# Initial Survey Instructions – Field Form

**Survey:** Integrated Waterbird Management and Monitoring (IWMM)

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# Introduction

### Survey Name

Integrated Waterbird Management and Monitoring

### PRIMR Survey ID(s)

Bear Lake: FF01RBRL00-168; Oxford Slough: FF01ROXS00-111

**Survey conducted on:** ☐Single refuge ☒ Multiple refuges on the complex

### Refuge name(s)

Bear Lake NWR

Oxford Slough WPA

# Background/Survey Justification

Bear Lake National Wildlife Refuge has approximately 16,000 acres of wetland habitat. This wetland habitat provides a wide range of resources for waterbirds throughout their lifecycle. Some of the greatest use of the refuge by waterbirds comes during spring and fall migration, as the refuge serves as a stopover habitat. It is important to track waterbird numbers to determine trends of use on the refuge. These data will be used to help find associations between habitat condition and bird use to help evaluate efficacy of management actions, drive management decisions and inform the public regarding bird use.

Waterbird surveys have been conducted in the past on the refuge, but were suspended between 2010 and 2016. They were restarted in 2016 in order to provide baseline habitat prior to planned habitat restoration projects. Many habitat manipulations were initiated in 2016 to decrease perennial emergent and residual vegetation cover. With an increase in open water, early successional submerged aquatic vegetation, and early successional emergent vegetation communities in many of the units it is likely that habitat quality for waterbirds and other wetland-associated wildlife species will be improved. Surveys in subsequent years will allow tracking of interannual variation in waterbird use as staff works towards achieving habitat-based objectives set forth in the CCP.

The IWMM program was initiated by conducting structured decision-making (SDM) workshops to develop an operational framework for management and monitoring of waterfowl, shorebirds, and wading birds, collectively referred to as waterbirds, at the local, regional, and flyway spatial scales (Coppen et al, 2007, Laskowski et al. 2008, Lor et al. 2008). Through these workshops, the IWMM initiative developed a multi-scaled adaptive management process that will inform local, regional/state, and flyway managers about how they can best meet the needs and support populations of migrating and wintering waterbirds. The program includes a monitoring component that assesses how well managers at all scales are meeting their

management objectives and an adaptive feedback loop that allows managers to adjust their management to address emerging threats.

During spring 2019, Bear Lake NWR adopted the IWMM methodology and this survey now tiers off the National Protocol Framework for the Inventory and Monitoring of Nonbreeding Waterbirds and their Habitat (Loges, et al. 2015). The focus of this framework is a multi-species group of waterbirds during winter and migration (excluding cryptic and secretive marshbirds; Conway 2011). Because every species has its own set of habitat needs, managers must consider many factors when integrating management of multiple species or groups. These factors include the annual wetland hydrological cycle, targeted portion of species' annual life cycles (Williams et al. 1996), budget and staff resources (i.e., capacity), and physical constraints of the wetlands being managed. The dynamic and interactive nature of these factors often presents different management opportunities or problems. Consequently, managers typically adjust objectives for different wetland units on an annual basis to take into consideration changing conditions. Site-specific versions of this protocol help managers collect the data needed to inform these types of local management decisions.

As a cooperator in the IWMM program, the Refuge has adopted methodologies for inventory and monitoring of nonbreeding waterbirds and their habitat and refined the target species and survey timing to meet Refuge needs. By integrating survey efforts with the IWMM, the Refuge will assist waterbird conservation at the Refuge, state, regional and flyway scales (Soulliere et al. 2013). The Refuge will use data collected from the waterbird and unit conditions survey to determine if management actions are achieving desired results and to fine-tune management, if needed. If habitat-based objectives from the CCP are being met and waterbird use of corresponding wetland habitats is not at the level anticipated, and exogenous factors that can affect waterbird populations are not determined as a causal factor in less avian use of improved wetland habitats, further habitat manipulations or alternate management strategies may be considered. Additionally, survey results will be used to inform the public of species composition and numbers observed on the refuge, which may be of interest to hunters and birdwatchers during peak migration seasons.

## Survey Targets & Objectives

### Target species/taxa/community

All waterbirds

### Target habitat(s) (*if applicable*)

Semi-permanently, seasonally and temporarily flooded wetlands

**Survey Objectives***
**(Management and Sampling objectives, i.e., what questions do you hope to address with this survey?)**

*Management Objectives from CCP*

- (1.2b. ) Alkali Meadow (Temporarily Flooded) Habitat
- (3.1a.) Alkali Upland Meadow (Intermittently Flooded) Habitat
- (1.1c.) Deep Emergent (Semi-Permanently Flooded) Habitat
- (3.1b.) Meadow Grass (Intermittently Flooded) Habitat
- (1.1a.) Open Water (Permanently Flooded) Habitat
- (1.1d) Shallow Emergent (Semi-permanently and Seasonally Flooded) Habitat
- (1.1b.) Submerged Aquatic (Permanently Flooded) Habitat
- (1.2a) Wet Meadow (Seasonally and Temporally Flooded) Habitat
- (2.1.) Wooded Riparian and In-Stream Habitat

*Survey Objectives*

- Document waterbird use during migration periods
- Assess migratory waterbird response to habitat management actions
- Collect data to inform public of waterbird use

## Sampling Design

**Is the population(s) to which inference is being made from sampling known?** X Yes ☐No ☐ Not Sure

**If yes, describe this population(s).**

The sampling frame is the wetland habitat on Bear Lake National Wildlife Refuge and the survey units are 9 management units on Bear Lake National Wildlife Refuge. The entirety of Oxford Slough WPA that can be observed from pre-determined points is the sampling frame for that unit.

**Are the attribute(s) of interest for the survey identified?** X Yes ☐No ☐Not Sure

**If yes, describe attribute(s) of interest.**

Species, numbers, waterbird use days and migration chronology curves.

**Are specific sampling units identified?** ☒ Yes ☐No ☐Not Sure

**If yes, select sampling unit type:** ☐Route/linear transect ☐Plot ☒ Point ☐ Other (describe below):

Bear Lake NWR:

1-3 points on each of the following management units: Alder, Bloomington, Bunn Lake, Mud Lake, North Dingle, South Dingle, Salt Meadow, Rainbow Sub, Rainbow. Since the units are large, points provide consistency between surveys are established along dikes and exterior refuge roads at points that allow suitable visibility. The west side route captures points on the Alder, Bloomington, Bunn Lake and Mud Lake units. The east side route captures points on the North Dingle, South Dingle, Salt Meadow, Rainbow Sub and Rainbow units.

Oxford Slough WPA:

4 points are established to provide consistency between surveys.

**Are sampling units permanent?** ☒ Yes ☐No ☐Not Sure

**If yes, how are sampling units marked? (e.g., GPS waypoints, rebar, flagging)**

Points are marked on GPS at Bear Lake NWR. Points at Oxford Slough are marked by GPS as well as t-posts at each point. (See appendix 6) for instructions for Oxford Slough that delineate observation boundaries).

