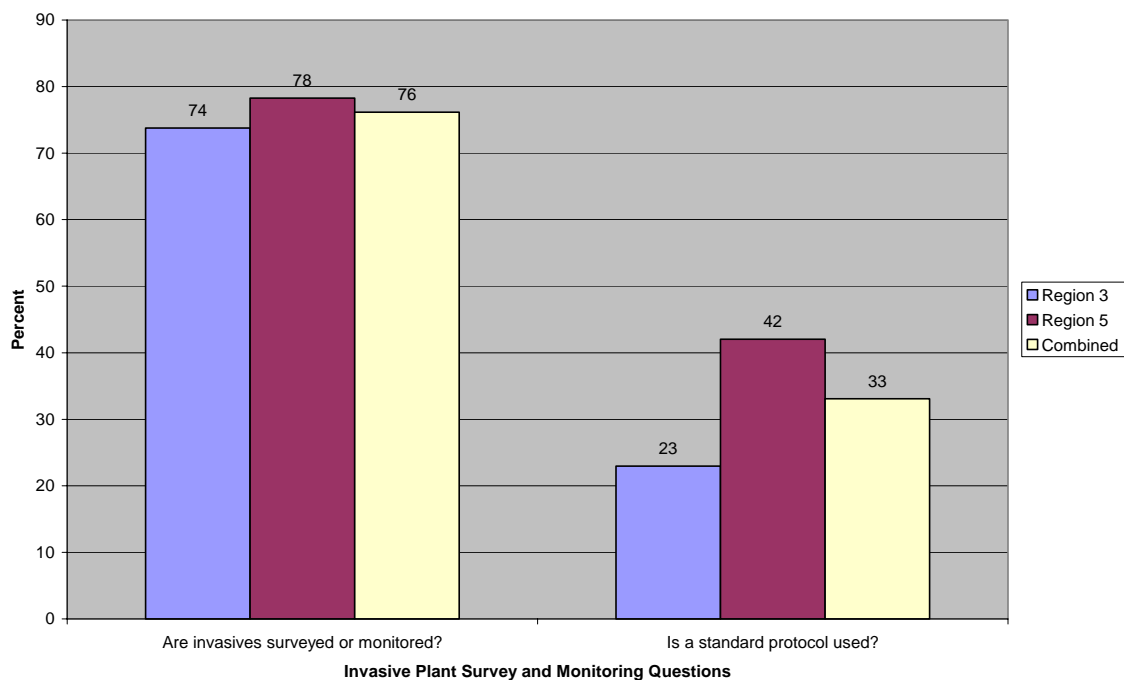


Figure 3. Invasive plant species survey and monitoring activities.

### Percentage of Stations Conducting Breeding Bird Surveys by Type

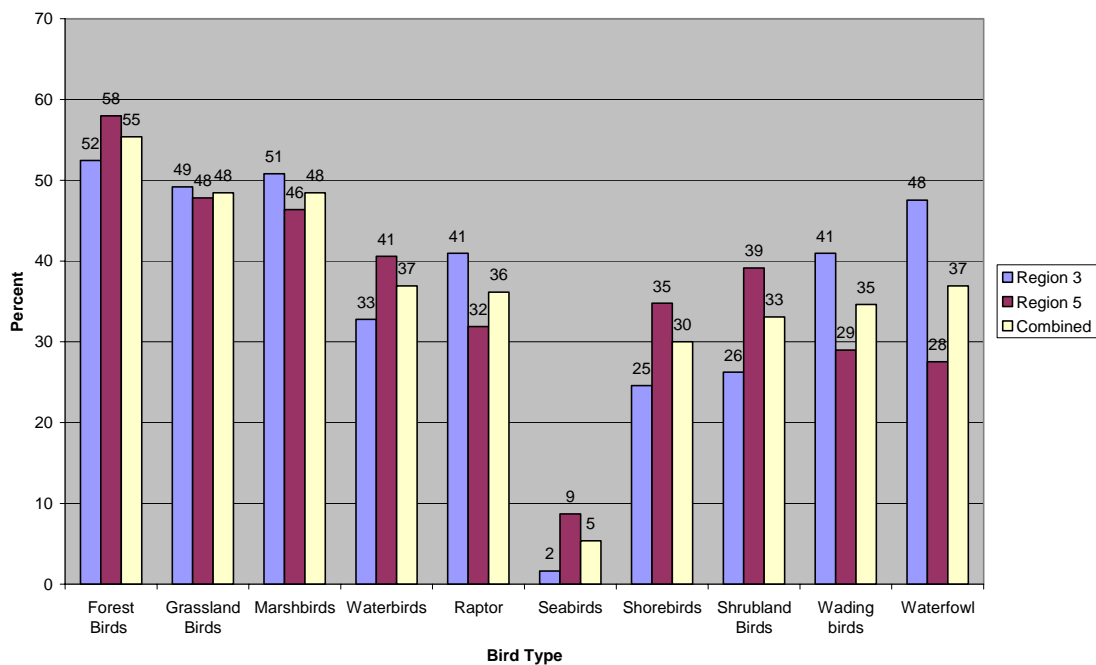


Figure 4. Percentage of stations conducting breeding bird surveys by type.

Percentage of Stations Conducting Migrating Bird Surveys by Type

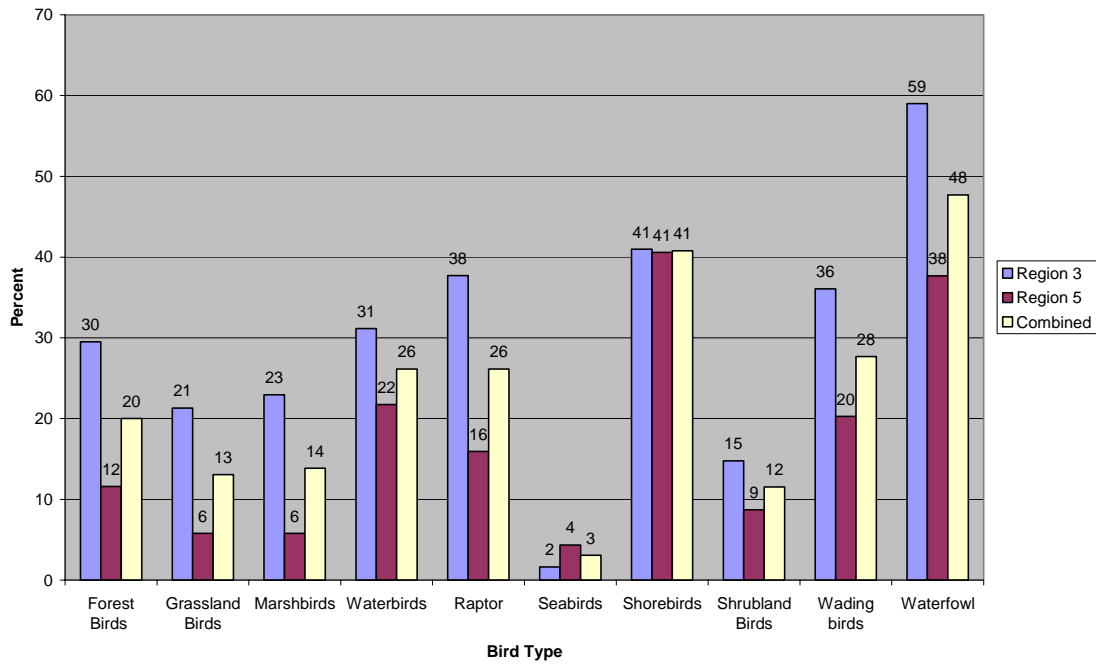


Figure 5. Percentage of stations conducting migrating bird surveys by type.

Percentage of Stations Conducting Wintering Bird Surveys by Type

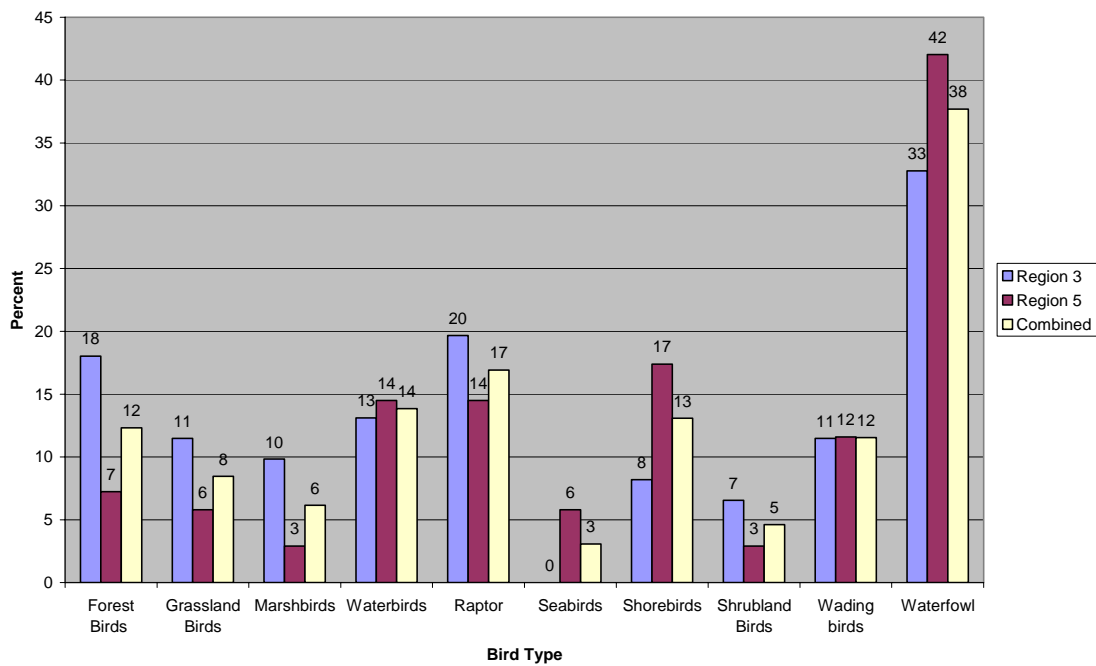


Figure 6. Percentage of stations conducting wintering bird surveys by type.

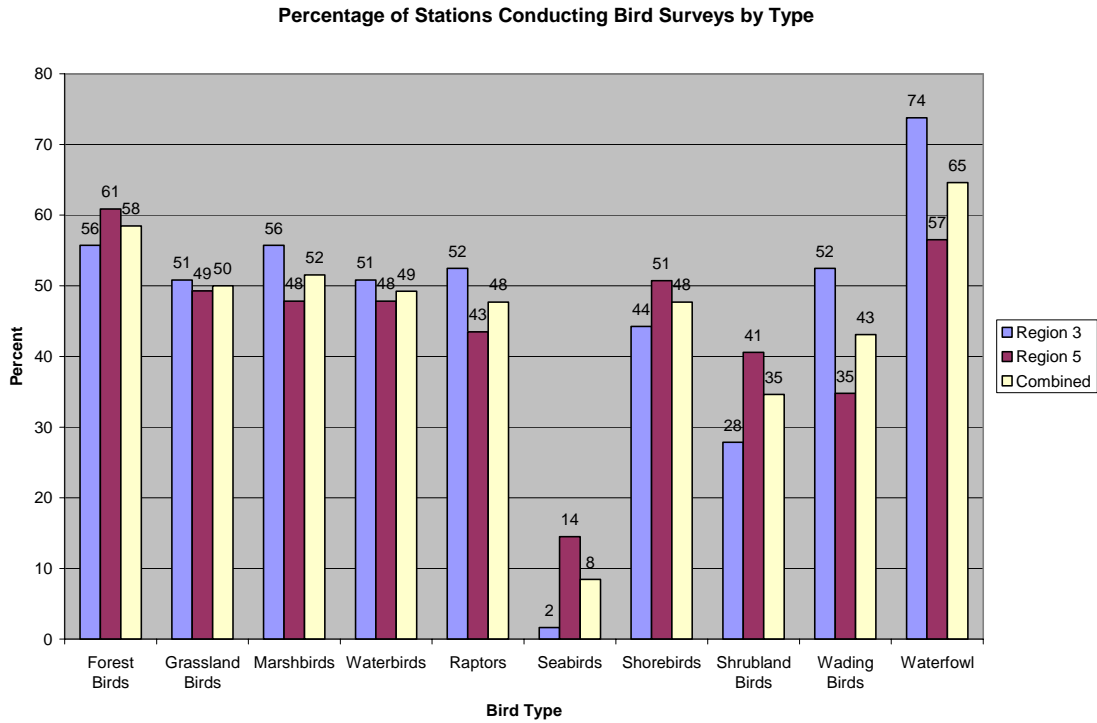


Figure 7. Percentage of stations conducting all bird surveys by type.

