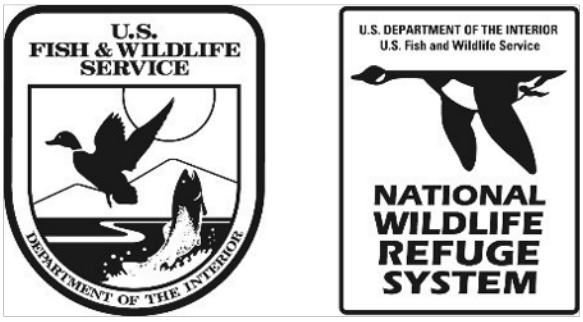
U.S. Fish & Wildlife Service

Great Dismal Swamp National Wildlife Refuge Inventory and Monitoring Plan

Foggy morning at Great Dismal Swamp National Wildlife Refuge. Photo credit: USFWS.

September 2021

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.



The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations.

Signature Page*

Action	Signature / Printed Name	Date
Prepared By:	FREDERIC WURSTER Digitally signed by FREDERIC WURSTER Date: 2021.08.31 13:33:57 -04'00' Refuge Wildlife Biologist	
Submitted By:	CHRISTOPHER LOWIE Digitally signed by CHRISTOPHER LOWIE Date: 2021.08.31 13:44:46 -04'00' Project Leader	
Reviewed By:	ANNE SITTAUER Digitally signed by ANNE SITTAUER Date: 2021.09.13 16:08:44 -04'00' Refuge Supervisor	
Reviewed By:	TROY WILSON Digitally signed by TROY WILSON Date: 2021.09.03 12:21:45 -04'00' I&M Coordinator	
Reviewed By:	WILLIAM SCHWENK Digitally signed by WILLIAM SCHWENK Date: 2021.09.07 16:42:45 -04'00' Chief of Division of Natural Resources and Conservation Planning	
Approved By:	SCOTT KAHAN Digitally signed by SCOTT KAHAN Date: 2021.09.28 14:16:17 -04'00' Chief of Refuges	

*Signatures apply to all contents of the Inventory and Monitoring Plan.

Acknowledgements

The Great Dismal Swamp National Wildlife Refuge Inventory and Monitoring Plan (IMP) was developed by many U.S. Fish and Wildlife (USFWS) Department of Interior Region 1 (North Atlantic-Appalachian Region) National Wildlife Refuge System staff. Jennifer Wright (Supervisory Wildlife Biologist) led the development of the IMP for the refuge, in consultation with Fred Wurster (Refuge Hydrologist) and Chris Lowie (Refuge Manager). The Division of Natural Resources and Conservation Planning (DNRCP)'s Core Team, which included Jennifer Casey (Assistant Regional Biologist), Rachel Katz (Biometrician), Austin Rizzo (Natural Resource Planner), Melinda Knutson (Contractor), and Laura Talbert (Natural Resource Planner), created the survey selection process, in consultation with the I&M Coordinator (Troy Wilson) and DNRCP Chief (Scott Schwenk). Laura Talbert served as the regional Point-of-Contact and assisted the refuge with implementing the survey selection process. Erin King and David Zimmermann (DNRCP's regional data managers) assisted with updating surveys in Planning and Review of I&M activities on Refuges (PRIMR) national database and the U.S. Fish and Wildlife Service Catalog (ServCat), Brian Klingbeil of the Natural Resource Program Center assisted with numerous technical issues and data wrangling.

Staff	Email	Position	Role
Jennifer Wright	jennifer_wright@fws.gov	Supervisory Wildlife Biologist	Author 1
Chris Lowie	chris_lowie@fws.gov	Refuge Manager	Author 2
Fred Wurster	fred_wurster@fws.gov	Refuge Hydrologist	Author 3
Laura Talbert	laura_talbert@fws.gov	Natural Resource Planner	DNRCP Point of Contact

Citation: Wright, J., C., Lowie, and F., Wurster. 2021. Great Dismal Swamp National Wildlife Refuge Inventory and Monitoring Plan. National Wildlife Refuge System, U.S. Fish and Wildlife Service, Department of Interior Region 1. Suffolk, VA. **HTTPS://ECOS.FWS.GOV/SERVCAT/REFERENCE/PROFILE/131341**.

Table of Contents

Summary

Great Dismal Swamp National Wildlife Refuge (NWR, DIS) has selected seven high priority surveys (Table 1) for the Inventory and Monitoring Plan (IMP). The surveys are within the refuge's capacity to implement, with surveys requiring approximately 88 weeks of staff time per year (on average) and some surveys staggered across multiple years. The refuge's total capacity to conduct I&M related activities is approximately 96 weeks of staff time per year (on average), which includes a buffer of approximately 5 weeks for unanticipated survey needs (e.g., partner needs or regional at-risk species surveys).

Table 1. Summary of selected surveys in order of priority to complete a site-specific protocol (SSP Priority) for Great Dismal Swamp NWR.

SSP Priority	Survey Name	Reason for Selecting Survey
1	Forest Condition Monitoring	The refuge's forest is a Priority 1 habitat that supports several ROC species. This survey is part of long-term monitoring effort to monitor habitat conditions in all forest types on refuge. It is intended to identify existing baseline conditions and monitor how forest habitat metrics change over time in response to management actions and disturbances. The refuge anticipates that the data will be used to support adaptive management of refuge's 113,000 mostly forested wetland habitat.
2	LTM Forest Plots with Water Level Data	Great Dismal Swamp NWR's forests are a Priority 1 habitat, and this survey is part of long-term monitoring effort to monitor the forest conditions in all habitat types on the refuge and to restore it to historic conditions, including peat soil, Atlantic White Cedar, and Cypress Gum. The survey is intended to identify existing baseline conditions and monitor how the forest habitat metrics change over time in response to management actions and disturbances, specifically water level. The refuge anticipates that the data will be used to support adaptive management of refuge's 113,000 mostly forested wetland habitat.
3	Refuge Water Level Readings	This monitoring evaluates how the refuge habitat responds to hydrologic restoration activities, and it allows the refuge to determine if their water management actions are achieving desired results. The refuge manages water level based on season-dependent and climatic targets that can vary depending on the forest type.
4	Spotted Turtle Assessment	The purpose of this inventory is to get a baseline population estimate for this refuge ROC species and to understand their forest habitat preferences. Poaching is historically a problem for the species (particularly for the pet trade), so the refuge needs to understand their Spotted Turtle population and know where they can be found in order to inform future management actions.
5	Red-cockaded Woodpecker Monitoring	The Red Cockaded Woodpecker is a Resource of Concern and a federally endangered species, and the USFWS Recovery Effort has been ongoing since 2015. The refuge has the second biggest RCW population in the state of Virginia, and the pond pine pocosin habitat used by the species is currently the refuge's second most dominant habitat type, totaling 18,000 acres. An area called the Blocks, a 2,200 acre pond pine pocosin stand, is being managed specifically for RCW habitat. The refuge, with the assistance from partners, has established 13 cluster sites throughout this management area, with each cluster site having a minimum of four nest cavity trees. These clusters will be managed to support family groups and reproductive success.
6	Invasive Plant Inventory	This survey monitors the status and extent of invasive plant species (e.g., alligatorweed, Phragmites) on the refuge roadsides and in the burn scar to inform management actions. These invasives impact the health of refuge wetland habitats and therefore impact ROC species (limiting food availability, foraging opportunities).
7	Surface Elevation and Accretion Monitoring (SETs)	This survey was started by USGS roughly six years ago to evaluate the quality of peat soil, which is traditionally a carbon sink. The survey's purpose is to monitor peat soil elevation change over time in various habitat types throughout the refuge (e.g., as peat loses ability to hold water, it shrinks) to determine if restoration actions have reversed the long-term decline of peat soils. Healthy peat soils are a key component of the refuge's Priority 1 forested wetland habitat objectives, which support the refuge's Priority ROCs.