**Is the methodology known to select sampling units within the sampling frame?** ☐ Yes ☐ No ☒ Not Sure

**If yes, describe the sampling design (e.g., simple random, stratified random).**

For meeting local-scale objectives, census techniques are used to assess environmental conditions and waterbird use by survey unit. A spatial sampling design in not required. Since a theoretical design is not used to allocate a sample of locations within a management unit, we refer to the units as a survey unit instead of sample units.

**Survey timing***

Survey timing is designed to capture Spring and Fall migration periods. Each point is surveyed once per week from ice-out to 31 May for spring migrants and 1 Aug to freeze-up for fall migrants.

**Is sample size based on power analysis and error (Types I and II)?**

☐Yes ☒ No ☐Not Sure ☐Not Applicable

**If yes, describe the power analysis and error.**

## Cooperative Surveys

**☒ Does this survey contribute to a collaborative State, Regional, or National I&M activity with inference beyond refuge boundaries?**

Point of Contact for cooperator (name and organization/agency)

Robert Fenwick, USFWS

Is there a written protocol available for the survey? ☐Yes ☐ No ☐ In Prep ☐ Not Sure

Protocol name, citation, and/or link to documentation

National Protocol Framework for the Inventory and Monitoring of Nonbreeding Waterbirds and their Habitats. ServCat/Reference/Profile/104965

Are there site-specific elements to implement it on the refuge? ☐Yes ☐ No ☐ Not Sure

## Field Methods and Sample Processing

**Pre-survey logistical considerations and preparation:**

Site, survey unit, and observer codes were assigned by IWMM staff. Observers should check with the IWMM coordinator and IWMM website to see if there are any updates to data collection methods or data management systems since the previous year's survey. New observers should contact the Science Coordinator (iwmmprogram@gmail.com) for assistance in assigning the observer codes. If you do not know the codes, leave them blank, but make sure that you fill in name details so that the codes can be completed subsequently. Refer to SOPs 2 and 3 of the Protocol Framework for additional information regarding pre-survey logistics and preparation including equipment needed for the survey.

Data for this survey can be recorded onto a paper form, or entered into a Survey 123 app and this is the observers choice. To use the Survey 123 app, an observer must have a valid USFWS computer account, be listed as an observer in the IWMM program, and have an

account to access the Avian Knowledge Network (AKN). Volunteers or assistants who do not have those resources must use the paper form.

### Field data collection procedures:

Detailed instructions for Waterbird and Unit Condition Survey are available in SOP 2 of the Framework. All fields of the datasheet (Supplemental Materials 1) or Survey 123 app must be completed and SOP 2 of the Framework provides codes and descriptions of all data fields.

On Bear Lake NWR observers drive along the survey routes and stop at designated points (See Appendix 1 for maps and Appendix 2 for coordinates of survey point locations). Observers stop the vehicle and conduct whole area counts while standing in bed of truck on an elevated platform at each point along the survey routes. Record habitat parameters across an entire unit for entry on the data sheet.

At Oxford Slough WPA observers park at the gate on the north side of the unit next to the rock pit. Observers walk down the 2-track road to the southeast to the observation points and must use a spotting scope. Record habitat parameters across the entire unit for entry on the data sheet.

Count all waterfowl, shorebirds, and wading birds at each point and sum to get total birds observed in each unit. Identify all of these waterbirds to species, when possible. When species identification is not possible, use aggregate categories. See the "Unidentified Waterbirds" codes in Appendix 5.

Familiarization with the American Ornithologists' Union (AOU) four-letter Alpha codes is helpful when conducting the waterbird surveys. AOU codes for waterbirds likely to be encountered on Bear Lake NWR are listed in Appendix 5. A full list of AOU codes can be found at: http//www.birdpop.org/alphacodes.htm. When counts are entered into IWMM's database, species should be identified by their AOU codes.

Each bird survey will also be accompanied by a range of unit condition measures representing weather, water depth, percent ice, flood duration, habitat cover, interspersion, vegetation height, and disturbance. For detailed instructions, please see the Protocol Framework SOP 2: Waterbird and Unit Condition Survey. ServCat/Reference/Profile/104965

Surveys are preferably conducted from 30 minutes before sunrise to noon on days with wind speeds less than 4 on the Beaufort scale and when skies are clear to overcast with no persistent precipitation.

Upon arrival at a point the observer counts the total number of waterbirds visible within the unit and then divides them up into appropriate species categories recording species and number of individuals, When species identification is not possible, use aggregate categories. If a bird or group of birds is detected in the air, but obviously took off from a location within the unit, it is recorded. If birds flush when driving or walking to a point and they would have

been able to be seen from the point, they are recorded. If birds are not able to be identified to species at a point but they are afterwards while driving further along the route, the observer can make changes to data from the previous point to reflect more refined speciation of individuals.

To avoid double counting, individuals detected by the observer are only recorded if they were not believed to be recorded at previous points.

*Young waterbirds/broods*—Do not include dependent young waterbirds in counts. For geese, swans and ducks, assume juveniles are independent when they can fly. Any juveniles that did not hatch in the immediate vicinity should be included in counts (e.g. juvenile swans migrating in family groups).

### Post-collection processing of samples, if applicable:

### Supplemental materials to conduct the survey (e.g., maps, data sheets, GPS locations of survey sites or units):

Appendix 1 – Survey Maps
Appendix 2 – GPS Coordinates for Survey Point Locations
Appendix 3 – Data Sheet
Appendix 4 – Weather and Habitat Codes
Appendix 5 – Species Codes
Appendix 6 – Photos Delineating Survey Areas at Oxford Slough WPA

### Equipment list:

-Clipboard
-Paper data sheets or I-phone/I-pad with Survey 123 installed and IWMM Mobile App (IMA) downloaded.
-Vest
-GPS with survey points
-Pencil
-Kestrel for weather
-Watch, or stopwatch
-Binoculars
-Spotting scope (for Oxford Slough)
-Ladder and safety harness

# Personnel

### Duties & responsibilities for individuals involved with conducting all phases of the survey's life cycle (design, field collection, data management, data analyses, and reporting):

IWMM National Project Coordinator – Robert Fenwick, USFWS, robert_fenwick@fws.gov

Survey coordinator: Ben Wishnek, Bear Lake National Wildlife Refuge,

The survey coordinator is responsible for ensuring that staff members are properly trained to carry out surveys. The IWMM will provide access to training materials for survey coordinator to train cooperator members as needed. It is the survey coordinator's responsibility to assess whether or not individual staff members possess the necessary competencies, e.g., waterfowl identification skills, to conduct surveys. The survey coordinator will budget staff time and financial resources and plan equipment availability to enable survey objectives to be successfully met. It the responsibility of the survey coordinator to enter data, and share annual reports with refuge management.

At Bear Lake and Oxford Slough, the survey coordinator will be the primary surveyor. However, the Refuge Manager and Biological Technicians may be solicited for assistance with conducting surveys as necessary.

### Necessary qualifications for previously identified individuals:

All surveys need to be conducted by qualified individuals.