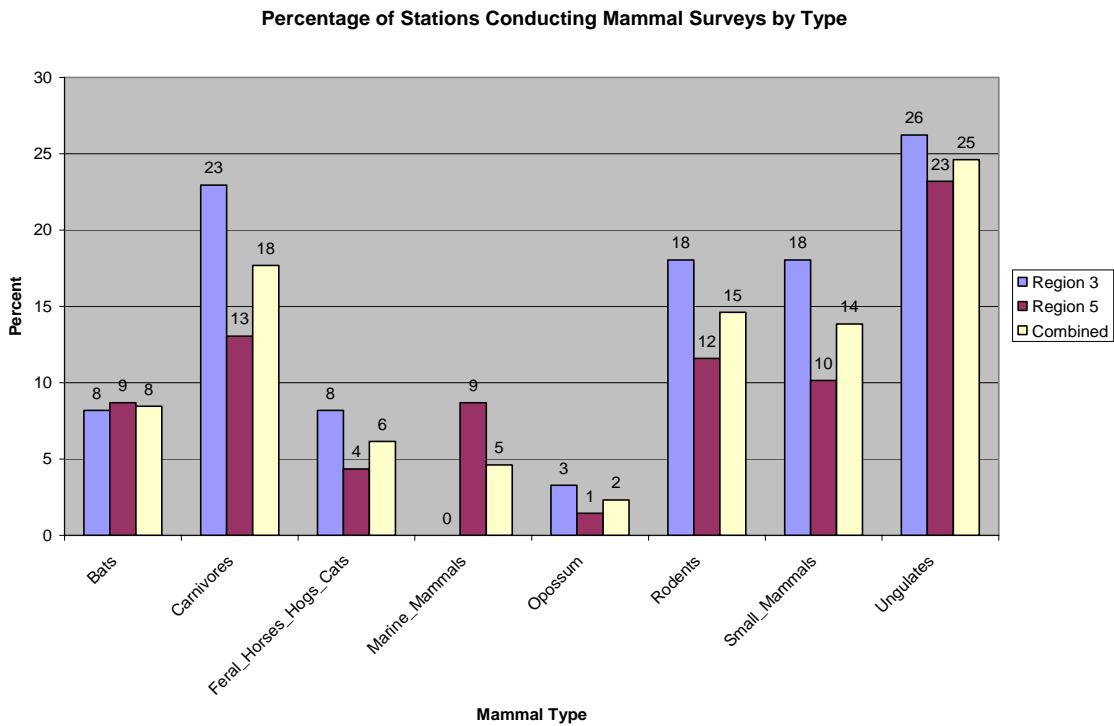


Figure 8. Percentage of stations conducting mammal surveys by type.

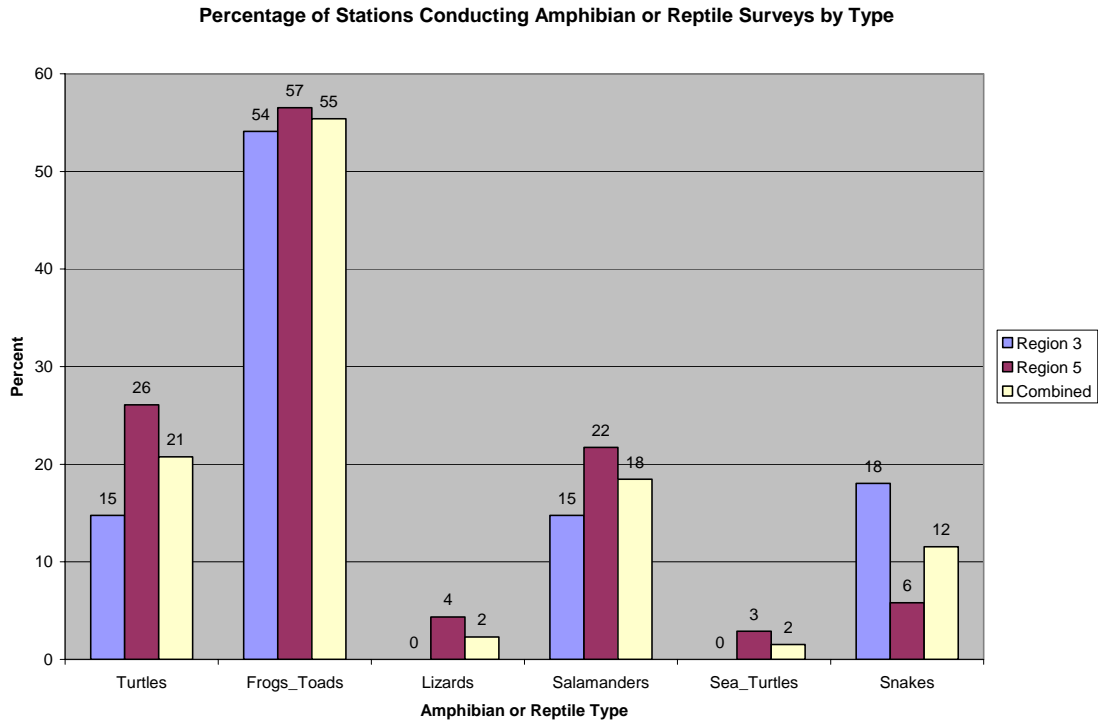


Figure 9. Percentage of stations conducting amphibian or reptile surveys by type.

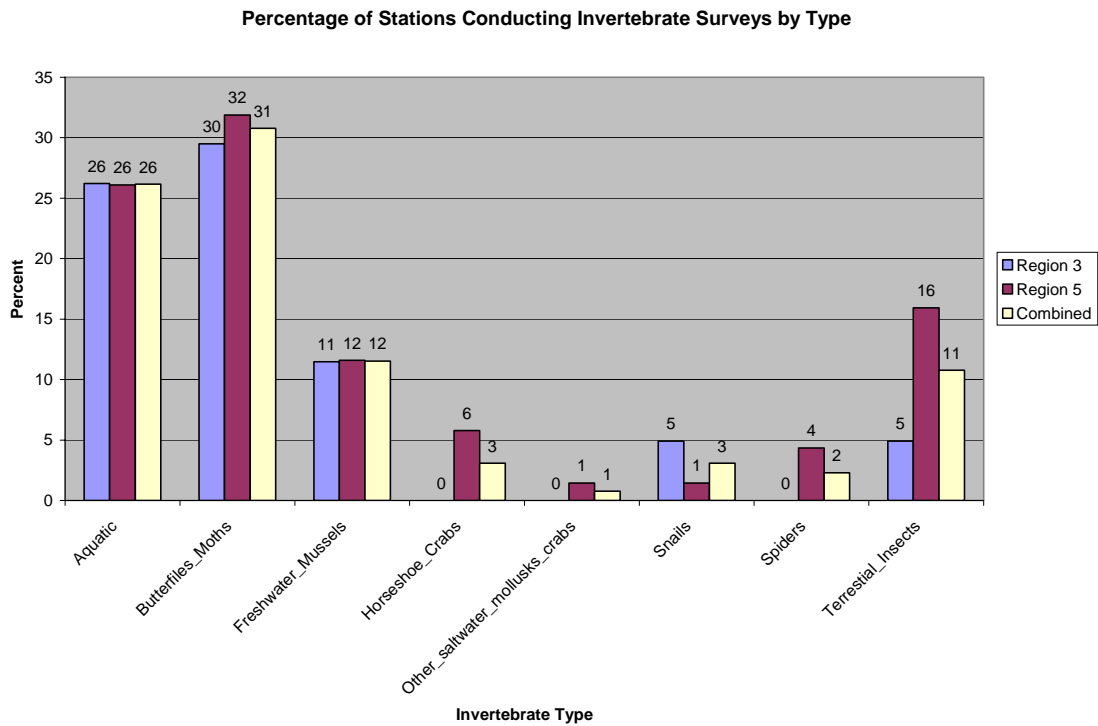


Figure 10. Percentage of stations conducting invertebrate surveys by type.

## Appendix A. Regions 3 & 5 Inventory & Monitoring Activities Questionnaire

This Inventory and Monitoring questionnaire focuses on the types of biological surveys currently being conducted on refuges and wetland management districts in Regions 3 & 5. Your input is critical and will help the BMT prioritize projects to meet your needs.

We are requesting one response per refuge or wetland management district. If your station is part of a refuge complex, please complete a survey for each refuge within the complex. Managers should assign the most appropriate staff to complete the survey. In your responses, please include all surveys that have been conducted at least once in the last 3 years at your station by refuge staff, volunteers, or other partners (EPA, USGS, States, etc.). The majority of the questionnaire addresses monitoring; there is one question about baseline inventories. An inventory is the use of accepted biological methods to determine the presence, relative abundance, and/or distribution of species; monitoring is the use of accepted biological methods to determine the status and/or demographics of species over time (701 FW 2). A standard monitoring protocol is a procedure used by numerous refuges, agencies or organizations that has gone through peer review and is generally accepted as a scientifically defensible monitoring program for the given objective.

If you are unsure of what category a species belongs to, indicate that species in the 'Other' category box. You may skip questions that are not applicable to your station. Use the 'Back' button on your browser to go back to a previous page. However, if you go back, any data already entered on the current page will need to be entered again. The questionnaire must be completed in one session; you can't close it and come back later. The questionnaire can be completed in approximately 20-30 minutes.

If you have any questions or comments regarding this questionnaire, please contact Melinda Knutson at: Melinda\_Knutson@fws.gov or (608) 781-6339 or Todd Sutherland at: Todd\_Sutherland@fws.gov or (608) 781-6263. Your feedback is very important. Thanks for your help!

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1) Enter your name (optional):

2) Please identify your region:

Region 3

Region 5

3) Please choose your Refuge or Wetland Management District:  
Drop down list of all R3/R5 Refuges and WMDs.  
This list was created from corporate master table (CMT) database.

### ABIOTIC SURVEYS

4) Are air quality surveys conducted at your station?

YES NO

5) Are soil surveys conducted at your station?

YES NO

6) Are environmental contaminants monitored at your station?

YES NO

7) If water quality surveys are conducted at your station, indicate surface and/or ground water below:

Surface Water

Ground Water

8) Are water levels monitored at your station?

YES NO

### HABITAT AND PLANT SURVEYS

9) Are habitat or plant surveys conducted at your station?