Introduction

This Inventory and Monitoring Plan (IMP) outlines the natural resource surveys that will be conducted at Great Dismal Swamp NWR. In general, the IMP focuses on the next five years due to uncertainty about funding and staffing that precludes planning a on longer timescale. The IMP may need to be revised after five years or as other refuge plans (e.g., Comprehensive Conservation Plan [CCP] or Habitat Management Plan [HMP]) are revised (Table 2).

Table 2. List of refuge station (s) by 3-letter LITCODE, years, and ServCat links for associated plans, including Comprehensive Conservation Plan(s), Habitat Management Plan(s), Resources of Concern (ROC), and SMART Objectives (if revised outside of HMP) for Great Dismal Swamp NWR.

Refuge	Plan	Year	ServCat Link
DIS	Comprehensive Conservation Plan	2006	https://ecos.fws.gov/ServCat/Reference/Profile/1428
DIS	Habitat Management Plan	2021	https://ecos.fws.gov/ServCat/Reference/Profile/133279
DIS	Resources of Concern	2021	https://ecos.fws.gov/ServCat/Reference/Profile/132256

This plan adheres to the Inventory and Monitoring (I&M) policy 701 FW2 (USFWS 2013a) for the National Wildlife Refuge System (NWRS), which promotes informed, transparent, and defensible resource management decisions by ensuring that all refuges collect and manage survey data for consistency, applicability, and scientific rigor. According to I&M policy "All refuges will use approved protocols when conducting surveys" (701 FW2).

To fully implement the I&M policy, surveys must be prioritized so that Site Specific Survey Protocols (SSP) can be documented for each selected survey. The SSP is the most detailed and complete documentation used in conducting a survey in the NWRS. Site-specific details include information regarding where and how many sites at which the survey will be conducted, operational requirements (time and costs), and safety issues, all of which can vary with a particular refuge or environment. The IMP provides a ranked list of selected surveys in need of SSPs. The selected surveys in this IMP will provide information about resource conditions and inform management decisions at multiple spatial scales.

Some surveys will provide information about long-term changes in resource conditions, locally and at broader spatial scales (state and national status and trends). Some surveys will inform refuge management decisions, helping to evaluate the effectiveness of past management decisions. Other surveys include indicators of biological diversity, integrity and environmental health (BIDEH), and help to restore populations of U.S. Fish and Wildlife Service (USFWS) trust resources and federally threatened and endangered (T&E) species. Some surveys inform decisions to resolve controversial issues.

Methods

The NWRS Leadership Team charged the Regions of the U.S. Fish and Wildlife Service (USFWS) with finalizing IMPs for all refuges by the end of fiscal year (FY)23, an effort known as the Chief's Challenge. The North Atlantic-Appalachian Region (Interior Region 1; IR01) set a goal of completing IMPs by the end of FY21. Refuges that had not completed IMPs by FY20 were notified of the plan development process.

In 2019, the IR01 Division of Natural Resources and Conservation Planning (DNRCP) identified a series of tasks that were considered prerequisites for the plans and a process for selecting surveys (Appendix A). They selected four focal ecosystems, including salt marsh, beach, freshwater wetland, and forest, representing the dominant systems on IR1 refuges. Regional ecosystem teams were convened to

develop generalized conceptual models (a drawing that represents an ecosystem and the relationships among drivers of the system, stressors, management actions and our management objectives) for these four ecosystems. In addition, the DNRCP identified lower priority ecosystems that are found on multiple refuges (e.g., grassland, shrubland, and river and stream), and conceptual models were developed by the DNRCP for these ecosystem types.

Over the next 2 years, the DNRCP staff worked with refuge staff to prioritize refuge Resources of Concern (ROC) for each refuge or refuge complex. Priority ROCs can be species, species guilds, habitats, or ecosystems. Objectives statements (SMART objectives) were updated for the highest priority habitats and priority ROCs. SMART objectives are specific, measurable, achievable, results-oriented, and time-fixed (Powell & Casey 2019), represent the desired future condition on the refuge, and drive the development and selection of management strategies. The tasks of documenting and prioritizing surveys began with a virtual workshop on January 21, 2021 to develop conceptual models for Priority 1 habitats, followed by virtual workshops on February 9 and 11, 2021 to document details about each survey and how they were prioritized using an IMP workbook (Excel file) developed by the DNRCP.

A series of filtering criteria were used to narrow the list of surveys selected for implementation. Reconnaissance and visitor services activities and research and cooperative projects that are led and managed by partner agencies were documented and removed from further consideration. Additional criteria involved focusing on surveys that will benefit Priority 1 habitats and priority ROCs, how they inform management, and limiting survey selection based on available staff time.

DNRCP Core Team members worked individually with refuges to complete their IMP Workbooks and finalize the selection of surveys. Finally, the DNRCP Data Management Team worked with refuge staff to update the Planning and Review of I&M activities on Refuges (PRIMR) database and the USFWS Service Catalog (ServCat). All selected surveys will require a site-specific protocol (comprehensive description of why, how, when, where, and who will conduct each survey), which will be archived under each refuge's ServCat survey-specific project with associated data, analysis and reporting products.

Results

Priority Habitats and Resources of Concern

A total of four Priority 1 habitats and 12 priority ROCs were selected during the ROC selection process (Table B1). The refuge focused primarily on these habitats during the survey selection process.

Potential and Selected Surveys

A total of 12 potential surveys were identified across multiple habitats (Table B2), with seven surveys selected as highest priority for the IMP (Table B3, Table B4.1, Table B4.2). These surveys were estimated to take approximately 88 weeks of staff time annually (Table B5.1, Table B5.2), which is within the refuges' estimate capacity of 96 weeks (e.g., time available for I&M activities; Table B6). The refuge prioritized development of each site-specific protocol (SSP) for each selected survey (Table 3, Table B7.1), and the protocol status field is further explained in Appendix A: Protocol Assessment section. Key survey attributes for each selected survey were also described to inform protocol development (Table B7.2).