For Bird and Habitat Condition surveys, surveyors should be able to:

- Navigate to survey points using GPS or ArcCollector.
- Identify waterbird species
- Estimate large numbers of waterbirds using advocated techniques
- Follow survey protocols

### Necessary training:

Cooperators should visit the IWMM website at: https://iwmmprogram.org/ for a recorded webinar that will introduce IWMM and introduce the waterbird survey, vegetation survey, and management actions tracking. Inexperienced waterbird counters are advised to practice their counting and estimation techniques before participating in IWMM. This can be 16 done in the field or at a desktop computer using Wildlife Counts software: https://wildlifecounts.com/index.html.

In addition, new observers will conduct at least one survey with oversight from the Survey Coordinator.

## Data Management and Analysis

### Specify data entry file format(s) (e.g., MS Excel, MS Access, GIS, web dbs (e.g., SQL)) and describe the data.

Collected data will be entered into the IWMM's centralized, online database. IWMM's database is a member of the Avian Knowledge Network (AKN). This database will compile bird survey, vegetation survey, and management action data. The database can also be used for managing surveys and collaboration with others. Using AKN for data management will require access to a 'portal.' It will also require knowledge of the one or more database protocols that are used for data entry and associated with the design and approach for data collection described by this survey protocol framework. More specific instructions for entering data into this database can be found in SOP 7 of the Framework.

The AKN hierarchy for the project is as follows:

**Project:** BEARLAKENWR – Bear Lake NWR
**Study Area:** Bear Lake NWR (ID-001)
**IWMM Management Units:**

- Alder (ID-001-ALDER)
- Bloomington (ID-001-BLO)
- Bunn Lake (ID-001-BL)
- Mud Lake (ID-001-ML)
- North Dingle (ID-001-ND)
- Rainbow (ID-001-RAINB)
- Rainbow Sub (ID-001-RS)
- Salt Meadow (ID-001-SM)
- South Dingle (ID-001-SD)

**Project:** OXFORDSLOUGHWPA– Oxford Slough WPA
**Study Area:** Bear Lake NWR (ID-002-OSWPA)

### Specify data storage/archive location (hardcopy and electronic).

Scanned hard copies of the data sheets will be located on the Wildlife Biologist's computer at the following location: C:\Users\bwishnek\BensWorkFiles\Inventory and Monitoring\Avian\Waterbird Monitoring\IWMM\Hard Copy Data Sheets.

Hard copies of data sheets will be stored in the file cabinet in the Wildlife Biologist's office in the folder entitled 'IWMM'.

Electronic copies of the data are entered in the AKN.

### Describe procedure(s) for processing and verifying/quality checking data.

Wildlife biologist will QA/QC data sheets filled out by others who may conduct survey. Once they have been checked they will be filed for data entry as time allows.

### Describe methods/software used in data analysis:

Summaries of monitoring efforts will be compiled for both spring and fall each year and reported to the Refuge Manager, Deputy Project Leader and Project Leader. Summary data for specific species, management units and/or time periods apart from annual season summaries will be produced as requested by USFWS employees or collaborators.

Tables with dates of surveys and personnel for each route and spring and fall survey period along with person-hours will be calculated and reported.

A summary of relevant management actions for each unit throughout the calendar year will be included in the annual summary.

Numbers of diving duck, dabbling duck, goose, American Coot, crane, pelican, shorebird, tern/gull, and wader at each point will be summed and reported by unit for each survey. Raw data is downloaded into excel spreadsheets from the AKN and species are grouped according to the above classifications and put into tables.

Although survey effort is prescribed in this document as weekly during spring (ice-out - 31 May) and fall (1 August – freeze-up), competing priorities and limited staffing sometimes does not allow weekly surveys to occur. Weekly data is needed to make canned analyses of bird use days and migration curves within the AKN more robust. If weekly data is able to be collected at a sufficient level, canned tools within the IWMM for reporting bird use days and migration curves may also be used for reporting.

Finally, lessons learned and modifications made to initial survey instructions will be reported.

### Survey metadata – Content and format:

*Include procedures for access and sharing and describe any use constraints.*

This survey is conducted to assess waterbird use and habitat conditions across management units at Bear Lake NWR and Oxford Slough WPA during spring and fall migration. It will be summarized on an annual basis to assist the Refuge Manager in assessing efficacy of management actions taken on each unit. Requests for the data will be discussed by the Wildlife Biologist and Refuge Manager and data will be given out on a case-by-case basis.

## Operational Requirements

### Budget (including staff time, equipment purchases, contracted expenses (e.g. flight time), analysis costs, annually itemized, as needed):

Average Annual Staff Time - 159 hours (Bear Lake) + 84 hours (Oxford Slough)

Total Average Annual Operation Cost - $8,744 (Bear Lake) + $4,470 (Oxford Slough)

### Schedule (calendar) for survey phases (design, field collection, data management, data analyses, and reporting):

Field Collection – ice-out to May 31 and August 1 to freeze-up

Data Management, Analyses, Reporting - Winter

### Coordination (if applicable):

### Necessary permits and other operational needs:

## Reporting

### Describe the schedule for progress and final reports and other deliverables (if applicable):

Reports are completed on an annual basis during the winter for the previous year's efforts.

## References (Include personal communication and citations for published and gray literature)


Bart J, Earnst S. 2002. Double sampling to estimate density and population trends in birds. Auk 119:36–45.

Buckland ST, Anderson DR, Burnham, KP, Laake JL, Borchers DL, Thomas L. 2004. Introduction to distance sampling, estimating abundance of biological populations. Oxford, UK: Oxford University Press.

Conway CJ. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319–346.

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Forcey GM, Anderson JT, Ammer FK, Whitemore RC. 2006. Comparison of two double-observer approaches for estimating breeding bird abundance. Journal of Wildlife Management 70:1674–1681.

Gray MJ, Hagy HA, Nyamn JA, Stafford JD. 2013. Management of wetlands for wildlife. Pages 121-180 in Anderson JT and Davis CA, editors. Wetland Techniques, Volume 3, Secaucus, New Jersey: Springer.

Laskowski H, Stanton J, Lonsdorf E, Lyons J, Brown S, Coppen J, Durbian F, Jones T, Leger T, Milliken A, Seamans M, Brewer DC, Runge MC. 2008. Application of structured decision making to access multiple scale monitoring needs for waterbird management. A case study from the structured decision making workshop, January 28—February 1, 2008, National Conservation Training Center, Shepherdstown, West Virginia.

Loges BW, Tavernia BG, Wilson AM, Stanton JD, Herner-Thogmartin JH, Casey J, Coluccy JM, Coppen JL, Hanan M, Heglund PJ, Jacobi SK, Jones T, Knutson MG, Koch KE, Lonsdorf EV, Laskowski HP, Lor SK, Lyons JE, Seamans ME, Stanton W, Winn B, and Ziemba LC. 2014. National protocol framework for the inventory and monitoring of nonbreeding waterbirds and their habitats, an Integrated Waterbird Management and Monitoring Initiative (IWMM) approach. Natural Resources Program Center, Fort Collins, CO.