YES NO

10) Select the major habitat types that are surveyed at your station:

Coniferous Forest

Deciduous Forest

Mixed Forest

Oak Savanna or Woodland Forest

Grasslands

Shrublands

Freshwater Marsh

Saltmarsh

Coastal Zones (beaches, dunes, ocean habitats)  
Riverine (rivers and associated terrestrial habitats)  
Lacustrine (lakes and associated terrestrial habitats)  
Other, please specify (50 characters or less)

11) List all threatened and endangered plant species that are surveyed or monitored at your station (3500 characters or less):

12) Are invasive plant species surveyed or monitored at your station?  
YES NO

13) List the top 5 invasive plant species that are surveyed or monitored at your station (50 characters or less per item):

14) Are standardized protocols used to survey or monitor invasive plant species at your station? If yes, indicate the protocols used in the text box below (50 characters or less):  
YES NO  
Protocols used:

## WILDLIFE SURVEYS

15) Select all forest bird surveys conducted at your station:  
Breeding  
Migrating  
Wintering  
Other, please specify (50 characters or less)

16) Are upland game birds surveyed at your station?  
YES NO

17) List the upland game bird species that are surveyed or monitored at your station (3500 characters or less):

18) Select all grassland bird surveys conducted at your station:  
Breeding  
Migrating  
Wintering  
Other, please specify (50 characters or less)

19) Select all marshbird surveys conducted at your station:  
Breeding

Migrating  
Wintering  
Other, please specify (50 characters or less)

20) Select all waterbird surveys (loons, inland gulls, terns) conducted at your station:  
Breeding  
Migrating  
Wintering  
Other, please specify (50 characters or less)

21) Select all raptor surveys conducted at your station:  
Breeding  
Migrating  
Wintering  
Other, please specify (50 characters or less)

22) Select all seabird surveys conducted at your station:  
Breeding  
Migrating  
Wintering  
Other, please specify (50 characters or less)

24) Select all shorebird surveys conducted at your station:  
Breeding  
Migrating  
Wintering  
Other, please specify (50 characters or less)

25) Select all shrubland bird surveys conducted at your station:  
Breeding  
Migrating  
Wintering  
Other, please specify (50 characters or less)

26) Select all wading bird surveys conducted at your station:  
Breeding  
Migrating  
Wintering  
Other, please specify (50 characters or less)

27) Select all waterfowl surveys conducted at your station:  
Breeding  
Migrating  
Wintering  
Other, please specify (50 characters or less)

28) List all threatened and endangered bird species that are surveyed or monitored at your station (3500 characters or less):

29) List all exotic or pest bird species that are surveyed or monitored at your station (3500 characters or less):

30) Select all mammal surveys conducted at your station:

Bats

Carnivores (Bear, Coyote, Fisher, Marten, Mink, Raccoon)

Feral Horses/Hogs/Cats

Marine Mammals

Opossum

Rodents (Beaver, Squirrel, Muskrat, Nutria)

Small Mammals

Ungulates (Deer, Elk, Moose)

Other, please specify (50 characters or less)

31) List all threatened and endangered mammal species that are surveyed or monitored at your station (3500 characters or less):

32) List all exotic or pest mammal species that are surveyed or monitored at your station (3500 characters or less):

33) Select all amphibian or reptile surveys conducted at your station:

Freshwater Turtles

Frogs/Toads

Lizards

Salamanders

Sea Turtles

Snakes

Other, please specify (50 characters or less)

34) List all threatened and endangered amphibian and reptile species that are surveyed or monitored at your station (3500 characters or less):

35) List all exotic or pest amphibian or reptile species that are surveyed or monitored at your station (3500 characters or less):

36) Select all fish surveys conducted at your station:

Estuarine Fish

Freshwater Fish

Saltwater Fish

Other, please specify (50 characters or less)

37) List all threatened and endangered fish species that are surveyed or monitored at your station (3500 characters or less):

38) List all exotic or pest fish species that are surveyed or monitored at your station (3500 characters or less):

39) Select all invertebrate surveys conducted at your station:

Aquatic Invertebrates

Butterflies/Moths

Freshwater Mussels

Horseshoe Crabs

Other Saltwater Mollusks or Crustaceans

Snails

Spiders

Terrestrial Insects

Other, please specify (50 characters or less)

40) List all threatened and endangered invertebrate species that are surveyed or monitored at your station (3500 characters or less):

41) List all exotic or pest invertebrate species that are surveyed or monitored at your station (3500 characters or less):

42) Please select all regional or national surveys that your staff participate in (either on or off station). Include a survey only if you are using a standardized protocol and the data is submitted to the sponsoring agency or organization for analysis:

FWS Waterfowl Breeding Population and Habitat Survey (aerial survey transects)

FWS Mid-Winter Waterfowl Survey

FWS 4 Square Mile Surveys (Waterfowl)

FWS July Duck Production Survey

FWS Duck Banding

FWS Woodcock Singing - Ground Survey

FWS Mourning Dove Call - Count Survey

USGS Breeding Bird Survey (road survey of breeding landbirds)

USGS Breeding Biology Research and Monitoring Database (BBIRD)

Breeding Bird Atlas (States)

Audubon Christmas Bird Count

Monitoring Avian Productivity and Survivorship (MAPS)

National Marsh Bird Monitoring and Research Program  
International Shorebird Survey (ISS)  
FWS Abnormal Amphibian Monitoring  
North American Amphibian Monitoring Program (States)

43) List any additional regional or national surveys that your staff participate in (on or off station), that use a standardized protocol and the data is submitted to the sponsoring agency or

organization for analysis (3500 characters or less):

44) Do you lack current baseline biological inventory data for any habitats, taxa, or areas at your station?

YES NO

45) If yes, please list the current habitat, taxa, or area data needed at your station (3500 characters or less):



**Appendix B. Summary of Field Station Response to Inventory and Monitoring Activities Questionnaire.**

RPTORGCODE <sup>1</sup>	ORGCODE <sup>2</sup>	ORGNAME <sup>3</sup>	ORGTTYPE <sup>4</sup>	Rpt_Code <sup>5</sup>	Group_Report <sup>6</sup>
33030	32510	AGASSIZ NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33621	33623	BATCHTOWN DIVISION	REFUGE ADMINISTRATIVE OFFICE	3	Two Rivers
32030	33590	BIG MUDDY NATIONAL FISH AND WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
31530	31531	BIG OAKS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33030	32640	BIG STONE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32640	32641	BIG STONE WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
33630	33633	BIG TIMBER DIVISION	REFUGE ADMINISTRATIVE OFFICE	3	Port Louisa
33621	33622	CALHOUN DIVISION	REFUGE ADMINISTRATIVE OFFICE	3	Two Rivers
33663	33661	CAMERON-BILLSBACH UNIT	REFUGE ADMINISTRATIVE OFFICE	3	Illinois River
31540	31541	CEDAR POINT NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33663	33660	CHAUTAQUA NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	3	Illinois River
33640	33643	CLARENCE CANNON NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32030	33610	CRAB ORCHARD NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32560	32565	CRANE MEADOWS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32030	32630	CYPRESS CREEK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33640	33642	DELAIR DIVISION	REFUGE ADMINISTRATIVE OFFICE	3	Great River
32030	33510	DESOTO NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33030	32586	DETROIT LAKES WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
31520	31521	DETROIT RIVER INTERNATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32595	32598	DRIFTLESS AREA NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33663	33664	EMIQON NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	3	Illinois River
33030	32585	FERGUS FALLS WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
32520	32524	FOX RIVER NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33640	33641	GARDNER DIVISION	REFUGE ADMINISTRATIVE OFFICE	3	Great River
33621	33624	GILBERT LAKE DIVISION	REFUGE ADMINISTRATIVE OFFICE	3	Two Rivers
32583	32580	GLACIAL RIDGE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32520	32521	GRAVEL ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33620	33640	GREAT RIVER NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	4	Great River
32520	32522	GREEN BAY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33030	32600	HAMDEN SLOUGH NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
31510	31512	HARBOR ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
31030	32520	HORICON NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
31510	31511	HURON NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32030	33663	ILLINOIS RIVER NATIONAL WILDLIFE AND FISHERY REFUGES	REFUGE ADMINISTRATIVE OFFICE	4	Illinois River
33580	33581	IOWA WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
33630	33632	KEITHSBURG DIVISION	REFUGE ADMINISTRATIVE OFFICE	3	Port Louisa
31510	31513	KIRTLANDS WARBLER WILDLIFE MANAGEMENT AREA	NATIONAL WILDLIFE REFUGE	1	
31030	32525	LEOPOLD WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
33030	32588	LITCHFIELD WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
33630	33631	LOUISA DIVISION	REFUGE ADMINISTRATIVE OFFICE	3	Port Louisa
32030	33620	MARK TWAIN NATIONAL WILDLIFE REFUGE	REFUGE ADMINISTRATIVE OFFICE	1	
33663	33662	MEREDOSIA NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	3	Illinois River
31520	31522	MICHIGAN ISLANDS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
31730	31731	MICHIGAN WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
33620	33680	MIDDLE MISSISSIPPI RIVER NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32540	32541	MILLE LACS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32030	33540	MINGO NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	4	Mingo
33030	32590	MINNESOTA VALLEY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32590	32591	MINNESOTA VALLEY WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
33030	32581	MORRIS WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	

RPTORGCODE <sup>1</sup>	ORGCODE <sup>2</sup>	ORGNAME <sup>3</sup>	ORGTTYPE <sup>4</sup>	Rpt_Code <sup>5</sup>	Group_Report <sup>6</sup>
31030	31530	MUSCATATUCK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33030	33670	NEAL SMITH NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
31030	32530	NECEDAH NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32640	32645	NORTHERN TALLGRASS PRAIRIE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	2	
31030	31540	OTTAWA NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33540	33541	OZARK CAVEFISH NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	3	Mingo
31030	31560	PATOKA RIVER NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33540	33542	PILOT KNOB NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	3	Mingo
33620	33630	PORT LOUISA NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	4	Port Louisa
33030	32540	RICE LAKE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32540	32542	RICE LAKE NATIONAL WILDLIFE REFUGE-SANDSTONE UNIT	REFUGE ADMINISTRATIVE OFFICE	1	
32566	32583	RYDELL NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
31030	31510	SENEY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33030	32560	SHERBURN NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
31030	31520	SHIAWASSEE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32030	33560	SQUAW CREEK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33030	32577	ST. CROIX WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
32030	33570	SWAN LAKE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33030	32560	TAMARAC NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	4	Tamarac
32560	32561	TAMARAC WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	3	Tamarac
32579	32578	TREMPEALEAU NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33620	33621	TWO RIVERS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	4	Two Rivers
33030	33580	UNION SLOUGH NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
32030	32579	UPPER MISSISSIPPI RIVER NATIONAL WILDLIFE AND FISH REFUGE	NATIONAL WILDLIFE REFUGE	4	Upper Miss
32579	32572	UPPER MISSISSIPPI RIVER NATIONAL WILDLIFE AND FISH REFUGE-LA CROSSE DISTRICT	REFUGE ADMINISTRATIVE OFFICE	3	Upper Miss
32579	32595	UPPER MISSISSIPPI RIVER NATIONAL WILDLIFE AND FISH REFUGE-MCGREGOR DISTRICT	REFUGE ADMINISTRATIVE OFFICE	3	Upper Miss
32579	32576	UPPER MISSISSIPPI RIVER NATIONAL WILDLIFE AND FISH REFUGE-SAVANNA DISTRICT	REFUGE ADMINISTRATIVE OFFICE	3	Upper Miss
32579	32574	UPPER MISSISSIPPI RIVER NATIONAL WILDLIFE AND FISH REFUGE-WINONA DISTRICT	REFUGE ADMINISTRATIVE OFFICE	3	Upper Miss
31540	31542	WEST SISTER ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
31030	32620	WHITTLESEY CREEK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
33030	32587	WINDOM WETLAND MANAGEMENT DISTRICT	WETLAND MANAGEMENT DISTRICT	1	
			No Report	0	
			Individual Station Reports	54	
			Group Station Reports	7	
			Potential Reporting Units	61	
			Total Reporting Units	61	
			Response Rate	100.00%	
			Included in multiple station submissions	1	
<sup>1</sup> Report to organization code = Official five-digit organization code of the next higher management organization to which another Service organization directly reports.					
<sup>2</sup> Organization code = Official five-digit code assigned to a Service organization where personnel are assigned, to all unstaffed land management units, or to meet an administrative requirement.					
<sup>3</sup> Organization Name = Official identifying name of a Service organization that has been assigned an official five-digit organization code.					
<sup>4</sup> Organization Type = Title that defines the type of organization by its primary facility functions and/or specialized duties and responsibilities.					
<sup>5</sup> Reporting Code = Numeric code identifying how field station reported to regional survey:					
0 = No report					
1 = Reported as individual station					
2 = No report, but included under a multiple station submission					
3 = No report, but included under group submission					
4 = Reported for a group					
<sup>6</sup> Group Report = Identifies a group name for stations included under a group submission					