Table 3. Status of protocols for each selected survey (NPF = tiers from national protocol framework, RPF = tiers from regional protocol framework, SOP = documented field methods only, ISI = based on initial survey instructions, None = no survey documentation available yet) at Great Dismal Swamp NWR.

SSP Priority	Survey Name	Protocol Status
1	Forest Condition Monitoring	SOP
2	LTM Forest Plots with Water Level Data	SOP
3	Refuge Water Level Readings	SOP
4	Spotted Turtle Assessment	SOP
5	Red-cockaded Woodpecker Monitoring	RPF
6	Invasive Plant Inventory	RPF
7	Surface Elevation and Accretion Monitoring (SETs)	NPF

Non-Selected Surveys

A total of zero surveys were removed from the selection process. In addition, four surveys were reclassified as reconnaissance, visitor services, cooperative, or research projects (Table B9), which do not require a site-specific protocol, but should still consider data management plans per USFWS policy.

National Databases

Completed protocols, data, reports, and other survey guidance materials will be posted in ServCat under each survey's associated project (Table 4), which is linked to each refuge's PRIMR record (PRIMR refuge code: FF05RDIS00) and nested within the Great Dismal Swamp NWR's ServCat Refuge I&M Program (ServCat reference code: 117006). Data from each selected survey will also be uploaded to appropriate regional or national databases, which will be defined in each survey's site-specific protocol.

Table 4. ServCat links for the Great Dismal Swamp NWR's Refuge I&M Program (Type = Program) and each selected survey (Type = Project).

Refuge	Title	Type	ServCat Link
DIS	Refuge I&M Program	Program	https://ecos.fws.gov/ServCat/Reference/Profile/117006
DIS	Forest Condition Monitoring	Project	https://ecos.fws.gov/ServCat/Reference/Profile/132853
DIS	Invasive Plant Monitoring	Project	https://ecos.fws.gov/ServCat/Reference/Profile/132854
DIS	LTM Forest Plots with Water Level Data	Project	https://ecos.fws.gov/ServCat/Reference/Profile/132857
DIS	Red-Cockaded Woodpecker Census	Project	https://ecos.fws.gov/ServCat/Reference/Profile/133104
DIS	LTM Forest Plots with Water Level Data	Project	https://ecos.fws.gov/ServCat/Reference/Profile/132857
DIS	Spotted Turtle Assessment	Project	https://ecos.fws.gov/ServCat/Reference/Profile/132865
DIS	Surface Elevation and Accretion Monitoring (SETs)	Project	https://ecos.fws.gov/ServCat/Reference/Profile/105026

Environmental Action Statement and Categorical Exclusion

The Environmental Action Statement (EAS) and Categorical Exclusion (Appendix C) document compliance with the National Environmental Policy Act (NEPA) and other statutes, orders, and policies that protect fish and wildlife resources.

IMP Revisions

The IMP will be revised according to the I&M Policy (Appendix D). A revised IMP will include the completed and signed Revision Signature Page, which will be placed at the beginning of the document, before the original signed signature page.

References

Powell M, Casey J. 2019. Crafting SMART Biological Management Objectives: A Practical Guide. USFWS, North Atlantic - Appalachian Region. Division of Natural Resources and Conservation Planning. Hadley, MA. **https://ecos.fws.gov/ServCat/Reference/Profile/112228**.

Reynolds JH, Knutson MG, Newman KB, Silverman ED, Thompson WL. 2016. A road map for designing and implementing a biological monitoring program. Environmental Monitoring and Assessment 188:1-25. DOI: 10.1007/s10661-016-5397-x.

USFWS [U.S. Fish and Wildlife Service]. 2013a. How To Develop Survey Protocols: A Handbook (Version 1.0). U.S. Fish and Wildlife Service. National Wildlife Refuge System, Natural Resource Program Center. Fort Collins, CO. **https://ecos.fws.gov/ServCat/Reference/Profile/20158**.

USFWS [U.S. Fish and Wildlife Service]. 2013b. Inventory and Monitoring in the National Wildlife Refuge System (701 FW 2). U.S. Fish and Wildlife Service - Division of Policy and Directives Management, Arlington, VA. **http://www.fws.gov/policy/ser700.html**.

Appendices

Appendix A. North Atlantic-Appalachian Region IMP Process

The National Wildlife Refuge System (NWRS) Leadership Team charged the Regions of the U.S. Fish and Wildlife Service (USFWS) with finalizing Inventory and Monitoring Plans (IMP) for all refuges by the end of fiscal year (FY) 23, an effort known as the "Chief's Challenge". The North Atlantic-Appalachian Region (Interior Region 1; IR01) set a goal of completing IMPs by the end of FY21. The Division of Natural Resources and Conservation Planning (DNRCP) developed a step-by-step approach to selecting surveys for IMPs. The steps begin with prioritizing refuge or refuge complex Resources of Concern (ROC) and end with a completed plan. Refuges that had not completed IMPs by FY20 were contacted to participate in the plan development process.

Focal Ecosystems

In 2019, the DNRCP selected four focal ecosystems that were high priorities across most refuges: salt marsh, beach, freshwater wetland, and forest. These four ecosystems represent the dominant systems on IR01 refuges and are a frequent focus of management activity to benefit associated priority wildlife. In addition, the DNRCP identified lower priority ecosystems that are found on multiple refuges, including grassland, shrubland, river and stream. The purpose of identifying focal ecosystems was to foster consistency, efficiency, and learning by using a shared approach to identifying management objectives and selecting surveys based on the focal ecosystems.

SMART Objectives

Regional ecosystem teams were convened to develop generalized conceptual models (a drawing that represents an ecosystem and the relationships among drivers of the system, stressors, management actions and our management objectives) and associated SMART objective statements for these four ecosystems. SMART objectives are specific, measurable, achievable, results-oriented, and time-fixed (Powell & Casey 2019).

Regional objective templates were developed to standardize the form of objective statements in IR01. These templates address five fundamental objectives for each habitat type. Some objectives may not apply in all habitat types (for example, not all habitats support federally threatened and endangered species). The fundamental objectives are:

- Maintain the ecosystem over time
- Support migratory bird populations
- Support recovery of federally threatened and endangered species
- Support refuge priority Resources of Concern (ROC)
- Maintain biological diversity and ecological integrity

DNRCP staff worked with refuge staff to select priority ROCs for each refuge or refuge complex. Priority ROCs could be species, species guilds, habitats, or ecosystems. Objectives for the Priority 1 habitats were written with specific attributes and targets (i.e., SMART objectives), in accordance with the regional template.