Lor S, Casey J, Lonsdorf E, Seamans M, Anderson M, Chambers C, Chmielewski A, Granfors D, Hinds L, Holcomb K, Brewer DC, Runge MC. 2008. Habitat management for multiple wetland bird objectives on national wildlife refuges. A case study from the structured decision making workshop, 21—25 July 2008, National Conservation Training Center, Shepherdstown, West Virginia.

Soulliere GJ, Loges BW, Dunton EM, Luukkonen DR, Eichholz MW, Koch KE. 2013. Monitoring waterfowl in the Midwest during the non-breeding period: challenges, priorities, and recommendations. Journal of Fish and Wildlife Management 4:395–405.

Thompson WL. 2002. Towards reliable bird surveys: accounting for individuals present but not detected. The Auk 119:18–25.

Thompson WL, White GC, Gown C. 1998. Monitoring vertebrate populations. New York, New York: Academic Press.

Webb EB, Smith LM, Vrtiska MP, LaGrange TG. 2010. Effects of local and landscape variables on wetland bird habitat use during migration through the rainwater basin. Journal of Wildlife Management 74:109–119.

Williams BK. 2011. Adaptive management of natural resources: framework and issues. Journal of Environmental Management 92.5:1346–1353.

Williams BK, Johnson FA, Wilkins, K. 1996. Uncertainty and the adaptive management of waterfowl harvests. Journal of Wildlife Management 60:223–232.

## File names of any separate reference materials not attached

Appendix 1 – Maps
Appendix 2 – GPS Coordinates for Survey Point Locations
Appendix 3 – Data Sheet
Appendix 4 – Weather and Habitat Codes
Appendix 5 – Species Codes
Appendix 6 – Photos Delineating Survey Areas at Oxford Slough WPA

## Version Tracking

### Preparer (name, position, and contact information):

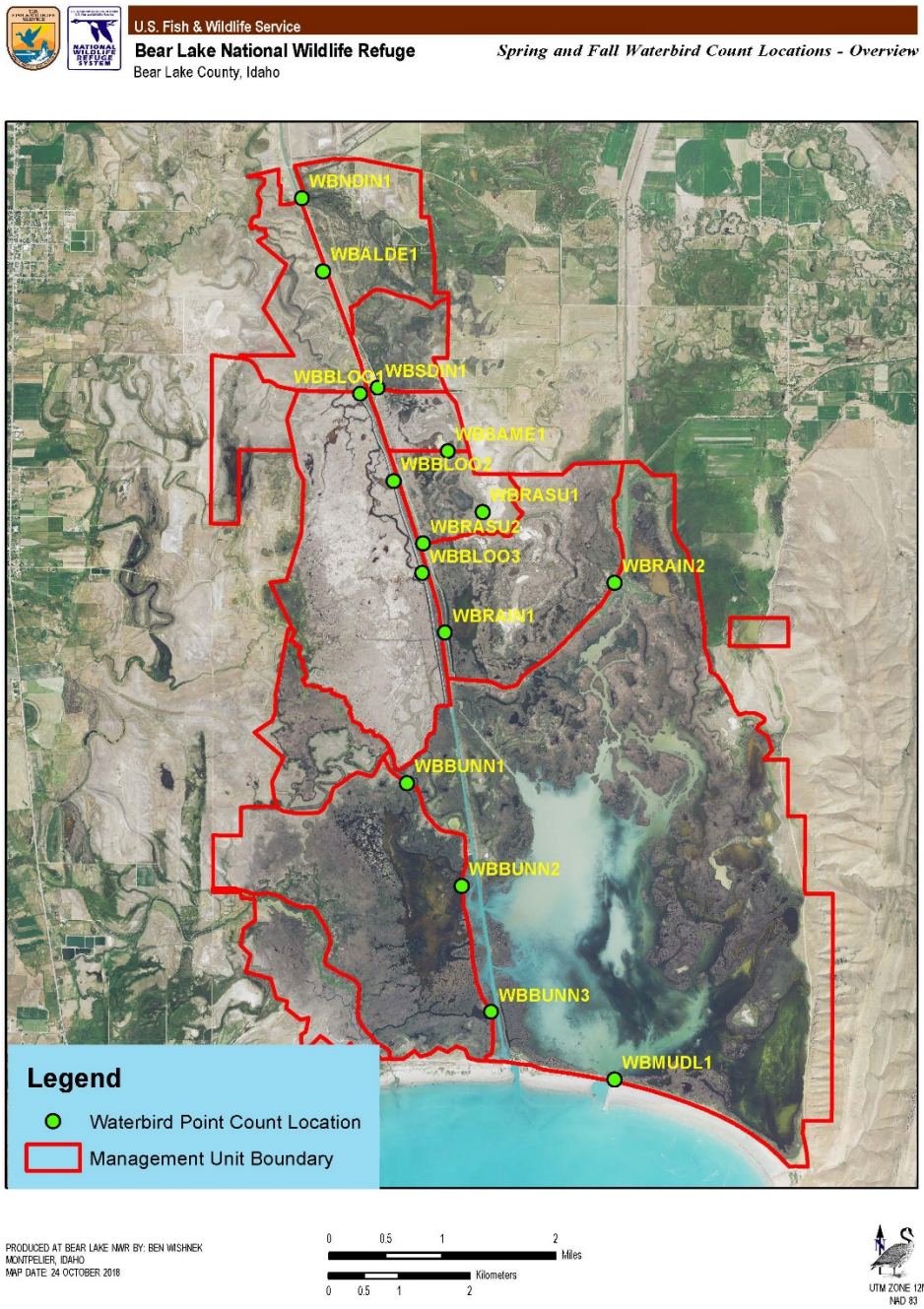
*You can use the table below to track updates to the Survey Methods Record.*

| **Version** | Completed by | Date | Comments/material updated |
|---|---|---|---|
| 1 | J. Barnett/B. Wishnek | Feb 2020 | |