RPTORGCODE <sup>1</sup>	ORGCODE <sup>2</sup>	ORGNAME <sup>3</sup>	ORGTTYPE <sup>4</sup>	Rpt_Code <sup>5</sup>	Group_Report <sup>6</sup>
52560	52562	AMAGANSETT NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50131	53630	AROOSTOOK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53510	53513	ASSABET RIVER NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50139	51510	BACK BAY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51530	51531	BLACKWATER NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53540	53541	BLOCK ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	51560	BOMBAY HOOK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50139	51630	CANAAN VALLEY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	52515	CAPE MAY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53532	53561	CARLTON POND WATERFOWL PRODUCTION AREA	TO BE CLASSIFIED	1	
50139	51530	CHESAPEAKE MARSHLANDS NATIONAL WILDLIFE REFUGE COMPLEX	REFUGE ADMINISTRATIVE OFFICE	2	
50139	51570	CHINCOTEAGUE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	4	Chincoteague
52560	52564	CONSCIENCE POINT NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53532	53535	CROSS ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50131	53510	EASTERN MASSACHUSETTS NATIONAL WILDLIFE REFUGE COMPLEX	REFUGE ADMINISTRATIVE OFFICE	2	
50139	51590	EASTERN NECK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50139	51660	EASTERN SHORE OF VIRGINIA NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50139	51620	EASTERN VIRGINIA RIVERS NATIONAL WILDLIFE REFUGE COMPLEX	REFUGE ADMINISTRATIVE OFFICE	2	
50134	52510	EDWIN B. FORSYTHE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	2	
52510	52512	EDWIN B. FORSYTHE NATIONAL WILDLIFE REFUGE-BARNEGAT DIVISION	REFUGE ADMINISTRATIVE OFFICE	1	
52510	52511	EDWIN B. FORSYTHE NATIONAL WILDLIFE REFUGE-BRIGANTINE DIVISION	REFUGE ADMINISTRATIVE OFFICE	1	
52560	52566	ELIZABETH ALEXANDRA MORTON NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	52520	ERIE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51600	51612	FEATHERSTONE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51650	51651	FISHERMAN ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53532	53536	FRANKLIN ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50131	53570	GREAT BAY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	0	
50139	51580	GREAT DISMAL SWAMP NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53510	53511	GREAT MEADOWS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	52530	GREAT SWAMP NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	52540	IROQUOIS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51620	51621	JAMES RIVER NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53540	53547	JOHN H. CHAFEE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53570	53571	JOHN HAY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	0	
50134	52570	JOHN HEINZ NATIONAL WILDLIFE REFUGE AT TINICUM	NATIONAL WILDLIFE REFUGE	1	
50131	53580	LAKE UMBAGOG NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	52560	LONG ISLAND NATIONAL WILDLIFE REFUGE COMPLEX	REFUGE ADMINISTRATIVE OFFICE	2	
50131	53532	MAINE COASTAL ISLANDS NATIONAL WILDLIFE REFUGE	REFUGE ADMINISTRATIVE OFFICE	1	
51530	51540	MARTIN NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53510	53518	MASHPEE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51600	51610	MASON NECK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53510	53517	MASSASOIT NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50131	53520	MISSISQUOI NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53510	53514	MONOMOY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	52550	MONTEZUMA NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50131	53530	MOOSEHORN NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51580	51581	NANSEMOND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53510	53515	NANTUCKET NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53540	53542	NINIGRET NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53510	53516	NOMANS LAND ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51600	51611	OCCOQUAN BAY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50139	51660	OHIO RIVER ISLANDS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	

RPTORGCODE <sup>1</sup>	ORGCODE <sup>2</sup>	ORGNAME <sup>3</sup>	ORGTTYPE <sup>4</sup>	Rpt_Code <sup>5</sup>	Group_Report <sup>6</sup>
53510	53512	OXBOW NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
52560	52563	OYSTER BAY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50131	53550	PARKER RIVER NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	4	Parker River
50139	51640	PATUXENT RESEARCH REFUGE	NATIONAL WILDLIFE REFUGE	1	
53532	53533	PETIT MANAN NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51510	51512	PLUM TREE ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53532	53537	POND ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50139	51600	POTOMAC RIVER NATIONAL WILDLIFE REFUGE COMPLEX	REFUGE ADMINISTRATIVE OFFICE	2	
51620	51623	PRESQUILE NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	51560	PRIME HOOK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50131	53563	RACHEL CARSON NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51620	51622	RAPPAHANNOCK RIVER VALLEY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50131	53540	RHODE ISLAND NATIONAL WILDLIFE REFUGE COMPLEX	REFUGE ADMINISTRATIVE OFFICE	0	
53540	53543	SACHUEST POINT NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53540	53544	SALT MEADOW NATIONAL WILDLIFE REFUGE	REFUGE ADMINISTRATIVE OFFICE	0	
53532	53534	SEAL ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
52560	52565	SEATUCK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
52610	52611	SHAWANGUNK GRASSLANDS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50131	53590	SILVIO O. CONTE NATIONAL FISH AND WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	4	Silvio O. Conte
53590	53591	SILVIO O. CONTE NATIONAL FISH AND WILDLIFE REFUGE-NULHEGAN BASIN DIVISION	REFUGE ADMINISTRATIVE OFFICE	3	Silvio O. Conte
50134	52650	ST. LAWRENCE WETLANDS AND GRASSLAND MANAGEMENT DISTRICT	REFUGE ADMINISTRATIVE OFFICE	1	
50131	53546	STEWART B. MCKINNEY NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53532	53560	SUNKHAZE MEADOWS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	52571	SUPAWNA MEADOWS NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51530	51532	SUSQUEHANNA NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	0	
52560	52568	TARGET ROCK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
53560	53564	THACHER ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	3	Parker River
53540	53545	TRUSTOM POND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
50134	52610	WALLKILL RIVER NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
51570	51571	WALLOPS ISLAND NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	3	Chincoteague
53570	53572	WAPACK NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	0	
52560	52561	WERTHEIM NATIONAL WILDLIFE REFUGE	NATIONAL WILDLIFE REFUGE	1	
			No Report	6	
			Individual Station Reports	66	
			Group Station Reports	3	
			Potential Reporting Units	75	
			Total Reporting Units	69	
			Response Rate	92.00%	
			Included in multiple station submissions	6	
<sup>1</sup> Report to organization code = Official five-digit organization code of the next higher management organization to which another Service organization directly reports.					
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<sup>3</sup> Organization Name = Official identifying name of a Service organization that has been assigned an official five-digit organization code.					
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3 = No report, but included under group submission					
4 = Reported for a group					
<sup>6</sup> Group Report = Identifies a group name for stations included under a group submission					

Appendix C. Summary of responses from the biological survey questionnaire.

<b>Abiotic Survey and Monitoring</b>	<b>Region 3 (N=61)</b>	<b>Region 5 (N=69)</b>	<b>Both Regions (N=130)</b>
Question 4: Are air quality surveys conducted at your station?	5	4	9
Question 5: Are soil surveys conducted at your station?	14	8	22
Question 6: Are environmental contaminants monitored at your station?	17	24	41
Question 7: If water quality surveys are conducted at your station, indicate surface and/or ground water below:			
Question 7: Surface Water	26	20	46
Question 7: Ground Water	7	10	17
Question 8: Are water levels monitored at your station?	40	29	69

<b>Habitat/Plant Survey and Monitoring</b>	<b>Region 3 (N=61)</b>	<b>Region 5 (N=69)</b>	<b>Both Regions (N=130)</b>
Question 9: Are habitat or plant surveys conducted at your station?	46	52	98
Question 10: Select the major habitat types that are surveyed at your station:			
Question 10: Coniferous Forest	6	16	22
Question 10: Deciduous Forest	28	26	54
Question 10: Mixed Forest	10	28	38
Question 10: Oak Savanna or Woodland Forest	15	4	19
Question 10: Grasslands	31	36	67
Question 10: Shrublands	14	28	42
Question 10: Freshwater Marsh	29	32	61
Question 10: Saltmarsh	0	21	21
Question 10: Coastal Zones (beaches, dunes, ocean habitats)	3	16	19
Question 10: Riverine (rivers and associated terrestrial habitats)	16	16	32
Question 10: Lacustrine (lakes and associated terrestrial habitats)	11	9	20
Question 12: Are invasive plant species surveyed or monitored at your station?	45	54	99
Question 14: Are standardized protocols used to survey or monitor invasive plant species at your station? If yes, indicate the protocols used in the text box below (50 characters or less):	14	29	43

<b>Q10 - Major Habitat Types "Other" (R3)</b>	<b>Total</b>
Bottomland hardwood	1
Cypress-tupelo swamp	1
Granite outcrops	1
Marsh vegetation for shorebird study	1

Sedge meadow	1
Wetland and associated uplands	1
<b>Q10 - Major Habitat Types "Other" (R5)</b>	<b>Total</b>
Coastal islands	2
Brackish marsh	1
Forest wetlands	1
Freshwater scrub/shrub wetlands	1
General habitat type - no composition	1
Invasives	1
Natural heritage areas	1
Natural research areas	1
Peat bog	1
Surveys for state listed rare plants	1
<b>Q11 - List T&amp;E plant species (R3)</b>	<b>Total</b>
Platanthera praeclara (western prairie fringed orchid)	4
Lespedeza leptostachya (prairie bush-clover)	3
Boltonia decurrens (decurent false aster)	2
Aconitum noveboracense (northern monkshood)	1
Escobaria vivipara (ball cactus, spinystar)	1
Iris lacustris (dwarf lake iris)	1
Platanthera leucophaea (eastern prairie fringed orchid)	1
Trifolium stoloniferum (running buffalo clover)	1
<b>Q11 - List T&amp;E plant species (R5)</b>	<b>Total</b>
Amaranthus pumilus (Seabeach amaranth)	3
Helonias bullata (swamp pink)	3
Aeschynomene virginica (sensitive joint-vetch)	2
Agalinis acuta (sandplain gerardia)	2
Arethusa bulbosa (swamp-pink)	2
Cirsium horridulum (yellow thistle)	2
Acorus americanus (sweetflag)	1
Aletris farinosa (white colicroot)	1
Aristida longispica (slimspike threeawn)	1
Aristida tuberculosa (seaside threeawn)	1
Astragalus robbinsii var. jesupii (jesup's milk-vetch)	1
Cypripedium reginae (showy lady's slipper)	1
Eleocharis tenuis (slender spikerush)	1
Epilobium strictum (downy willowherb)	1
Lilium philadelphicum (wood lily)	1
Lonicera oblongifolia (swamp fly honeysuckle)	1
Platanthera ciliaris (yellow fringed orchid)	1
Platanthera hyperborea (northern green orchid)	1
Poa saltuensis (oldpasture bluegrass, drooping bluegrass)	1
Polygala cruciata (drumheads)	1
Polygala verticillata (whorled milkwort)	1
Sabatia dodecandra (marsh rose gentian, marsh pink)	1
Sabatia stellaris (rose of Plymouth)	1
Scirpus ancistrochaetus (northeastern bulrush)	1
Scleria pauciflora (fewflower nutrush)	1

Scleria triglomerata (whip nutrush)	1
Sorbus decora (northern mountain ash)	1
Sorghastrum nutans (yellow indian-grass)	1
Spiranthes vernalis (upland ladiestresses)	1
Stachys hyssopifolia (hyssopleaf hedgenettle)	1
Trichophorum clintonii (Clinton's bulrush)	1
Triosteum perfoliatum (common horsegentian)	1
<b>Q13 - List the top 5 invasive plant species that are surveyed or monitored (R3)</b>	<b>Total</b>
Lythrum salicaria (purple loosestrife)	22
Phalaris arundinacea (reed canary grass)	18
Cirsium arvense (Canada thistle)	18
Euphorbia esula (leafy spurge)	14
Centaurea maculosa (spotted knapweed)	11
Alliaria petiolata (garlic mustard)	10
Frangula (buckthorn)	9
Carduus nutans (plumeless thistle, musk thistle)	8
Phragmites communis (common reed)	7
Robinia pseudo-acacia (black locust)	5
Rosa multiflora (multiflora rose)	4
Sorghum halepense (Johnsongrass)	3
Polygonum cuspidatum (Japanese knotweed)	3
Xanthium (cocklebur)	3
Sericea Lespedeza (not found in ITIS)	3
Pueraria (kudzu)	3
Acer negundo (boxelder)	3
Elaeagnus umbellata (autumn olive)	3
Lonicera tatarica (bush honeysuckle)	2
Lonicera tatarica (Tartarian honeysuckle)	2
Celastrus orbiculatus (oriental bittersweet)	2
Typha (cattail) <i>hybrid</i>	2
Butomus umbellatus (flowering rush)	2
Microstegium vimineum (Japanese stiltgrass)	2
Ulmus pumila (Siberian elm)	2
Cirsium (thistle)	1
Pastinaca sativa (wild parsnip)	1
Sonchus (sowthistle)	1
Elytrigia repens (quackgrass)	1
Trees	1
Non native cool season grasses	1
Lonicera japonica (Japanese honeysuckle)	1
Lespedeza cuneata (Chinese lespedeza)	1
Tanacetum (tansy)	1
Melilotus (sweet clover)	1
Sorghum bicolor (shatter cane)	1
Dipsacus (teasel)	1
Dioscorea oppositifolia (Chinese yam)	1
Ailanthus altissima (tree-of-heaven)	1
Brunnichia cirrhosa (no common name found in ITIS)	1

