VIA Electronic Filing

May 4, 2020

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: Hinckley (Gregory B. Jarvis) Hydroelectric Project, FERC No. 3211-009, Updated Study Report

Dear Secretary Bose:

In accordance with 18 C.F.R. § 5.15(f), the Power Authority of the State of New York (Power Authority) encloses for filing the attached Updated Study Report (USR) for the Hinckley (Gregory B. Jarvis) Hydroelectric Project, FERC No. 3211-009 (the Project). The existing Project license was issued by the Federal Energy Regulatory Commission (FERC or the Commission) on August 12, 1982 and will expire on July 31, 2022. The Power Authority is following the Integrated Licensing Process (ILP) as outlined by 18 C.F.R. Part 5 for the Project relicensing.

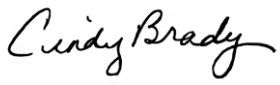
The Commission issued a Study Plan Determination (SPD) on May 11, 2018. Following the completion of the first year of field studies, the Power Authority filed an Initial Study Report (ISR) on May 8, 2019 and held an ISR Meeting on May 22, 2019. The Power Authority then filed its ISR Meeting Summary on June 8, 2019 after which stakeholder comments were received on or before July 20, 2019. The Power Authority filed its response to comments on August 9, 2019. On September 6, 2019, the Commission issued its *Determination on Requests for Study Modifications for the Hinckley (Gregory B. Jarvis) Hydroelectric Project*. In its determination, the Commission recommended supplemental analysis pertaining to the *Reservoir Fluctuation Field Survey* as well as a new study – the *Dissolved Oxygen Enhancement Study*. The Commission found that no other study modifications or new studies were necessary.

The enclosed USR describes the overall progress in implementing the FERC-approved study plan. In addition, as required by 18 C.F.R. §§ 5.15(f) and 5.15(c)(2), the Power Authority hereby notifies the Commission and licensing participants that due to the COVID-19 pandemic the USR Meeting will take place via teleconference on May 19, 2020 from 10:00 AM – 12:00 PM. Anyone wishing to participate in the meeting is kindly asked to RSVP to: Jarvis.Relicensing@nypa.gov by noon on Monday, May 18, 2020. WebEx log-in information will be emailed directly to interested participants.

Following the USR Meeting, the Power Authority will file a meeting summary by June 3, 2020. Licensing participants will then have until July 6, 2020 to file comments, disputes, and requests for modifications to the USR.

The Power Authority is filing the USR with the Commission electronically. Participants may access the USR on the Commission's website (http://www.ferc.gov) by going to the "eLibrary" link and entering the docket number (P-3211). The Power Authority is also making the USR available on the Project relicensing website (https://jarvis.nypa.gov/). If there are any questions regarding the USR or the relicensing process, please direct them to the undersigned at (914) 287-3153 or cindy.brady@nypa.gov.

Sincerely,



Cindy Brady
Manager, Licensing

UPDATED STUDY REPORT

Prepared by:

Gomez and Sullivan Engineers

Normandeau Associates Environmental Consultants

May 2020

GREGORY B. JARVIS PROJECT RELICENSING

FERC NO. 3211

NEW YORK STATE OF OPPORTUNITY. | NY Power Authority

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List of Abbreviations

C.F.R	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
DO	Dissolved Oxygen
FERC	Federal Energy Regulatory Commission
ILP	Integrated Licensing Process
ISR	Initial Study Report
Jarvis Project	Hinckley (Gregory B. Jarvis) Power Project (FERC No. 3211)
kV	kilovolt
MW	megawatt
New York Power Authority	Power Authority of the State of New York
NOI	Notice of Intent
NY	New York
NYS	New York State
NYSCC	New York State Canal Corporation
NYSDEC	New York State Department of Environmental Conservation
Operating Diagram	2012 Hinckley Reservoir Operating Diagram
PAD	Pre-Application Document
Project	Hinckley (Gregory B. Jarvis) Power Project (FERC No. 3211)
PSP	Proposed Study Plan
RSP	Revised Study Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
SPD	Study Plan Determination
SUNY Poly	State University of New York Polytechnic Institute
USFWS	U.S. Fish and Wildlife Service
USR	Updated Study Report

1 Overview

1.1 Project Description

The Power Authority of the State of New York (d/b/a "New York Power Authority" and referred to as the "Power Authority") is licensed by the Federal Energy Regulatory Commission ("FERC" or the "Commission") to operate the Hinckley (Gregory B. Jarvis) Power Project ("Jarvis Project" or "Project") (FERC No. 3211-NY). The Project is located on West Canada Creek, a tributary of the Mohawk River, at the Hinckley Reservoir Dam. The Project is approximately 0.5 miles upstream of the Town of Hinckley in the counties of Oneida and Herkimer, NY. The original license was issued on August 12, 1982 and expires on July 31, 2022.

The 9-megawatt (MW) Project consists of: (a) the 3,635-foot-long Hinckley Dam; (b) 65-foot-long intake structure; (c) 15-foot diameter penstock, which bifurcates into two 90-foot-long, 10.5-foot diameter penstocks; (d) two 4.5-MW horizontal Kaplan turbine/generator units; (e) a 120-foot-long, 55-foot wide powerhouse; (f) Hinckley Reservoir; and (g) a 200-foot-long 46 kV underground interconnection, which runs from the powerhouse to a switchyard located north of New York State (NYS) Route 365.

Hinckley Reservoir is operated by the New York State Canal Corporation (NYSCC) in accordance with the 2012 Hinckley Reservoir Operating Diagram (Operating Diagram). The Operating Diagram is the product of legally binding operating agreements between NYSCC, State of New York, Mohawk Valley Water Authority, New York State Thruway Authority, and Erie Boulevard Hydropower, L.P. The Power Authority merely utilizes the reservoir releases prescribed by the Operating Diagram to generate power at the Project. The Power Authority does not have the authority or the rights to deviate from these releases and if the Jarvis Project were not to exist, the same reservoir water levels and discharges would still occur in accordance with the Operating Diagram.

In addition, the current FERC license for the Project requires a continuous minimum flow in West Canada Creek of 160 cubic feet per second (cfs) as measured at the NYSCC diversion structure at the Nine Mile Creek Feeder Dam, which is located approximately 5.1 miles downstream of the Project.

1.2 Initial Study Report

The original 40-year license for the Project expires on July 31, 2022. In 2017, the Power Authority began the public process for seeking a new license for the Project. To prepare its license application, the Power Authority is using the Commission's Integrated Licensing Process (ILP) as outlined in 18 C.F.R. Part 5. In accordance with 18 C.F.R. §§ 5.5 and 5.6, the Power Authority filed its Notice of Intent (NOI) and Pre-Application Document (PAD) on June 30, 2017. The PAD included the Power Authority's preliminary study plans for the Project. The Commission issued its Scoping Document 1 (SD1) on August 29, 2017 and held scoping meetings with agencies,

stakeholders, and the public on September 26-27, 2017 at the State University of New York Polytechnic Institute (SUNY Poly) in Utica, NY. Following the scoping meetings, the Commission issued its Scoping Document 2 (SD2) on December 12, 2017.

Subsequently, the Power Authority received comments on the PAD and the study plans as well as requests for additional studies. The Power Authority reviewed these comments and study requests, and developed a Proposed Study Plan (PSP), which served to address and respond to all comments and requests received. The Power Authority filed the PSP with FERC on December 12, 2017. The Power Authority then held a PSP Meeting on January 11, 2018 at SUNY Poly. Stakeholders provided comments to the Power Authority on the PSP on or before March 12, 2018. The Power Authority filed a Revised Study Plan (RSP) on April 11, 2018. On May 11, 2018, FERC issued its Study Plan Determination (SPD) for the Project. The Power Authority conducted the first season of field studies between May and October 2018.

Following the first field season, the ILP regulations required the Power Authority to "prepare and file with the Commission an initial study report describing its overall progress in implementing the study plan and schedule and the data collected, including an explanation of any variance from the study plan and schedule" (18 C.F.R. § 5.15(c)(1)). Accordingly, the Power Authority submitted its Initial Study Report (ISR) for the Project on May 8, 2019. The Power Authority then held its ISR Meeting on May 22, 2019 at SUNY Poly. Following the ISR Meeting, the Power Authority filed its ISR Meeting Summary with the Commission on June 10, 2019. On or before July 10, 2019, the Power Authority received comments, requests for new studies, or modifications to studies from the Commission, the New York State Department of Environmental Conservation (NYSDEC), and Citizens for Hinckley Lake.

On September 6, 2019, the Commission issued its *Determination on Requests for Study Modifications for the Hinckley (Gregory B. Jarvis) Hydroelectric Project*. The Determination did not recommend the requested modifications to the *Hinckley Reservoir Bathymetric Survey*, *Tailwater Water Quality Study*, and *Recreation and Public Access Study*, nor the new request for a *Property Owner Survey and Access Study*. The Commission did, however, recommend a supplemental analysis pertaining to the *Reservoir Fluctuation Field Study* as well as the new *Dissolved Oxygen Enhancement Study*.

The purpose of this document is to describe the overall progress in implementing the FERC-approved study plan, schedule, and data collection, including explanations of variances, if any, from the approved study plan or schedule, which have occurred since the ISR.

1.3 Study Plan Implementation Summary

In accordance with the FERC-approved study plan, the Power Authority has completed the following studies and filed study reports for each with the Commission as part of the Power Authority's ISR on May 8, 2019.

- *Hinckley Reservoir Bathymetric Survey*,
- *Desktop Modeling of Peaking Fluctuations*,
- *Reservoir Fluctuation Field Study*,
- *Recreation and Public Access Study*, and
- *Tailwater Water Quality Study*.

Since the ISR was filed, additional studies listed below were completed or are in process.

- *Assessment of Fish Entrainment and Turbine Survival*
- *Reservoir Fluctuation Field Study – Supplemental Analysis*
- *Dissolved Oxygen Enhancement Study (New Study)*

Additional details pertaining to these three studies are contained in this Updated Study Report (USR).

1.3.1 Assessment of Fish Entrainment and Turbine Survival

This study report was incomplete at the time of the ISR filing. Task 1 of this study included collecting field measurements of depth and velocity from the area in front of the powerhouse intakes and minimum flow release structures during the full range of generation and minimum flow releases. As explained in the May 8, 2019 ISR, the field component had not yet been completed because 1) the Unit 1 turbine was out of service for much of the summer of 2018, and 2) weather and ice cover conditions at the Project in the fall and winter of 2018 prevented safe boat access to perform the work.

The Power Authority completed the field measurements in the spring of 2019 and filed the *Assessment of Fish Entrainment and Turbine Passage Survival* final report with the Commission on October 30, 2019. The report is not being re-filed as part of the USR, but the Power Authority will present the results of the study at the USR Meeting.

In its September 6, 2019 Determination Letter, the Commission stated that once the Power Authority filed the *Assessment of Fish Entrainment and Turbine Survival* report, Commission staff would modify the process plan and schedule to allow for a 30-day comment period for the completed study. On March 5, 2020, the Commission issued a *Staff Update on Process Plan*, stating that it will consider comments on the final report during the comment period for the USR and will not revise the process plan.

1.3.2 Reservoir Fluctuation Field Study – Supplemental Analysis

The Power Authority filed the results of the *Reservoir Fluctuation Field Study* with the ISR. At the ISR meeting, Commission staff requested that the Power Authority provide the amount of aquatic

habitat (e.g., substrate, cover resources, and cover density) and shoreline erosion within the study area in acres, so that staff could determine the relative composition of habitat types affected by reservoir fluctuations. Appendix D of the Power Authority's June 10, 2019, ISR Meeting Summary provided tables with dominant substrate classes, cover resources, and historic vs. active shoreline erosion as a percent of the total survey area.

The Commission provided written comments on the ISR on July 9, 2019 and requested additional information related to the *Reservoir Fluctuation Field Study*. The Power Authority provided a written response to the Commission and stakeholder comments on the ISR on August 9, 2019. Attachment 1 to that filing included supplemental information on the *Reservoir Fluctuation Field Study* and a commitment from the Power Authority to perform additional analysis, as requested by the Commission, and to file this information with the USR. In its September 6, 2019 Determination Letter, the Commission recommended modifying the study to allow for the Power Authority's proposed desktop analysis in lieu of additional phase 2 field surveys.

The requested information is being provided in the attached report *Reservoir Fluctuation Field Study – Supplemental Analysis.*

1.3.3 Dissolved Oxygen Enhancement Study

The Power Authority conducted a Tailwater Water Quality Study in 2018 and filed the results with the ISR on May 8, 2019. The Commission provided comments on the ISR on July 9, 2019 and requested that the Power Authority conduct a *Dissolved Oxygen Enhancement Study* to assess dissolved oxygen enhancement options for the Project. In its September 6, 2019 Determination Letter, the Commission recommended that NYPA complete the *Dissolved Oxygen Enhancement Study*.

An update on the status of implementing the study plan and a schedule for completing the study is provided in Section 2.

1.4 Next Steps

In accordance with FERC's regulations, the Power Authority will hold an USR Meeting with resource agencies and stakeholders to review the Power Authority's progress in implementing the FERC-approved study plan. Because of the COVID-19 pandemic, the meeting will be held via teleconference on May 19, 2020 from 10:00 AM – 12:00 PM.

By June 3, 2020, the Power Authority will file its summary of the USR Meeting with the Commission. Within thirty days of that filing (i.e., by July 3, 2020[1]), members of the public or

[1] In accordance with 18 C.F.R. § 385.2007(a)(2), if a filing deadline falls on a Saturday, Sunday, holiday, or other date when the Commission is not open for business, the filing deadline does not end until the close of business on the next business day.

Commission staff may file a disagreement on the USR Meeting Summary. Disagreements may include any requests for modifications to ongoing studies or for a new study. The request for modified or new studies must be accompanied by justification as set forth in the Commission's regulations at 18 C.F.R. § 5.15(f). Within thirty days of the filing of disagreements (i.e., August 2, 2020[2]), any party may file responses to the disagreements or requests for modified or new studies. No later than thirty days thereafter (i.e., September 1, 2020), the Commission will amend the approved study plan, if needed.

Next steps for the completion of outstanding studies are detailed in Section 2.

[2] *Id.*

2 Status Update on Studies Not Complete

2.1 Dissolved Oxygen Enhancement Study

2.1.1 Introduction

In accordance with the FERC study request, the Power Authority developed a Dissolved Oxygen Enhancement Study Plan and provided a draft to the NYSDEC and U.S. Fish and Wildlife Service (USFWS) for review on December 20, 2019. Both agencies concurred with the Study Plan as proposed. The Dissolved Oxygen Enhancement Study Plan was filed with the Commission on January 15, 2020.

In addition, the Power Authority conducted voluntary water quality monitoring from July 2019 through October 2, 2019 to further inform water quality dynamics in the Project tailwater and potential DO enhancement measures to be evaluated in the *Dissolved Oxygen Enhancement Study*. The results of voluntary monitoring during the summer of 2019 were provided as an attachment to the Dissolved Oxygen Enhancement Study Plan.

2.1.2 Study Goals and Objectives

The goal of this study is to assess potential DO enhancement options for the Jarvis Project to inform the need for potential license conditions such that DO concentrations in Project tailwaters remain compliant with the state's minimum DO criteria for downstream trout waters.

The objective of the study is to assess the feasibility, potential effectiveness, and costs of various DO enhancement measures, including operational and physical options.

2.1.3 Study Implementation, Methods, and Variances

The methodologies for this study primarily involve desktop literature review and feasibility assessment of potential enhancement measures. The proposed methods and status update for each study task are summarized below.

2.1.3.1 Task 1: Literature Review of Potential Re-aeration Methods

This task is in progress. The Power Authority is conducting a literature search about the effectiveness and costs associated with different re-aeration methods. The outcome will be the identification of those DO enhancement measures with the most potential for further investigation at the Project.

2.1.3.2 Task 2: Evaluate Gate 4 Releases (Mass Balance Equation)

The Power Authority will employ a mass balance equation to predict the DO concentration of water downstream from the tailwater (at the point of mixing where the tailwater and Gate 4 releases meet) under various release volumes. Preliminary calculations were presented in the study plan.

The Power Authority tested the potential of the Gate 4 outlet to contribute to adequate DO levels downstream from the tailrace by providing releases through Gate 4 in conjunction with varying releases through the turbines. The tests were performed on August 7, 2019. The Gate 4 testing results demonstrated that DO enhancement is possible when the turbines are operating if Gate 4 releases are provided. The magnitude of releases from Gate 4 required to achieve DO enhancement to NYS water quality standards is proportional to turbine discharge volume and the stratification condition in Hinckley Reservoir.

Additional analysis of the feasibility of using Gate 4 releases as a DO enhancement option, in consideration of the Project's Operating Diagram, will be discussed in the DO enhancement study report.

2.1.3.3 Task 3: Desktop Feasibility Study

This task is in progress. The Power Authority will study the feasibility of the DO enhancement measures identified in Task 1 that have the most potential to address DO concentrations in Project tailwaters. This analysis will use cost information from the literature search to estimate capital, operation, and maintenance costs as well as potential impacts on generation.

2.1.3.4 Task 4: Report

As stated in the study plan, a study report will be prepared to describe the results of the desktop feasibility evaluation. For each potential enhancement measure, the technical feasibility, predicted effectiveness, and estimated costs (including loss of generation revenue) will be presented.

2.1.4 Schedule for Completing the Study

Literature Review and Feasibility Study	In Progress
File Study Report:	Winter 2021

Attachment 1. Reservoir Fluctuation Field Study – Supplemental Analysis

HINCKLEY RESERVOIR FLUCTUATION FIELD STUDY – SUPPLEMENTAL ANALYSIS

Prepared by: Gomez and Sullivan Engineers

May 2020

GREGORY B. JARVIS PROJECT RELICENSING

FERC NO. 3211

NEW YORK STATE OF OPPORTUNITY. | NY Power Authority

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List of Abbreviations

%	Percent
BCD	Barge Canal Datum
C.F.R.	Code of Federal Regulations
EAV	Emergent Aquatic Vegetation
El.	Elevation
FAV	Floating Aquatic Vegetation
FERC	Federal Energy Regulatory Commission
ft.	Feet / foot
GPS	Global Positioning System
ILP	Integrated Licensing Process
ISR	Initial Study Report
NOI	Notice of Intent
NGVD29	National Geodetic Vertical Datum of 1929
NY	New York
NYSDEC	New York State Department of Environmental Conservation
PAD	Pre-Application Document
RSP	Revised Study Plan
SAV	Submerged Aquatic Vegetation
SPD	Study Plan Determination
the Commission	Federal Energy Regulatory Commission
the Power Authority	The Power Authority of the State of New York
the Project	Hinckley (Gregory B. Jarvis) Hydroelectric Project (FERC No. 3211-NY)
the Study	Hinckley Reservoir Fluctuation Field Study

1 Introduction

1.1 Background

The Power Authority of the State of New York (d/b/a "New York Power Authority" and referred to as the "Power Authority") is licensed by the Federal Energy Regulatory Commission ("FERC" or the "Commission") to operate the Hinckley (Gregory B. Jarvis) Hydroelectric Project (FERC No. 3211-NY), referred to herein as "the Project." The Project is located at the Hinckley Reservoir Dam on West Canada Creek, approximately 0.5 miles upstream of the Town of Hinckley in the counties of Oneida and Herkimer, New York (NY). The Power Authority is seeking a new license from the Commission for the continued operation of the Project via the Commission's Integrated Licensing Process (ILP), as outlined in 18 C.F.R. Part 5. The original license was issued on August 12, 1982 and expires on July 31, 2022. As required by the Federal Power Act, the Power Authority will be applying for a new license for the Project on or before July 31, 2020.

As part of the ILP, the Power Authority developed its Revised Study Plan (RSP) in consultation with interested stakeholders. The RSP was filed with FERC on April 11, 2018, and the Commission issued its Study Plan Determination (SPD) on May 11, 2018, which included the Commission's recommended *Reservoir Fluctuation Field Study* (the Study). The in-field effort was conducted in July 2018 and the Study Report was submitted to the Commission as part of the Initial Study Report (ISR) on May 8, 2019. The Power Authority held an ISR meeting on May 22, 2019 and filed an ISR meeting summary with the Commission on June 8, 2019. Comments on the ISR and meeting summary were issued by the Commission on July 9, 2019, and by the New York State Department of Environmental Conservation (NYSDEC) and Citizens for Hinckley Lake on July 10, 2019.

In the ISR, the Power Authority concluded that a Phase 2 field survey was not necessary to satisfy FERC's stated goals of characterizing and describing the resources present within the littoral zone, and that quantification of the abundance and distribution of aquatic organisms and important habitat features could be determined via existing information and supplemental desktop analyses. In response to the ISR comments, the Power Authority filed reply comments on August 9, 2019 in which the Power Authority proposed to conduct a supplemental desktop analysis using the results of the survey, bathymetric data, and historical water level data to "determine the elevation and distribution of potentially affected resources" as noted in FERC's SPD.

In its September 6, 2019 Determination Letter on Requests for Study Modifications, the Commission recommended modifying the study to allow for the Power Authority's proposed desktop analysis in lieu of additional Phase 2 field surveys. This report presents the Power Authority's supplemental desktop analysis related to the *Reservoir Fluctuation Field Study*, and utilizes field survey data, bathymetric data, aerial imagery, and historical water level data.

1.2 Supplemental Analysis Goals and Objectives

1.2.1 Goals and Objectives

The goal of this analysis is to supplement the initial *Reservoir Fluctuation Field Study* Report by using existing data to identify the elevation and distribution of aquatic resources potentially affected by water level fluctuations in Hinckley Reservoir, as requested by the Commission. To achieve this goal, the Power Authority has conducted a spatial and statistical desktop analysis utilizing the results of the collected 2018 field data, bathymetric data, and historical water level data.