Training Workshops

The tasks of documenting and prioritizing surveys began with a workshop for refuge biologists and other staff on January 21, 2021 to develop conceptual models for Priority 1 habitats, followed by workshops

on February 9 and 11, 2021 to document details about each survey and how they were prioritized using an IMP Workbook (Excel-based; see Microsoft Stream: HTTPS://WEB.MICROSOFTSTREAM.COM/GROUP/46B3E2FF-9281-41D9-B32B-C57CB94CD0BE?VIEW=VIDEOS). The generalized ecosystem conceptual models were stepped down to represent specific attributes, drivers and management actions employed by the refuge or refuge complex. The habitat-specific conceptual models helped to identify potential surveys. The IMP Workbook captured the list of potential surveys, details of each selected survey (survey type, reason for selecting the survey, and attributes to be measured), and was used to draft the refuge's IMP.

Potential Surveys

Potential surveys for each refuge or refuge complex included:

- Surveys listed as 'current' in PRIMR and any other current surveys not listed in PRIMR;
- Information needs identified in the CCP or HMP (if available), including assessing progress in achieving SMART objectives and assessing the status of key threats to priority ROCs; and
- Surveys identified using ecosystem conceptual models that focus on management objectives, ecosystem drivers, limiting factors, and/or management uncertainties.

Survey Selection

The survey selection (prioritization) process involved a series of three filters. The first filter focused on the priority habitat in which the survey will occur. If the survey is in a Priority 1 habitat, it was retained for further consideration. If the survey was in a non-Priority 1 habitat (e.g., Priority 2, 3, 4, etc.), the survey was not evaluated further and was called a "planned" survey (as opposed to a "selected" survey) in the IMP. Some refuges did not have planned surveys because they wanted to evaluate all habitats together (not just Priority 1 habitat surveys). Additionally, some refuges identified "future" surveys as those that could occur within the next 5 years but capacity or funding is uncertain at this time. The second filter focused on the main purpose of the survey and re-classifying surveys that generally do not require a site-specific protocol (per policy). The following list describes surveys that were re-classified:

- Reconnaissance – General surveillance activities of refuge resources that do not require a site-specific protocol, data management, or long-term documentation (e.g., checking storm damage, visual assessment of vegetation succession).
- Visitor Services – Activities that are primarily conducted to educate and engage visitors to the refuge (e.g., Audubon's Christmas Bird Count, Bluebird Box Monitoring).
- Cooperative Surveys – Surveys on the refuge that are primarily the responsibility of partner agencies and organizations (protocol development and data management). The refuge role varies, ranging from minimal (e.g., issuing Special Use Permits) to strong engagement (e.g., field data collection). Some cooperative surveys were considered "selected" survey (i.e., not reclassified as cooperative) when the refuge plays a major role in protocol development, data collection, or data management for partners.
- Research – Academic or government research projects led by one or more Principal Investigators (PI) that conduct their work on the refuge. The PI is responsible for the study design, data collection, analysis, and reporting. The refuge is in a support role, mainly via issuance of a Special Use Permit.

The third filter focused on the relative importance of the survey to management decisions and potential conservation outcomes. Surveys have the highest value when they reduce key uncertainties that are

impeding the refuge from selecting the most effective actions to achieve their SMART objectives, as quickly as possible. To help refuges link their surveys to management, each survey was classified as primarily one or more of the following survey types: (1) inventory or baseline inventory, (2) trend monitoring, (3) threshold monitoring, (4) effectiveness monitoring, and (5) adaptive management (Reynolds et al. 2016). Survey types that can be clearly linked to a decision have the highest value and surveys that cannot be linked were removed. In general, a survey was removed because it was not closely tied to refuge objectives, or it had served its purpose and additional information was not needed, or the survey was deferred due to capacity limitations. Figure A1 summarizes the considerations that guided the final selection of surveys; this information was captured in the IMP Workbook.

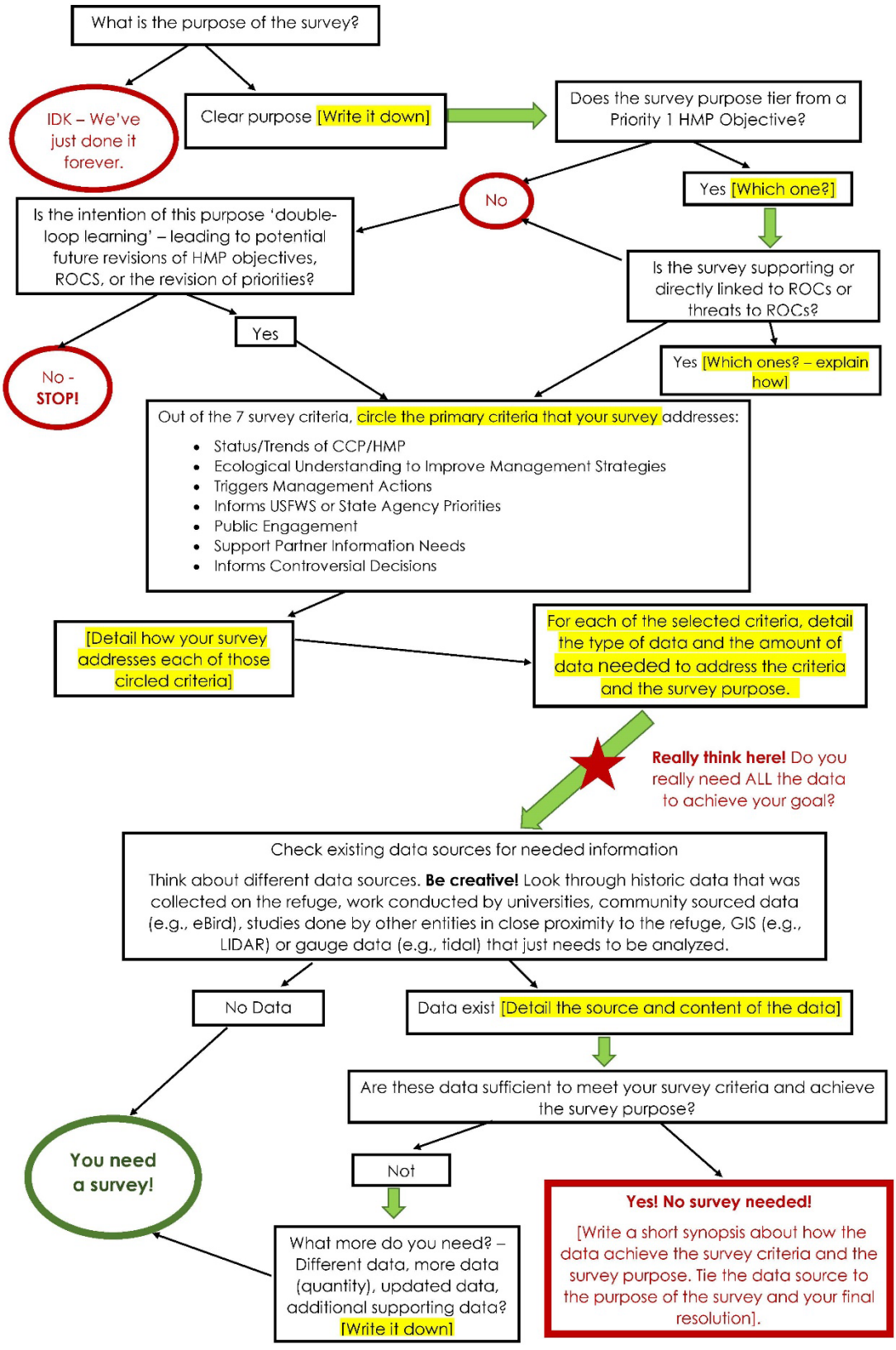


Figure A.1. Flow chart describing the series of filters and questions used to guide the survey selection process.