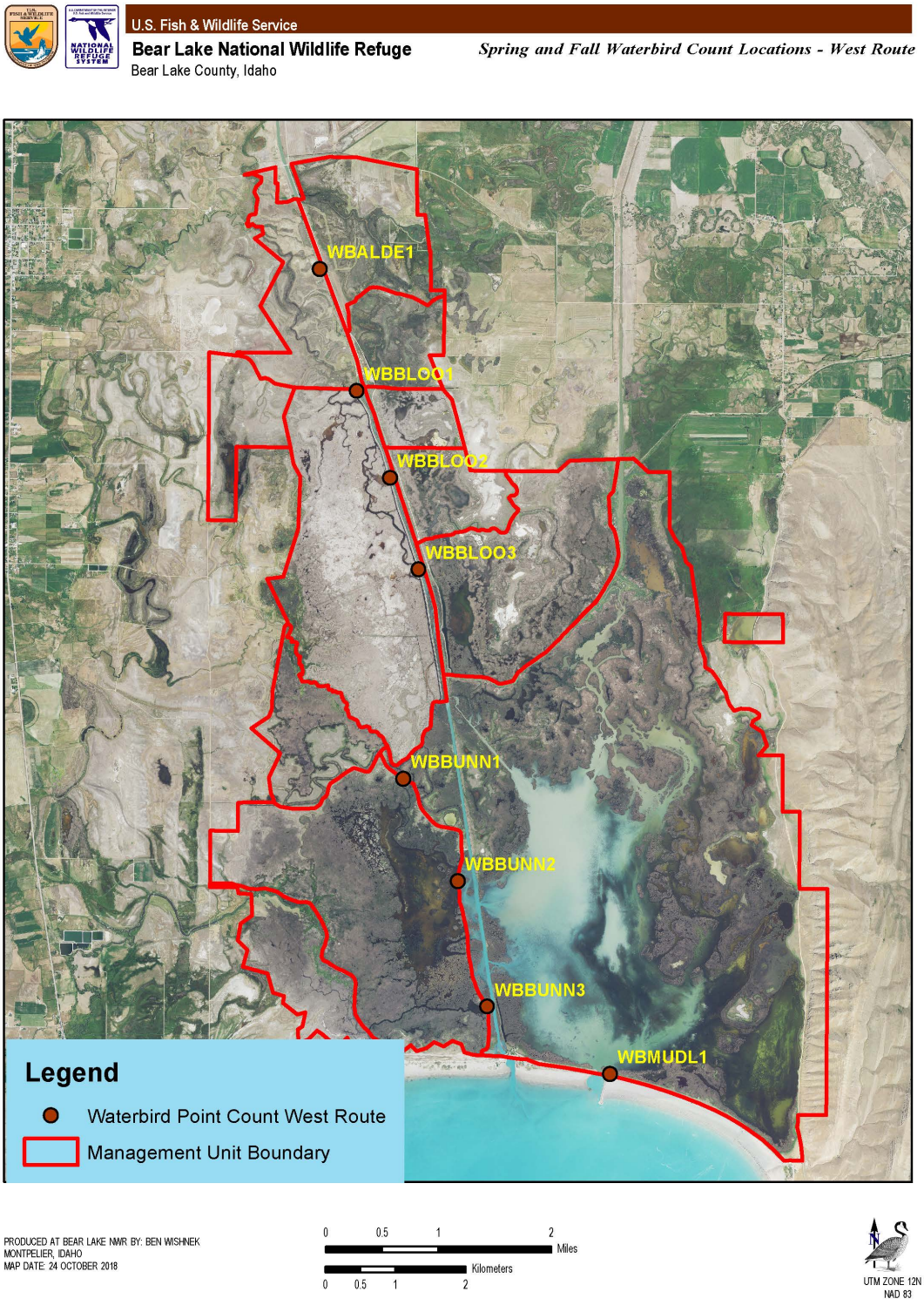
# Maps and Appendices

## Appendix 1. Maps

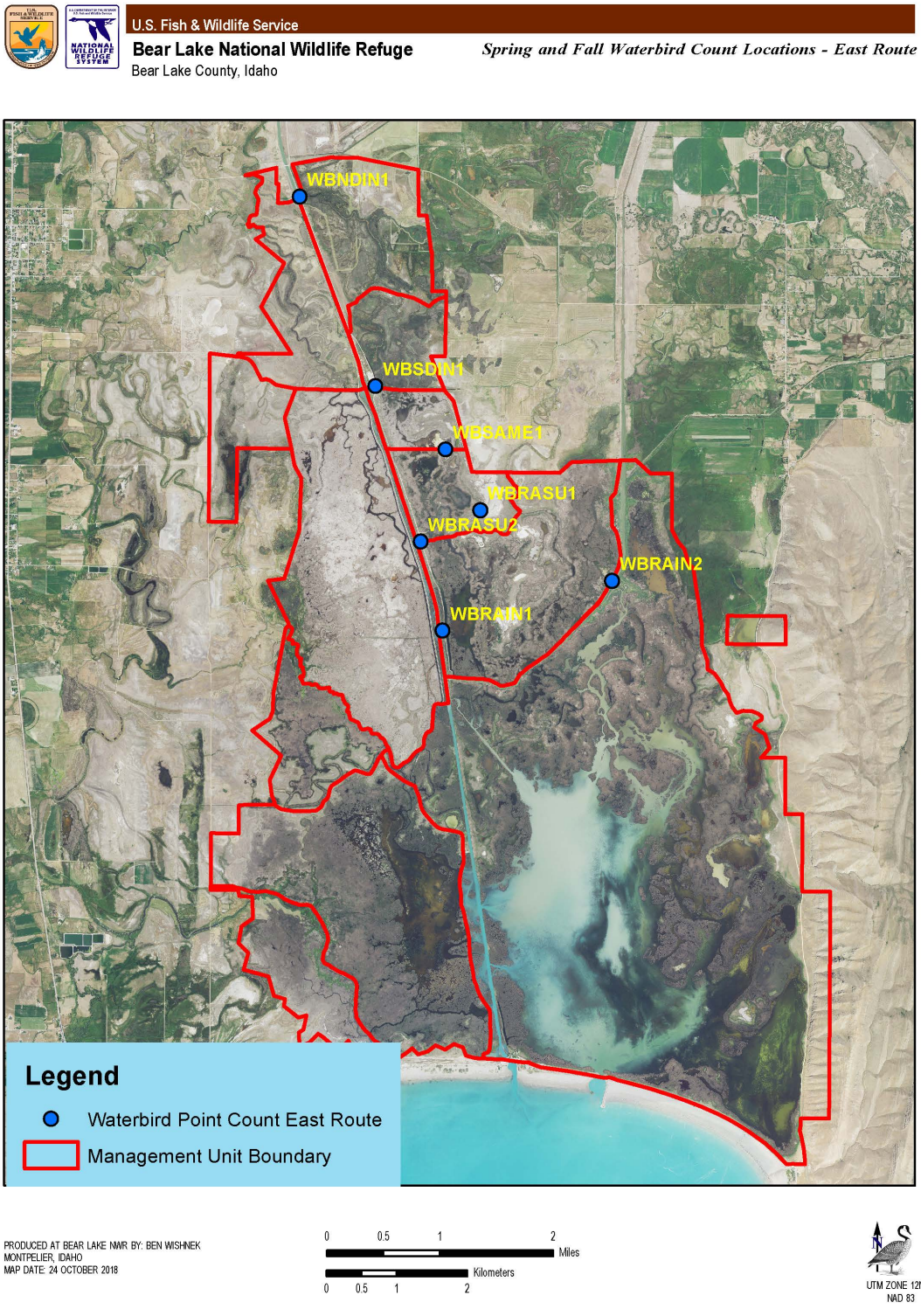
*Overview Map*



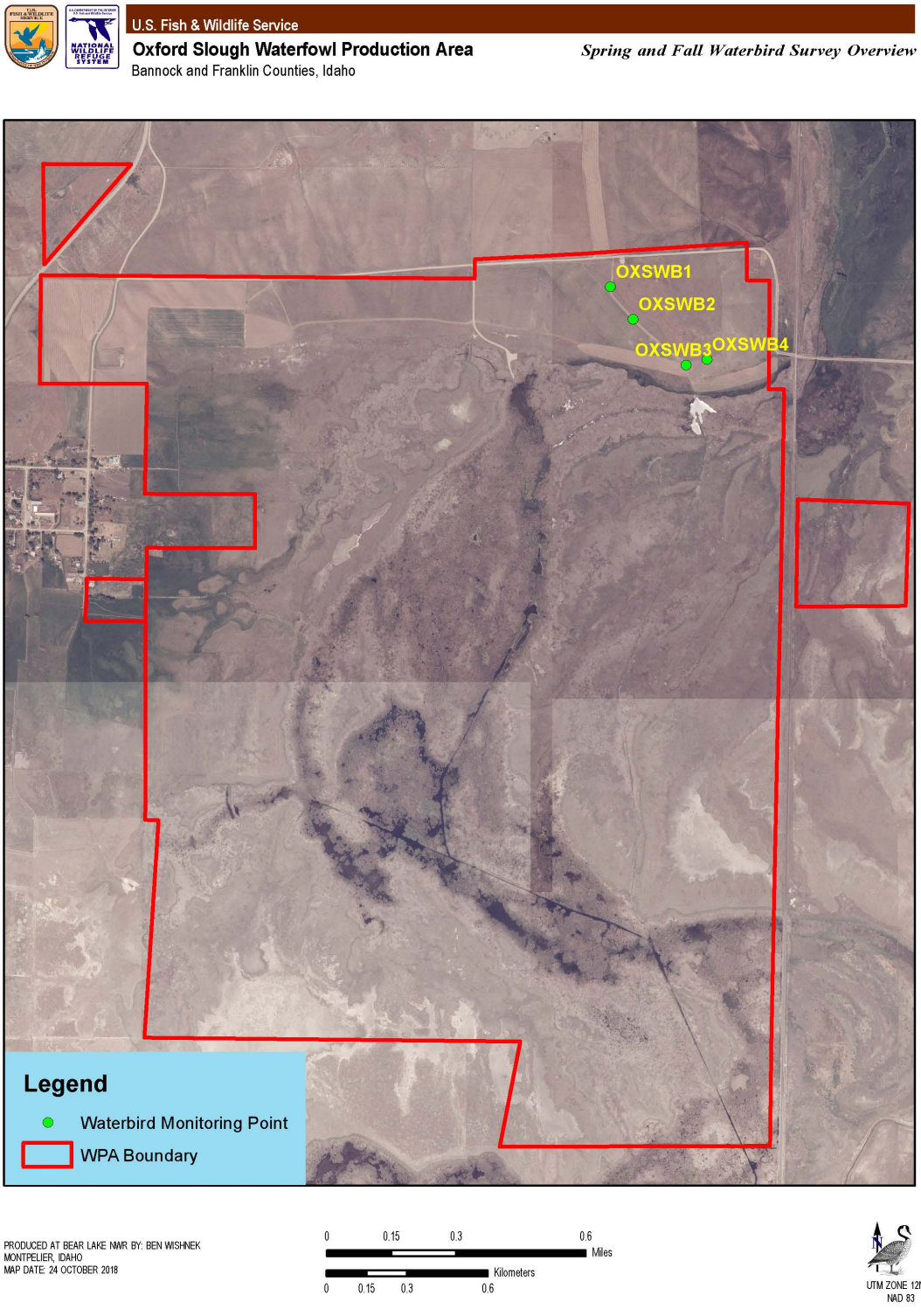
*West Route*


U.S. Fish & Wildlife Service
Bear Lake National Wildlife Refuge
Bear Lake County, Idaho
Spring and Fall Waterbird Count Locations - West Route
WBALDE1
WBBLOO1
WBBLOO2
WBBLOO3
WBBUNN1
WBBUNN2
WBBUNN3
WBMUDL1
Legend
Waterbird Point Count West Route
Management Unit Boundary
PRODUCED AT BEAR LAKE NWR BY: BEN WISHNEK
MONTPELIER, IDAHO
MAP DATE: 24 OCTOBER 2018
0 0.5 1 2
Miles
0 0.5 1 2
Kilometers
UTM ZONE 12N
NAD 83