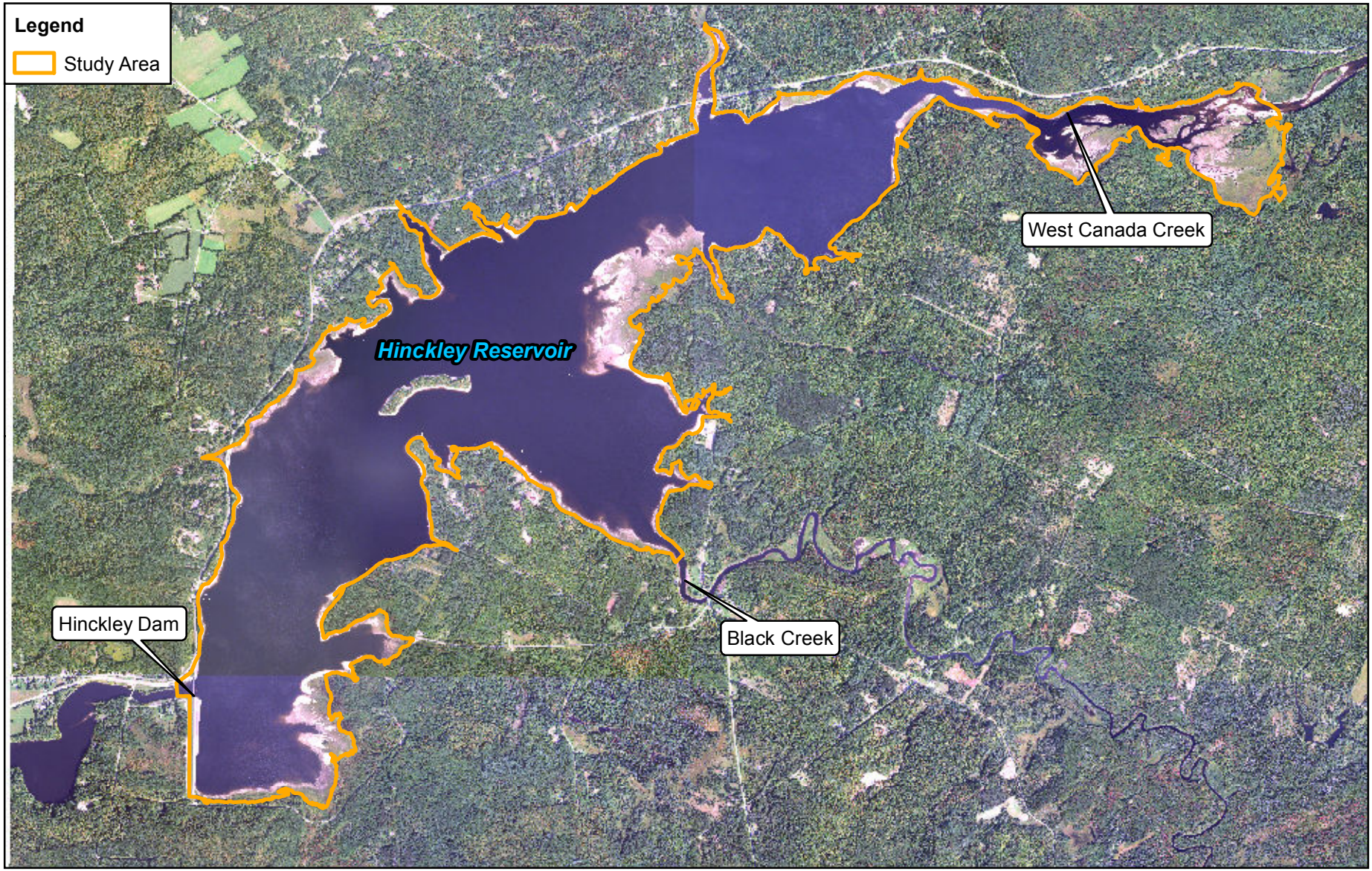
The objective of this analysis is to provide the requested data to address the Commission's comments on the Study Report. This includes the following:

- Provide the total survey area (in acres) for each of the observed resources, and the amount, (in acres) of each substrate class, cover resource, and cover density observed during the study;
- Provide revised figures demonstrating the distribution and abundance of substrate classifications and cover resources along the bank gradient;
- Compare location and elevation information of observed aquatic resources (fish nests, isolated pools) against historical water level information to quantify the potential impacts water levels may have. This analysis will quantify the elevation range where aquatic resources were observed as well as the percentage of time such resources are likely to be inundated or exposed; and
- Compare location and elevation information of wetland resources against historical water level information to determine the percentage of time these wetlands are inundated or exposed at varying reservoir elevation levels.

1.2.2 Geographic Extent and Timing of Survey

The data utilized in this analysis were collected from the field survey conducted July 16-19, 2018. The water surface elevation during the survey was between elevation (El.) 1213.8 and 1213.2 feet (ft.) Barge Canal Datum (BCD)[1], which, as described in the ISR, was below the median monthly July water level of El. 1220.3 (for period 2001-2018). The geographic extent of the survey is depicted in Figure 1.2.2-1.

[1] All elevations referenced throughout this report refer to the Barge Canal Datum (BCD). Elevations referenced to the BCD are 1.04 feet higher than elevations referenced to the National Geodetic Vertical Datum of 1929 (NGVD29 or Mean Sea Level (MSL)); thus, El. 1225.0 BCD = 1223.96 NGVD29.



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Gregory B. Jarvis Project
(FERC No. P-3211)
Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis

0 1,750 3,500 7,000 Feet

Figure 1.2.2-1:
Geographic Extent of Survey

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2 Methods

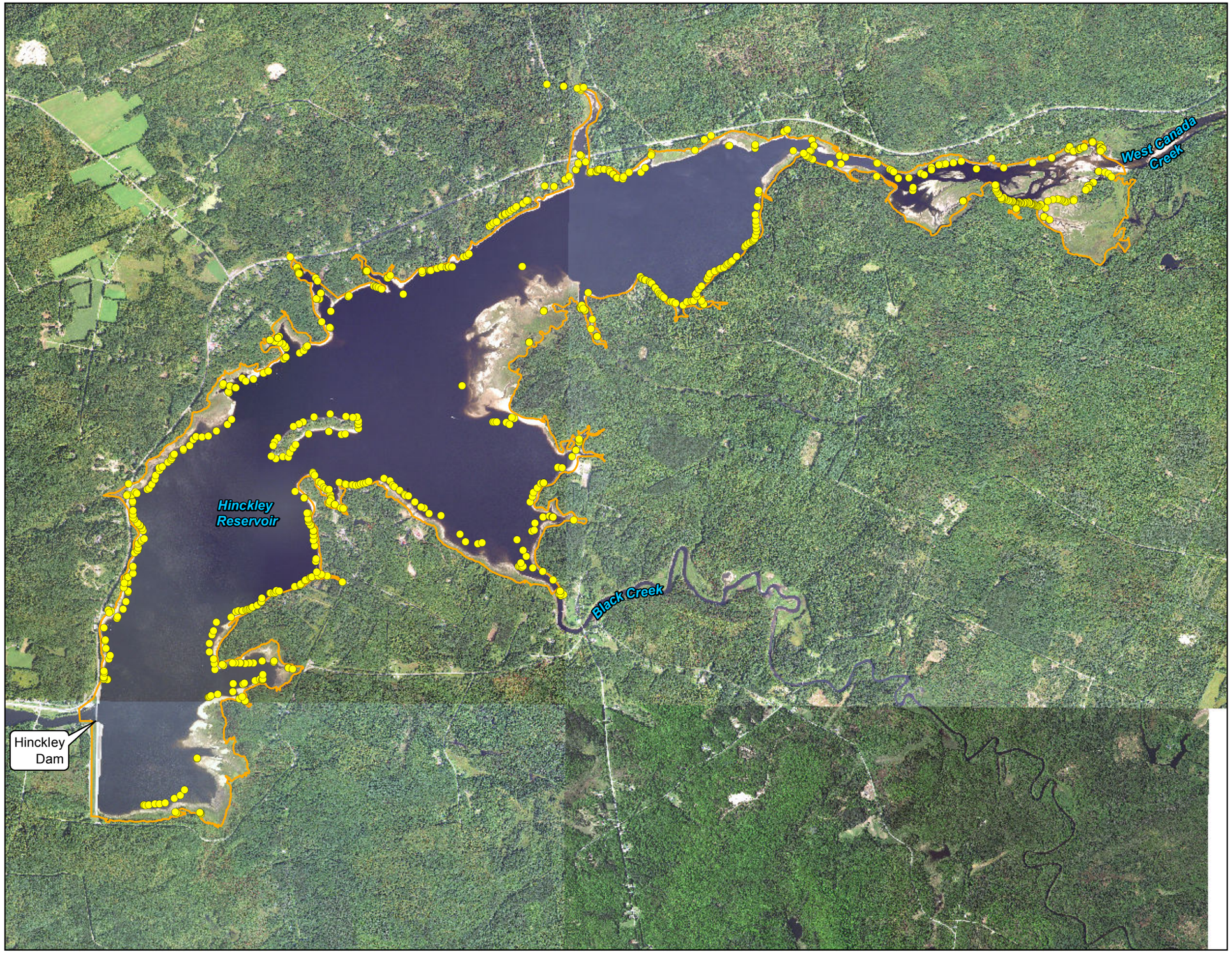
The methodologies described below were developed to address the Commission's comments by utilizing the results of the 2018 field survey, bathymetric data, aerial imagery, and historical water level data. Each of the following subsections summarizes the methods used in this supplemental analysis to address the Commission's comments.

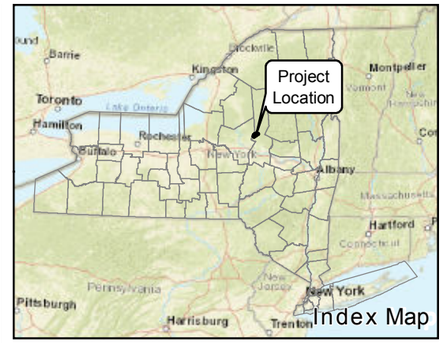
2.1 Analysis of Cover Resources

In the Study Report, cover resources were characterized spatially based on observations extending from the water line at the time of the survey (El. 1213) to El. 1202. In addition, cover resources such as emergent aquatic vegetation (EAV) were classified above the water surface at the time of the survey extending to El. 1225. Data were presented spatially as a single figure encompassing the entire study area (Figure 3.1.2-1 of the Study Report) as well as in a more detailed map book (Appendix B of the Study Report). As part of this supplemental desktop analysis, cover resources were further analyzed throughout the entire study area (i.e., El. 1225 to 1202) using information gathered during the survey (e.g., extensive field photographs (as shown in Figure 2.1-1), detailed field notes of each distinct area, and GPS data), aerial imagery, and bathymetric data. The results of this analysis provided additional information pertaining to the distribution and abundance of cover resources through the study area.

To retain consistency with the Study Report, the same cover resource classifications were used in this analysis. Cover resource categories include EAV, submerged aquatic vegetation (SAV), floating aquatic vegetation (FAV), boulder, and woody debris and detritus. For the purpose of this analysis, FAV is again used to characterize woody shrub vegetation. Additional analysis was performed using aerial imagery and field photos to refine and more accurately map the cover resources present up to El. 1225. Cover resources were attributed by their abundance within each specific polygon, both above and below the water line (i.e., absent (0%), very sparse (10%), low (25%), moderate (50%), and high (75%)). Where there were multiple cover resource types present in a defined polygon, each cover resource was assigned a relative percentage based on its abundance within the entire polygon.

The results of this analysis are provided on revised figures as polygons to symbolize both the above water and below water cover resources present at the time of the survey. Each individual polygon is identified and presented with labeled segment ID's consistent with those shown as figures and tables in Appendix B of the Study Report. In polygons where multiple resources are present, figures are symbolized with the most abundant resource for a given area. An additional quantitative statistical analysis was performed to calculate and summarize the total area in acres of each cover resource type above the water line at the time of the survey, below the water line at the time of the survey, and in the cumulative study area (i.e., El. 1202 to 1225). Areal coverage was calculated based on the abundance multiplied by the area of each unique polygon. All attributed cover resource data were used in this summary.





Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Study
Supplemental Analysis
Figure 2.1-1: Field Photo Locations

Legend

- Photo Location
- Study Area

N

NOTES
1. Basemap Imagery WSEL = 1216 ft. BCD (9/10/17)
2. Study Area generally represents El. 1225 ft. BCD.
3. WSEL at the time of the survey was approximately 1213 ft. BCD

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

0 1,250 2,500 5,000 Feet

1 inch = 2,500 feet

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2.2 Revised Substrate Figures

Substrate composition was characterized both above (i.e., El. 1225 to 1213) and below the water surface at the time of the survey (i.e., El. 1213 to 1202) in the Study Report. This information was presented in the Study Report as figures depicting the substrate as lines through the study area. In those figures the distribution of substrate along the bank gradient was denoted by a cross-hatched pattern that represented the area where substrate observations were applicable.

To address the Commission's request for figures which more clearly demonstrate the distribution of substrate classifications, new figures have been created which removed the cross-hatched pattern and instead present polygons to symbolize substrate compositions rather than lines. Substrate classifications used in this analysis are consistent with those used in the substrate analysis of the Study Report (e.g., silt/clay, sand, gravel, cobble, boulder, and bedrock) with the addition of rip/rap to classify areas that have been armored with man-placed materials. Substrate compositions were attributed by their abundance within each specific polygon, both above and below the water line (i.e., absent (0%), very sparse (10%), low (25%), moderate (50%), high (75%), and full coverage (100%)). Where there were multiple substrate types present in a defined polygon, each type was assigned a relative percentage based on its abundance within the entire polygon. In polygons where multiple substrates were identified, figures were symbolized by the dominant or codominant substrate type.

An additional quantitative statistical analysis was performed to calculate and summarize the total area in acres of each substrate type above the water line, below the water line, and in the cumulative study area (i.e., El. 1202 to 1225). Similar to cover type, areal substrate coverage was calculated based on the abundance of each substrate type multiplied by the area of each unique polygon. All attributed substrate composition data were used in this summary.

2.3 Location and Elevation Information of Observed Aquatic Resources

The four-day field survey conducted in July 2018 included thorough searches for aquatic resources throughout the study area. This included fish nests, mussels, other observable aquatic flora and fauna, and isolated pools. Field staff searched both by boat and on foot and examined the area both above and below the water line at the time of the survey (i.e., a range of El. 1225 to 1202). As previously reported, there were no mussels, or evidence of mussels, observed in the study area. Additionally, the locations of fish nests and isolated pools were documented in the initial study. A total of twenty fish nests were located during the survey. Section 3.2.1 of the Study Report provides a summary of the nests, including location and elevation data, as well as information on the type of fish, the status of the nest, and a comparison to historic reservoir water surface elevation data. The location of observed resources were recorded via GPS and their elevation was determined either via GPS or using bathymetric data. As described in Section 3.2.2 of the Study Report, there were eleven observed isolated pools in and around the unique habitat of the West Canada Creek reach.

A figure clearly identifying each of the eleven isolated pools was developed as part of this supplemental work. Location and elevation information of observed aquatic resources (i.e., observed isolated pools) was compared against historical water level information to quantify the potential impacts of water levels. The goal of this supplemental analysis was to quantify and present the elevation range where isolated pools were observed and the percentage of time (on a monthly and annual basis) when isolated pools are likely to be inundated or exposed. This desktop analysis consisted of utilizing GPS-collected or bathymetric data and historical reservoir water surface elevation data (from January 2001 to December 2019, as presented in Section 4.4.1.1 of the Draft License Application Exhibit E).

2.4 Analysis of Wetland Inundation or Exposure

The 2018 survey resulted in the identification of 485 total acres of wetlands within the study area. During the survey, the GPS locations of wetland complexes were collected and wetland types, dominant plant species, and the observed hydrologic characteristics were classified. As described in the Study Report, wetland complexes were generally large, flat areas and were uniform in their characteristics.

To address the Commission's request, information collected during the survey, available bathymetric data, and historical reservoir water surface elevation data were used to determine wetland elevations and the percentage of time that identified wetland complexes are inundated or exposed. Data were summarized by wetland type, and the acreage and total percentage of wetland exposure (i.e., total percentage of the wetland type that is above water) is presented for each one-foot interval of reservoir elevation, based on historical reservoir water surface elevation data. Wetland data is presented as percentages encompassing exposure at elevations on an annual basis.

3 Results

3.1 Analysis of Cover Resources

Revised figures presenting cover resource composition in the study area are presented in Appendix A and as a single map encompassing the entire study area in Figure 3.1-1. Table 3.1-1 presents a summary of the coverage area in acres of each cover resource found throughout the study area, including the areas both above and below the water level at the time of the survey, as well as the cumulative total area. Coverage resource composition data is additionally presented as a percentage of the total study area in Table 3.1-2. A table summarizing the cover resources of each distinct polygon is provided in Appendix A (similar to the presentation of data in the Aquatic Habitat Segment Attributes table in Appendix B of the Study Report).

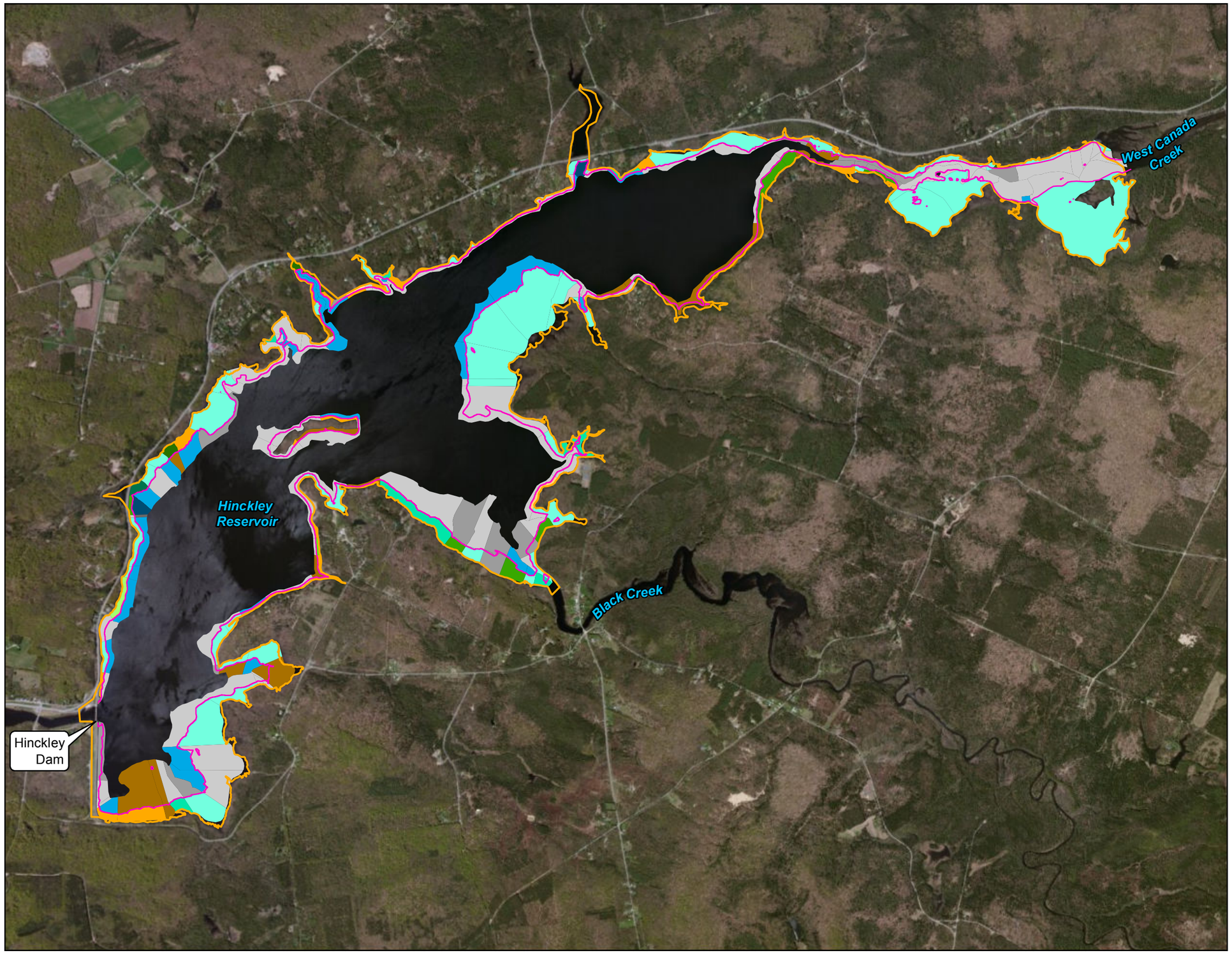
Results of this analysis indicate that the study area is comprised of mostly bare substrate (798 acres or 72% of the total study area). Coverage of SAV was generally low and was located primarily in areas below the water surface at the time of the survey (23 acres or 5% of the below water area compared to 2 acres or <1% above water). This analysis identified that EAV was located exclusively above the water level at the time of the survey, covering 29% of the El. 1213 to 1225 range. As discussed in the Study Report, EAV is most abundant in the expansive, generally flat area of the West Canada Creek reach.

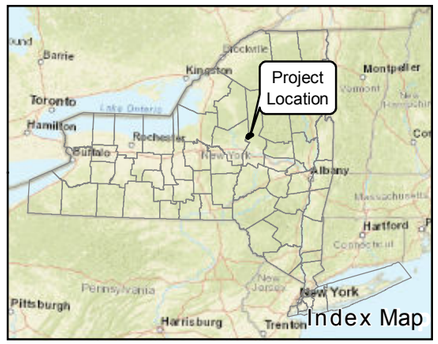
Table 3.1-1. Summary of Cover Resource Coverage Area

Elevation Type	Elevation Range (ft.)	Boulder (acres)	Woody Debris/Detritus (acres)	EAV (acres)	SAV (acres)	FAV (acres)	Bare Substrate (acres)	Total Acres
Above Water Surface	1213 – 1225	25	14	182	2	27	379	629
Below Water Surface	1202 – 1213	24	19	0	23	<1	419	485
Total Area	1202 – 1225	49	33	182	25	27	798	1,114

Table 3.1-2. Summary of Cover Resource Coverage Percentage

Elevation Type	Elevation Range (ft.)	Boulder %	Woody Debris/Detritus %	EAV %	SAV %	FAV %	Bare Substrate %
Above Water Surface	1213 – 1225	4%	2%	29%	<1%	4%	60%
Below Water Surface	1202 – 1213	5%	4%	0%	5%	<1%	86%
Total Coverage %	1202 – 1225	4%	3%	16%	2%	3%	72%





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Hinckley Reservoir Fluctuation Study
Supplemental Analysis
Figure 3.1-1: Cover Resources

- Study Area
- Elevation 1213' BCD (WSEL at time of survey)

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

N

*Multiple cover resources listed indicate near equal abundance of each resource. Abundance percentage of dominant and subdominant resources can be found in Appendix A table of the Hinckley Reservoir Fluctuation Field Study - Supplemental Analysis Report.

NOTES
1. Study Area generally represents El. 1225 ft. BCD
2. WSEL at the time of the survey was approximately 1213 ft. BCD

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0 1,250 2,500 5,000 Feet

1 inch = 2,500 feet

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3.2 Revised Substrate Figures and Analysis

Revised figures presenting substrate composition in the study area are presented in Appendix B and as a single map encompassing the entire study area in Figure 3.2-1. Table 3.2-1 presents a summary of the coverage area in acres of each substrate composition found throughout the study area, including the areas both above and below the water level at the time of the survey, as well as the cumulative total area. Substrate composition data is also provided as a percentage of the total study area in Table 3.2-2.