Refuge Capacity

Refuge capacity ultimately limits the number and type of surveys that may be conducted by refuge staff. To assess the refuge's capacity to conduct surveys, refuge staff estimated the number of weeks typically spent on I&M activities each year in relation to other activities. They also estimated the time required to plan and implement a survey, as well as manage the data, and produce and interpret reports. The final set of selected surveys was constrained by refuge capacity. Many refuges included time spent by interns, volunteers, or contractors, so the total capacity estimates often exceed funding for full time refuge staff; this additional capacity is garnered via grant funding for temporary staff, interns, or via volunteer agreements.

Protocol Assessment

To assess the comprehensiveness of existing survey documentation (protocols and SOPs) for the selected surveys and estimate the level of effort that will be needed to complete such documentation, each of the selected surveys was scored against a standardized checklist of protocol components.

According to I&M policy "All refuges will use approved protocols when conducting surveys" (701 FW 2). There are four types of documents used to describe survey protocols. These are:

- National Protocol Frameworks (NPFs),
- Regional Protocol Frameworks (RPFs),
- Site-specific Survey Protocols (SSPs),
- Standard Operating Procedures (SOPs), and
- Initial Survey Instructions (ISIs).

For each selected survey, refuge staff identified the protocol being used (NPF, RPF, SSP, ISS, and SOP) and applied a quick assessment of the eight key elements of a complete protocol (introduction, survey design, field methods, data management and analysis, reporting, personnel requirements and training, operational requirements, and references) according to the Survey Protocol Handbook (USFWS 2013b).

Surveys that follow a National or Regional Protocol Framework (NPF and RPF, respectively) will require significantly less time for protocol development because guidance for objectives, rationale, standard operating procedures (SOPs), supplemental materials, and other protocol components are already available. As an indication of the level of effort that will be required, the primary protocol guidance for each selected survey was evaluated by indicating if they would tier from either a NPF or RPF, or a prior level of documentation called Standard Operating Procedure (SOP; detailed step-by-step instructions for field methods only) or Initial Survey Instructions (ISI; includes some information at least one aspect of the survey), or if they will be developed from scratch (None). The refuge staff ranked their surveys for implementation, thereby indicating which surveys need SSPs within 5 years.

National Databases

The PRIMR database is a repository for all surveys conducted by the NWRS, documenting historic, planned, and current surveys. After the surveys were selected for the plan, they were documented in the PRIMR database. The Refuge Wildlife Biologist, in coordination with a Regional Data Manager, selected relevant PRIMR survey templates and updated them with refuge-specific information. When survey templates were not available, I&M staff worked with refuge staff to create a new PRIMR record with all required elements (Contacts & Partners, Costs, and Rationale; Element 1: Objectives; Element 2: Sampling Design; Element 4: Data Management; and Protocols & Products).

The Regional Data Manager checked selected survey names for consistency, ensured surveys were marked as IMP approved, and assigned survey priorities (1 = selected, 2 = planned) in PRIMR. Additionally, a ServCat Project was created and linked to each survey in PRIMR under each refuge's I&M ServCat Program. All protocols, standard operating procedures, supplemental materials, reports, and datasets for each selected survey will be archived under the appropriate ServCat Project (Table 5).

Appendix B. Potential, Selected, and Removed Surveys

Priority Resources of Concern by Priority Habitat

Table B1. Priority Resources of Concern (ROC) for each priority habitat developed during the ROC selection process for Great Dismal Swamp NWR (completed in 2021, **HTTPS://ECOS.FWS.GOV/SERVCAT/REFERENCE/PROFILE/132256**).

Priority Habitat	ROC Habitat Name	ROC Common Name
1	DIS Atlantic White Cedar Forest	Atlantic White Cedar
1	DIS Atlantic White Cedar Forest	Eastern Whip-poor-will
1	DIS Cypress-Gum Swamp	Louisiana Waterthrush
1	DIS Cypress-Gum Swamp	Spotted Turtle
2	DIS Maple-Gum Forested Wetland	Prothonotary Warbler
2	DIS Maple-Gum Forested Wetland	Swainson's Warbler
1	DIS Mesic Mixed Hardwood Forest	Ovenbird
1	DIS Mesic Mixed Hardwood Forest	Virginia Least Trillium
2	DIS Non-Riverine Pine Hardwood Forest	Red-headed Woodpecker
2	DIS Non-Riverine Pine Hardwood Forest	Swainson's Warbler
1	DIS Pond Pine Pocosin	Brown-headed Nuthatch
1	DIS Pond Pine Pocosin	Red-cockaded Woodpecker

Potential Survey List

Table B2. List of potential surveys considered for selection by priority habitat considered for the Great Dismal Swamp NWR. Note that the IMP Priority Habitats and IMP Habitat Names were generated by refuge staff as shorthand for the IMP process and may differ from ROC Habitat Priorities and ROC Habitat Names in Table B3.

Refuge	IMP Priority Habitat	IMP Habitat Name	Potential Survey Name
DIS	1	Pond Pine Pocosin	Red-cockaded Woodpecker Monitoring
DIS	1	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW; Maple Gum, Coastal Plain Season Wetlands, Non-riverine Pine HW	Forest Condition Monitoring
DIS	1	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	LTM Forest Plots with Water Level Data
DIS	1	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Open water, Maple Gum	Audubon's Christmas Bird Count
DIS	1	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	North American Breeding Bird Survey
DIS	1	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	Refuge Water Level Readings
DIS	1	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Non-riverine Pine HW, Maple Gum	Surface Elevation and Accretion Monitoring (SETs)
DIS	1	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	Invasive Plant Inventory
DIS	1	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	July Butterfly Survey
DIS	1	Cypress Gum, Mesic Pin Mixed HW, Non-riverine Pine HW, Maple Gum	Spotted Turtle Assessment
DIS	1	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	Gaps in Canopy Assessment via Flyover (Annual)
DIS	2	Maple Gum, Non-riverine Pine HW	Swainson's Warbler Breeding Survey

Survey Purpose and Reason for Selection

Table B3. Purpose and reason for selecting each survey by IMP Habitat Name for Great Dismal Swamp NWR.