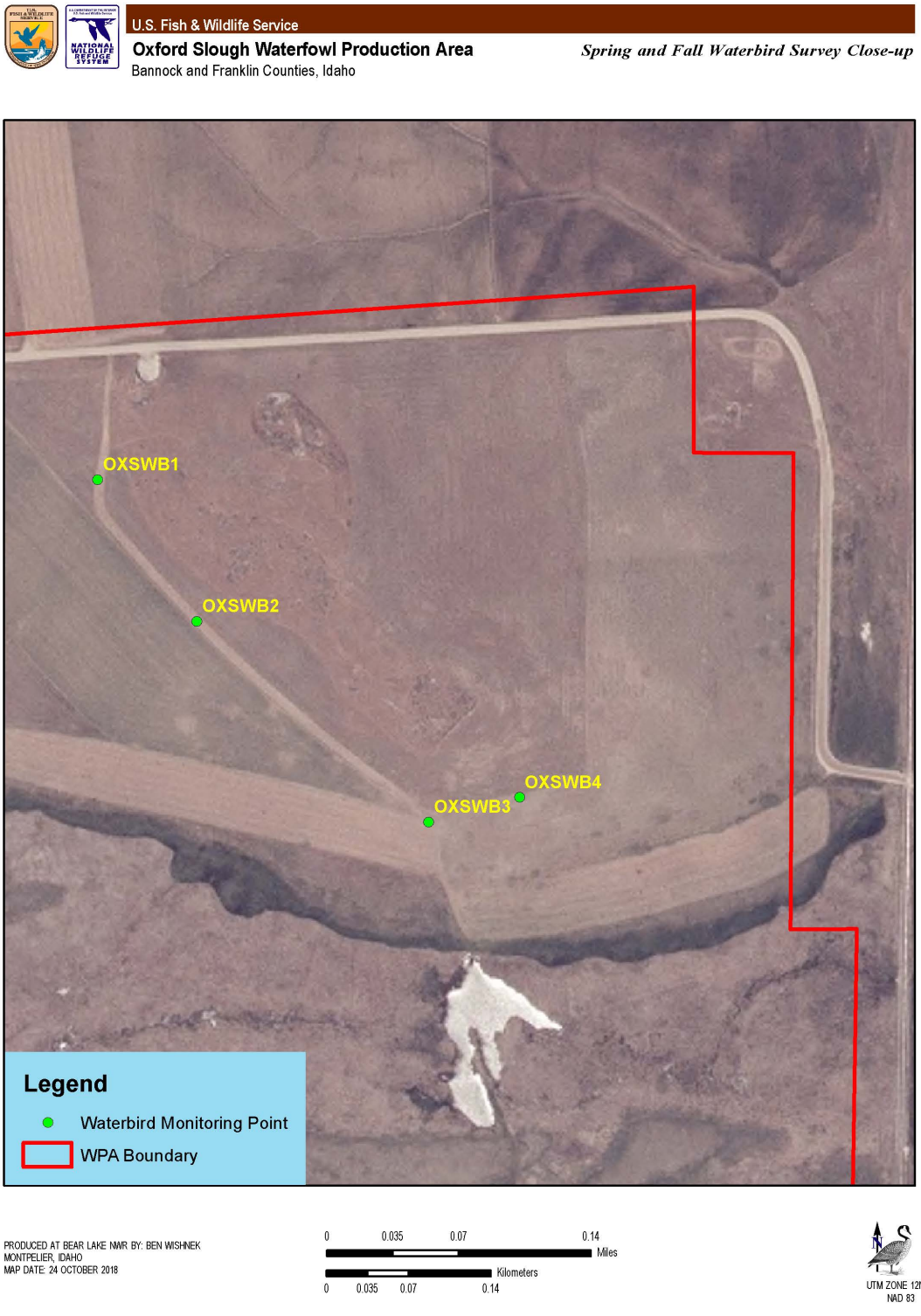
*East Route*


U.S. Fish & Wildlife Service
Bear Lake National Wildlife Refuge
Bear Lake County, Idaho
Spring and Fall Waterbird Count Locations - East Route
WBNDIN1
WBSDIN1
WBSAME1
WBRASU1
WBRASU2
WBRAIN2
WBRAIN1
Legend
Waterbird Point Count East Route
Management Unit Boundary
PRODUCED AT BEAR LAKE NWR BY: BEN WISHNEK
MONTPELIER, IDAHO
MAP DATE: 24 OCTOBER 2018
0 0.5 1 2
Miles
0 0.5 1 2
Kilometers
UTM ZONE 12N
NAD 83

*Oxford Slough Overview Map*



*Oxford Slough Close-up Map*



## Appendix 2 – GPS Coordinates * for Survey Point Locations

*Bear Lake*

*Coordinate System is NAD 1983 UTM Zone 12N

| Point | Latitude | Longitude |
|---|---|---|
| *West Route* | | |
| ALDE1 | 42.241914 | -111.974069 |
| BLOO1 | 42.207798 | -111.341131 |
| BLOO2 | 42.196652 | -111.335374 |
| BLOO3 | 42.184940 | -111.330324 |
| BUNN1 | 42.158093 | -111.332826 |
| BUNN2 | 42.144980 | -111.323400 |
| BUNN3 | 42.128866 | -111.318180 |
| MUDL1 | 42.120319 | -111.296967 |
| *East Route* | | |
| NDIN1 | 42.232779 | -111.351327 |
| SDIN1 | 42.208588 | -111.338122 |
| SAME1 | 42.200540 | -111.326040 |
| RASU1 | 42.192766 | -111.319982 |
| RASU2 | 42.188712 | -111.330218 |
| RAIN1 | 42.177339 | -111.326434 |
| RAIN2 | 42.183795 | -111.297311 |

*Oxford Slough*

| Point | Latitude | Longitude |
|---|---|---|
| OXSWB1 | 42.26714 | -111.99231 |
| OXSWB2 | 42.26606 | -111.99127 |
| OXSWB3 | 42.26454 | -111.98885 |
| OXSWB4 | 42.26474 | -111.98792 |

## Appendix 3. Data Sheet

# IWMM - Waterbird & Unit Condition Survey: Recording form for multiple units

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Project Name** | | **Observers** | | | | | |
| **Start temp (°F)** | | **Date** | __/__/____ | **Wind** (Beaufort 0-6) | | **Notes:** | |
| **Unit Code:** | | | | | | | |
| **Survey start/end time** | | / | / | / | / | / | / |
| **Survey type (whole area, aerial)** | | WA | WA | WA | WA | WA | WA |
| **% Visibility** | | | | | | | |
| **Local Tide Conditions**[a] | | 9 | 9 | 9 | 9 | 9 | 9 |
| **Salinity** | | N/A | N/A | N/A | N/A | N/A | N/A |
| **Water Gauge**[b] (units= ) | | | | | | | |
| **Water Depth** % of unit in each category (sum to 100) | Dry | | | | | | |
| | Saturated/mud | | | | | | |
| | 0 to 5 cm(≈ 0-2") | | | | | | |
| | 5 to 15 cm(≈ 2-6") | | | | | | |
| | 15 to 25 cm(≈ 6-10") | | | | | | |
| | >25 cm(≈ >10") | | | | | | |
| **Estimation method:** Bathymetry +gage, Ocular, or Other | | | | | | | |
| **Percent of ice cover** | | | | | | | |
| **Flood Duration**[c] | | | | | | | |
| **Flood dur. method:** Bathymetry +gage, 1st hand , 2nd hand, or other | | | | | | | |
| **Habitat Cover** % of unit in each category (sum to 100) | Water (Include SAV.[d] & Floating-Leaved | | | | | | |
| | Scrub-shrub | | | | | | |
| | Forest | | | | | | |
| | Emergent | | | | | | |
| | Bare Ground | | | | | | |
| **Interspersion**[e] | | | | | | | |
| **Disturbance severity**[f] | | | | | | | |
| **Disturbance sources**[g] | | | | | | | |
| **Chronic human disturbance**[h] | | | | | | | |
| **Height** % of unit in each category (sum to 100) | <2.5 cm (≈<1") | | | | | | |
| | 2.5 to 15 cm (≈1-6") | | | | | | |
| | 15 to 30 cm (≈6-12") | | | | | | |
| | 30 to 60cm (≈1-2') | | | | | | |
| | 60 cm to 3 m (≈2-10') | | | | | | |
| | 3 to 6 m (≈10-20') | | | | | | |
| | >6 m (≈>20') | | | | | | |

| To be completed if not printed double-sided: | | Project | | Date | _ _/_ _/_ _ | |
|---|---|---|---|---|---|---|
| **Species** | unit: | unit: | unit: | unit: | unit: | unit: |
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**a, tide conditions**: 1 = high; 2 = almost high, rising; 3 = almost high, falling; 4 = half tide, rising; 5 = half tide, falling; 6 = almost low, rising; 7 = almost low, falling; 8 = low; 9 = not observed, not applicable, or observations made during more than one period **b, gauge units**: 1=feet/tenths, 2=feet/inches, 3=meters

**c, flood duration:** 1 = surface water present for > 90 days; 2 = surface water present 30-90 days, 3 = surface water present < 30 days; 4 = permanent inundation; 5 = no information

**d, submersed aquatic vegetation**

**e, interspersion:** class "L" = includes large water/bare ground features with connected patches and linear edge; Class "S"= contains small, disconnected patches of water/bare ground with increased random distribution and fewer instances of connection; Class "M" = consists of patterns that contain discernible regions of both configuration classes L and S