Festuca arundinacea (tall fescue)	1
Cynoglossum (hound's tongue)	1
Vinca major (periwinkle)	1
Rubus parviflorus (thimbleberry)	1
Heracleum (cow parsnip)	1
<b>Q13 - List the top 5 invasive plant species that are surveyed or monitored (R5)</b>	<b>Total</b>
Phragmites communis (common reed)	33
Lythrum salicaria (purple loosestrife)	20
Celastrus orbiculatus (oriental bittersweet)	16
Rosa multiflora (multiflora rose)	14
Polygonum cuspidatum (Japanese knotweed)	12
Microstegium vimineum (Japanese stiltgrass)	11
Alliaria petiolata (garlic mustard)	8
Cynanchum nigrum (black swallowwort)	7
Ailanthus altissima (tree-of-heaven)	6
Elaeagnus umbellata (autumn olive)	6
Lonicera japonica (Japanese honeysuckle)	6
Polygonum perfoliatum (mile-a-minute weed)	5
Cirsium arvense (Canada thistle)	5
Robinia pseudo-acacia (black locust)	5
Sorghum halepense (Johnsongrass)	4
Lonicera morrowii (Morrow's honeysuckle)	4
Frangula (buckthorn)*	4
Trapa (water chestnut)	3
Elaeagnus angustifolia (russian olive)	3
Phalaris arundinacea (reed canary grass)	3
Centaurea maculosa (spotted knapweed)	2
Pueraria (kudzu)	2
Eragrostis curvula (weeping lovegrass)	2
Lespedeza cuneata (Chinese lespedeza)	2
Berberis thunbergii (Japanese barberry)	2
Rosa rugosa (rugosa rose)	2
Wisteria sinensis (Chinese wisteria)	1
Humulus japonicus (Japanese hop)	1
Euphorbia cyparissias (cypress spurge)	1
Lonicera (honeysuckle)	1
Lepidium (pepperweed)	1
Ampelopsis brevipedunculata (porcelainberry)	1
Artemisia vulgaris (mugwort)	1
Cabomba caroliniana (Carolina fanwort)	1
Juniperus (redcedar)	1
Ligustrum (privet)	1
Nelumbo lutea (American lotus)	1
Myriophyllum spicatum (Eurasian watermilfoil)	1
Foeniculum vulgare (sweet fennel)	1
Wisteria (wisteria)	1
Populus alba (white poplar)	1
Salix (willow)	1



Iris pseudacorus (paleyellow iris)	1
Celastrus scandens (American bittersweet)	1
Centaurea nigra (black knapweed)	1
<b>Q14 - Protocols used to monitor invasives (R3)</b>	<b>Total</b>
The Nature Conservancy's Weed Information Management System (WIMS)	2
100m and 50m line transects with measurements at each 0.5m, 10m.	1
Daubermire plots, belt transect method developed by ND refuge biologists, floristic quality assessment -- no standardized protocols for leafy spurge or loosestrife	1
GIS Mapping (shapefiles)	1
GIS mapping for buckthorn, spotted knapweed etc. vegetation surveys and photopoints for leafy spurge biocontrol monitoring of purple loosestrife	1
Hybridization of Montana State and LaCreek NWR	1
Measuring & Monitoring Plant Populations BLM Tech. Ref. 1730-1 Elzinga et al. 1998	1
National loosestrife protocol developed by Cornell University. USDA and Minnesota Department of Agriculture protocol for leafy spurge.	1
North American Invasive Plant Mapping Standards	1
Protocol established by the Minnesota Dept. of Agriculture Weed mapping program is used. We may choose to utilize TNC's WIMS system next year.	1
Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. 1993. Handbook of field methods for monitoring land birds. Gen. Tech. Rep. PSW-GTR-144. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. 41pp.	1
We are part of the grass seeding/Canada thistle study that is being conducted at several Minnesota and one Iowa station.	1
<b>Q14 - Protocols used to monitor invasives (R5)</b>	<b>Total</b>
Region 5 Invasive Plant Spp Inventory and Mapping Protocol	14
GIS based monitoring using protocol developed by Jan Taylor and Region 5 biologists.	3
Region 5 aerial invasive species control project protocol	3
University of Delaware Mile-a-Minute Weed Monitoring Protocol	2
"Photopoints Protocol" for Phragmites reed.	1
An invasive species mapping effort was just undertaken following standardized procedures involving walking transects and recording species abundance and distribution.	1
Invasive Plant Atlas of New England protocol	1
multi-refuge control evaluation (Rosa multiflora)	1
No standard protocol - more opportunistic recording and GPS data collection	1
polygons searched with minimum of two people	1
protocol developed by Massachusetts Audubon Society.	1
Purple Loosestrife Cornell Swallowwort & Phragmites own design Garlic Mustard (rough R5 protocol) R5 Invasive Mapping Protocol (complete 2004)	1
Refuge mapped species 2-5 above & mapping of 1 (J. stiltgrass) is in progress; inspect and map areas and species killed	1
Region 5 protocols for phragmites only	1
Standardized North American Marsh Bird Monitoring Protocol	1
The salt ponds portion of the refuge was mapped with systematic transects, and all invasive plants detected were recorded as a point or polygon using GPS. Associated with each point is an abundance and distribution category.	1

This refuge will actually begin standardized inventory of invasive plants this spring. Protocols involve walking line transects (path recorded with GPS) and collecting points / polygons where invasive plants are detected using the GPS. At each point we record the species present, an estimation of the infected area, and abundance estimate, and a distribution category (infrequent occurrence, evenly throughout, localized patches, frequent stands, or densely throughout)	1
transects with minimum of two people	1
We have .5 meter veg plots established to monitor changes in vegetative composition as a result of ongoing invasive plant control (mechanical and chemical).	1

<b>Wildlife Survey and Monitoring</b>	<b>Region 3 (N=61)</b>	<b>Region 5 (N=69)</b>	<b>Both Regions (N=130)</b>
Question 15: Select all forest bird surveys conducted at your station:			
Question 15: Breeding	32	40	72
Question 15: Migrating	18	8	26
Question 15: Wintering	11	5	16
Question 16: Are upland game birds surveyed at your station?	17	16	33
Question 18: Select all grassland bird surveys conducted at your station:			
Question 18: Breeding	30	33	63
Question 18: Migrating	13	4	17
Question 18: Wintering	7	4	11
Question 19: Select all marshbird surveys conducted at your station:			
Question 19: Breeding	31	32	63
Question 19: Migrating	14	4	18
Question 19: Wintering	6	2	8
Question 20: Select all waterbird surveys (loons, inland gulls, terns) conducted at your station:			
Question 20: Breeding	20	28	48
Question 20: Migrating	19	15	34
Question 20: Wintering	8	10	18
Question 21: Select all raptor surveys conducted at your station:			
Question 21: Breeding	25	22	47
Question 21: Migrating	23	11	34
Question 21: Wintering	12	10	22
Question 22: Select all seabird surveys conducted at your station:			
Question 22: Breeding	1	6	7
Question 22: Migrating	1	3	4
Question 22: Wintering	0	4	4
Question 23: Are woodcocks surveyed at your station?	11	23	34
Question 24: Select all shorebird surveys conducted at your station:			
Question 24: Breeding	15	24	39

<b>Wildlife Survey and Monitoring</b>	<b>Region 3 (N=61)</b>	<b>Region 5 (N=69)</b>	<b>Both Regions (N=130)</b>
Question 24: Migrating	25	28	53
Question 24: Wintering	5	12	17
Question 25: Select all shrubland bird surveys conducted at your station:			
Question 25: Breeding	16	27	43
Question 25: Migrating	9	6	15
Question 25: Wintering	4	2	6
Question 26: Select all wading bird surveys conducted at your station:			
Question 26: Breeding	25	20	45
Question 26: Migrating	22	14	36
Question 26: Wintering	7	8	15
Question 27: Select all waterfowl surveys conducted at your station:			
Question 27: Breeding	29	19	48
Question 27: Migrating	36	26	62
Question 27: Wintering	20	29	49
Question 30: Select all mammal surveys conducted at your station:			
Question 30: Bats	5	6	11
Question 30: Carnivores (Bear, Coyote, Fisher, Marten, Mink, Raccoon)	14	9	23
Question 30: Feral Horses/Hogs/Cats	5	3	8
Question 30: Marine Mammals	0	6	6
Question 30: Opossum	2	1	3
Question 30: Rodents (Beaver, Squirrel, Muskrat, Nutria)	11	8	19
Question 30: Small Mammals	11	7	18
Question 30: Ungulates (Deer, Elk, Moose)	16	16	32
Question 33: Select all amphibian or reptile surveys conducted at your station:			
Question 33: Freshwater Turtles	9	18	27
Question 33: Frogs/Toads	33	39	72
Question 33: Lizards	0	3	3
Question 33: Salamanders	9	15	24
Question 33: Sea Turtles	0	2	2
Question 33: Snakes	11	4	15
Question 36: Select all fish surveys conducted at your station:			
Question 36: Estuarine Fish	0	7	7
Question 36: Freshwater Fish	27	10	37
Question 36: Saltwater Fish	0	2	2
Question 39: Select all invertebrate surveys conducted at your station:			
Question 39: Aquatic Invertebrates	16	18	34
Question 39: Butterflies/Moths	18	22	40
Question 39: Freshwater Mussels	7	8	15

<b>Wildlife Survey and Monitoring</b>	<b>Region 3 (N=61)</b>	<b>Region 5 (N=69)</b>	<b>Both Regions (N=130)</b>
Question 39: Horseshoe Crabs	0	4	4
Question 39: Other Saltwater Mollusks or Crustaceans	0	1	1
Question 39: Snails	3	1	4
Question 39: Spiders	0	3	3
Question 39: Terrestrial Insects	3	11	14

<b>Q15 - Forest Bird Species "Other" (R3)</b>	<b>Total</b>
Christmas Bird Count (Wintering)	2
Breeding-Ruffed grouse drumming	1
<b>Q15 - Forest Bird Species "Other" (R5)</b>	<b>Total</b>
American woodcock productivity	1
Limited migratory surveys in early 90s	1
MAPS station	1
migrating nighthawks	1
Neotropical landbirds	1
Used to do MAPS banding	1
would like to conduct migrating	1
<b>Q17 - List the upland game bird species surveyed (R3)</b>	<b>Total</b>
Bonasa umbellus (ruffed grouse)	7
Tympanuchus cupido (greater prairie-chicken)	5
Phasianus colchicus (ring-necked pheasant)	5
Scolopax minor (american woodcock)	4
Meleagris gallopavo (wild turkey)	4
Tympanuchus phasianellus (sharp-tailed grouse)	3
Colinus (bobwhites, bobwhite quail)	2
Zenaida macroura (mourning dove)	1
Gallinago gallinago (common snipe)	1
<b>Q17 - List the upland game bird species surveyed (R5)</b>	<b>Total</b>
Scolopax minor (american woodcock)	13
Bonasa umbellus (ruffed grouse)	3
Zenaida macroura (mourning dove)	1
Falciennis canadensis (spruce grouse)	1
Caprimulgus vociferus (whip-poor-will)	1
Meleagris gallopavo (wild turkey)	1
<b>Q18 - Grassland Bird "Other" (R3)</b>	<b>Total</b>
Christmas Bird Count	1
<b>Q18 - Grassland Bird "Other" (R5)</b>	<b>Total</b>
we have breeding bird points in grasslands	2
5 yr baseline completed - nt currently surveyed	1
done for 2-3 years; Bio-review team recommend ceas	1
Standard Region 5 protocol	1
would like to conduct migrating and wintering	1
<b>Q19 - Marshbird "Other" (R3)</b>	<b>Total</b>
NONE	0
<b>Q19 - Marshbird "Other" (R5)</b>	<b>Total</b>
saltmarsh sharp-tailed sparrow	2