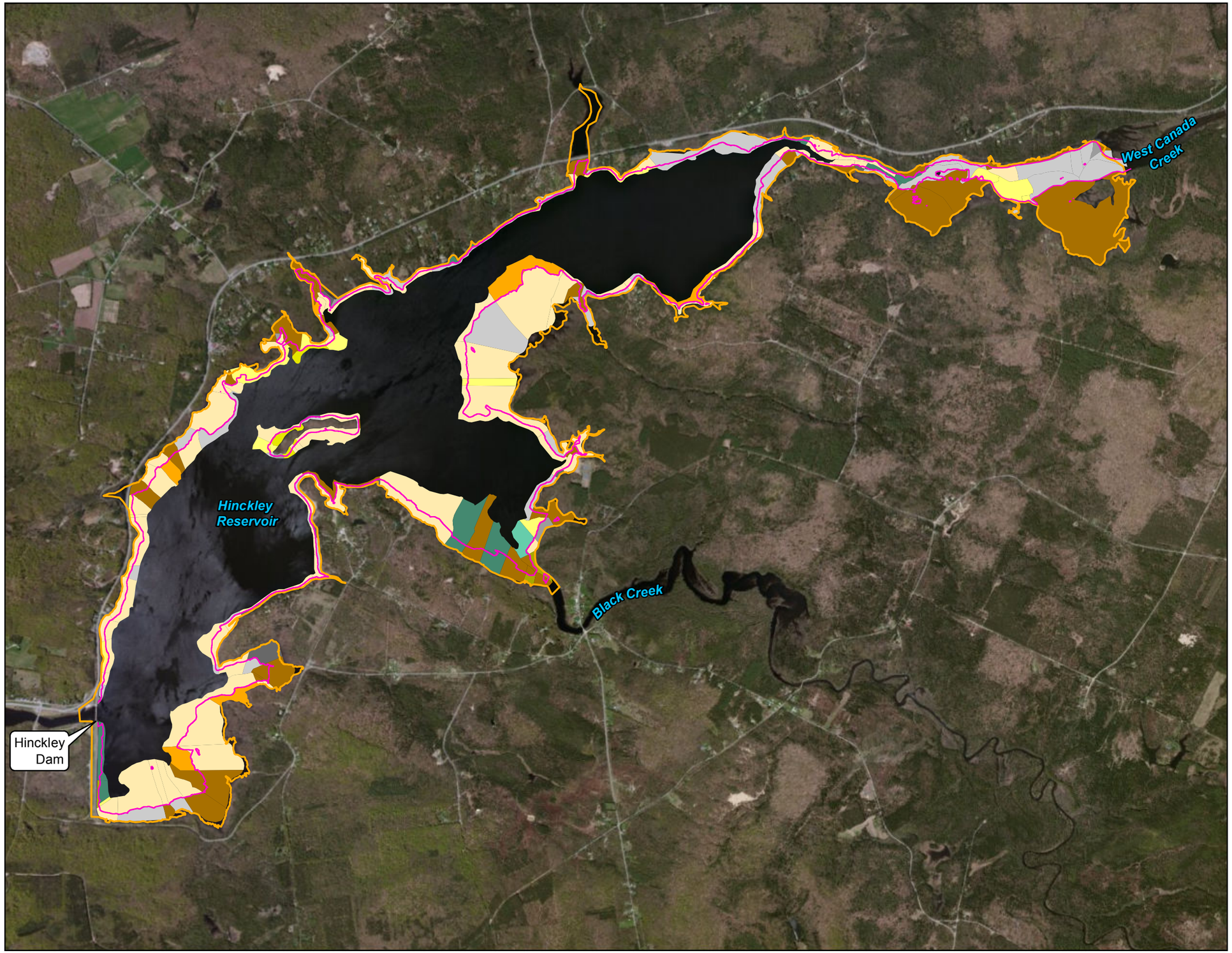
This supplemental analysis shows that sand was the dominant substrate in the study area, both above and below the water surface. Coverage of boulders, cobble, gravel, and sand was found to be slightly greater below the water than above the water surface, while silt was more prominent at elevations above the water level at the time of the survey. Riprap was found to occur in the area south of the Hinckley Dam and at the Black Creek confluence with the reservoir. In total, riprap comprised less than five acres or <1% of the survey area. This analysis identified that the main channel of the West Canada Creek reach is dominated by a cobble substrate while the slightly higher elevation section is characterized by a silt substrate. The results of this analysis are in agreement with the characterization provided in the Study Report, which states that the West Canada Creek reach area contains sections of fine (floodplain) depositions and areas of gravel-cobble bars.

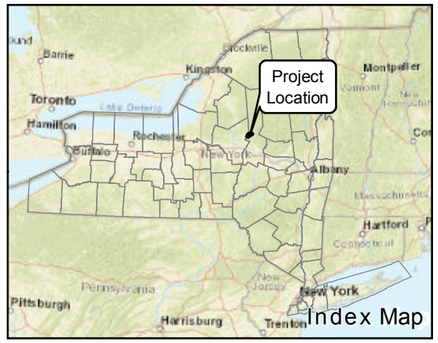
Table 3.2-1. Summary of Substrate Composition Coverage Area

Elevation Type	Elevation Range (ft.)	Riprap (acres)	Boulder (acres)	Cobble (acres)	Gravel (acres)	Sand (acres)	Silt (acres)	Total Acres
Above Water Surface	1213 – 1225	5	21	100	43	239	232	640
Below Water Surface	1202 – 1213	<1	32	92	53	216	81	474
Total Area	1202 – 1225	5	53	192	96	455	313	1,114

Table 3.2-2. Summary of Substrate Composition Coverage Percentage

Elevation Type	Elevation Range (ft.)	Riprap %	Boulder %	Cobble %	Gravel %	Sand %	Silt %
Above Water Surface	1213 – 1225	1%	3%	16%	7%	38%	35%
Below Water Surface	1202 – 1213	<1%	7%	19%	11%	47%	17%
Total Coverage %	1202 – 1225	<1%	5%	17%	9%	42%	27%





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Hinckley Reservoir Fluctuation Study
Supplemental Analysis
Figure 3.2-1: Substrate Coverage

Study Area

Elevation 1213' BCD (WSEL at time of survey)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

N

*Multiple dominant substrate types listed indicate near equal abundance of each substrate.

NOTES
1. Study Area generally represents El. 1225 ft. BCD.
2. WSEL at the time of the survey was approximately 1213 ft. BCD
3. Dominant = 50% or greater coverage

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0 1,250 2,500 5,000 Feet

1 inch = 2,500 feet

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3.3 Location and Elevation Information of Observed Aquatic Resources

Figure 3.3-1 provides a revised figure showing the labeled locations of observed pools. All observed pools are located in the area of the West Canada Creek reach. Pools A through H are larger in size and are located closer to the main channel, while the smaller Pools I through K are located further south in the more vegetated, slightly higher elevation section. As Pools A through H are located in an area closer to the main channel and consist of cobble substrate, they are more dynamic and are influenced by riverine flow and movement of bed materials. Pools I through K are more stable, as they are located further from the main channel in an area dominated by EAV and comprised of a silt substrate. These pools are part of a flood chute channel that drains into the reservoir.

A summary of each of the mapped pools and their corresponding monthly and annual percentages of inundation is provided in Table 3.3-1. Each observed pool is identified by its location ID, which corresponds to Figure 3.3-1. The depth of the pool as observed in the field and the maximum bed elevation associated with each pool are also provided. The maximum bed elevation of each pool corresponds with the elevation at which the pool is still connected to the main body of the reservoir. When the water surface elevation is below the maximum pool bed elevation that pool then becomes isolated from the main body of the reservoir.

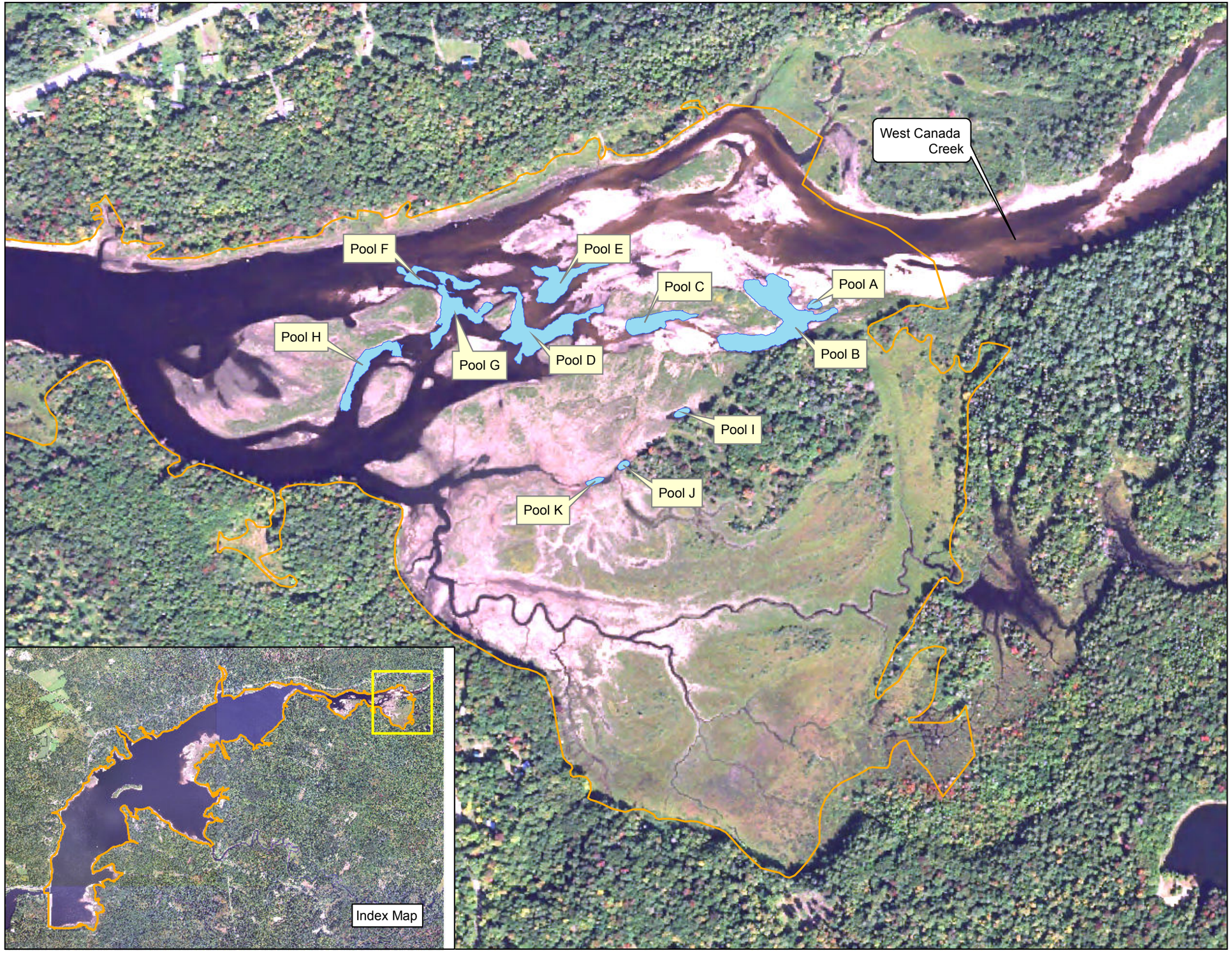
The percentage of time each pool's maximum bed elevation is equaled or exceeded was calculated based on historical water surface elevation data. For example, Pool A's maximum bed elevation was measured to be El. 1220.9. This corresponds to Pool A being inundated 32% of the time in January, 11% of the time in February, 10% of the time in March, etc. To calculate the percentage of time when the Reservoir's elevation is less than the Pool A maximum elevation, the provided percentages should be subtracted from 100%. Therefore 68% of the time in January the reservoir elevation is less than Pool A's maximum bed elevation, 89% of the time in February, 90% of the time in March, etc. On an annual basis, Pool A is inundated 39% of the time (or, in other words, Pool A is isolated from the main body of the reservoir 61% of the time annually). In general, the pools have a higher likelihood of being inundated by the main reservoir in the months of April, May and June due to the reservoir's operating diagram.

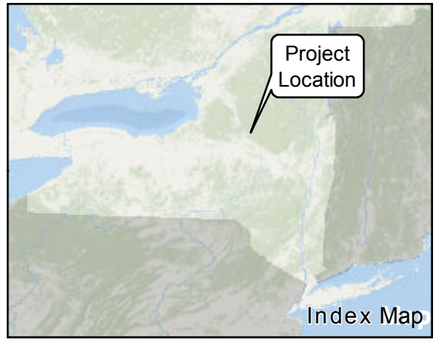
Table 3.3-1. Summary of Monthly and Annual Inundation Percentages of Observed Isolated Pools

Location ID	Pool Depth (ft.)	Maximum Pool Bed El. (ft.)[2]	Percentage of Time the Maximum Pool El. is Equaled or Exceeded by the Water Surface Elevation of Hinckley Reservoir (2001-2019)												
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Pool A	2.5	1220.9	32%	11%	10%	61%	81%	70%	42%	28%	9%	25%	46%	45%	39%
Pool B	8.0	1223.2	18%	4%	7%	53%	54%	44%	22%	15%	3%	17%	27%	24%	24%
Pool C	2.0	1219.6	40%	15%	14%	68%	85%	80%	54%	33%	12%	27%	51%	53%	45%
Pool D	3.0	1218.0	48%	20%	17%	74%	88%	87%	70%	40%	17%	29%	58%	58%	51%
Pool E	2.5	1217.1	51%	23%	19%	76%	91%	90%	76%	45%	22%	32%	62%	61%	54%
Pool F	2.5	1218.0	48%	20%	17%	74%	88%	87%	70%	40%	17%	29%	58%	58%	51%
Pool G	1.5	1218.0	48%	20%	17%	74%	88%	87%	70%	40%	17%	29%	58%	58%	51%
Pool H	2.5	1218.3	47%	19%	16%	73%	87%	86%	67%	39%	15%	28%	57%	57%	49%
Pool I	1.5	1225.2	5%	1%	3%	34%	18%	12%	5%	1%	1%	9%	9%	6%	9%
Pool J	5.5	1217.5	50%	22%	18%	75%	89%	89%	74%	43%	20%	31%	60%	59%	53%
Pool K	3.0	1215.3	57%	26%	25%	81%	93%	93%	85%	57%	32%	39%	67%	68%	61%

Note: The percentages indicate the frequency that each pool is connected to the main body of the reservoir.

[2] Maximum pool bed elevations were derived from the Hinckley Reservoir bathymetric dataset. Depending on the location of the pool relative to the bathymetric survey transect, elevations shown may be reflective of measured survey data or interpolated data derived from GIS. Interpolated data should be considered approximate (e.g., Pool I).





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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis
Figure 3.3-1:
Approximate Location of Observed Pools

Legend

- Study Area
- Pool Location

N

NOTES
1. The Reservoir Water Surface Elevation displayed in the basemap imagery is 1216 ft BCD. Basemap Imagery shown was flown on 9/10/2017.
2. Study Area generally represents El. 1225 ft. BCD.
3. WSEL at the time of the survey was approximately 1213 ft. BCD

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1 inch = 400 feet

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3.4 Analysis of Wetland Inundation or Exposure

The 2018 survey identified and mapped a total of 485 acres of wetlands within the study area. There were two wetland types identified, freshwater emergent and forested/shrub. Emergent wetlands were found to be primarily comprised of bulrushes (*Scirpus*), rushes (*Juncus*), sedges (*Carex*), and sneezeweed (*Helenium*). The Study Report noted that these emergent wetlands were observed at several locations throughout the reservoir that would be inundated at the spillway crest elevation (El. 1225). Forested/shrub wetlands exist primarily on the fringes of the reservoir and consisted primarily of willows (*Salix*), maple (*Acer*), alder (*Alnus*), and herbaceous plants.

This supplemental analysis further investigated the extent of wetland inundation at various reservoir water surface elevations. Table 3.4-1 presents a summary of each wetland type and the acreage and percentage of total area that is exposed (above water) at one-foot reservoir water surface elevation ranges. The table also provides the annual percentages of time that the minimum elevation of the range depicted is equaled or exceeded (based on historical water surface elevation data). For example, if the reservoir water surface elevation range shown is El. 1223 – 1224, then this column would depict the percentage of time that El. 1223 is equaled or exceeded (i.e., 25% of the time annually).

When the reservoir is at or above the spillway crest elevation, which annually occurs 10% of the time, 26% of emergent wetlands and 90% of forested/shrub wetlands are exposed. This illustrates that the forested/shrub wetlands are not strongly affected by reservoir operations. As discussed in the Study Report, emergent wetlands consist of large areas that are seasonally inundated when the reservoir is at its spillway crest elevation. This data can be utilized to quantify the extent of exposure or inundation at various reservoir water surface elevations. For example, 74% of emergent wetlands are inundated at the spillway crest elevation of 1225; however, when the reservoir water surface elevation is 1218, which occurs approximately 51% of the time annually, 76% of emergent wetlands are exposed (therefore 24% are inundated). This analysis further demonstrates the dynamic extent of emergent wetlands and reservoir water surface elevations.

Table 3.4-1. Summary of Wetland Inundation or Exposure

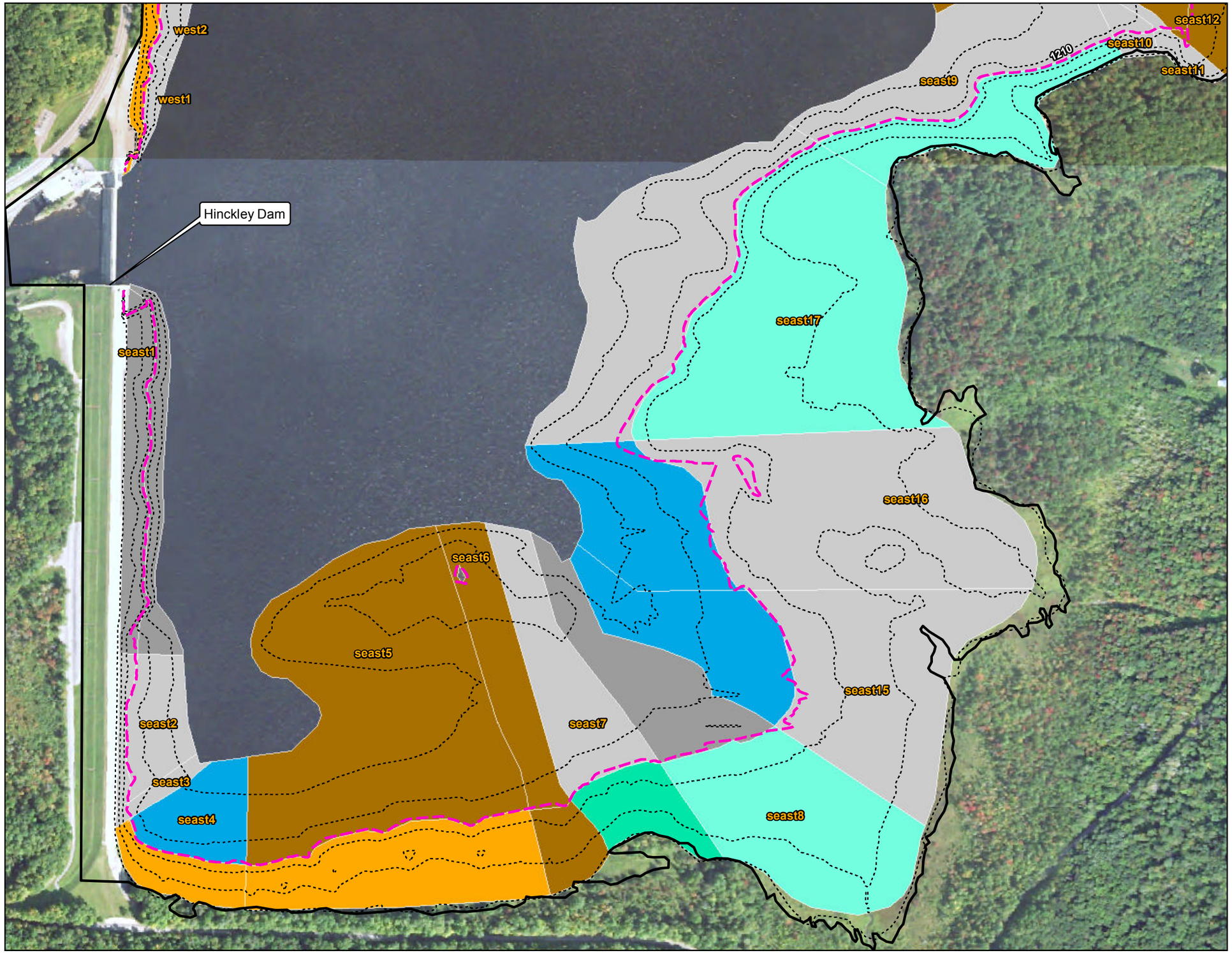
Wetland Type	Reservoir Water Surface Elevation Range (ft.)	Acreage	Total Percentage of Wetland Exposed (above water)	Annual % of Time Reservoir Water Surface Elevation is Equaled or Exceeded - 2001-2019 (Low Elev. Range)
Freshwater Emergent Wetland	Above 1225	57	26%	10%
	1224-1225	10	31%	18%
	1223-1224	11	36%	25%
	1222-1223	12	41%	32%
	1221-1222	14	48%	38%
	1220-1221	17	55%	43%
	1219-1220	20	65%	47%
	1218-1219	25	76%	51%
	1217-1218	13	82%	54%
	1216-1217	10	86%	58%
	1215-1216	8	90%	62%
	1214-1215	7	93%	65%
	1213-1214	6	96%	68%
	1212-1213	3	97%	71%
	1211-1212	1	98%	74%
	1210-1211	1	98%	77%
	<1210	4	>99%	78%
Forested/Shrub	Above 1225	238	90%	10%
	1224-1225	7	93%	18%
	1223-1224	6	95%	25%
	1222-1223	4	97%	32%
	1221-1222	3	98%	38%
	1220-1221	2	99%	43%
	<1220	4	>99%	44%

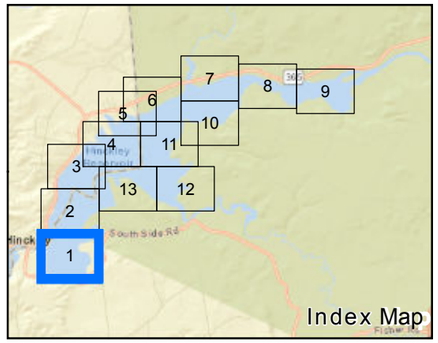
4 Summary

This analysis supplements the initial *Reservoir Fluctuation Field Study* by using existing data to identify the elevation and distribution of aquatic resources potentially affected by water level fluctuations in Hinckley Reservoir, as requested by the Commission. The Power Authority has conducted a spatial and statistical desktop analysis utilizing the results of the 2018 field data, bathymetric data, and historical water level data to sufficiently address the Commission's comments.

Results of this analysis quantified the cover resources and indicate that the study area is comprised mostly of bare substrate (72% of the total study area) with a low amount of SAV present (5% of the below water surface study area and 2% of the total area). The analysis of substrate composition found that sand was dominant (42% of the total study area) and that boulders, cobble, gravel, and sand were found to be slightly greater in areas below the water surface than above the water surface. This analysis further investigated the location and elevation of observed pools and provided percentages of time each identified pool would be inundated or exposed on both a monthly and annual basis. Lastly, the analysis of wetland inundation or exposure quantified the acreage and percentage of each identified wetland type exposed (above water) at different reservoir water surface elevation ranges. The wetland analysis found that 26% of emergent wetlands and 90% of forested/shrub wetlands are exposed when the reservoir is at or above the spillway crest elevation, which occurs 10% of the time annually. This analysis indicates that the forested/shrub wetlands are not strongly affected by reservoir operations and illustrates the dynamic extent of emergent wetlands in relation to reservoir water surface elevations.