Refuge	IMP Habitat Name	Survey Name	Purpose	Reason for Selection
DIS	Cypress Gum, Mesic Pin Mixed HW, Non-riverine Pine HW, Maple Gum	Spotted Turtle Assessment	Status/Trends	The purpose of this inventory is to get a baseline population estimate for this refuge ROC species and to understand their forest habitat preferences. Poaching is historically a problem for the species (particularly for the pet trade), so the refuge needs to understand their Spotted Turtle population and know where they can be found in order to inform future management actions.
DIS	Pond Pine Pocosin	Red-cockaded Woodpecker Monitoring	Status/Trends, Ecological Understanding, Informs USFWS Agency Priorities	The Red Cockaded Woodpecker is a Resource of Concern and a federally endangered species, and the USFWS Recovery Effort has been ongoing since 2015. The refuge has the second biggest RCW population in the state of Virginia, and the pond pine pocosin habitat used by the species is currently the refuge's second most dominant habitat type, totaling 18,000 acres. An area called the Blocks, a 2,200 acre pond pine pocosin stand, is being managed specifically for RCW habitat. The refuge, with the assistance from partners, has established 13 cluster sites throughout this management area, with each cluster site having a minimum of four nest cavity trees. These clusters will be managed to support family groups and reproductive success.
DIS	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	Invasive Plant Inventory	Triggers Management	This survey monitors the status and extent of invasive plant species (e.g., alligatorweed, Phragmites) on the refuge roadsides and in the burn scar to inform management actions. These invasives impact the health of refuge wetland habitats and therefore impact ROC species (limiting food availability, foraging opportunities).
DIS	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	LTM Forest Plots with Water Level Data	Status/Trends, Triggers Management	Great Dismal Swamp NWR's forests are a Priority 1 habitat, and this survey is part of long-term monitoring effort to monitor the forest conditions in all habitat types on the refuge and to restore it to historic conditions, including peat soil, Atlantic White Cedar, and Cypress Gum. The survey is intended to identify existing baseline conditions and monitor how the forest habitat metrics change over time in response to management actions and disturbances, specifically water level. The refuge anticipates that the data will be used to support adaptive management of refuge's 113,000 mostly forested wetland habitat.
DIS	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	Refuge Water Level Readings	Supports Partner Needs, Triggers Management	This monitoring evaluates how the refuge habitat responds to hydrologic restoration activities, and it allows the refuge to determine if their water management actions are achieving desired results. The refuge manages water level based on season-dependent and climatic targets that can vary depending on the forest type.

Refuge	IMP Habitat Name	Survey Name	Purpose	Reason for Selection
DIS	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Non-riverine Pine HW, Maple Gum	Surface Elevation and Accretion Monitoring (SETs)	Support Partner Priorities	This survey was started by USGS roughly six years ago to evaluate the quality of peat soil, which is traditionally a carbon sink. The survey's purpose is to monitor peat soil elevation change over time in various habitat types throughout the refuge (e.g., as peat loses ability to hold water, it shrinks) to determine if restoration actions have reversed the long-term decline of peat soils. Healthy peat soils are a key component of the refuge's Priority 1 forested wetland habitat objectives, which support the refuge's Priority ROCs.
DIS	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW; Maple Gum, Coastal Plain Season Wetlands, Non-riverine Pine HW	Forest Condition Monitoring	Status/Trends, Triggers Management	The refuge's forest is a Priority 1 habitat that supports several ROC species. This survey is part of long-term monitoring effort to monitor habitat conditions in all forest types on refuge. It is intended to identify existing baseline conditions and monitor how forest habitat metrics change over time in response to management actions and disturbances. The refuge anticipates that the data will be used to support adaptive management of refuge's 113,000 mostly forested wetland habitat.

PRIMR Summary

Table B4.1. Details for selected surveys (from PRIMR "Table 1" export), including the selected survey name (PRIMR Codes: I = Inventory, CI = Cooperative Inventory, M = Monitoring, BM = Baseline Monitoring, CM = Cooperative Monitoring, CB = Cooperative Baseline Monitoring, R = Research, CR = Cooperative Research), PRIMR ID (refuge cost code and PRIMR code), focal area for survey (surveys typically span multiple management units), staff time (FTE for FWS and Other staff), survey timing during the year, and years the survey will occur for Great Dismal Swamp NWR.

Selected Survey Name	PRIMR ID	Focal Area	Staff FTE	Timing	Years
Forest Condition Monitoring (BM)	FF05RDIS00-018	Multiple management units	FWS:0.33	June-August	2021-2035
Invasive Plant Inventory (I)	FF05RDIS00-019	Entire station	FWS:0.04, Other:0.01	May-August	2021-2035
LTM Forest Plots with Water Level Data (BM)	FF05RDIS00-020	Entire station	FWS:0.1	Feb, March, Aug, Sept	2021-2036
Red-Cockaded Woodpecker Monitoring (BM)	FF05RDIS00-024	Single management unit	FWS:0.62	Year-round	2021-2035
Refuge Water Level Readings (M)	FF05RDIS00-021	Entire station	FWS:0.38	Year-round Ditch levels: monthly Ditch flow: quarterly	2021-2035
Spotted Turtle Assessment (I)	FF05RDIS00-022	Entire station	FWS:0.02	April	2021-2021
Surface Elevation and Accretion Monitoring (SETs) (BM)	FF05RDIS00-023	Multiple management units	FWS:0.21, Other:0	April, October	2018-2030

Table B4.2. Details for selected surveys (from PRIMR "Table 1" export), including the selected survey name, PRIMR ID (refuge cost code and PRIMR code), protocol framework source (either National Protocol Framework or Regional Protocol Framework, if selected), and refuge protocol source (either ISI or SOP, if available) for the Great Dismal Swamp NWR. Note that 'Refuge Protocol Source' = None indicates that the protocol file has not been entered into ServCat.

Selected Survey Name	Protocol Status	Protocol Framework Citation	Protocol Framework Source	Refuge Protocol Source
Forest Condition Monitoring (BM)	ISI/SOP	None	None	None
Invasive Plant Inventory (I)	RPF	Bush et. al. 2021	http://ecos.fws.gov/ServCat/Reference/Profile/116190	None
LTM Forest Plots with Water Level Data (BM)	ISI/SOP	None	None	None
Red-Cockaded Woodpecker Monitoring (BM)	RPF	Richardson et. al. 2019	http://ecos.fws.gov/ServCat/Reference/Profile/114147	None
Refuge Water Level Readings (M)	ISI/SOP	None	None	None
Spotted Turtle Assessment (I)	ISI/SOP	None	None	https://ecos.fws.gov/ServCat/Reference/Profile/114350
Surface Elevation and Accretion Monitoring (SETs) (BM)	NPF	Lynch et. al. 2015	http://ecos.fws.gov/ServCat/Reference/Profile/56400	None

Survey Schedule and Capacity Estimate

Table B5.1. Proposed survey schedule with estimated number of weeks of staff time needed to conduct each survey (selected = surveys in Priority 1 habitats; planned = surveys in non-Priority 1 habitats, if applicable) for Great Dismal Swamp NWR.