5 yr baseline completed - nt currently surveyed	1
Clapper & Black Rail	1
Secretive marshbird surveys	1
Sharp-tailed & Seaside Sparr	1
Standard R5 marshbird callback survey	1
Standard Region 5 protocol	1
would like to conduct migrating and wintering	1
<b>Q20 - Waterbird "Other" (R3)</b>	<b>Total</b>
NONE	0
<b>Q20 - Waterbird "Other" (R5)</b>	<b>Total</b>
Breeding season, but not productivity	1
opportunistic migrant observations	1
terns only	1
<b>Q21 - Raptor "Other" (R3)</b>	<b>Total</b>
NONE	0
<b>Q21 - Raptor "Other" (R5)</b>	<b>Total</b>
Bald eagle roosting	3
Osprey nesting	2
American Kestrel only	1
Bald eagle nesting	1
hawk watch station in some years	1
migrating kestrel survey by volunteer	1
opportunistic breeding observations	1
Osprey only	1
Osprey shoreline surveys	1
Production of bald eagles	1
Production of ospreys	1
<b>Q22 - Seabird "Other" (R3)</b>	<b>Total</b>
NONE	
<b>Q22 - Seabird "Other" (R5)</b>	<b>Total</b>
Pelagic seabird monitoring	2
Incidentals immediately off beach are recorded	1
opportunistic seabird sightings recorded	1
Seabird Mortality Survey (Beached Birds)	1
<b>Q23 - Shorebird "Other" (R3)</b>	<b>Total</b>
year round surveys conducted weekly	1
<b>Q24 - Shorebird "Other" (R5)</b>	<b>Total</b>
migrating shorebirds recorded opportunistic all	1
<b>Q25 - Shrubland birds "Other" (R3)</b>	<b>Total</b>
CBC	1
<b>Q25 - Shrubland birds "Other" (R5)</b>	<b>Total</b>
species recorded during grassland bird surveys	1
Would like to conduct Migrating and Wintering.	1
<b>Q26 - Wading birds "Other" (R3)</b>	<b>Total</b>
year round surveys conducted weekly	1
<b>Q26 - Wading birds "Other" (R5)</b>	<b>Total</b>
Blue Heron nesting	1
During breeding season, but not productivity	1

During breeding season, not breeding on refuge.	1
GTBH nest counts conducted in winter	1
Only when surveying other sps.	1
opportunistic sightings	1
<b>Q27 - Waterfowl "Other" (R3)</b>	<b>Total</b>
year round surveys conducted weekly	1
<b>Q27 - Waterfowl "Other" (R5)</b>	<b>Total</b>
opportunistic sightings recorded	2
Banding, brood counts	1
Baseline only, not currently monitored	1
During breeding season, but not productivity	1
Incidental brood surveys	1
Waterfowl Production (brood) surveys	1
<b>Q28 - List all T&amp;E bird species that are surveyed or monitored (R3)</b>	<b>Total</b>
Haliaeetus leucocephalus (bald eagle)	32
Grus americana (whooping crane)	4
Sterna hirundo (common tern)	3
Dendroica kirtlandii (kirtland's warbler)	2
Charadrius melodus (piping plover)	2
Cygnus buccinator (trumpeter swan)	2
Sterna antillarum (least tern)	1
Falco peregrinus (peregrine falcon)	1
<b>Q28 - List all T&amp;E bird species that are surveyed or monitored (R5)</b>	<b>Total</b>
Haliaeetus leucocephalus (bald eagle)	32
Charadrius melodus (piping plover)	18
Sterna dougallii (roseate tern)	8
Sterna antillarum (least tern)	3
Rynchops niger (black skimmer)	2
Chlidonias niger (black tern)	2
Cistothorus platensis (sedge wren)	2
Botaurus lentiginosus (american bittern)	1
Gallinula chloropus (common moorhen)	1
Gallinago gallinago (common snipe)	1
Ammodramus savannarum (grasshopper sparrow)	1
Rallus elegans (king rail)	1
Ixobrychus exilis (least bittern)	1
Cistothorus palustris (marsh wren)	1
Pandion haliaetus (osprey)*	1
Haematopus palliatus (american oystercatcher)	1
Falco peregrinus (peregrine falcon)	1
Several state listed T&E species	1
Several state listed T&E species on marshbird surveys	1
Rallus limicola (virginia rail)	1
Falciennis canadensis (spruce grouse)	1
<b>Q29 - List all exotic or pest bird species that are surveyed or monitored (R3)</b>	<b>Total</b>
Sturnus vulgaris (european starling)	5
Passer domesticus (house sparrow)	4
Molothrus ater (brown-headed cowbird)	3

Phalacrocorax auritus (double-crested cormorant)	3
Cygnus olor (mute swan)	3
Phalacrocoracidae (cormorants)	2
Phasianus colchicus (ring-necked pheasant)	2
Columba livia (rock dove)	2
Corvus brachyrhynchos (american crow)	1
Quiscalus quiscula (common grackle)	1
Passer montanus (Eurasian Tree Sparrow)	1
Meleagris gallopavo (wild turkey)	1
<b>Q29 – List all exotic or pest bird species that are surveyed or monitored (R5)</b>	<b>Total</b>
Cygnus olor (mute swan)	16
Branta canadensis (canada goose) resident	8
Larus marinus (great black-backed gull)	6
Larus argentatus (herring gull)	6
Larus atricilla (laughing gull)	4
Quiscalus major (boat-tailed grackle)	1
Quiscalus quiscula (common grackle)	1
Corvidae (crows)	1
Sturnus vulgaris (european starling)	1
Chen caerulescens (snow goose)	1
Carpodacus mexicanus (house finch)	1
<b>Q30 - Mammals "Other" (R3)</b>	<b>Total</b>
Gray Wolf (Timber Wolf)	2
Beaver lodge/muskrat hut	1
Otter	1
Bobcat	1
<b>Q30 - Mammals "Other" (R5)</b>	<b>Total</b>
None. But have a deer hunt and fur trapping	1
opportunistic seal sightings	1
opportunistic recordings of mammalian predators	1
seals and feral cats recorded opportunistically	1
fox	1
harbor and gray seal inventories	1
<b>Q31 - List all T&amp;E mammal species that are surveyed or monitored (R3)</b>	<b>Total</b>
Canis lupus (gray wolf, timber wolf)	7
Myotis sodalis (Indiana bat)	4
Myotis grisescens (gray bat)	1
<b>Q31 - List all T&amp;E mammal species that are surveyed or monitored (R5)</b>	<b>Total</b>
Sciurus niger ssp. Cinereus (Delmarva Peninsula fox squirrel)	4
Myotis sodalis (Indiana bat)	2
Lynx canadensis (Canada lynx)	1
Sylvilagus transitionalis (New England cottontail)	1
Glaucomys sabrinus ssp. Fuscus (Virginia northern flying squirrel)	1
<b>Q32 – List all exotic or pest mammal species that are surveyed or monitored (R3)</b>	<b>Total</b>
Castor canadensis (beaver)	2
Felidae (cats)	2
Sus scrofa (pig (feral))	2
<b>Q32 – List all exotic or pest mammal species that are surveyed or monitored (R5)</b>	<b>Total</b>

Vulpes vulpes (red fox)	5
Procyon lotor (raccoon)	4
Castor canadensis (beaver)	3
Felidae (cats)	3
Mustela vison (mink)	3
Myocastor coypus (nutria)	3
Canis latrans (coyote)	2
Cervus nippon (Sika deer)	2
Sus scrofa (pig (feral))	1
Ondatra zibethicus (muskrat)	1
<b>Q33 - Amphibian or Reptile "Other" (R3)</b>	<b>Total</b>
NONE	0
<b>Q33 - Amphibian or Reptile "Other" (R5)</b>	<b>Total</b>
Blanding's Turtle	3
vernal pool species	3
Diamond back terrapin	1
frogs in past	1
opportunistic sightings recorded	1
vernal pool surveys	1
vernal pools present	1
<b>Q34 - List all T&amp;E amphibian and reptile species that are surveyed or monitored (R3)</b>	<b>Total</b>
Sistrurus catenatus ssp. Catenatus (eastern massasauga)	3
Nerodia sipedon ssp. Insularum (Lake Erie water snake)	1
Desmognathus fuscus ssp. Conanti (spotted dusky salamander)	1
<b>Q34 - List all T&amp;E amphibian and reptile species that are surveyed or monitored (R5)</b>	<b>Total</b>
Clemmys muhlenbergii (bog turtle)	2
Hyla andersonii (Pine Barrens Treefrog)	2
Malaclemys terrapin (diamondback terrapin)	1
Kinosternon subrubrum ssp. Subrubrum (eastern mud turtle)	1
Ambystoma tigrinum ssp. Tigrinum (eastern tiger salamander)	1
Caretta caretta (loggerhead sea turtle)	1
Pseudemys rubriventris ssp. Bangsi (plymouth red-bellied turtle)	1
Cheloniidae (sea turtles)	1
Hyla versicolor (gray treefrog)	1
Scaphiopus holbrookii ssp. Holbrookii (eastern spadefoot)	1
<b>Q35 - List all exotic or pest amphibian or reptile species that are surveyed or monitored (R3)</b>	<b>Total</b>
NONE	0
<b>Q35 - List all exotic or pest amphibian or reptile species that are surveyed or monitored (R5)</b>	<b>Total</b>
Trachemys scripta ssp. Elegans (red-eared slider)	1
<b>Q36 - Fish "Other" (R3)</b>	<b>Total</b>
NONE	
<b>Q36 - Fish "Other" (R5)</b>	<b>Total</b>
we monitor diet composition of seabird colony	2
Occasional survey by FAO (every 5 yrs)	1
salt marsh fish data collected for R5 OMWM study	1



Saltmarsh Nekton as part of research	1
we monitor diet composition (fish) of seabirds	1
we monitor prey deliveries (fish) at tern colonies	1
<b>Q37 – List all T&amp;E fish species that are surveyed or monitored (R3)</b>	<b>Total</b>
Scaphirhynchus albus (pallid sturgeon)	2
Acipenser fulvescens (lake sturgeon)	1
Opsopoeodus emiliae (pugnose minnow)	1
Notropis photogenis (silver shiner)	1
Notropis topeka (Topeka shiner)	1
<b>Q37 – List all T&amp;E fish species that are surveyed or monitored (R5)</b>	<b>Total</b>
Lampetra appendix (american brook lamprey)	1
Noturus miurus (brindled madtom)	1
Labidesthes sicculus (brook silverside)	1
Umbra limi (central mudminnow)	1
Ammocrypta pellucida (eastern sand darter)	1
Percina macrocephala (longhead darter)	1
Ichthyomyzon greeleyi (mountain brook lamprey)	1
Noturus eleutherus (mountain madtom)	1
Noturus stigmosus (northern madtom)	1
<b>Q38 – List all exotic or pest fish species that are surveyed or monitored (R3)</b>	<b>Total</b>
Cyprinidae (carps)	17
Pimephales promelas (fathead minnow)	2
Salmo trutta (brown trout)	1
Cottus gobio (bullhead)	1
Oncorhynchus kisutch (Coho salmon)	1
Oncorhynchus mykiss (rainbow trout)	1
<b>Q38 – List all exotic or pest fish species that are surveyed or monitored (R3)</b>	<b>Total</b>
Cyprinidae (carps)	2
Micropterus dolomieu (smallmouth bass)	1
<b>Q39 - Invertebrate "Other" (R3)</b>	<b>Total</b>
biological control agents for Canada thistle	1
Cave fauna was surveyed	1
dragonfly	1
<b>Q39 - Invertebrate "Other" (R5)</b>	<b>Total</b>
opportunisticly recorded by volunteers	2
American Burying Beetle	1
annelids	1
H. Crabs in past	1
state listed dragonfly in past	1
<b>Q40 List all T&amp;E invertebrate species that are surveyed or monitored (R3)</b>	<b>Total</b>
Dakota Skipper	3
Karner blue butterfly	2
Lampsilis higginsii (Higgins' eye pearly mussel)	1
Discus macclintocki (iowa pleistocene snail)	1
<b>Q40 List all T&amp;E invertebrate species that are surveyed or monitored (R5)</b>	<b>Total</b>
Cicindela dorsalis (northeastern beach tiger beetle)	3
Alasmidonta heterodon (dwarf wedge mussel)	2
Nicrophorus americanus (american burying beetle)	1