Appendix A - Hinckley Reservoir Fluctuation Study - Cover Resources Revised Figures and Cover Resource Segment Attribute Tables





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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 1 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

N

*Multiple cover resources listed indicate near equal abundance of each resource. Abundance percentage of dominant and subdominant resources can be found in Appendix A table of the Hinckley Reservoir Fluctuation Field Study - Supplemental Analysis

NOTES
1. Basemap Imagery WSEL = 1216 ft. BCD (9/10/17)
2. Study Area generally represents El. 1225 ft. BCD.
3. WSEL at the time of the survey was approximately 1213 ft. BCD

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0 200 400 800 Feet

1 inch = 400 feet

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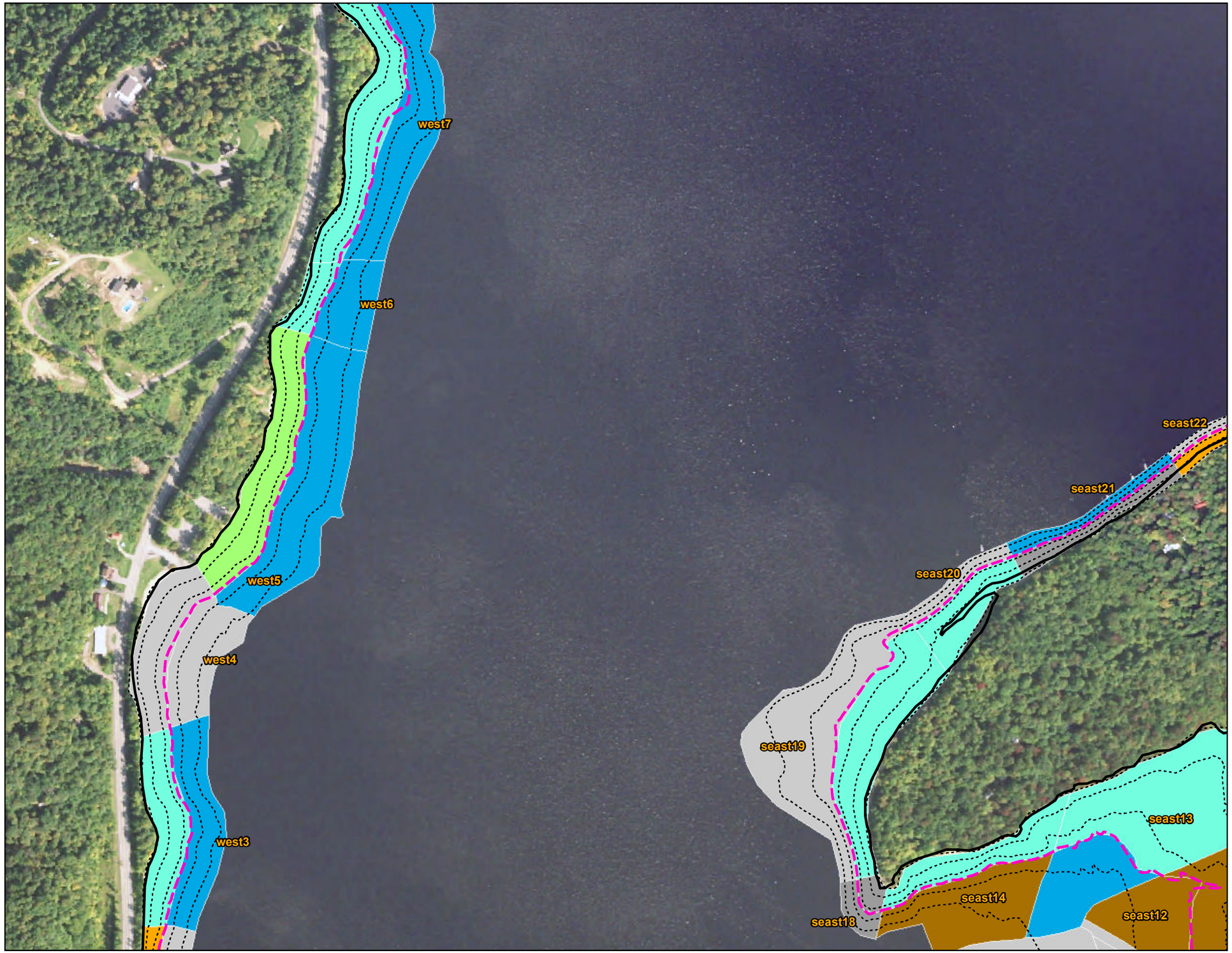

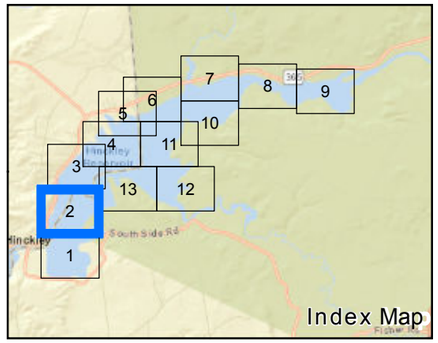

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 2 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

N

*Multiple cover resources listed indicate near equal abundance of each resource. Abundance percentage of dominant and subdominant resources can be found in Appendix A table of the Hinckley Reservoir Fluctuation Field Study - Supplemental Analysis

NOTES
1. Basemap Imagery WSEL = 1216 ft. BCD (9/10/17)
2. Study Area generally represents El. 1225 ft. BCD.
3. WSEL at the time of the survey was approximately 1213 ft. BCD

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1 inch = 400 feet

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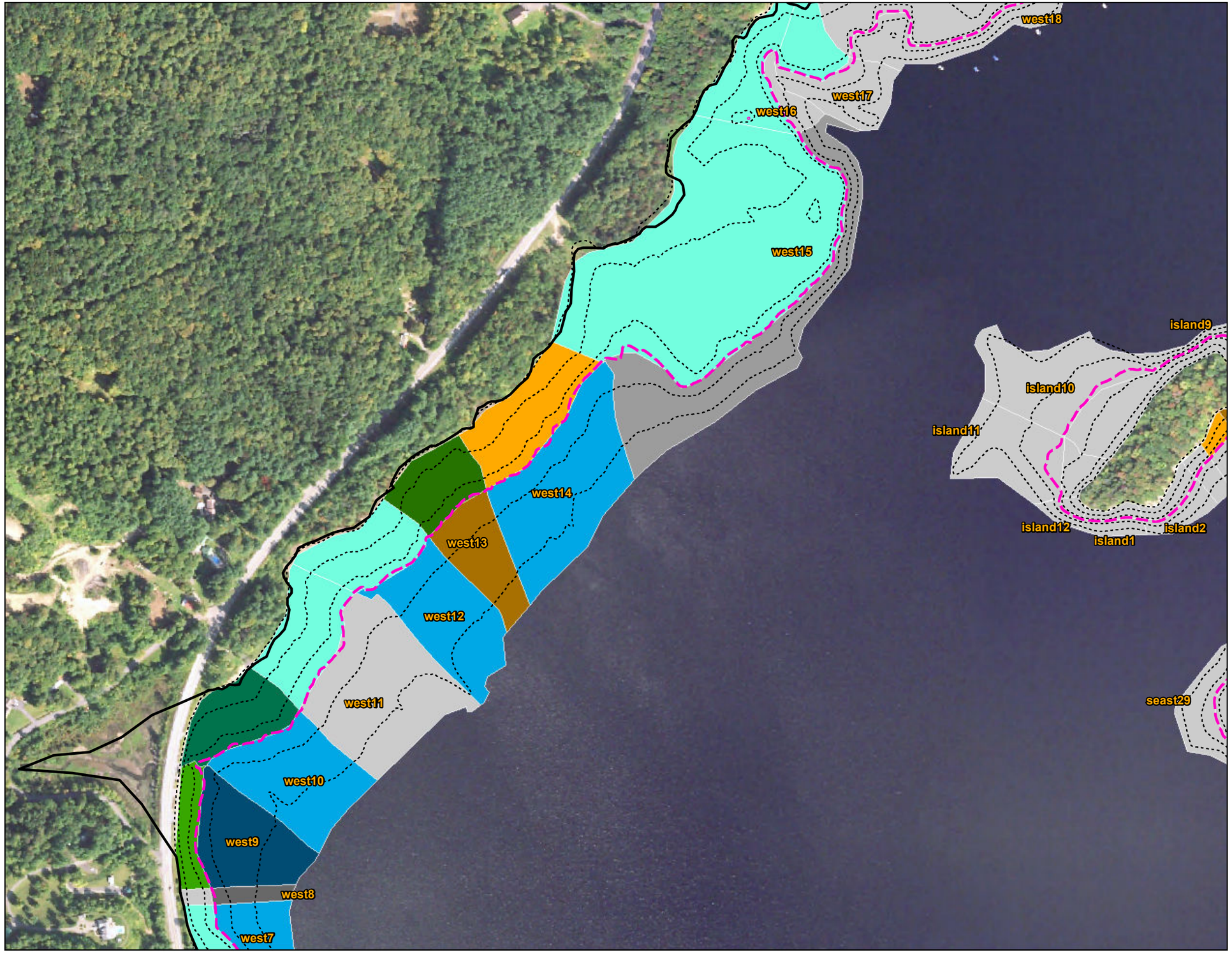

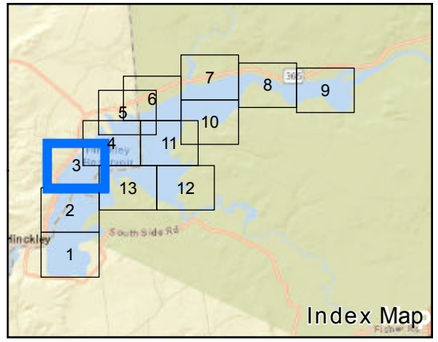

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 3 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

N

*Multiple cover resources listed indicate near equal abundance of each resource. Abundance percentage of dominant and subdominant resources can be found in Appendix A table of the Hinckley Reservoir Fluctuation Field Study - Supplemental Analysis

NOTES
1. Basemap Imagery WSEL = 1216 ft. BCD (9/10/17)
2. Study Area generally represents El. 1225 ft. BCD.
3. WSEL at the time of the survey was approximately 1213 ft. BCD

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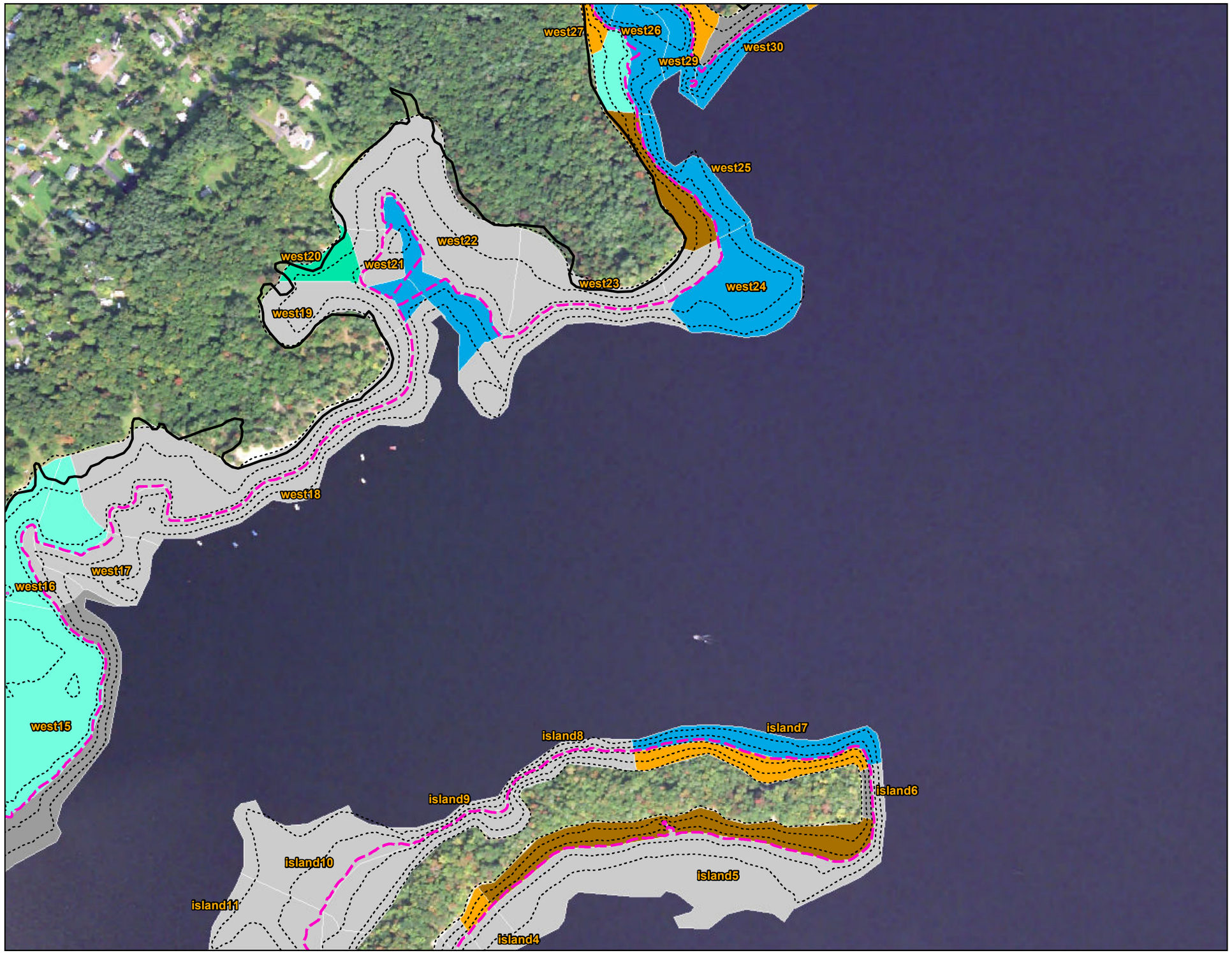

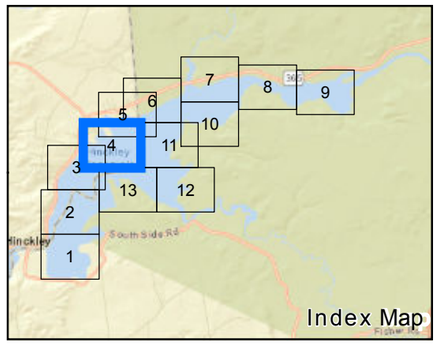

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 4 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
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N

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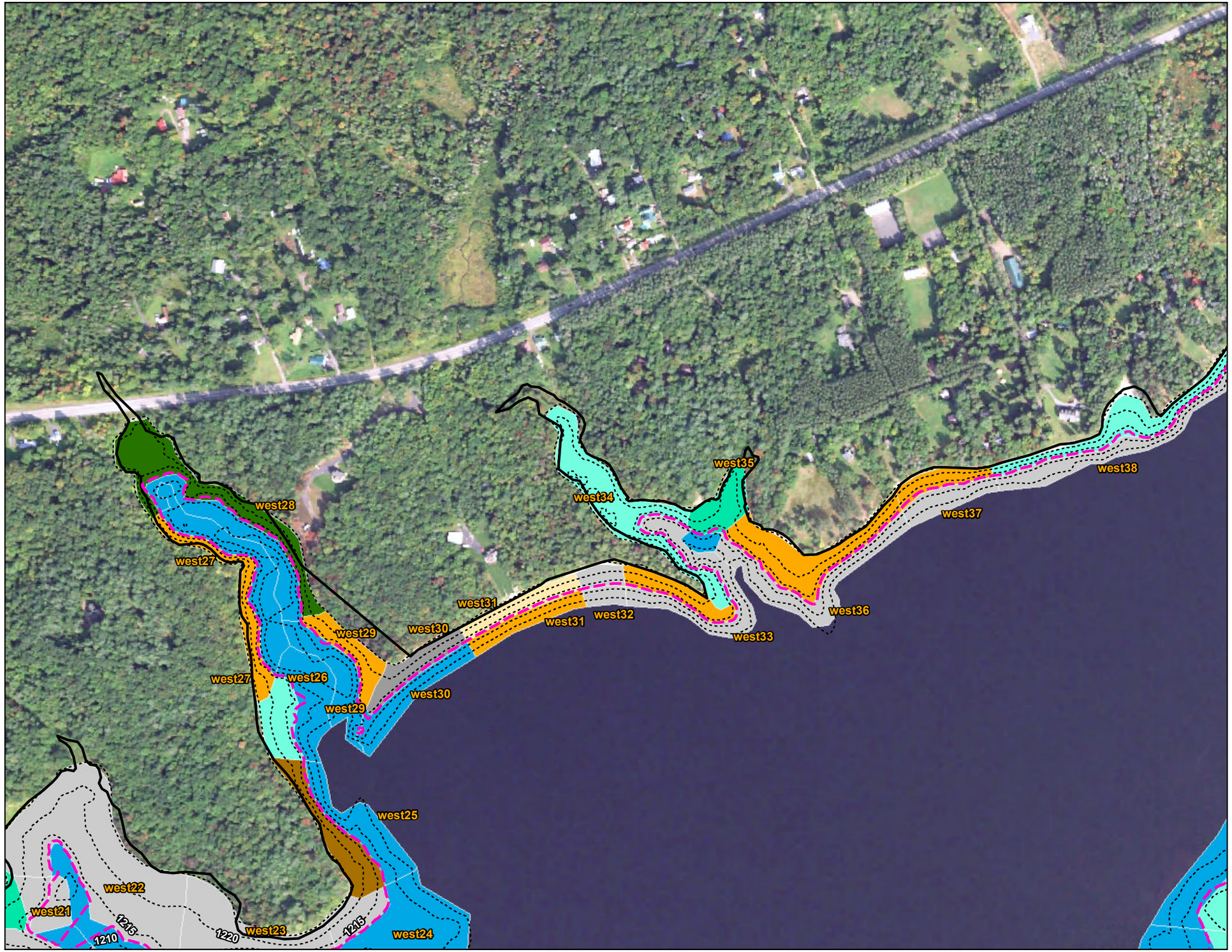

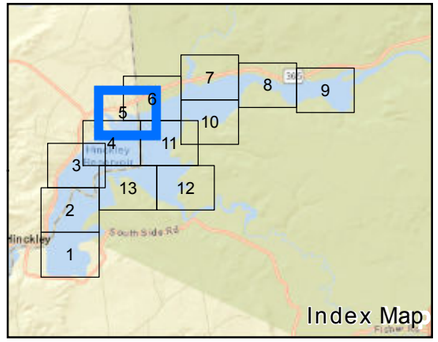

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 5 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

N

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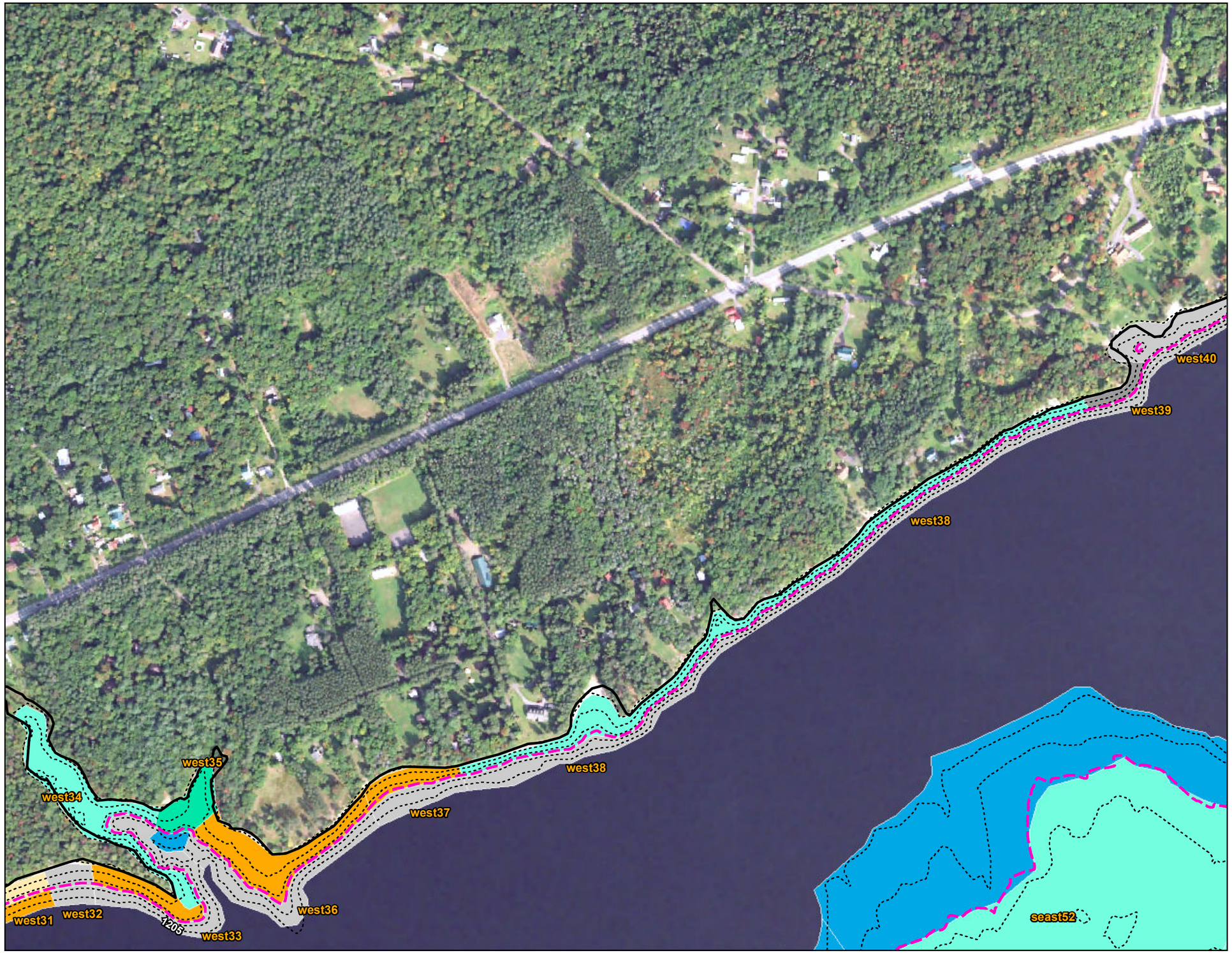

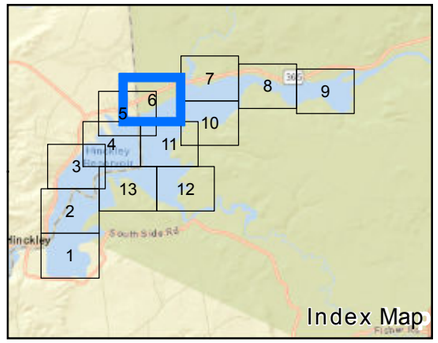

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 6 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

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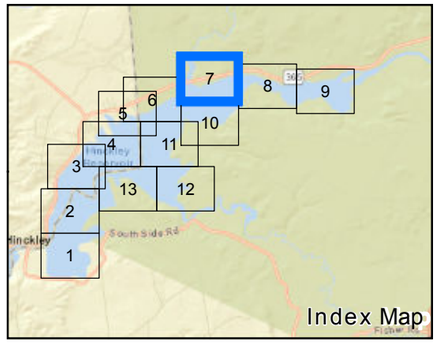

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 7 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

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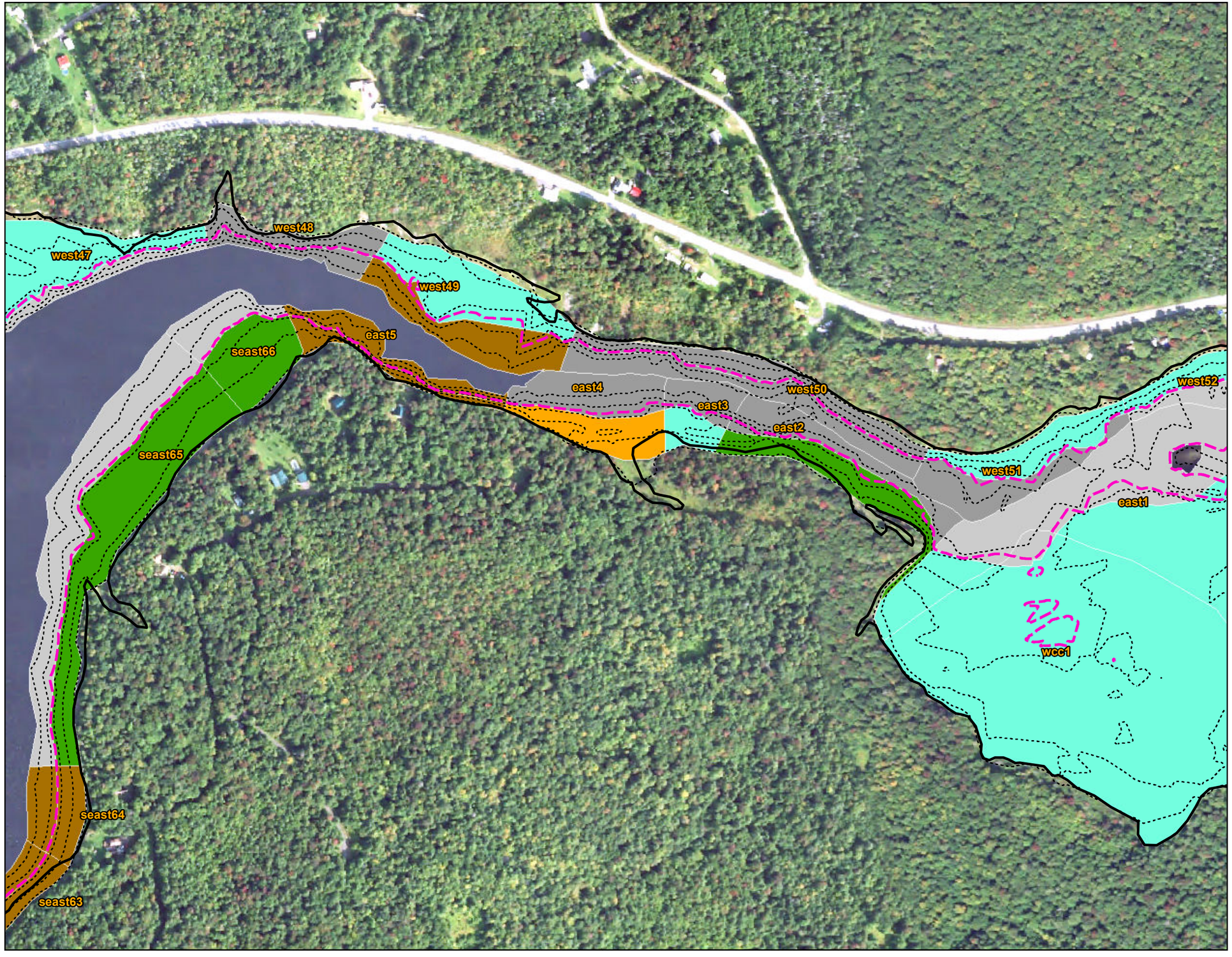