**f, disturbance severity:** 1 = no effect on waterbirds; 2 = some waterbirds move but stay within unit; 3 = some waterbirds leave unit; 4 = most/all waterbirds leave unit

**g: disturbance codes** (may be more than one): 1=Pedestrian, 2=Loose dog, 3=Hunting, 4= Fishing, 5=Boats, 6=Motor Vehicles, 7=Aircraft, 8=Raptor

**h, chronic human disturbance:** 1 = no entry into the unit for any reason; 2 = Closed to all use with entry into unit by resource managers or designees for management activities, surveys, or other controlled non-hunting activities; 3 = Managed access for all activities including firearms hunting. May include effort to control use levels and temporal closures; 4 = open access via trail, viewing platforms etc. No firearms hunting allowed; 5 = Open access, including firearms hunting, often with routine restrictions but without a site specific management program to control the level of authorized use; 6 = unknown

# Appendix 4 – Weather and habitat codes

**The Beaufort Wind Scale**

| MPH | Beaufort | Description | Appearance of wind effects |
|---|---|---|---|
| <1 | 0 | Calm | Calm, smoke rises vertically |
| 1-3 | 1 | Light Air | Smoke drift indicates wind direction, still wind vanes |
| 4-7 | 2 | Light Breeze | Wind felt on face, leaves rustle, vanes begin to move |
| 8-12 | 3 | Gentle Breeze | Leaves and small twigs constantly moving, light flags extended |
| 13-18 | 4 | Moderate Breeze | Raises dust and loose paper; small branches are moved |
| 19-24 | 5 | Fresh Breeze | Small trees in leaf begin to sway |
| 25-31 | 6 | Strong Breeze | Large branches in motion; umbrellas used with difficulty |

BEAR LAKE NWR – Codes for IWMM Survey

Site Code: ID – 001

Unit Codes:

- Alder: ALDER
- Bloomington: BLO
- Bunn Lake: BL
- Mud Lake: ML
- North Dingle: ND
- Rainbow: RAINB
- Salt Meadow: SM
- South Dingle: SD
- Rainbow Sub: RS

| FLOOD DURATION CATEGORIES | |
|---|---|
| CODE | DESCRIPTION |
| 1 | Surface water present > 90 days |
| 2 | Surface water present 30-90 days |
| 3 | Surface water present <30 days |
| 4 | Permanent Inundation |
| 5 | No information |

**Local tide conditions: 9**

Salinity Measure: 3

**Salinity: <0.5**

Flood duration method: 3

**Chronic Disturbance class:**

**3 (hunt open) or 4 (Hunt closed)**

Water Depth Method: 1 = bathy; 2 = ocular

| DISTURBANCE SEVERITY SCALE | | |
|---|---|---|
| SCALE | SEVERITY | DEFINITION |
| 1 | light/none | no effect on waterbirds |
| 2 | | some waterbirds move but stay within unit |
| 3 | | some waterbirds leave unit |
| 4 | | most/all waterbirds leave the unit |

| TYPES OF DISTURBANCE | |
|---|---|
| CODE | DESCRIPTION |
| 0 | none |
| 1 | Pedestrian |
| 2 | Loose dog |
| 3 | Hunting |
| 4 | Fishing |
| 5 | Boats |
| 6 | Motor Vehicles |
| 7 | Aircraft |
| 8 | Raptor |
| 9 | Other |

## Appendix 5 – Species Codes

| Bird Code | Name | Scientific Name | | Bird Code | Common Name | Scientific Name |
|---|---|---|---|---|---|---|
| AMAV | American Avocet | *Recurvirostra americana* | | MALL | Mallard | *Anas platyrhynchos* |
| AMBI | American Bittern | *Botaurus lentiginosus* | | NOPI | Northern Pintail | *Anas acuta* |
| AMCO | American Coot | *Fulica americana* | | NSHO | Northern Shoveler | *Anas clypeata* |
| AMWI | American Wigeon | *Anas americana* | | PBGR | Pied-billed Grebe | *Podilymbus podiceps* |
| AWPE | American White Pelican | *Pelecanus erythrorhynchos* | | REDH | Redhead | *Aythya americana* |
| BNST | Black-necked Stilt | *Himantopus mexicanus* | | RNDU | Ring-necked Duck | *Aythya collaris* |
| BUFF | Bufflehead | *Bucephala albeola* | | RUDU | Ruddy Duck | *Oxyura jamaicensis* |
| CAGU | California Gull | *Larus californicus* | | SACR | Sandhill Crane | *Antigone canadensis* |
| CANG | Canada Goose | *Branta canadensis* | | TRUS | Trumpeter Swan | *Cygnus buccinator* |
| CANV | Canvasback | *Aythya valisineria* | | TUSW | Tundra Swan | *Cygnus columbianus* |
| CITE | Cinnamon Teal | *Anas cyanoptera* | | UDAD | Unid. Dabbling Duck | *Anatidae sp.* |
| COGO | Common Goldeneye | *Bucephala clangula* | | UDID | Diving Ducks | *Aythya* |
| COLO | Common Loon | *Gavia immer* | | UNDO | Unidentified Dowitcher | *Scolopacidae sp.* |
| COME | Common Merganser | *Mergus merganser* | | UNDU | Unid. Duck | *Anatidae sp.* |
| DCCO | Double-crested Cormorant | *Phalacrocorax auritus* | | UNLG | Unid. Larus Gull | *Laridae sp.* |
| EAGR | Eared Grebe | *Podiceps nigricollis* | | UNSC | Unidentified Scaup | *Anatidae sp.* |
| FRGU | Franklin's Gull | *Leucophaeus pipixcan* | | UNTE | Unid. Teal | *Anatidae sp.* |
| GADW | Gadwall | *Anas strepera* | | UNWF | Unidentified waterfowl | *Waterfowl spp.* |
| GBHE | Great Blue Heron | *Ardea herodias* | | WEGR | Western Grebe | *Aechmophorus occidentalis* |
| GRYE | Greater Yellowlegs | *Tringa melanoleuca* | | WESA | Western Sandpiper | *Calidris mauri* |
| GWTE | Green-winged Teal | *Anas crecca* | | WFIB | White-faced Ibis | *Plegadis chihi* |
| LESC | Lesser Scaup | *Aythya affinis* | | WILL | Willet | *Tringa semipalmata* |
| | | | | WISN | Wilson's Snipe | *Gallinago delicata* |

## Appendix 6 – Photos Delineating Survey Areas at Oxford Slough WPA

*OXSWB1*

Everything west of the dike (circled in red) off of the main parking area is surveyed.

*OXSWB2*

Everything east of the dike in the photo for point 1 to the small peak identified with the arrow in this photo is surveyed.

*OXSWB3*

Everything to the east of the small peak in the photo under the arrow on the right and to the west of the dike in the photo under the arrow on the left is surveyed.

*OXSWB4*

Everything from the east of the dike and the willow identified in the photo with the arrow east to the WPA boundary/railroad tracks is surveyed.