Pleurobema clava (clubshell)	1
Lasmigona compressa (creek heelsplitter)	1
Cyprogenia stegaria (fanshell)	1
Epioblasma torulosa ssp. Rangiana (northern riffleshell)	1
Anodonta imbecillis (paper pondshell)	1
Epioblasma florentina ssp. Curtisi (pearlymussel)	1
Lampsilis abrupta (pink mucket)	1
<b>Q41 – List all T&amp;E exotic or pest invertebrate species that are surveyed or monitored (R3)</b>	<b>Total</b>
Porthetria dispar (gypsy moth)	4
Dreissena polymorpha (zebra mussel)	2
Bithynia (faucet snails)	1
Galerucella californiensis (not found in ITIS) purple loosestrife defoliating beetles	1
Culicidae (mosquitoes)	1
<b>Q41 – List all T&amp;E exotic or pest invertebrate species that are surveyed or monitored (R5)</b>	<b>Total</b>
Culicidae (mosquitoes)	5
Porthetria dispar (gypsy moth)	3
Dreissena polymorpha (zebra mussel)	2
Latin name not found in ITIS (hemlock woolly adelgid)	1
Linyphia triangularis (invasive spider) Not found in ITIS	1
Dendroctonus frontalis (southern pine beetle)	1

Miscellaneous	Region 3 (N=61)	Region 5 (N=69)	Both Regions (N=130)
Question 42: Please select all regional or national surveys that your staff participate in (either on or off station). Include a survey only if you are using a standardized protocol and the data is submitted to the sponsoring agency or organization for analysis: <i>(Note: some refuges reported conducting National surveys, such as Woodcock Singing Ground Surveys, when the refuge was using the National protocol only to collect local data that were not submitted to the National monitoring effort.)</i>			
Question 42: FWS Waterfowl Breeding Population and Habitat Survey (aerial survey transects)	2	1	3
Question 42: FWS Mid-Winter Waterfowl Survey	24	8	32
Question 42: FWS 4 Square Mile Surveys (Waterfowl)	10	0	10
Question 42: FWS July Duck Production Survey	0	1	1
Question 42: FWS Duck Banding	21	13	34
Question 42: FWS Woodcock Singing - Ground Survey	16	17	33
Question 42: FWS Mourning Dove Call - Count Survey	13	4	17
Question 42: USGS Breeding Bird Survey (road survey of breeding landbirds)	10	17	27
Question 42: USGS Breeding Biology Research and Monitoring Database (BBIRD)	1	1	2
Question 42: Breeding Bird Atlas (States)	5	8	13
Question 42: Audubon Christmas Bird Count	27	34	61

Miscellaneous	Region 3 (N=61)	Region 5 (N=69)	Both Regions (N=130)
Question 42: Monitoring Avian Productivity and Survivorship (MAPS)	4	8	12
Question 42: National Marsh Bird Monitoring and Research Program	13	15	28
Question 42: International Shorebird Survey (ISS)	6	16	22
Question 42: FWS Abnormal Amphibian Monitoring	16	14	30
Question 42: North American Amphibian Monitoring Program (States)	14	9	23
Question 44: Do you lack current baseline biological inventory data for any habitats, taxa, or areas at your station?	49	68	117

<b>Q43 – List any additional regional or national surveys that your staff participate in that use a standardized protocol and the data is submitted to the sponsoring agency or organization for analysis (R3)</b>	<b>Total</b>
Minnesota DNR predator scent station survey	5
Sandhill Crane Count	5
Calling Toad/Frog survey,	2
Long Point Bird Observatory (Canada) Marsh Monitoring Network, marsh birds and amphibian surveys	2
Multi-Refuge Impoundment Study	2
Water Quality, sediments, aquatic veg. by Illinois Natural History Survey (USGS-LTRM)	1
August Roadside Pheasant and Upland Game Survey - data submitted to the Iowa DNR	1
August Roadside Pheasant and Upland Game Survey (data submitted to the Iowa DNR)	1
Common tern and Double-crested cormorant breeding population estimates and production are sent in to MNDNR Nongame for statewide surveys	1
Double-crested cormorant range wide survey	1
Fall Waterfowl Migration Survey (submitted to MNDNR)	1
Furbearer Survey, Missouri Dept. of Conservation	1
Grass seeding/Canada thistle.	1
great lakes colonial bird survey	1
Gypsy moth	1
heron colony survey	1
Illinois Natural History Survey Frog and Toad Survey	1
Indiana Audubon Society May Day Spring Bird Count	1
Kitland Warbler Singing Male Survey	1
Michigan Reptile and Amphibian Atlas	1
Mid-winter Bald Eagle Survey	1
Minnesota Breeding Waterfowl Survey with MNDNR.	1
Minnesota River Birding Day Survey-September.	1
MN Waterfowl Breeding Pair Survey which is related to the FWS Waterfowl Breeding population and habitat survey, except MN does their own methodology.	1
National Fish and Wildlife Foundation woody vegetation removal/bird use study.	1
North American Butterfly Survey Whip-poor-will Survey (State wide night survey)	1
North American Migration Count, International Crane Foundation's Annual Midwest Crane Count	1
Prairie Chicken Booming Ground Census	1

Scent stations, small mammal trap survey, ruffed grouse, sharp-tailed grouse, bear food survey	1
USFWS Annual bald eagle count - Indiana Department of Natural Resources (IDNR) River otter re-introduction monitoring - IDNR Midwinter goose count - IDNR Great blue heron rookery monitoring - IDNR	1
<b>Q43 – List any additional regional or national surveys that your staff participate in that use a standardized protocol and the data is submitted to the sponsoring agency or organization for analysis (R5)</b>	<b>Total</b>
Anuran Call Count	8
FWS R5 breeding landbird point counts	6
Gulf of Maine seabird census	6
USGS vernal pool study	6
R5 Invasive plants	5
Grassland Breeding Bird Survey	4
Amphibian study with USGS	3
NYS Colonial Waterbird Survey	3
Breeding Saltmarsh Sparrow	2
Cortney's North American marsh bird survey	2
Marsh Bird Callback	2
Mid Winter Bald Eagle Survey	2
R5 Marsh bird surveys-	2
USGS R3/R5 Impoundment Study	2
Amphibian Breeding Survey Region 5	1
an additional BBS Route	1
bird banding for migrating birds	1
Breeding Bird Survey	1
colonial nesting bird survey piping plover	1
Double Crested Cormorant Surveys-USDA	1
Forest bird surveys - R5	1
Great Backyard Bird Count, Cornell Laboratory of Ornithology	1
International Piping/Wilson's Plover Survey	1
July 4 Butterfly count	1
least tern productivity survey waterbird survey (region 5)	1
Massachusetts Coastal Waterbird Census	1
Multi-State Mourning Dove Banding project	1
new england wildflower society rare plant	1
OMWM Saltmarsh Research study.	1
piping plover	1
PRISM	1
R5 Neotropical Landbirds	1
Ruffed Grouse	1
saltmarsh wetland die back	1
SAV Surveys - data goes to Elizabeth City State Univ. (NC) and NC Div. of Water Quality, and Back Bay NWR	1
Seanet- Beached bird survey	1
Snowgoose, brant, swan productivity surveys (SNOBS).	1
Spawning Horseshoe Crab Survey	1
USGS Stream Salamander Survey	1
VT Butterfly Atlas	1

whip-poor-will surveys using state protocol	1
<b>Q45 - List current habitat, taxa, or area data needed at your station (R3)</b>	<b>Total</b>
No inventory or monitoring is being done currently. Monitoring of wetlands, grasslands and associated wildlife would be helpful, but we have no dedicated MI-WMD staff.	1
We are a relatively new refuge and could benefit from baseline surveys of coastal wetlands, associated upland habitats, islands, palustrine habitats	1
Inverts, Herps	1
mammals, reptiles, amphibians, fish, insects,	1
all waterbirds except secretive marshbirds and waterfowl, raptors, small mammals, terrestrial and aquatic invertebrates, wetland vegetation, fish, amphibian/reptiles	1
tallgrass prairie, oak savannah, wetland, aquatic	1
Fish, Carnivores, Bottomland forest, prairie	1
Currently we are lacking breeding marshbird and wading bird data. We have plans for that to happen, but has not occurred yet.	1
Diving duck recruitment, general water quality, Duck recruitment in the transition forest/prairie zone	1
Forest inventory, grassland inventory, Upland bird species, terrestrial insects, amphibians, mammals, herbaceous upland and wetland species, raptors, marshbirds, forest birds, grassland birds, water quality, submerged aquatic veg., etc.	1
General descriptions of habitat conditions and bird use are noted on WPAs but no formal surveys. Breeding Waterfowl, shorebird, marsh/waterbird, mammal, amphibian, insects, and habitat surveys.	1
Grasslands, Forest, Wetlands, Terrestrial Invertebrates, Invasive Plant Species	1
All major Refuge habitat types need surveyed for plant species composition and structure; need baseline amphibian, reptile, mammal, invertebrate, and fish data.	1
Exotic Invasive Plants; Grassland, Shrubland, and Forest herbaceous plants; Exotic Earthworms; Reptiles; Butterfly/Moths; Invertebrates	1
Basically as a new refuge we need help setting up all surveys, but first need to develop a monitoring plan	1
Exotic Invasive Plants; Fish; Mammals; Reptiles; Butterfly/Moth; Other Invertebrates; Exotic Earthworms; Grassland and Forest Herbaceous Plants;	1
There has been some data collection and monitoring of habitats on Rydell by the Un. of MN - Crookston but nothing on a regular bases.	1
Grassland, oak savanna, wetland, shorebirds, grassland birds	1
reptiles (other than turtles), shorebirds, waterbirds, raptors, amphibians, mammals, invertebrates, mollusks	1
complete plant inventory, muskrats, photo interpretation for habitat monitoring	1
Insects, small mammals, reptiles, salamanders, plants, bats	1
Insects, aquatic invertebrates, small mammals, reptiles, deer, salamanders, bats, beaches	1
Insects, small mammals, amphibians, reptiles, bats, molluscs, songbirds, plants	1
In order to establish habitat management needs and evaluate success, several surveys are needed. Plants - we do not have a comprehensive inventory of natives, nor do we have a current comprehensive inventory of invasives. Insects- although a few narrowly focused inventories have been done (butterflies, dragonflies several years ago), no comprehensive inventory exists. An inventory of pollinators (esp, bees) would be useful. Crustaceans, mammals, fish - these surveys have been done, but not recently.	1
We currently have no up-to-date or comprehensive baseline biological inventory information for any of the habitat, taxa and areas on the refuge.	1

turtles, bottomland forest inventory in Pool 4, spring waterfowl migration, winter eagle use	1
We could use baseline data for fescue grassland and pine plantation forest that we plan to convert to native or higher wildlife value cover. We could use inventory data for Indiana bats.	1
Coastal wetlands; reptiles, especially wood turtles (state endangered), lowland forest and shrub communities, Sedge meadow communities, Riparian forest communities, mammals.	1
algific talus slope habitat - need plants and invertebrates birds mammals plants fish	1
Mammals Herps Raptors Upland Game Birds Aquatic Invertebrates Terrestrial Invertebrates Aquatic Vegetation Forest Birds Wading birds Waterbirds Marshbirds Hydrology/Wetland Function/Water Quality	1
Currently there are no up-to-date or comprehensive baseline biological inventory information present on the habitat, taxa and area data for this refuge.	1
Prairie butterflies Grassland bird use	1
forest or shrub birds, raptors, bats, rodents (mice, voles, moles...), amphibians and reptiles except for frogs and all invertebrates	1
Additional forest songbird assessment (point counts), aquatic invertebrates, water quality, wild rice production, furbear population assessments, comprehensive plant inventory (both terrestrial & aquatic), detailed vegetation classification, insect populations, mussels and snails, waterfowl production, marshbirds, reptiles, black bear and turkeys, etc.	1
grassland habitat, wetland habitat, all fauna associated with grassland and wetland habitats, waterfowl nest success rates as they relate to various grassland plant communities (native vs. introduced, diverse (forb rich) vs. grass dominated, effects of various management tools (prescribed burning, mowing, tree removal) on waterfowl and other grassland birds production success rates	1
Need baseline on most habitats and wildlife with our higher priorities as: Grassland birds, invasive species, fisheries, reptiles & amphibians, Forest Birds (breeding and migrating), grassland vegetation, bottomland hardwood regeneration, cypress regeneration.	1
grassland habitat, wetland habitat, all fauna associated with grassland and wetland habitat, waterfowl production success rates as they relate to various grassland plant communities (native vs. introduced, diverse (forb rich) vs. grass dominated), effects of various management tools(prescribed burning, mowing, tree removal) on waterfowl and other grassland bird production success rates	1
Waterfowl breeding populations in woodland and transition habitats. Invert populations in upland and wetland habitats	1
This is a new refuge. Baseline data is needed for all taxa including vegetation, birds, mammals, and herps. Accurate floodplain elevation data is also needed.	1
invertebrates, shorebirds, small mammals, wetlands	1
invertebrates	1
Reptiles Freshwater mussels Aquatic Invertebrates Terrestrial Insects Aquatic Plants Floodplain Forest Inventory - esp. data on the dead & dying component	1
Mammals Invasive species (flora and fauna) Species lists	1
forest cover inventory; emerald ash borer monitoring; northern pike spawning response to wetland impoundment enhancement; mammal inventory; freshwater mussel inventory; water quality monitoring; eastern fox snake population assessment; Blanding's turtle population assessment	1
Woodcock Wetland birds and vegetation Muskrat/otter population (for trapping info) reptiles/amphibians wood duck habitat model	1