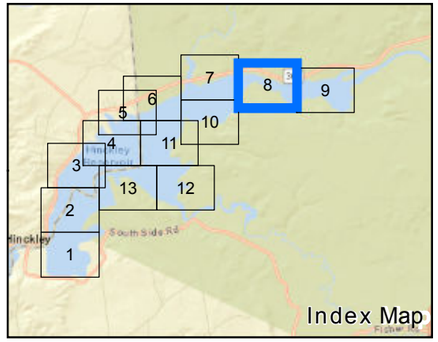

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 8 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

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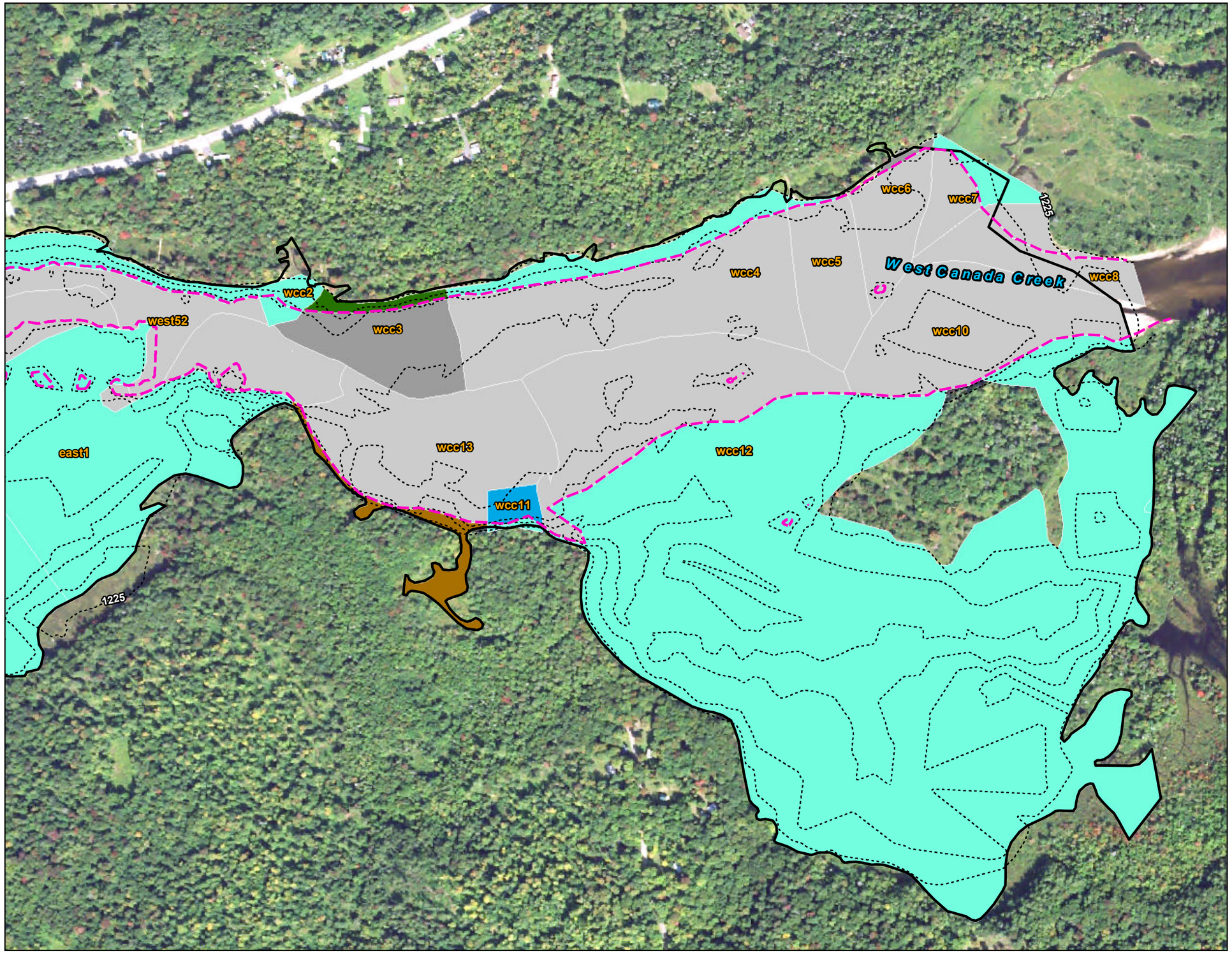

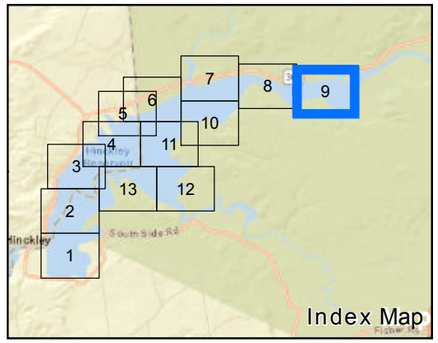

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 9 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

N

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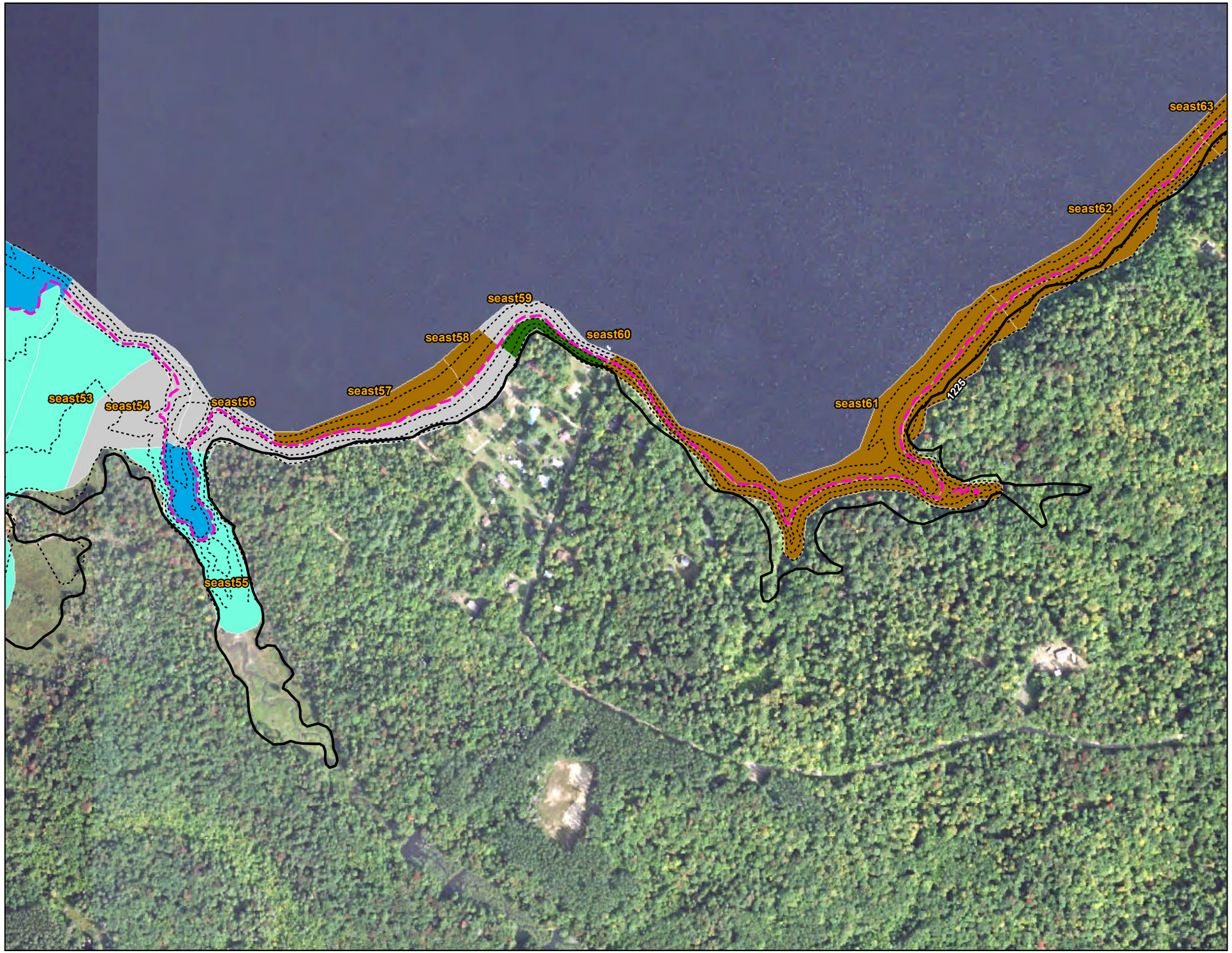

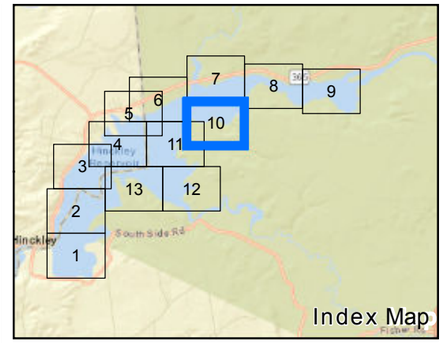

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 10 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
- EAV, FAV, Boulder
- EAV, Boulder
- EAV, Woody Debris/Detritus
- FAV
- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

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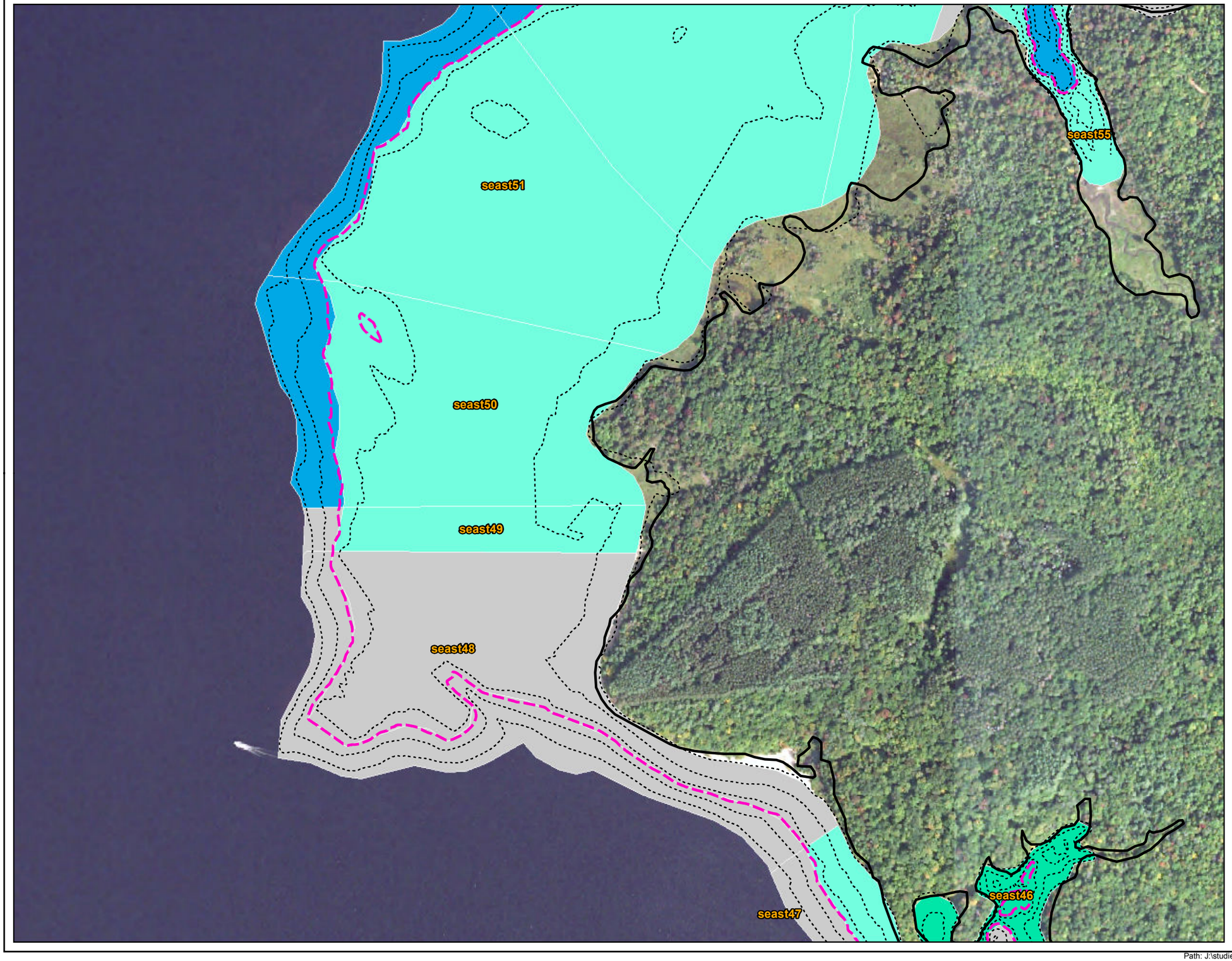

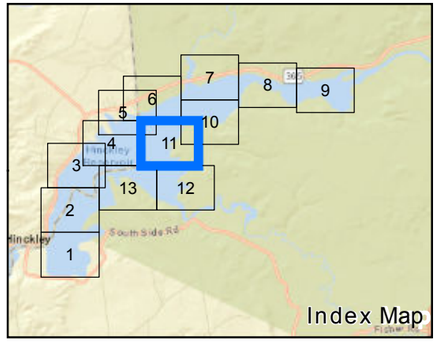

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 11 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
- EAV, SAV
- EAV, FAV, SAV
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- FAV, Woody Debris/Detritus
- SAV
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- Woody Debris/Detritus

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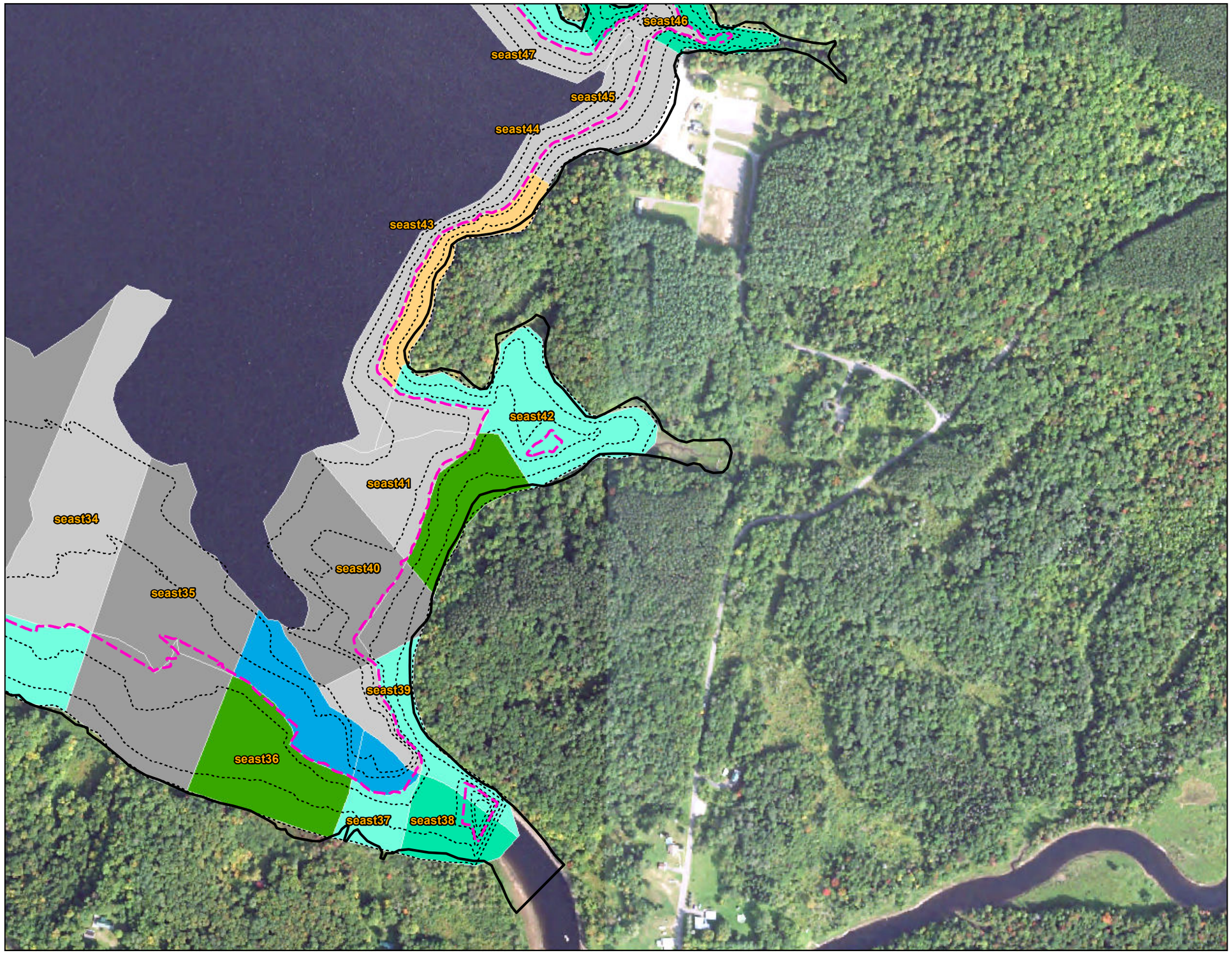

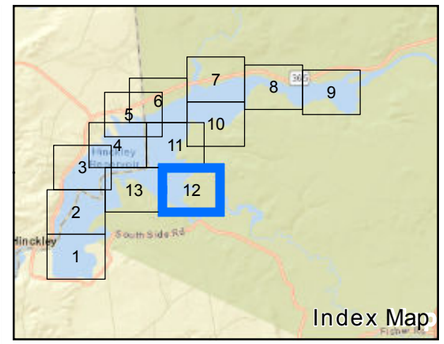

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 12 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
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- Woody Debris/Detritus

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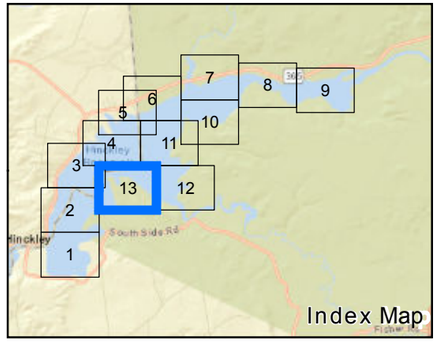

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix A
Cover Resources (Page 13 of 13)

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

Cover Resource*

- Bare Substrate
- Boulder
- Boulder, Woody Debris/Detritus
- EAV
- EAV, FAV
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- EAV, FAV, Boulder
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- FAV, Boulder
- FAV, Woody Debris/Detritus
- SAV
- SAV, Woody Debris/Detritus
- Woody Debris/Detritus

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Cover Resource Segment Attributes – Below Water Surface (El. 1202 - 1213)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
east1	0.00	0.00	0.00	0.00	0.00	8.69	8.69	0	0	0	0	0	100
east1	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0	0	0	0	0	100
east2	1.06	0.00	0.00	0.00	0.00	1.06	2.11	50	0	0	0	0	50
east3	0.52	0.00	0.00	0.00	0.00	0.52	1.03	50	0	0	0	0	50
east4	0.57	0.00	0.00	0.23	0.00	1.48	2.27	25	0	0	10	0	65
east5	0.00	0.34	0.00	0.00	0.00	1.01	1.35	0	25	0	0	0	75
island1	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0	0	0	0	0	100
island10	0.00	0.00	0.00	0.00	0.00	4.53	4.53	0	0	0	0	0	100
island11	0.00	0.00	0.00	0.00	0.00	2.95	2.95	0	0	0	0	0	100
island12	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0	0	0	0	0	100
island2	0.00	0.00	0.00	0.00	0.00	0.64	0.64	0	0	0	0	0	100
island3	0.00	0.00	0.00	0.00	0.00	0.31	0.31	0	0	0	0	0	100
island4	0.00	0.00	0.00	0.00	0.00	0.65	0.65	0	0	0	0	0	100
island5	0.00	0.00	0.00	0.00	0.00	8.65	8.65	0	0	0	0	0	100
island6	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0	0	0	0	0	100
island7	0.00	0.00	0.00	0.19	0.00	1.74	1.94	0	0	0	10	0	90
island8	0.00	0.00	0.00	0.00	0.00	0.49	0.49	0	0	0	0	0	100
island9	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0	0	0	0	0	100
seast1	0.62	0.00	0.00	0.00	0.00	1.87	2.49	25	0	0	0	0	75
seast10	0.00	0.00	0.00	0.00	0.00	0.49	0.49	0	0	0	0	0	100
seast11	0.00	0.00	0.00	0.00	0.00	0.38	0.38	0	0	0	0	0	100
seast12	0.00	1.34	0.00	0.00	0.00	1.34	2.68	0	50	0	0	0	50
seast13	0.00	0.00	0.00	0.28	0.00	2.49	2.76	0	0	0	10	0	90
seast14	0.37	0.92	0.00	0.00	0.00	2.40	3.69	10	25	0	0	0	65
seast15	0.00	0.00	0.00	1.64	0.00	4.91	6.54	0	0	0	25	0	75
seast16	0.00	0.00	0.00	1.84	0.00	5.53	7.37	0	0	0	25	0	75
seast17	0.00	0.00	0.00	0.00	0.00	13.94	13.94	0	0	0	0	0	100
seast18	0.13	0.00	0.00	0.00	0.00	0.39	0.52	25	0	0	0	0	75
seast19	0.00	0.00	0.00	0.00	0.00	6.24	6.24	0	0	0	0	0	100