Refuge	Status	Survey Name	Frequency	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
DIS	Selected	Red-cockaded Woodpecker Monitoring	repeated, every year (for 15.0 years)	2.0	2.0	4.0	4.0	4.0	4.0	2.0	2.0	3.0	3.0	1.0	1.0	32.0
DIS	Selected	Forest Condition Monitoring	repeated, every year (for 15.0 years); each management unit is completed in 1.0 year, then repeated every 5.0 yrs					1.0	4.0	4.0	4.0	2.0	1.0	1.0		17.0
DIS	Selected	LTM Forest Plots with Water Level Data	repeated, every year (for 15.0 years)		0.2	2.0					0.2	2.0	1.0			5.4
DIS	Selected	Refuge Water Level Readings	repeated, every year (for 15.0 years)	2.0	1.0	2.0	1.0	2.0	2.0	2.0	1.0	2.0	1.0	2.0	2.0	20.0
DIS	Selected	Surface Elevation and Accretion Monitoring (SETs)	repeated, every year (for 10.0 years)			0.5	4.0	1.0				0.5	4.0	1.0		11.0
DIS	Selected	Invasive Plant Inventory	repeated, every year					1.0			1.0					2.0
DIS	Selected	Spotted Turtle Assessment	one-time, single year				1.0									1.0
DIS	Planned	Swainson's Warbler Breeding Survey	repeated, every year					0.2								0.2

Table B5.2. Annual average and cumulative 5-year total capacity (when applicable) estimated to conduct all surveys (total weeks of staff time needed), with the number of weeks estimated for emerging needs (including non-selected surveys), and total refuge capacity available (see Table B6), with a remaining budget (weeks left) for Great Dismal Swamp NWR.

Status	Annual Average	5.0-Year Total
Total Weeks Needed	87.8	439.2
Available for Other Needs	5.2	26.0
Total Weeks Capacity	96.0	480.0
Budget (Weeks Left)	3.0	14.8

Annual Refuge Capacity

Table B6. Average annual capacity (staff time in weeks per year) available to conduct surveys by refuge staff position for Great Dismal Swamp NWR.

Category	Activity	Supervisory Wildlife Biologist	Refuge Hydrologist	Biological Technician	Intern (12 wks)	Regional Hydrologist
Conservation	Conservation Delivery	3.0	2.0	2.0	0.0	NA
Planning	Planning	5.0	3.0	2.0	0.0	NA
Management	Management Implementation	7.0	4.0	7.0	2.0	NA
Management	Reconnaissance	2.0	2.0	1.0	0.0	NA
Visitor Services	Visitor Services	2.0	0.5	1.0	0.0	NA
Research	Research	2.0	1.0	2.0	0.0	NA
Administration	Supervision	1.0	1.0	1.0	0.0	NA
Administration	Training	3.0	2.0	2.0	0.0	NA
Administration	Leave	4.0	2.0	2.0	0.0	NA
Administration	Administration and Other Duties	4.0	1.0	2.0	0.0	NA
I&M	Planning and Design of Surveys	3.0	3.0	2.0	1.0	2.0
I&M	Data Collection	12.0	14.5	9.0	8.0	6.0
I&M	Data Management	2.0	8.0	2.0	1.0	4.0
I&M	Analysis and Reporting	2.0	8.0	2.0		6.0
Total Weeks		52.0	52.0	37.0	12.0	18.0
I&M Subtotal		19.0	34.0	15.0	10.0	18.0
Total weeks per year available for selected surveys		**96.0**				

Protocol Assessment

Table B7.1 Protocol assessment for Great Dismal Swamp NWR selected surveys, with the priority for completing a site-specific protocol (SSP Priority), the current status of the protocol (protocol documented via: NPF-National Protocol Framework; RPF-Regional Protocol Framework; SSP-Site-Specific Protocol; SOP-Standard Operating Procedure; ISI-Initial Survey Instructions; None-None Available), and a score for completeness (0 = no information available, 1 = lacking many needed details, 2 = lacking moderate amount of detail, 3 = lacking a few details, or 4 = addressed in sufficient detail) for each of the eight core protocol elements (Intro = Introduction and Objectives, Design = Sampling Design, Field = Field Methods, Data = Data Management and Analysis, Report = Reporting, Pers = Personnel Requirements, Oper = Operational Requirements, Refs = References), standard operating procedures (SOPs), and supplemental materials (SMs).

Survey Name	SSP Priority	Protocol Status	Intro	Design	Field	Data	Report	Pers	Oper	Refs	SOPs	SMs
Forest Condition Monitoring	1	SOP	2	2	2	2	2	2	2	2	2	2
LTM Forest Plots with Water Level Data	2	SOP	2	2	2	2	2	2	2	2	2	2
Refuge Water Level Readings	3	SOP	1	1	3	2	1	1	1	1	1	1
Spotted Turtle Assessment	4	SOP	3	2	3	3	2	2	2	3	2	2
Red-cockaded Woodpecker Monitoring	5	RPF	3	3	3	3	3	3	3	3	3	3
Invasive Plant Inventory	6	RPF	3	3	4	4	3	3	3	4	3	3
Surface Elevation and Accretion Monitoring (SETs)	7	NPF	3	3	4	4	3	4	4	4	3	3

Table B7.2. Survey attribute rationales (e.g., what is the main attribute of interest, what will be measured, and when?) for each selected survey at Great Dismal Swamp NWR.

Refuge	Survey Name	Survey Attribute Rationale
DIS	Forest Condition Monitoring	The refuge has established forest I&M plots within all the water management units to collect a baseline inventory and monitor change in conditions over time, documenting forest health and successional stage. The plots will be visited on a 5-6 year cycle. This data will be used to establish trends and potentially trigger management.
DIS	Invasive Plant Inventory	This annual survey collects data on invasive species type, percent cover, and location.
DIS	LTM Forest Plots with Water Level Data	This survey will monitor the response of refuge forest habitat to installed hydrology units. The management goal is to efficiently create and re-wet the existing peat soil, which has deteriorated after centuries of logging and ditching. It includes higher resolution data collection (SEWALL data, LIDAR) and additional metrics of forest health and wetland water levels than those measured by forest conditions monitoring. This survey began in 2016, so it is still in the early stages. Only 10 plots that are visited twice annually, but this could expand depending on preliminary results.
DIS	Red-cockaded Woodpecker Monitoring	The refuge monitors the RCW population year round, tracking the banded young RCW to give an understanding of the population living on the refuge, their movement in the managed area, and their habitat preference. Head counts are done in winter and spring, cavities are inspected at the beginning of the breeding season to peep for nest prep and eggs, hatchlings are banded at day 7-10, and cavity inspections are done post-breeding season for cleaning and maintenance. A periodic check in pond pine pocosin habitat is done to find new clusters (using helicopter). This survey will look at trees and pine stands to monitor the foraging and nesting habitat suitability for RCW.
DIS	Refuge Water Level Readings	This annual survey monitors surface water and groundwater conditions in refuge ditches and the forested wetland habitat. This allows the refuge to monitor the effectiveness of their water management actions in meeting different habitat management objectives.
DIS	Spotted Turtle Assessment	This survey will gather data on the location, population, and weight of individual Spotted Turtles on the refuge. Not much is known about the population currently, and more information is needed.
DIS	Surface Elevation and Accretion Monitoring (SETs)	This annual survey monitors elevation trends of peat soils in response to water level and/or vegetation community changes. When soil is saturated, the peat layer can begin to build again, whereas if peat is dried out, it loses its water holding capacity and shrinks.