Giant cane Inventory, Forest Inventory, Botanical Surveys, Musel Surveys of the Cache River, Bat Surveys, Upland Bird Surveys, Invertebrate Surveys	1
Wetland birds Wood duck habitat model four square mile wetland plants reptile/amphibian surveys	1
Water quality to include:pH,conductivity,dissolved heavy metals-iron-aluminum and manganese, sulfates, acidity, alkalinity, TDS and TSS, neotropical migrant birds, northern copperbelly watersnake, submergent and emergent marsh vegetation, aquatic invertebrates, frogs/toads and snails.	1
<b>Q45 - List current habitat, taxa, or area data needed at your station (R5)</b>	<b>Total</b>
Insect surveys Wetland plants	1
Invertebrates, Fish, Plants (have a plant inventory, but not sure how accurate or complete)	1
NVCS refuge habitat cover maps	1
Migration surveys--need a standard protocol for surveying migrating landbirds Aquatic--fish nursery habitats; Pollinators: bats, moths, butterflies, bees; Small mammals	1
Insects Mollusks	1
National Vegetation Classification Mapping, Map managed habitats, Reptiles, amphibians, mammals, raptors, terrestrial & aquatic invertebrates, all pest and nuisance species, Federal & State listed plants, water quality, land use analysis, ecosystem biomonitoring protocols, invasive species, habitat based bird surveys, adaptive management surveys	1
bats wintering bird use forest health reptiles furbearers exotic fish	1
Fresh Marsh, Inverts, Mammals Salt Marsh, Birds, Mammals, Inverts Forested Uplands, Birds, Mammals, Inverts	1
peatlands, softwoods, aquatic habitats, inverts, fish, plankton	1
Baseline inventory of small mammals, bats, salamanders, fish; Population densities on deer, moose, bear, coyote, fox and other game species; Bathymetry of all managed wetlands.	1
sandplain grassland plant inventory insect (ongoing) plant (ongoing- 80% complete) mammal (especially bat inventory) reptile (especially salamander, snake, etc)	1
all categories which have not been left blank in this survey	1
any area not responded to for this survey	1
no systematic surveys of any kind have been conducted on this refuge	1
We have pretty complete inventories done 2000 or later on pretty much all taxa, and detailed forest sampling, at many of our units, but lack this on a handful of smaller units. In addition, we need better information on beaver and waterfowl use of beaver ponds. Of course, we could always use more detailed studies to figure out more specific info about the demographics and distribution of many species - for example native trout and black bear demographics, distribution, and movements.	1
Habitat: Upland Forests and coastal islands Taxa: Insects, amphibians, mammalian predators to breeding birds, forage fish for terns, food-chain based small mammals, and bats	1
We have little baseline data on most all taxa. Only birds have been systematically surveyed. Forest stands map needs updated	1
lack good baseline data taxa other than birds.	1
saltmarsh bird data shorebird breeding, migrating, wintering data(current information is casual)	1
veg mapping invasive plant species mapping insect inventory mammal inventory herp. inventory plant inventory bird inventory invasive animal inventory predator inventory plant species of concern inventory/ mapping	1

raptor, invertebrates, reptiles, bats, migratory landbirds, water quantity, sharp-tailed sparrow productivity, habitats are monitored only for specific management actions or questions, we lack monitoring for general health or integrity.	1
This refuge consists primarily of tidal riverine salt marsh habitats and adjacent upland shrub and forested habitats. We have not yet inventoried for reptiles, amphibians, landbirds, wading birds, small mammals, or migratory waterbirds and shorebirds. We hope to initiate a New England cottontail inventory this winter. The state monitors nesting osprey.	1
We are currently compiling data that has been collected in the past either by USFWS or other sources to determine the gaps / needs. We suspect that much of the inventory of species has been done. We will need to map distribution of invasive plants.	1
We plan to initiate New England Cottontail inventory this winter and an amphibian survey in the spring. We need to conduct secretive marshbird surveys, and continue to monitor saltmarsh restoration (fish, invertebrates, vegetation, bird use). Salt marsh restoration monitoring currently part of a research project but we need to be prepared to conduct ongoing monitoring of the site.	1
We need to do a complete assessment of Trustom Pond (coastal pond) including water quality, vegetation, fish, and other associated species. This was done many years ago. We need to survey for New England Cottontail, and bats and determine distribution on the refuge if present, as well as potentially rare small mammals, amphibians, reptiles and secretive marsh birds. Some of this has been done, but not for several years.	1
In newly acquired pine barrens habitat we need to conduct an inventory of all taxa. We initiated some bat and small mammal inventory in localized areas but need more. We need to initiate secretive marshbird surveys. Reptile inventory throughout.	1
(1) Accurate periodic (e.g. every 10 years) of marsh loss/erosion since refuge establishment; (2) Use of farming areas by migratory and resident birds throughout year, especially breeding and migration seasons; (3) Use of grasslands by obligate and facultative grassland birds during migration and winter; (4) GIS mapping of refuge; (5) survey of condition/health of marsh including mapping; (6) an understanding of the long term and short term impacts of overabundant snow geese grazing on the marsh, including veg loss, but also impacts to other wildlife, soils, erosion rate, water quality, susceptibility to storm surge; (7) how can we reverse the snow goose-caused marsh loss and recover the marsh when continually being inundated with tens of thousands and hundreds of thousands of snow geese.	1
Plants Fish	1
Data are lacking on species composition and changes due to natural succession. Invasive plant species mapping and monitoring needs to be conducted to determine whether control measures are necessary and appropriate	1
marine fish marine invertebrates current wintering waterfowl use invasive species	1
invasive species mapping updates marine finfish wintering waterfowl forest birds	1
forest birds marsh birds herptiles invasive plants	1
Forest Vegetation Invasive Plants Estuarine/Riverine Fish Herptile species	1
invasive plant species forest bird surveys grassland bird surveys	1
invasive plant species marine fish marine invertebrates forest birds small mammals	1
Vegetation cover type map	1
Vegetation Cover Type Map	1
The flora (degraded (exotics) grass & shrublands - former military base) and fauna - no known habitat surveys are available.	1
non-game species as a whole; hydrology of the Dismal swamp Ecosystem; basic veg surveys for many of the habitats	1



Rare Tiger beetles (Cicindella spp.) along dune habitats. Thorough survey of designated Natural Heritage Program "Natural Areas" that historically held rare plants, inverts., etc. to document presence and distribution. (Past surveys were not thorough.) Natural resource (habitats, fauna, etc.)inventories on newly acquired properties on the west side of the Refuge.	1
Aquatic Invertebrates, need better Reptile and Amphibian data, better "census" database to store, retrieve and display data.	1
Invertebrates, Mammals, Amphibian, Reptile, Forest, Grasslands, Shrublands, Marsh, and Coastal Zones	1
Baselines on Shrub, Marsh, Coastal dunes, Mammals, Invertebrates, Reptiles, Amphibians	1
Mammals, reptiles, amphibians, fish	1
Mammals, amphibians, reptiles, invertebrates(primarily beach inverts for feeding shorebird populations), upland passerine bird surveys, upland and mixed forest composition data, pre/post prescribed fire monitoring protocols.	1
Contaiminent study: Effects on upland game birds and mammals and plants and human consumption. Contaminant Study: Effects on invertebrates, amphibians, fish, and small mammals. Rare and endangered plant communitis survey Forest, wetland and grassland habitats Canada Lynx survey Large Mammal Population Surveys Freshwater fish surveys (especially landlocked salmon and brook trout) grassland bird productivity study (Upland Sandpiper and Bobolink) Woodcock productivity study Breeding Waterfowl nesting success study	1
"good" data needed for: wintering waterfowl migrating songbirds migrating raptors migrating shorebirds probably others	1
Everything! We really don't have baseline data on migrating songbirds or waterfowl or native or invasive plants for instance. We also could use some good data on inverts (pitch pine scrub shrub habitat here) and birds on some of our newer parcels.	1
We don't know anything about how migrant birds are using this Refuge. We don't have a plant species list.	1
migrating waterfowl on the rivers migrating songbirds invertebrates rare plants	1
migrating songbirds and waterfowl plant inventory - especially rare species invertebrates mammals - we have volunteers conducting tracking data, but that's it	1
All the basics - plants, birds, mammals, etc... including maybe New England cottontails.	1
migrating songbirds and waterfowl nesting marshbirds (the current protocol falls very short!) invertebrates invasive species New England cottontails	1
forest; brushland; wetland & stream biota specifically fish and invertebrates	1
Vegetation Survey--North Tract (Vegetation Cover Mapping). Insects.	1
Herptile, Fish, Small Mammal	1
Presence and Distribution of Reptiles Presence and Distribuion of Hemlock Wooly Adelgid Impact of deer browse to woody plants (particularly forest species) Invasive Plant Survey of entire Refuge (partial survey completed in 2002) Fall/Winter use of Refuge by Migratory Birds (particularly grassland and shrubland habitats)	1
T&E plants, small mammals, bats, reptiles and amphibians, marsh loss, burned areas, American black duck, blue-winger teal, wood duck, breeding densities and habitat use of marsh birds, average DBH of upper canopy trees for forest cores, miles of forest corridors, aerial surveys for eagle productivity, botanical survey, long-term water quality monitoring stations, res. CAGO and MUSW, lepidopterans.	1
secretive marshbird data, completed invasive plant inventory for entire Refuge,	1
completed invasive plant species inventory,	1

we are lacking information on: recent seabird populations on most refuge islands, standardized monitoring protocols for razorbills, great cormorants and Leach's storm-petrels, we need info on diversity and abundance of inter-tidal invertebrates and the effects of commercial harvesting on trust resources (i.e. removal of prey items and disturbance), effects of prescribed fire on seabird nesting habitat, neotropical migrant, shorebird and raptor monitoring on coastal islands, availability of late successional habitat at the Refuge, botanical inventories of coastal islands, invasive plant surveys, factors limiting prey availability for colonial nesting seabirds, survival and recruitment rates of seabirds, foraging ecology of alcids and terns (where birds are foraging / overlap among species)	1
With the exception of aerial bald eagle surveys conducted by the state we have no routine biological monitoring program for these 6 remote islands. The only active monitoring the Refuge conducts is to try and survey the seabird colonies every five years. This Refuge lacks basic information on flora and fauna	1
We monitor the seabird colony on this island every five years - no other biological information is available	1
the Refuge contains numerous offshore islands that are rarely visited by staff. We lack general biological information on botanical and inter-tidal communities (and the effects of harvesting these species). We try to survey the seabirds on most islands once every five years. We need to evaluate the extent of invasive plants on these islands and initiate control measures. We need baseline information on bird use throughout the year.	1
Existing staffing limits the time technicians can spend on this remote island (20 miles from mainland). We do not have data on raptor, shorebird, neotropical migrant, or seabird use outside the 12 week nesting season.	1
Current staffing limits the time we can place a technician on this island. We lack biological information on the use of this island outside the 10 week nesting season.	1
Surveys to date occur very infrequently. More work is needed on insects and on marsh plants and aquatic invertebrates. Regular monitoring of black terns is needed as well. It is mostly anecdotal right now.	1