Cover Resource Segment Attributes – Below Water Surface (El. 1202 - 1213)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
seast2	0.00	0.00	0.00	0.00	0.00	2.89	2.89	0	0	0	0	0	100
seast20	0.00	0.00	0.00	0.00	0.00	0.73	0.73	0	0	0	0	0	100
seast21	0.00	0.09	0.00	0.22	0.00	0.56	0.86	0	10	0	25	0	65
seast22	0.00	0.00	0.00	0.00	0.00	1.02	1.02	0	0	0	0	0	100
seast23	0.00	0.00	0.00	0.00	0.00	0.68	0.68	0	0	0	0	0	100
seast24	0.00	0.18	0.00	0.00	0.00	1.58	1.75	0	10	0	0	0	90
seast25	0.00	0.00	0.00	0.00	0.00	0.64	0.64	0	0	0	0	0	100
seast26	0.00	0.00	0.00	0.00	0.00	0.53	0.53	0	0	0	0	0	100
seast27	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0	0	0	0	0	100
seast28	0.00	0.00	0.00	0.00	0.00	0.59	0.59	0	0	0	0	0	100
seast29	0.00	0.00	0.00	0.00	0.00	2.12	2.12	0	0	0	0	0	100
seast3	0.00	0.00	0.00	0.00	0.00	0.58	0.58	0	0	0	0	0	100
seast30	0.00	0.00	0.00	0.00	0.00	3.60	3.60	0	0	0	0	0	100
seast31	0.00	0.11	0.00	0.00	0.00	1.01	1.12	0	10	0	0	0	90
seast32	0.00	0.00	0.00	0.00	0.00	26.73	26.73	0	0	0	0	0	100
seast33	7.05	0.00	0.00	0.00	0.00	7.05	14.10	50	0	0	0	0	50
seast34	0.00	0.00	0.00	0.00	0.00	10.41	10.41	0	0	0	0	0	100
seast35	3.85	0.00	0.00	0.77	0.00	3.08	7.71	50	0	0	10	0	40
seast36	0.00	0.00	0.00	0.34	0.00	3.08	3.43	0	0	0	10	0	90
seast37	0.00	0.00	0.00	0.10	0.00	0.86	0.96	0	0	0	10	0	90
seast39	0.00	0.00	0.00	0.00	0.00	1.54	1.54	0	0	0	0	0	100
seast4	0.00	0.00	0.00	0.34	0.00	3.02	3.36	0	0	0	10	0	90
seast40	3.54	0.00	0.00	0.00	0.00	3.54	7.08	50	0	0	0	0	50
seast41	0.00	0.00	0.00	0.00	0.00	3.67	3.67	0	0	0	0	0	100
seast42	0.00	0.00	0.00	0.00	0.00	1.34	1.34	0	0	0	0	0	100
seast43	0.00	0.00	0.00	0.00	0.00	3.27	3.27	0	0	0	0	0	100
seast44	0.00	0.00	0.00	0.00	0.00	0.68	0.68	0	0	0	0	0	100
seast45	0.00	0.00	0.00	0.00	0.00	1.18	1.18	0	0	0	0	0	100
seast46	0.00	0.00	0.00	0.00	0.00	1.01	1.01	0	0	0	0	0	100

Cover Resource Segment Attributes – Below Water Surface (El. 1202 - 1213)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
seast47	0.00	0.00	0.00	0.00	0.00	3.24	3.24	0	0	0	0	0	100
seast48	0.00	0.00	0.00	0.00	0.00	10.81	10.81	0	0	0	0	0	100
seast49	0.00	0.00	0.00	0.00	0.00	0.60	0.60	0	0	0	0	0	100
seast5	0.00	6.05	0.00	0.00	0.00	18.15	24.20	0	25	0	0	0	75
seast50	0.00	0.00	0.00	1.24	0.00	3.71	4.95	0	0	0	25	0	75
seast51	0.00	0.00	0.00	1.32	0.00	3.95	5.27	0	0	0	25	0	75
seast52	0.00	0.00	0.00	1.84	0.00	16.53	18.36	0	0	0	10	0	90
seast53	0.00	0.00	0.00	0.00	0.00	0.96	0.96	0	0	0	0	0	100
seast54	0.00	0.00	0.00	0.00	0.00	0.66	0.66	0	0	0	0	0	100
seast55	0.00	0.00	0.00	0.11	0.00	0.95	1.06	0	0	0	10	0	90
seast56	0.00	0.00	0.00	0.00	0.00	0.88	0.88	0	0	0	0	0	100
seast57	0.00	0.45	0.00	0.00	0.00	1.36	1.81	0	25	0	0	0	75
seast58	0.00	0.06	0.00	0.00	0.00	0.56	0.62	0	10	0	0	0	90
seast59	0.00	0.00	0.00	0.00	0.00	0.69	0.69	0	0	0	0	0	100
seast6	0.00	2.49	0.00	0.00	0.00	2.49	4.99	0	50	0	0	0	50
seast60	0.00	0.00	0.00	0.00	0.00	0.21	0.21	0	0	0	0	0	100
seast61	0.00	1.31	0.00	0.00	0.00	3.94	5.26	0	25	0	0	0	75
seast62	0.00	0.54	0.00	0.00	0.00	1.62	2.16	0	25	0	0	0	75
seast63	0.00	0.17	0.00	0.00	0.00	0.51	0.69	0	25	0	0	0	75
seast64	0.00	0.22	0.00	0.00	0.00	0.67	0.90	0	25	0	0	0	75
seast65	0.00	0.00	0.00	0.00	0.00	5.86	5.86	0	0	0	0	0	100
seast66	0.00	0.00	0.00	0.00	0.00	1.37	1.37	0	0	0	0	0	100
seast7	0.00	0.00	0.00	0.00	0.00	6.28	6.28	0	0	0	0	0	100
seast8	1.56	0.00	0.00	0.00	0.00	4.68	6.23	25	0	0	0	0	75
seast9	0.00	0.00	0.00	0.00	0.00	7.98	7.98	0	0	0	0	0	100
wcc1	0.00	0.00	0.00	0.00	0.00	0.46	0.46	0	0	0	0	0	100
wcc10	0.00	0.00	0.00	0.00	0.00	9.39	9.39	0	0	0	0	0	100
wcc11	0.00	0.00	0.00	0.18	0.00	0.54	0.72	0	0	0	25	0	75
wcc12	0.00	0.00	0.00	0.00	0.00	11.16	11.16	0	0	0	0	0	100

Cover Resource Segment Attributes – Below Water Surface (El. 1202 - 1213)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
wcc13	0.00	0.00	0.00	0.00	0.00	3.80	3.80	0	0	0	0	0	100
wcc13	0.00	0.00	0.00	0.00	0.00	9.95	9.95	0	0	0	0	0	100
wcc3	0.45	0.45	0.00	0.00	0.00	3.61	4.52	10	10	0	0	0	80
wcc4	0.00	0.00	0.00	0.00	0.00	12.08	12.08	0	0	0	0	0	100
wcc5	0.00	0.00	0.00	0.00	0.00	4.03	4.03	0	0	0	0	0	100
wcc6	0.00	0.00	0.00	0.00	0.00	3.09	3.09	0	0	0	0	0	100
wcc7	0.00	0.00	0.00	0.00	0.00	1.42	1.42	0	0	0	0	0	100
wcc8	0.00	0.00	0.00	0.00	0.00	3.03	3.03	0	0	0	0	0	100
west1	0.00	0.00	0.00	0.00	0.00	0.59	0.59	0	0	0	0	0	100
west10	0.00	0.45	0.00	2.23	0.00	1.79	4.47	0	10	0	50	0	40
west11	0.00	0.00	0.00	0.00	0.00	6.68	6.68	0	0	0	0	0	100
west12	0.00	0.00	0.00	1.05	0.00	3.14	4.19	0	0	0	25	0	75
west13	0.00	1.22	0.00	0.00	0.00	1.22	2.45	0	50	0	0	0	50
west14	0.00	0.00	0.00	1.66	0.00	4.97	6.62	0	0	0	25	0	75
west15	0.68	0.00	0.00	0.00	0.00	6.16	6.84	10	0	0	0	0	90
west16	0.00	0.00	0.00	0.00	0.00	0.63	0.63	0	0	0	0	0	100
west17	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0	0	0	0	0	100
west18	0.00	0.00	0.00	0.00	0.00	4.18	4.18	0	0	0	0	0	100
west19	0.00	0.00	0.00	0.11	0.00	0.33	0.44	0	0	0	25	0	75
west2	0.00	0.00	0.00	0.00	0.00	0.86	0.86	0	0	0	0	0	100
west21	0.00	0.00	0.00	0.00	0.00	0.56	0.56	0	0	0	0	0	100
west22	0.00	0.00	0.00	0.19	0.00	1.67	1.86	0	0	0	10	0	90
west23	0.00	0.00	0.00	0.00	0.00	2.58	2.58	0	0	0	0	0	100
west24	0.00	0.00	0.00	0.37	0.00	3.29	3.65	0	0	0	10	0	90
west25	0.00	0.00	0.00	0.14	0.00	1.30	1.44	0	0	0	10	0	90
west26	0.00	0.00	0.00	0.15	0.00	1.35	1.50	0	0	0	10	0	90
west27	0.00	0.00	0.00	0.20	0.00	1.76	1.95	0	0	0	10	0	90
west28	0.00	0.00	0.00	0.15	0.00	1.39	1.54	0	0	0	10	0	90
west29	0.00	0.00	0.00	0.13	0.00	1.18	1.31	0	0	0	10	0	90

Cover Resource Segment Attributes – Below Water Surface (El. 1202 - 1213)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
west3	0.00	0.00	0.00	0.72	0.00	2.16	2.88	0	0	0	25	0	75
west30	0.00	0.00	0.00	0.29	0.00	0.87	1.16	0	0	0	25	0	75
west31	0.00	0.00	0.00	0.00	0.19	0.58	0.77	0	0	0	0	25	75
west32	0.00	0.00	0.00	0.00	0.00	0.31	0.31	0	0	0	0	0	100
west33	0.00	0.00	0.00	0.00	0.00	0.89	0.89	0	0	0	0	0	100
west34	0.00	0.00	0.00	0.00	0.00	0.84	0.84	0	0	0	0	0	100
west35	0.00	0.00	0.00	0.02	0.00	0.22	0.25	0	0	0	10	0	90
west36	0.00	0.00	0.00	0.00	0.00	1.84	1.84	0	0	0	0	0	100
west37	0.00	0.00	0.00	0.00	0.00	0.79	0.79	0	0	0	0	0	100
west38	0.00	0.00	0.00	0.00	0.00	3.18	3.18	0	0	0	0	0	100
west39	0.00	0.00	0.00	0.00	0.00	0.38	0.38	0	0	0	0	0	100
west4	0.00	0.00	0.00	0.00	0.00	2.38	2.38	0	0	0	0	0	100
west40	0.00	0.00	0.00	0.00	0.00	0.89	0.89	0	0	0	0	0	100
west41	0.00	0.00	0.00	0.04	0.00	0.38	0.42	0	0	0	10	0	90
west42	0.00	0.59	0.00	0.59	0.00	1.17	2.34	0	25	0	25	0	50
west43	0.00	0.00	0.00	0.00	0.00	0.37	0.37	0	0	0	0	0	100
west44	0.00	0.00	0.00	0.00	0.00	0.31	0.31	0	0	0	0	0	100
west45	0.00	0.00	0.00	0.15	0.00	1.31	1.45	0	0	0	10	0	90
west46	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0	0	0	0	0	100
west47	0.00	0.00	0.00	0.00	0.00	8.03	8.03	0	0	0	0	0	100
west48	0.66	0.00	0.00	0.00	0.00	0.22	0.88	75	0	0	0	0	25
west49	0.00	0.28	0.00	0.00	0.00	2.52	2.80	0	10	0	0	0	90
west5	0.00	0.00	0.00	1.54	0.00	4.63	6.18	0	0	0	25	0	75
west50	0.71	0.00	0.00	0.00	0.00	2.14	2.85	25	0	0	0	0	75
west51	1.67	0.00	0.00	0.00	0.00	0.56	2.23	75	0	0	0	0	25
west52	0.00	0.00	0.00	0.00	0.00	4.32	4.32	0	0	0	0	0	100
west6	0.18	0.00	0.00	0.44	0.00	1.14	1.76	10	0	0	25	0	65
west7	0.00	0.57	0.00	1.42	0.00	3.69	5.67	0	10	0	25	0	65
west8	0.05	0.05	0.00	0.00	0.00	0.41	0.52	10	10	0	0	0	80

Cover Resource Segment Attributes – Below Water Surface (El. 1202 - 1213)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
west9	0.00	0.88	0.00	0.88	0.00	1.76	3.52	0	25	0	25	0	50
Total	**23.67**	**18.76**	**0.00**	**23.07**	**0.19**	**419.13**	**484.83**						

Cover Resource Segment Attributes – Above Water Surface (El. 1213 – 1225)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
east1	0.00	0.00	0.42	0.00	0.00	1.26	1.68	0	0	25	0	0	75
east1	0.00	0.00	10.56	0.00	5.28	5.28	21.11	0	0	50	0	25	25
east2	0.62	0.00	0.62	0.00	0.00	1.23	2.46	25	0	25	0	0	50
east3	0.00	0.00	0.19	0.00	0.00	0.58	0.78	0	0	25	0	0	75
east4	0.00	0.00	0.00	0.00	0.19	1.70	1.89	0	0	0	0	10	90
east5	0.21	0.42	0.00	0.00	0.21	0.00	0.85	25	50	0	0	25	0
island1	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0	0	0	0	0	100
island10	0.00	0.00	0.00	0.00	0.00	2.69	2.69	0	0	0	0	0	100
island11	0.00	0.00	0.00	0.00	0.00	0.62	0.62	0	0	0	0	0	100
island12	0.00	0.00	0.00	0.00	0.00	0.14	0.14	0	0	0	0	0	100
island2	0.00	0.00	0.00	0.00	0.00	0.48	0.48	0	0	0	0	0	100
island3	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0	0	0	0	0	100
island4	0.00	0.00	0.00	0.00	0.03	0.25	0.28	0	0	0	0	10	90
island5	0.00	0.37	0.00	0.00	0.00	3.29	3.66	0	10	0	0	0	90
island6	0.02	0.00	0.00	0.00	0.00	0.19	0.21	10	0	0	0	0	90
island7	0.00	0.00	0.00	0.00	0.17	1.51	1.67	0	0	0	0	10	90
island8	0.00	0.00	0.00	0.00	0.00	0.64	0.64	0	0	0	0	0	100
island9	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0	0	0	0	0	100
seast1	0.34	0.00	0.00	0.00	0.00	3.10	3.45	10	0	0	0	0	90
seast10	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0	0	0	0	0	100
seast11	0.00	0.00	0.00	0.00	0.00	0.67	0.67	0	0	0	0	0	100
seast12	0.00	4.54	2.27	0.00	0.00	2.27	9.09	0	50	25	0	0	25
seast13	0.75	0.00	1.87	0.00	0.00	4.86	7.48	10	0	25	0	0	65
seast14	0.22	0.00	0.54	0.00	0.22	1.19	2.16	10	0	25	0	10	55
seast15	0.00	0.00	0.00	0.00	0.00	13.67	13.67	0	0	0	0	0	100
seast16	0.00	0.00	0.00	0.00	0.00	18.75	18.75	0	0	0	0	0	100
seast17	0.00	0.00	2.12	0.00	0.00	19.10	21.23	0	0	10	0	0	90
seast18	0.03	0.00	0.00	0.00	0.00	0.30	0.34	10	0	0	0	0	90
seast19	0.00	0.00	1.05	0.00	0.42	2.74	4.22	0	0	25	0	10	65

Cover Resource Segment Attributes – Above Water Surface (El. 1213 – 1225)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
seast2	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0	0	0	0	0	100
seast20	0.00	0.00	0.17	0.00	0.00	1.56	1.73	0	0	10	0	0	90
seast21	0.11	0.00	0.00	0.00	0.00	0.97	1.07	10	0	0	0	0	90
seast22	0.00	0.00	0.00	0.00	0.31	0.94	1.25	0	0	0	0	25	75
seast23	0.00	0.00	0.00	0.00	0.00	0.51	0.51	0	0	0	0	0	100
seast24	0.00	0.00	0.18	0.00	0.44	1.14	1.76	0	0	10	0	25	65
seast25	0.08	0.00	0.08	0.00	0.08	0.56	0.80	10	0	10	0	10	70
seast26	0.00	0.00	0.00	0.00	0.06	0.56	0.63	0	0	0	0	10	90
seast27	0.04	0.00	0.00	0.00	0.00	0.40	0.44	10	0	0	0	0	90
seast28	0.00	0.00	0.00	0.00	0.00	1.14	1.14	0	0	0	0	0	100
seast29	0.00	0.00	0.00	0.00	0.00	1.41	1.41	0	0	0	0	0	100
seast3	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0	0	0	0	0	100
seast30	0.00	0.00	1.51	0.00	0.61	3.93	6.05	0	0	25	0	10	65
seast31	0.00	0.31	0.00	0.00	0.12	0.80	1.23	0	25	0	0	10	65
seast32	0.00	0.00	3.05	0.00	3.05	6.10	12.20	0	0	25	0	25	50
seast33	1.47	0.00	1.47	0.00	0.00	0.00	2.94	50	0	50	0	0	0
seast34	0.36	0.00	1.78	0.00	0.00	1.42	3.55	10	0	50	0	0	40
seast35	3.08	0.00	0.62	0.00	0.00	2.46	6.16	50	0	10	0	0	40
seast36	1.36	0.00	1.36	0.00	0.54	2.18	5.44	25	0	25	0	10	40
seast37	0.00	0.00	0.38	0.00	0.15	0.99	1.53	0	0	25	0	10	65
seast38	0.00	0.00	0.26	0.00	0.26	2.07	2.59	0	0	10	0	10	80
seast39	0.00	0.00	0.23	0.00	0.00	2.10	2.33	0	0	10	0	0	90
seast4	0.00	0.00	0.00	0.00	0.55	1.64	2.18	0	0	0	0	25	75
seast40	0.37	0.00	0.15	0.00	0.00	0.97	1.49	25	0	10	0	0	65
seast41	0.76	0.00	0.76	0.00	0.30	1.22	3.05	25	0	25	0	10	40
seast42	0.00	0.00	3.10	0.00	1.55	1.55	6.20	0	0	50	0	25	25
seast43	0.63	0.25	0.25	0.00	0.63	0.76	2.54	25	10	10	0	25	30
seast44	0.00	0.00	0.00	0.00	0.00	0.57	0.57	0	0	0	0	0	100
seast45	0.00	0.00	0.00	0.00	0.00	1.81	1.81	0	0	0	0	0	100

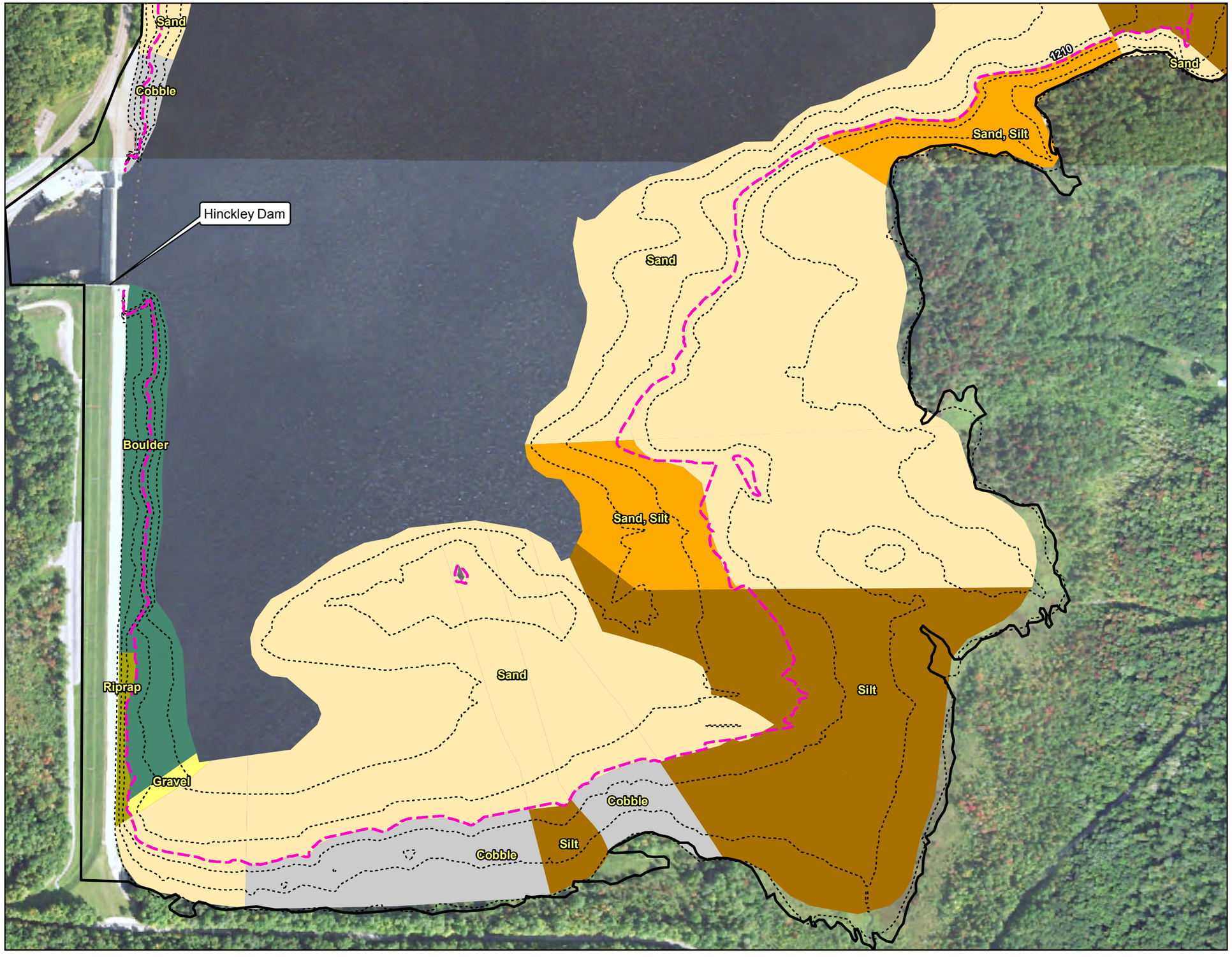
Cover Resource Segment Attributes – Above Water Surface (El. 1213 – 1225)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
seast46	0.00	0.52	1.29	0.00	1.29	2.06	5.16	0	10	25	0	25	40
seast47	0.00	0.00	1.46	0.00	0.00	1.46	2.92	0	0	50	0	0	50
seast48	0.00	0.00	0.00	0.00	0.00	22.35	22.35	0	0	0	0	0	100
seast49	0.00	0.00	1.41	0.00	0.00	4.22	5.62	0	0	25	0	0	75
seast5	0.00	0.84	0.84	0.00	2.10	4.63	8.42	0	10	10	0	25	55
seast50	0.00	0.00	2.23	0.00	0.00	20.03	22.25	0	0	10	0	0	90
seast51	0.00	0.00	6.98	0.00	0.00	20.95	27.93	0	0	25	0	0	75
seast52	0.00	0.00	9.94	0.00	0.00	29.83	39.78	0	0	25	0	0	75
seast53	0.00	0.00	1.90	0.00	0.00	5.70	7.61	0	0	25	0	0	75
seast54	0.00	0.00	0.00	0.00	0.00	2.45	2.45	0	0	0	0	0	100
seast55	0.00	0.00	0.26	0.00	0.00	2.36	2.62	0	0	10	0	0	90
seast56	0.00	0.00	0.00	0.00	0.00	0.69	0.69	0	0	0	0	0	100
seast57	0.00	0.00	0.00	0.00	0.00	1.58	1.58	0	0	0	0	0	100
seast58	0.00	0.00	0.00	0.00	0.00	0.61	0.61	0	0	0	0	0	100
seast59	0.00	0.04	0.04	0.00	0.00	0.32	0.40	0	10	10	0	0	80
seast6	0.00	0.92	0.46	0.00	0.18	0.28	1.84	0	50	25	0	10	15
seast60	0.00	0.02	0.02	0.00	0.00	0.16	0.20	0	10	10	0	0	80
seast61	0.00	1.91	0.38	0.00	0.38	1.15	3.83	0	50	10	0	10	30
seast62	0.00	1.00	0.00	0.00	0.50	0.50	2.01	0	50	0	0	25	25
seast63	0.00	0.21	0.08	0.00	0.08	0.46	0.83	0	25	10	0	10	55
seast64	0.00	0.26	0.10	0.00	0.10	0.56	1.02	0	25	10	0	10	55
seast65	0.66	0.00	0.66	0.00	0.00	5.26	6.57	10	0	10	0	0	80
seast66	0.60	0.00	0.60	0.00	0.00	1.19	2.39	25	0	25	0	0	50
seast7	0.00	0.00	0.31	0.00	0.31	2.45	3.07	0	0	10	0	10	80
seast8	0.00	0.00	2.83	0.00	1.13	7.37	11.34	0	0	25	0	10	65
seast9	0.00	0.00	0.54	0.00	0.00	4.84	5.37	0	0	10	0	0	90
wcc1	0.00	0.00	13.86	0.00	0.00	13.86	27.72	0	0	50	0	0	50
wcc10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	50	0	0	50
wcc10	0.00	0.00	0.02	0.00	0.00	0.02	0.04	0	0	50	0	0	50