Reconnaissance, Visitor Services, Cooperative, and Research Projects

Table B9. Reconnaissance, visitor services, cooperative, and research projects (if applicable) that will continue to occur at Great Dismal Swamp NWR, with no need for an I&M site-specific protocol. Each project should still follow USFWS data management policy.

Refuge	Habitat	Project Type	Project Name	Purpose
DIS	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	Reconnaissance	Gaps in Canopy Assessment via Flyover (Annual)	The purpose of this survey is to know the condition of leaf-out each year based on aerial surveys (either by helicopter or satellite imagery) and determine if tree stress is potentially related to water management or insect damage (Gypsy Moth, Tent Caterpillar and Southern Pine Beetle are historically species that have damaged forest, typically gum, maple, and pine species. If Pine Beetle outbreak detected, forest removal needed. This survey enables refuge to respond quickly to insect damage). Informs management actions in stressed forest habitat - altering water level using water control structures or informing where to install water control structures.
DIS	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Open water, Maple Gum	Visitor Services	Audubon's Christmas Bird Count	The purpose for this survey is to provide educational and outreach opportunities for the public to collect avian population trend data nationwide.
DIS	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	Visitor Services	July Butterfly Survey	The purpose for this survey is to provide educational and outreach opportunities for the public to collect butterfly population trend data nationwide.
DIS	Pond Pine Pocosin, Atlantic White Cedar, Cypress Gum, Mesic Pine Mixed HW, Coastal Plain Seasonal Wetlands, Non-riverine Pine HW, Maple Gum	Cooperative	North American Breeding Bird Survey	The purpose of this point-count survey is to document the presence of breeding birds along 50 data points each year. The refuge conducts 2 breeding bird surveys, one route in VA portion of the refuge and another in NC (typically visited annually). The data collected can document trends in avian breeding and types of avian guilds present, including invasive Starlings on the burn scar, which may indirectly compete with RCW for food. The data has been used to inform management decisions on the refuge. Refuge relies on this data in case of FOIA requests regarding the increased water level management's effects on ground nesting birds.

Appendix C. Environmental Action Statement

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) (40 CFR §1500-1508), and other statutes, orders, and policies that protect fish and wildlife resources, we have established the following administrative record and determined that the action of issuing and implementing the Inventory and Monitoring Plan (IMP) for Great Dismal Swamp NWR is categorically excluded as provided by 43 CFR §46.210 and/or 516 DM 8.5 and 43 CFR §46.215. No further NEPA documentation will therefore be made.

The proposed action is implementation of the Inventory and Monitoring Plan (IMP) for Great Dismal Swamp NWR and was developed in accordance with revised Service policy 701 FW 2. This IMP addresses strategies previously described and analyzed in the refuge's 2006 Comprehensive Conservation Plan (CCP) and associated Environmental Assessment (EA) for the refuge. The EA concluded that impacts associated with inventory and monitoring were less than significant, and in most cases, negligible. The rationale for selection of one specific alternative for implementation is explained in the Finding of No Significant Impact (FONSI) accompanying the final CCP. The goals, objectives, and survey strategies included in this IMP fall within the bounds of those described and assessed in the CCP and EA.

This IMP documents and prioritizes inventory and monitoring surveys and research currently conducted and proposed to be conducted at the refuges. This plan improves inventory and monitoring efforts to better inform and support refuge goals, objectives, and the effectiveness of habitat management. Data derived from these efforts will be used to assess past management actions and potentially drive management actions to be taken in both the short and the long-term.

The proposed action is covered by the following Departmental categorical exclusion(s):

- "Research, inventory, and information collection activities directly related to the conservation of fish and wildlife resources which involve negligible animal mortality or habitat destruction, no introduction of contaminants, or no introduction of organisms not indigenous to the affected ecosystem." 516 DM 8.5B(1).
- "The issuance of new or revised site, unit, or activity-specific management plans for public use, land use, or other management activities when only minor changes are planned. Examples could include an amended public use plan or fire management plan." 516 DM 8.5B(10).

EXTRAORDINARY CIRCUMSTANCES (43 CFR 46.215):

Could this proposed action (check (✓) Yes or No for each item below):

Yes	No	Could This Proposed Action	
□	☑	a.	Have significant adverse effects on public health or safety
□	☑	b.	Have significant impacts on such natural resources and unique geographic characteristics as historic or cultural resources; park, recreation or refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands (EO 11990); floodplains (EO 11988); national monuments; migratory birds; and other ecologically significant or critical areas?
□	☑	c.	Have highly controversial environmental effects or involve unresolved conflicts concerning alternative uses of available resources [NEPA section 102(2)(E)]?
□	☑	d.	Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks?
□	☑	e.	Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects?
□	☑	f.	Have a direct relationship to other actions with individually insignificant but cumulatively significant environmental effects?
□	☑	g.	Have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places as determined by the bureau?
□	☑	h.	Have adverse effects on species listed or proposed to be listed on the List of Endangered or Threatened Species, or have significant impacts on designated Critical Habitat for these species?
□	☑	i.	Violate a Federal law, or a State, local, or tribal law or requirement imposed for the protection of the environment?
□	☑	j.	Have a disproportionately high and adverse effect on low income or minority populations (EO 12898).
□	☑	k.	Limit access to and ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites (EO 13007).
□	☑	l.	Contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species (Federal Noxious Weed Control Act and EO 13112).

If any receive a "Yes" check (✓), an EA/EIS must be prepared.

Within the spirit and intent of the Council of Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) and other statutes, orders, and policies that protect fish and wildlife resources, we have established the following administrative record and have determined:

[X] The proposed action is covered by a categorical exclusion as provided by 43 CFR §46.210 or 516 DM 8.5. No further NEPA documentation will therefore be made.

[ ] An Extraordinary Circumstance (43 CFR 46.215) could exist for the proposed action and, so an EA/EIS must be prepared.

Appendix D. IMP Revision Signature Page

Action	Signature /Printed Name	Date
Survey list or priority changed:		
Submitted By:	Project Leader	
Reviewed By:	I&M Coordinator	
Approved By:	Refuge Supervisor	