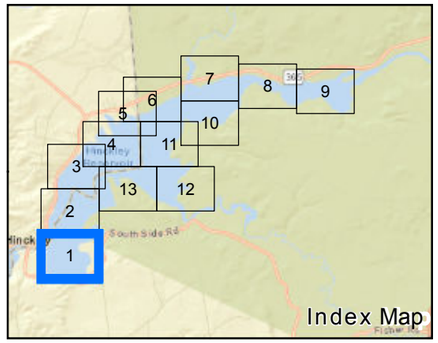
Cover Resource Segment Attributes – Above Water Surface (El. 1213 – 1225)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
wcc11	0.00	0.00	0.04	0.00	0.00	0.12	0.17	0	0	25	0	0	75
wcc12	0.00	0.00	58.84	0.00	0.00	19.61	78.45	0	0	75	0	0	25
wcc13	0.00	0.00	0.00	0.00	0.00	1.54	1.54	0	0	0	0	0	100
wcc2	0.00	0.00	0.42	0.00	0.00	0.14	0.56	0	0	75	0	0	25
wcc2	0.00	0.00	0.22	0.00	0.00	0.07	0.29	0	0	75	0	0	25
wcc3	0.00	0.07	0.49	0.00	0.00	0.10	0.65	0	10	75	0	0	15
wcc4	0.62	0.00	1.87	0.00	0.00	0.00	2.50	25	0	75	0	0	0
wcc5	0.00	0.00	0.09	0.00	0.01	0.02	0.12	0	0	75	0	10	15
wcc6	0.05	0.00	0.00	0.00	0.00	0.14	0.19	25	0	0	0	0	75
wcc7	0.00	0.00	0.77	0.00	0.10	0.15	1.03	0	0	75	0	10	15
wcc8	0.00	0.00	0.00	0.00	0.00	0.96	0.96	0	0	0	0	0	100
west1	0.00	0.00	0.00	0.00	0.12	0.37	0.50	0	0	0	0	25	75
west10	0.00	0.00	1.24	1.24	0.00	0.00	2.49	0	0	50	50	0	0
west11	0.00	0.00	1.45	0.00	0.00	1.45	2.90	0	0	50	0	0	50
west12	0.00	0.00	1.92	0.00	0.00	0.64	2.56	0	0	75	0	0	25
west13	0.00	0.54	0.54	0.00	0.00	1.09	2.17	0	25	25	0	0	50
west14	0.00	0.00	0.00	0.00	1.73	1.73	3.46	0	0	0	0	50	50
west15	4.57	0.00	9.13	0.00	0.00	4.57	18.27	25	0	50	0	0	25
west16	0.00	0.00	0.65	0.00	0.00	1.95	2.60	0	0	25	0	0	75
west17	0.00	0.00	1.12	0.00	0.00	0.37	1.49	0	0	75	0	0	25
west18	0.00	0.00	0.00	0.00	0.00	6.55	6.55	0	0	0	0	0	100
west19	0.00	0.00	0.00	0.00	0.00	2.25	2.25	0	0	0	0	0	100
west2	0.00	0.00	0.00	0.00	0.13	0.40	0.53	0	0	0	0	25	75
west20	0.00	0.00	0.44	0.00	0.44	0.00	0.88	0	0	50	0	50	0
west21	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0	0	0	0	0	100
west22	0.00	0.00	0.00	0.00	0.00	6.67	6.67	0	0	0	0	0	100
west23	0.00	0.00	0.00	0.00	0.00	2.58	2.58	0	0	0	0	0	100
west24	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0	0	0	0	0	100
west25	0.00	0.14	0.00	0.00	0.00	1.30	1.45	0	10	0	0	0	90

Cover Resource Segment Attributes – Above Water Surface (El. 1213 – 1225)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
west26	0.00	0.00	0.10	0.00	0.00	0.90	1.00	0	0	10	0	0	90
west27	0.00	0.00	0.00	0.00	0.12	1.12	1.25	0	0	0	0	10	90
west28	0.00	0.27	0.27	0.00	0.00	2.16	2.70	0	10	10	0	0	80
west29	0.00	0.00	0.00	0.00	0.09	0.84	0.93	0	0	0	0	10	90
west3	0.00	0.00	1.24	0.00	0.00	1.24	2.48	0	0	50	0	0	50
west30	0.09	0.00	0.00	0.00	0.00	0.82	0.91	10	0	0	0	0	90
west31	0.00	0.09	0.00	0.00	0.09	0.71	0.88	0	10	0	0	10	80
west32	0.00	0.00	0.00	0.00	0.00	0.38	0.38	0	0	0	0	0	100
west33	0.00	0.00	0.00	0.00	0.09	0.77	0.85	0	0	0	0	10	90
west34	0.00	0.00	0.70	0.00	0.00	2.10	2.79	0	0	25	0	0	75
west35	0.00	0.00	0.09	0.00	0.09	0.73	0.92	0	0	10	0	10	80
west36	0.00	0.00	0.00	0.00	0.22	1.95	2.16	0	0	0	0	10	90
west37	0.00	0.00	0.00	0.00	0.17	0.51	0.68	0	0	0	0	25	75
west38	0.37	0.37	0.93	0.00	0.00	2.06	3.74	10	10	25	0	0	55
west39	0.19	0.00	0.00	0.00	0.00	0.19	0.39	50	0	0	0	0	50
west4	0.00	0.00	0.00	0.00	0.00	2.56	2.56	0	0	0	0	0	100
west40	0.00	0.00	0.00	0.00	0.00	2.26	2.26	0	0	0	0	0	100
west41	0.00	0.00	0.00	0.00	0.00	0.68	0.68	0	0	0	0	0	100
west42	0.23	0.23	1.14	0.00	0.00	0.68	2.27	10	10	50	0	0	30
west43	0.00	0.00	0.00	0.00	0.00	0.31	0.31	0	0	0	0	0	100
west44	0.26	0.03	0.00	0.00	0.03	0.02	0.34	75	10	0	0	10	5
west45	0.00	0.00	0.17	0.00	0.17	1.36	1.70	0	0	10	0	10	80
west46	0.00	0.00	0.00	0.00	0.20	1.81	2.01	0	0	0	0	10	90
west47	4.31	0.00	8.63	0.00	0.00	4.31	17.25	25	0	50	0	0	25
west48	1.01	0.00	0.00	0.00	0.34	0.00	1.35	75	0	0	0	25	0
west49	0.00	0.36	2.67	0.00	0.89	0.00	3.56	0	10	75	0	25	0
west5	0.00	0.00	0.98	0.98	0.98	0.98	3.90	0	0	25	25	25	25
west50	1.12	0.22	0.56	0.00	0.00	0.34	2.24	50	10	25	0	0	15
west51	0.00	0.00	1.54	0.00	0.00	0.51	2.05	0	0	75	0	0	25

Cover Resource Segment Attributes – Above Water Surface (El. 1213 – 1225)													
Location ID	**Boulder Acreage**	**Woody Debris/Detritus Acreage**	**EAV Acreage**	**SAV Acreage**	**FAV Acreage**	**Bare Substrate Acreage**	**Total Acreage**	**Boulder %**	**Woody Debris/ Detritus %**	**EAV %**	**SAV %**	**FAV %**	**Bare Substrate %**
west52	0.00	0.00	1.55	0.00	0.00	1.55	3.10	0	0	50	0	0	50
west6	0.00	0.00	0.08	0.00	0.00	0.73	0.81	0	0	10	0	0	90
west7	0.41	0.00	1.03	0.00	0.00	2.69	4.13	10	0	25	0	0	65
west8	0.00	0.00	0.00	0.00	0.00	0.19	0.19	0	0	0	0	0	100
west9	0.28	0.00	0.28	0.00	0.00	0.56	1.13	25	0	25	0	0	50
Totals	**25.23**	**13.94**	**182.42**	**2.47**	**27.28**	**379.11**	**630.09**						

Appendix B - Hinckley Reservoir Fluctuation Study – Substrate Revised Figures





Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 1 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

N

*Multiple dominant substrate types listed indicate near equal abundance of each substrate.

NOTES
1. Basemap Imagery WSEL = 1216 ft. BCD (9/10/17)
2. Study Area generally represents El. 1225 ft. BCD
3. WSEL at the time of the survey was approximately 1213 ft. BCD
4. Dominant = 50% or greater coverage

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0 200 400 800 Feet

1 inch = 400 feet

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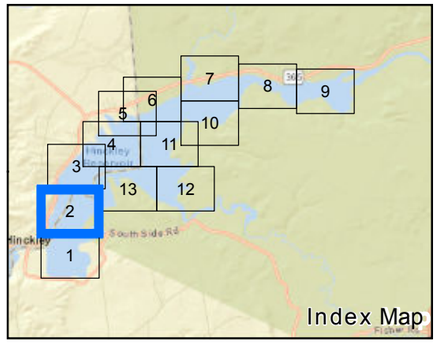

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 2 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

N

*Multiple dominant substrate types listed indicate near equal abundance of each substrate.

NOTES
1. Basemap Imagery WSEL = 1216 ft. BCD (9/10/17)
2. Study Area generally represents El. 1225 ft. BCD
3. WSEL at the time of the survey was approximately 1213 ft. BCD
4. Dominant = 50% or greater coverage

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

0 200 400 800 Feet

1 inch = 400 feet

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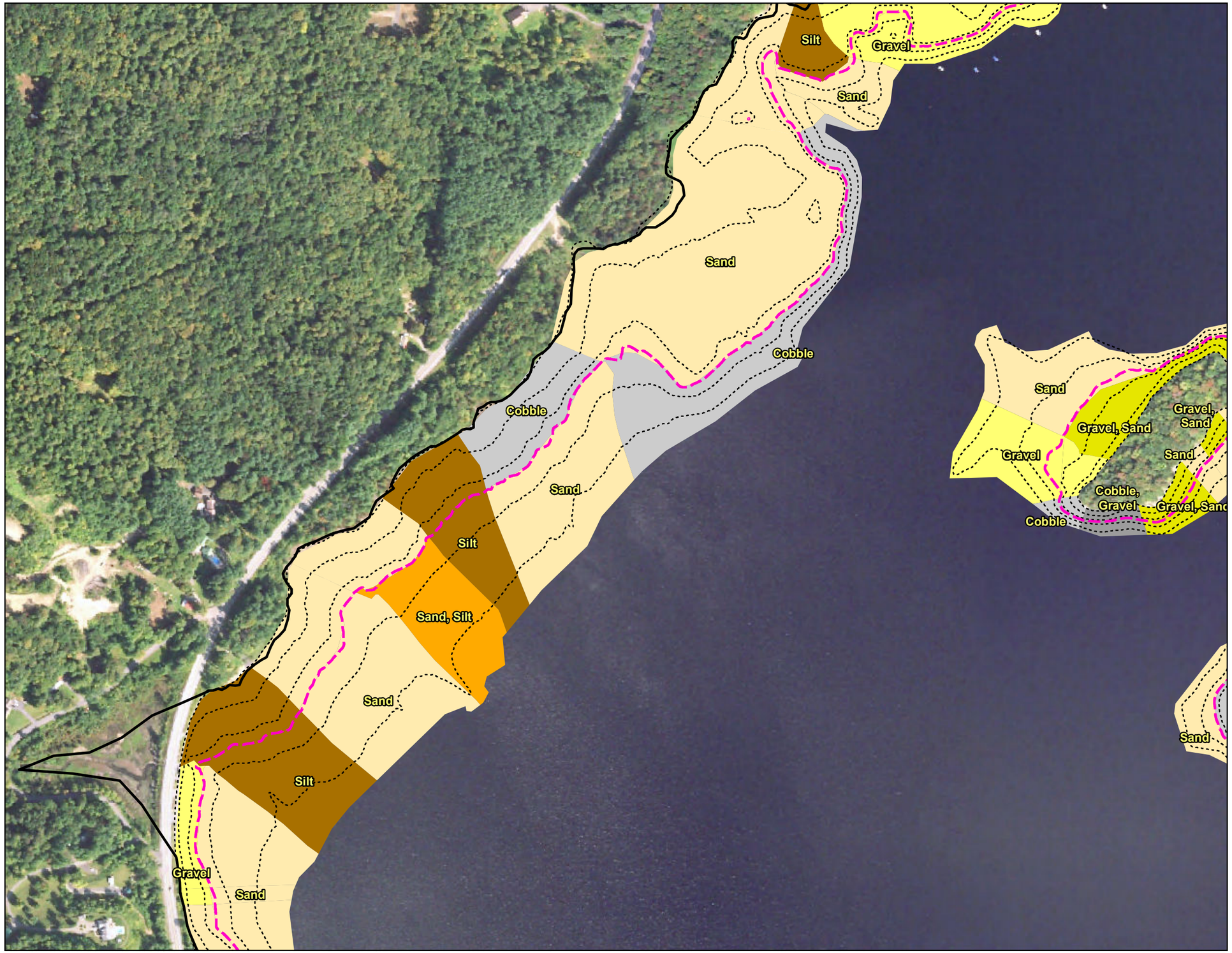

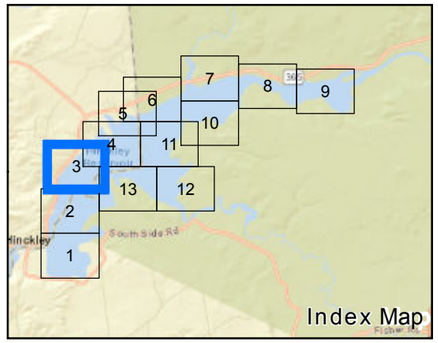

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 3 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
- Study Area

N

*Multiple dominant substrate types listed indicate near equal abundance of each substrate.

NOTES
1. Basemap Imagery WSEL = 1216 ft. BCD (9/10/17)
2. Study Area generally represents El. 1225 ft. BCD
3. WSEL at the time of the survey was approximately 1213 ft. BCD
4. Dominant = 50% or greater coverage

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0 200 400 800 Feet

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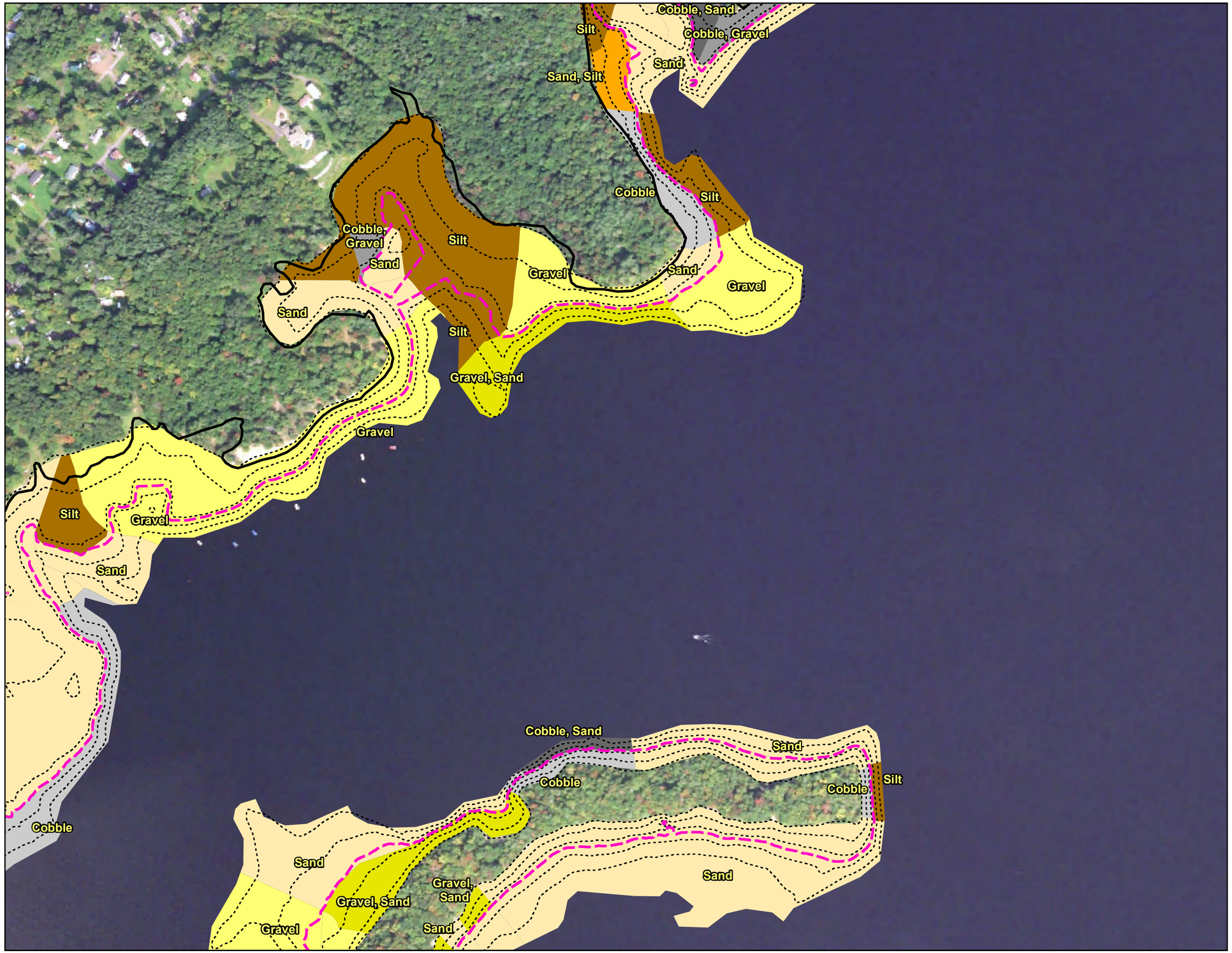

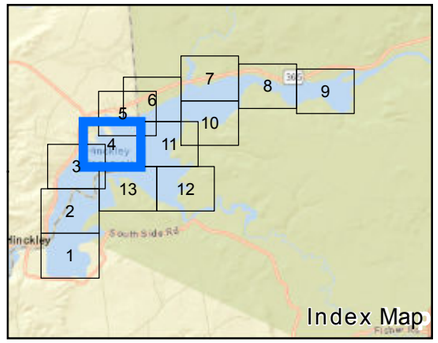

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 4 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

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- 5 Foot Contour Line
- Study Area

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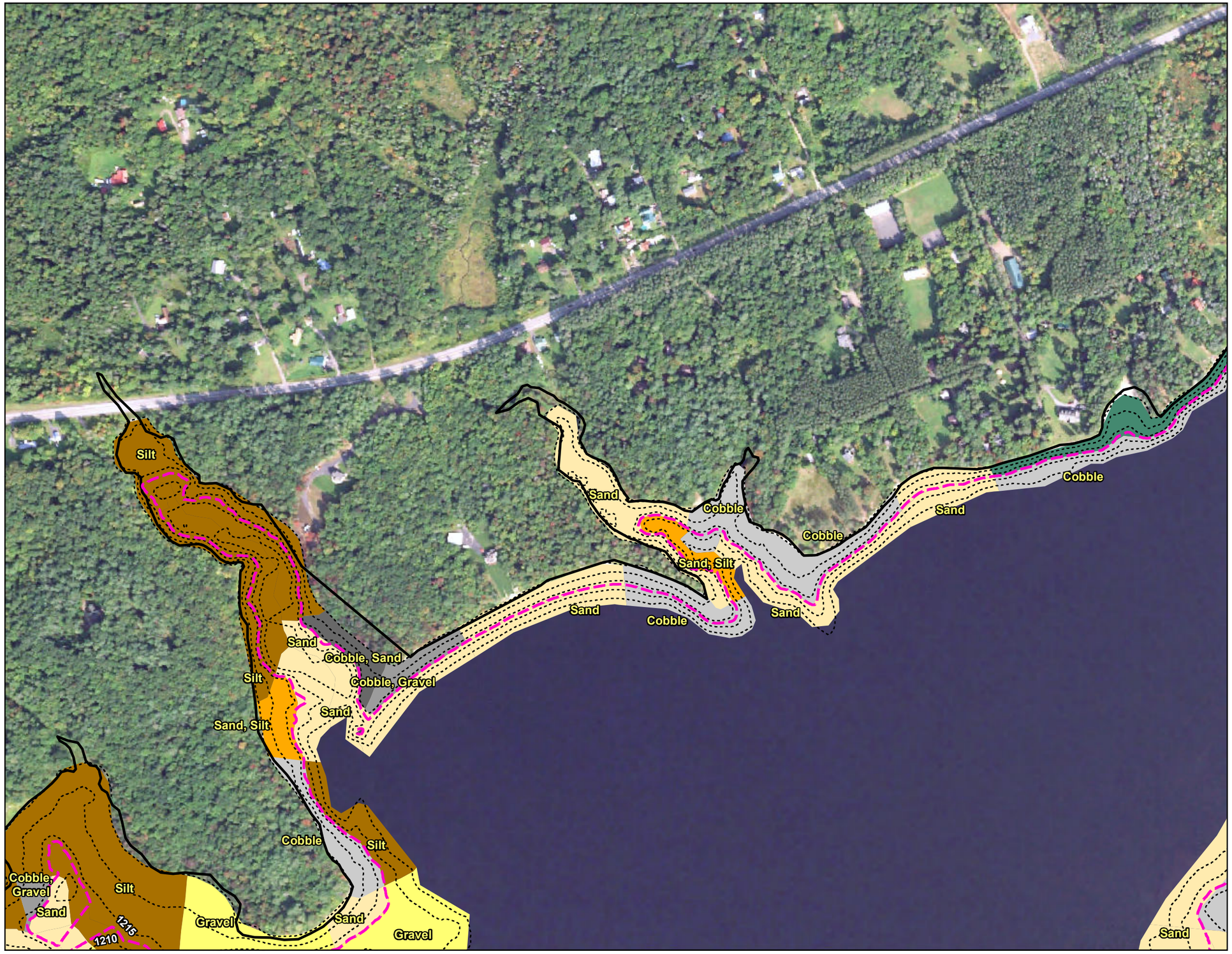

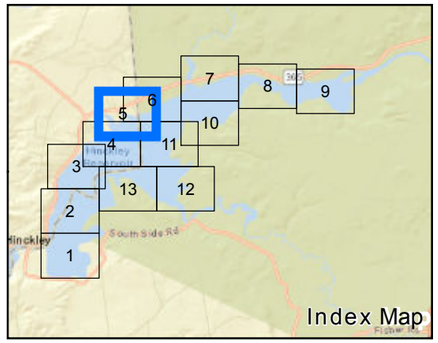

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 5 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

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- 5 Foot Contour Line
- Study Area

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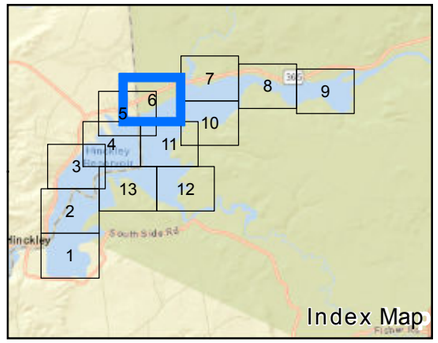

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 6 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

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- Study Area

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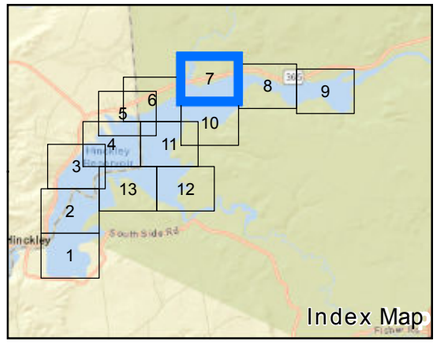

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 7 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

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- Study Area

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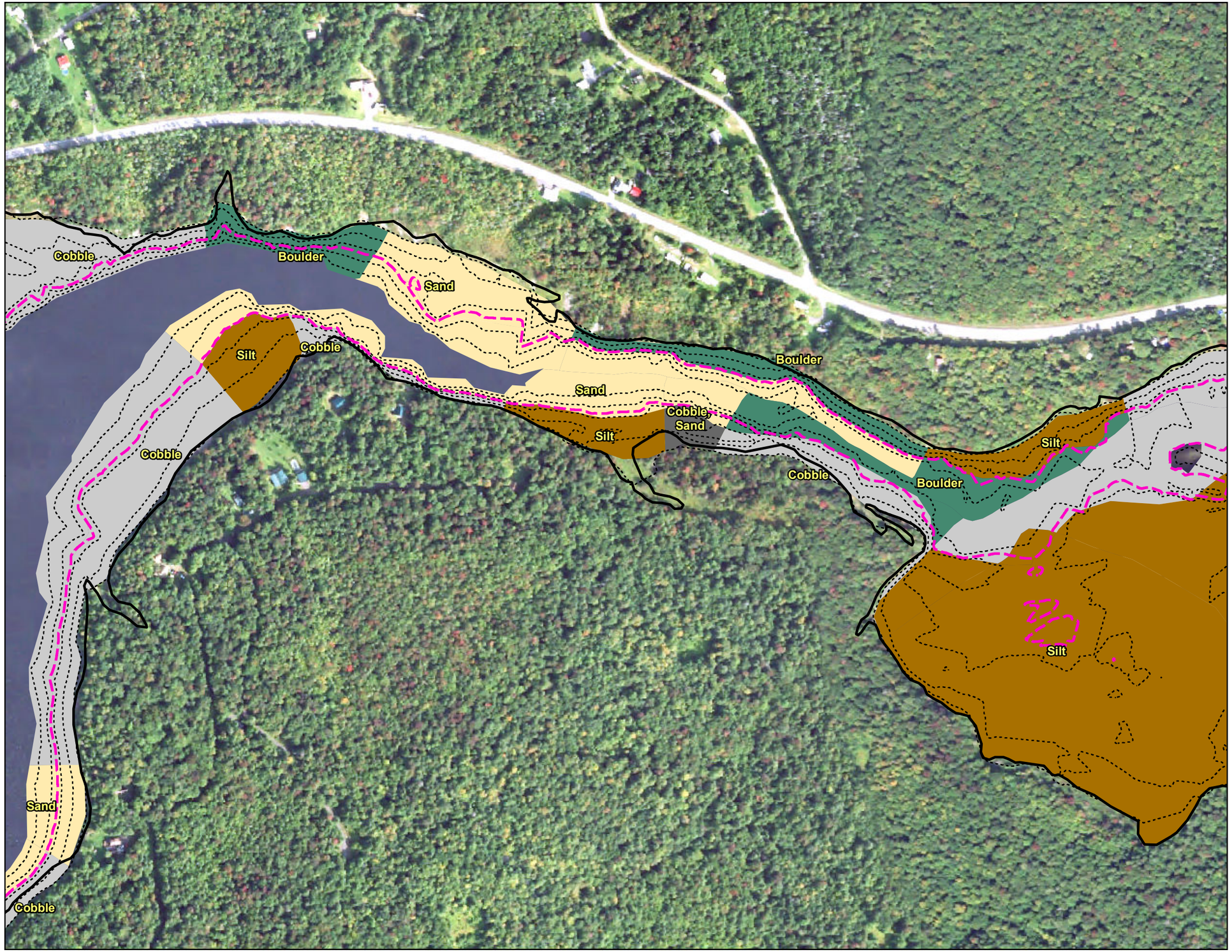

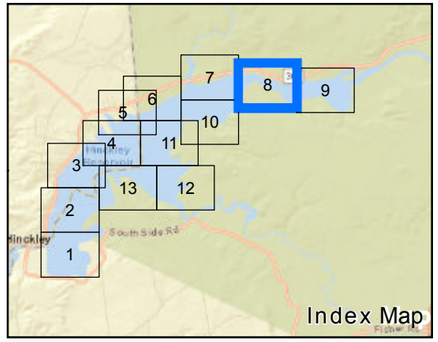

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 8 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

- Elevation 1213' BCD (WSEL at time of survey)
- 5 Foot Contour Line
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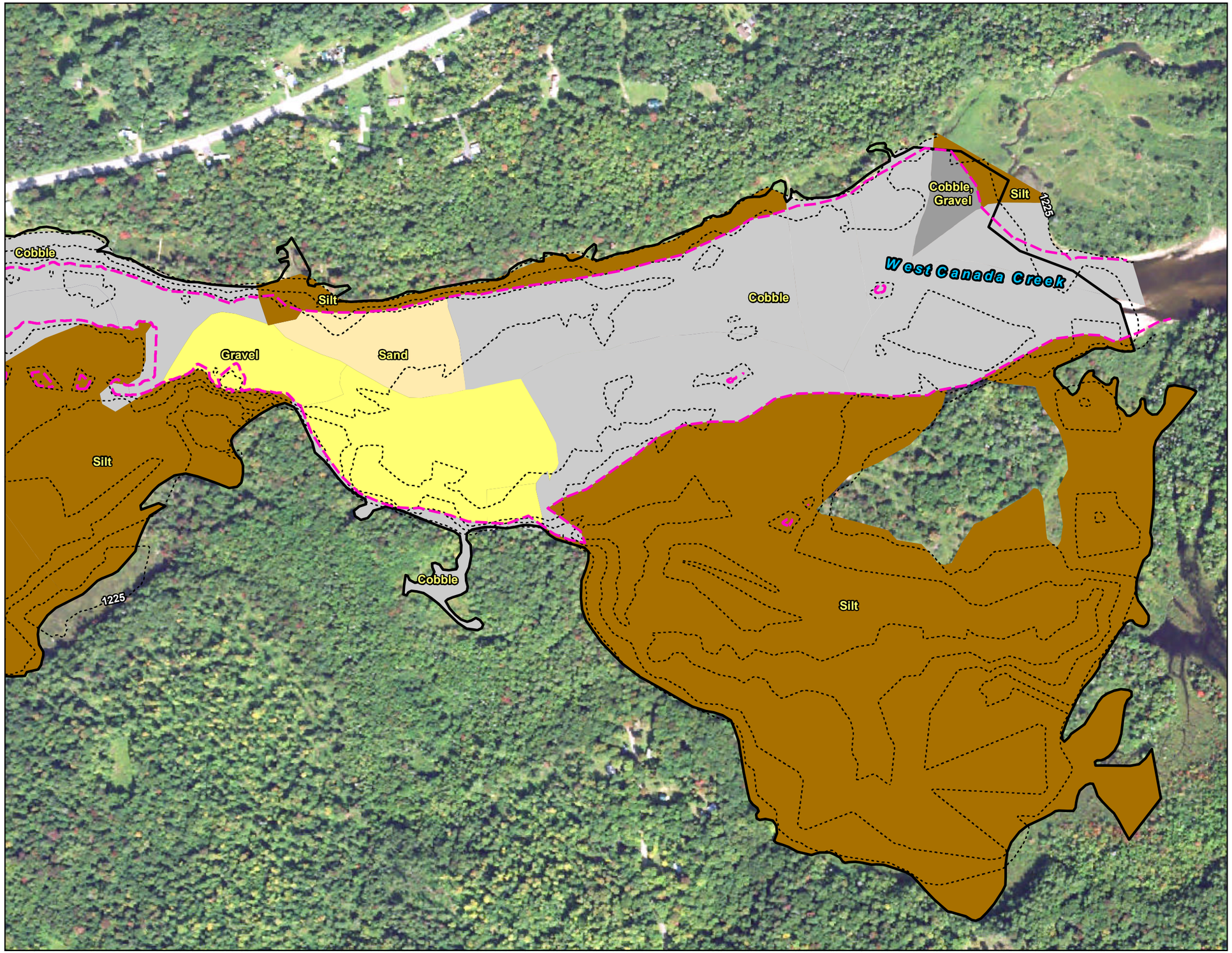

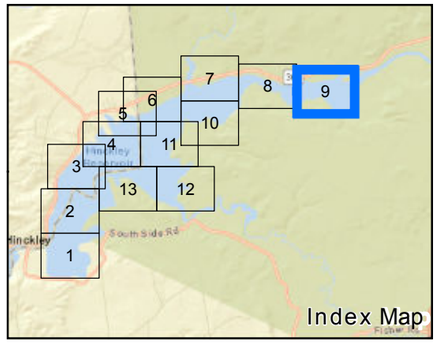

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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 9 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

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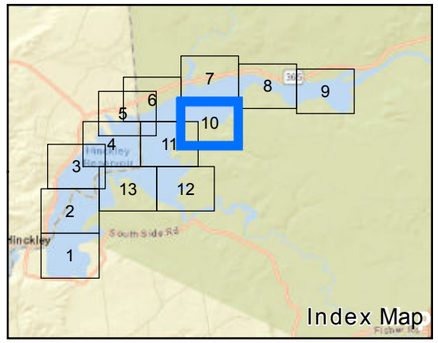

Gregory B. Jarvis Project
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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 10 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

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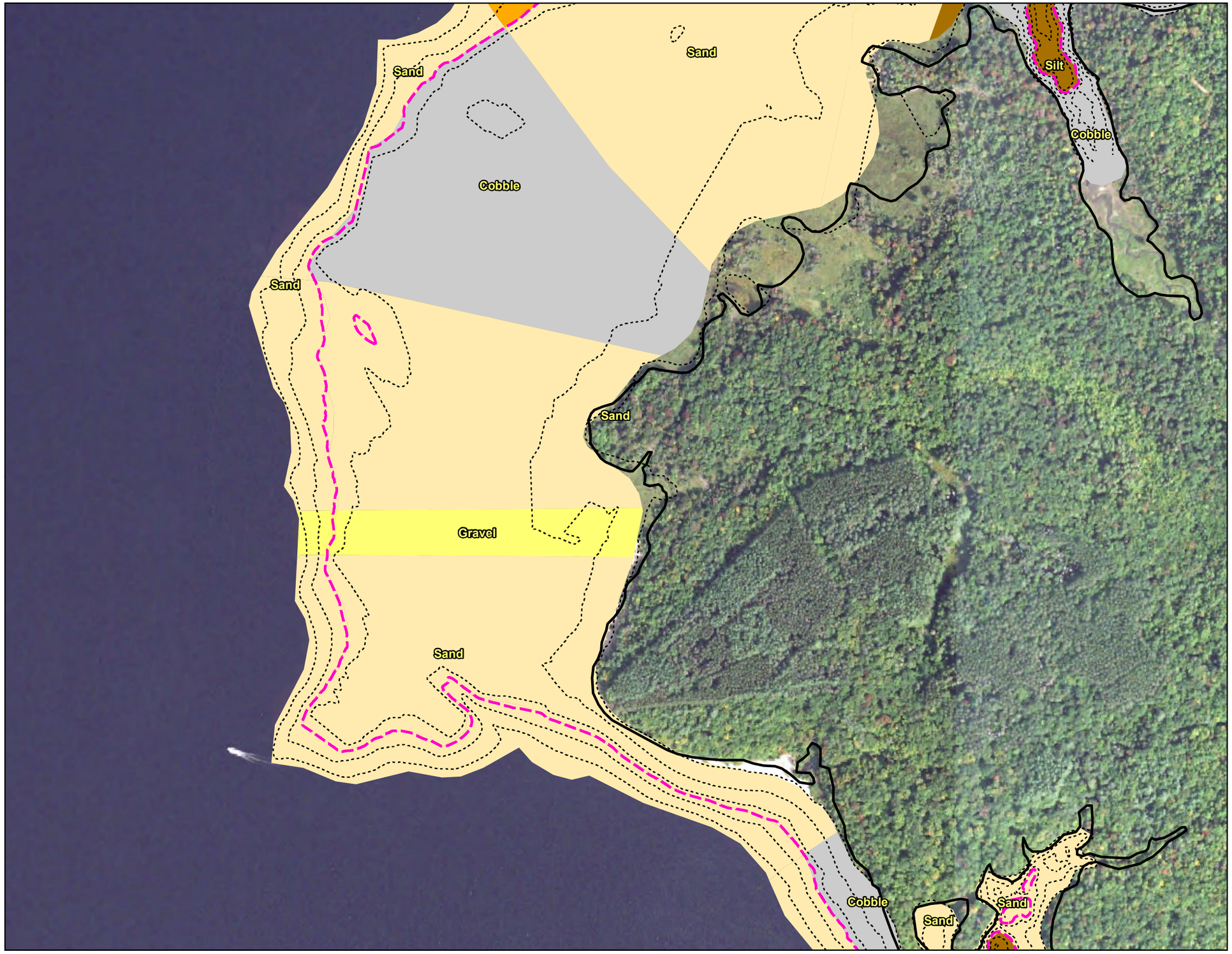

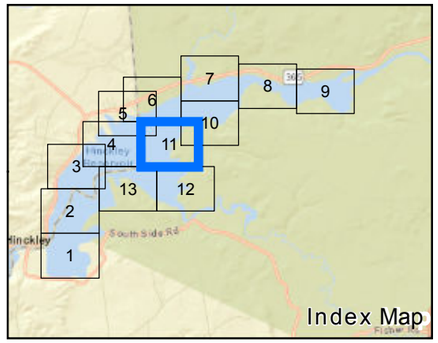

Gregory B. Jarvis Project
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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 11 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

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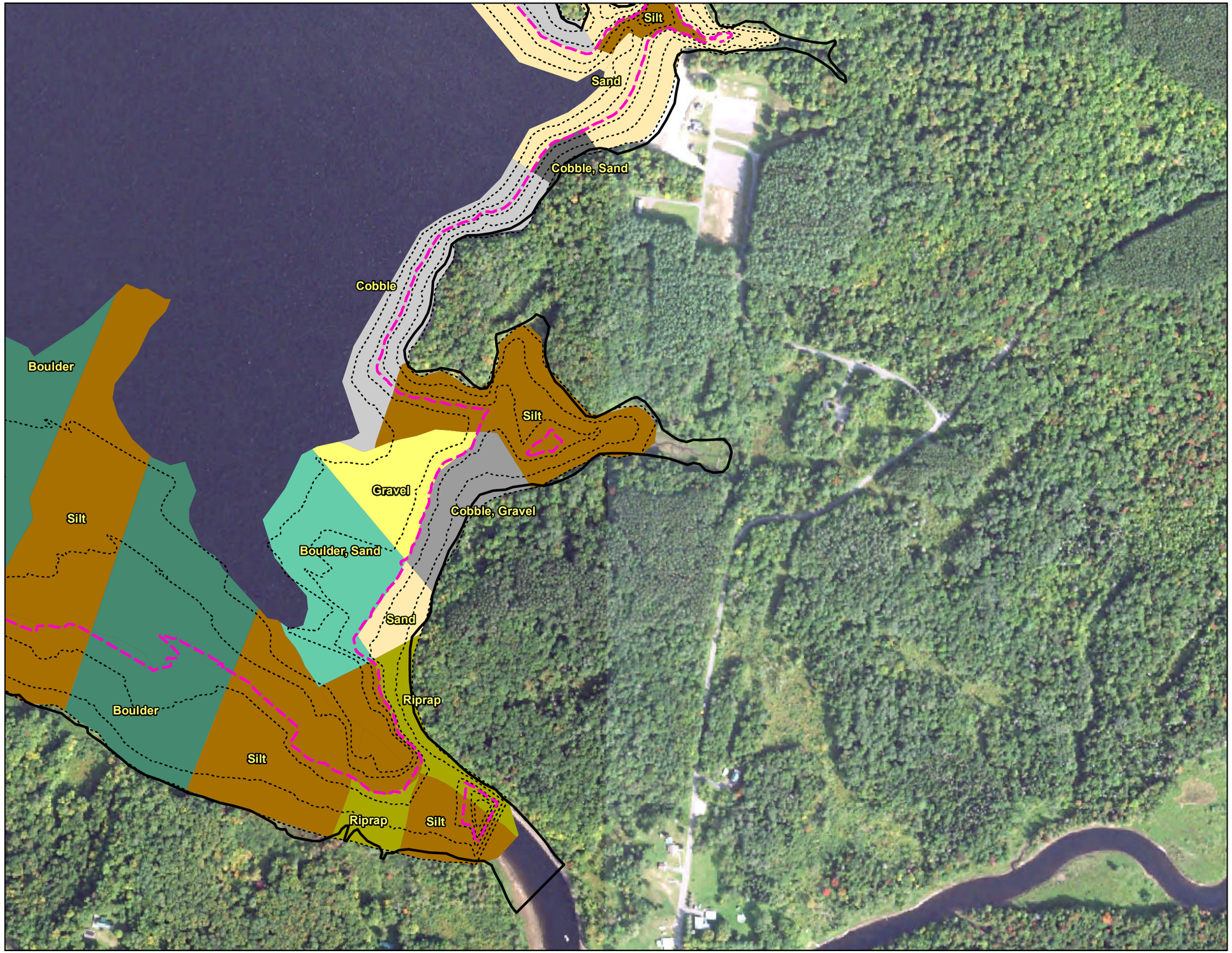

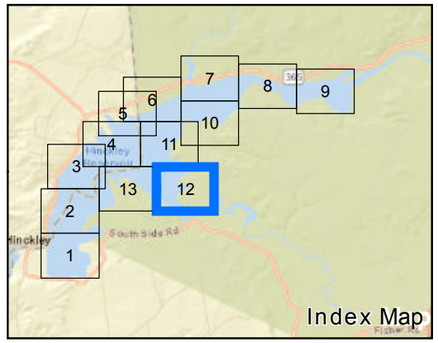

Gregory B. Jarvis Project
(FERC No. P-3211)

Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 12 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
- Riprap
- Sand
- Sand, Silt
- Silt

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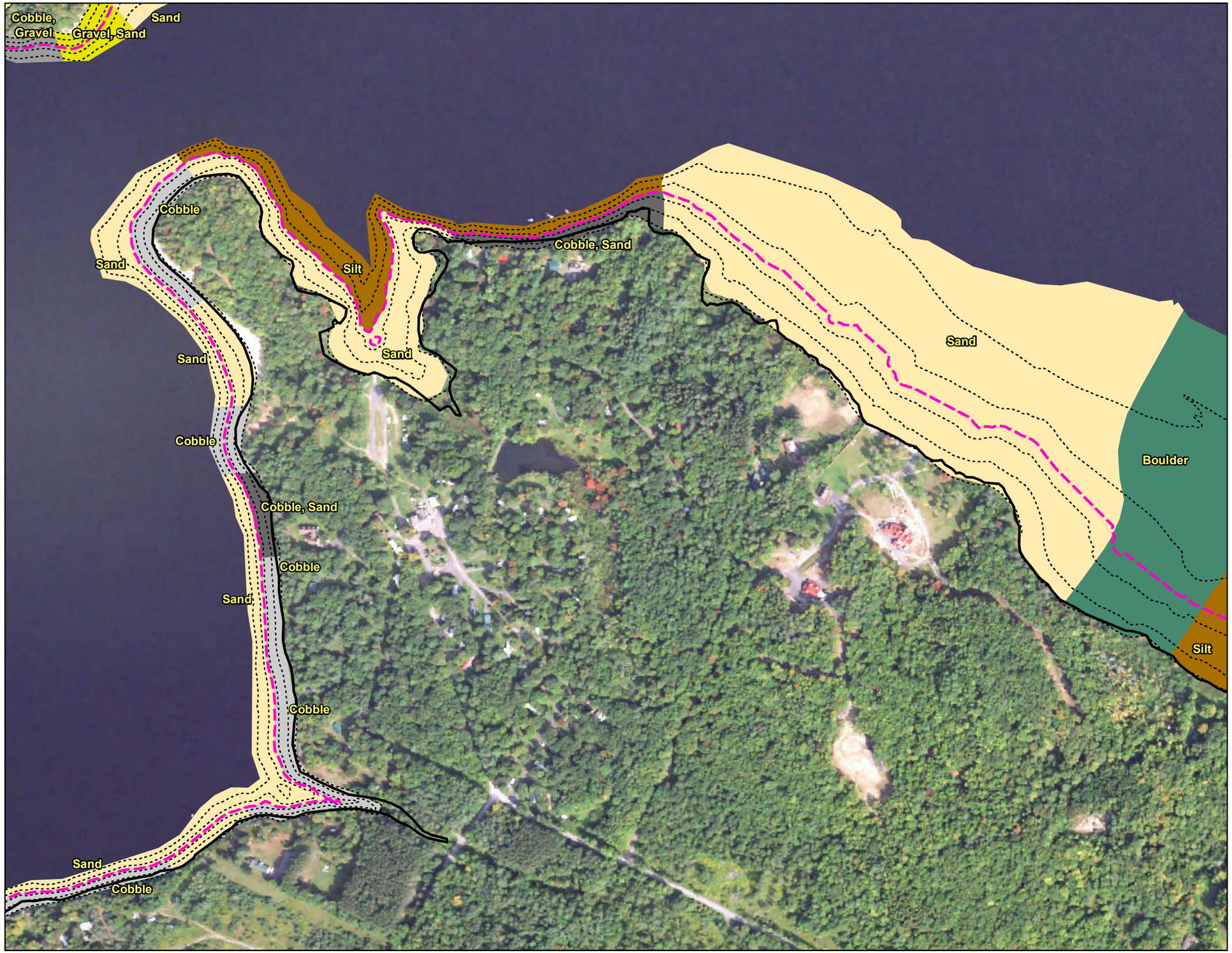

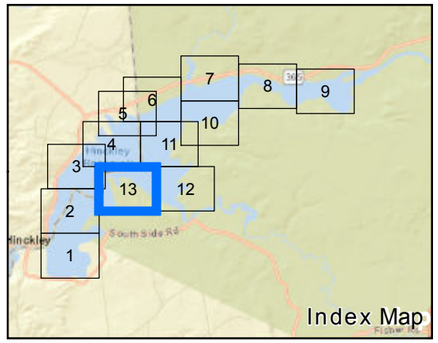

Gregory B. Jarvis Project
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Hinckley Reservoir Fluctuation Field Study
Supplemental Analysis Appendix B
Substrate Coverage (Page 13 of 13)

Dominant Substrate*

- Boulder
- Boulder, Sand
- Cobble
- Cobble, Gravel
- Cobble, Sand
- Gravel
- Gravel, Sand
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