MAXIMIZING STREAKED HORNED LARK SUCCESS USING THE STRATEGIC PLACEMENT OF DREDGED MATERIAL IN THE COLUMBIA RIVER

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Streaked horned lark nest, 2018
Photo courtesy of Center for Natural Lands Management

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INTRODUCTION

Streaked horned larks and streaked horned lark habitat

Columbia River dredging – why do we care?

Corps' Five-Year Placement Plan

Monitoring and modeling

Streaked horned lark nest
USACE 2018

Streaked horned lark
Photo courtesy of USFWS

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STREAKED HORNED LARKS (SHLA)

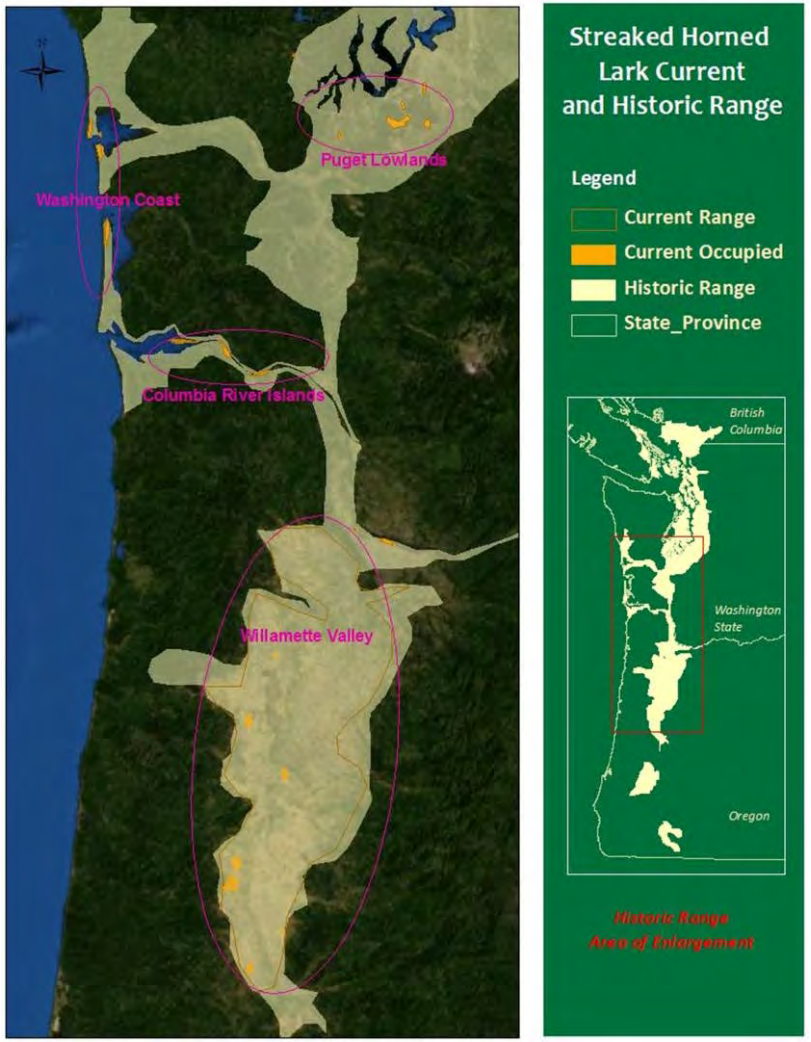
Sub-species of widespread horned lark

Three SHLA populations in Washington and Oregon
- Puget Lowlands
- Washington coast and Columbia River
- Willamette Valley

Listed as *threatened* under Endangered Species Act in October 2013

Year-round occupation in Columbia River
- Breeding and non-breeding season
  - Breeding season: 15 March to 15 August

Current population estimate and trend is stable
- Columbia River population: 130-150 individuals (~60 pairs)
- Region-wide population: 1,170 – 1,610 individuals



Anderson 2011

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SHLA BREEDING HABITAT – “LARK CARPET”

Remnant prairies, coastal dunes with sparse, low growing vegetation and agricultural fields

Suitable habitat
- Minimum of 16% bare ground
- Grasses and forbes, less than 13 inches
- Large areas with open viewshed
- Relatively flat, 0-5% slope

Disturbed habitats

SHLA habitat, Tenasillahe Island, 2018
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COLUMBIA RIVER DREDGING – WHY DO WE CARE?

Dredging the Columbia River navigation channel is essential to the Columbia River SHLA population

Placement activities simulate natural disturbance regimes which are vital to lark survival

- Historic spring floodwaters scoured island habitats
- Altered vegetation patterns and succession

Placement activities in upland areas creates and maintains lark habitat

- Vegetation removal
- Material placement
- Vegetation succession
- Frequency and recurrence

If not for the Corps' upland placement activities, nesting habitat would not exist and larks would likely not occur in the Columbia River!

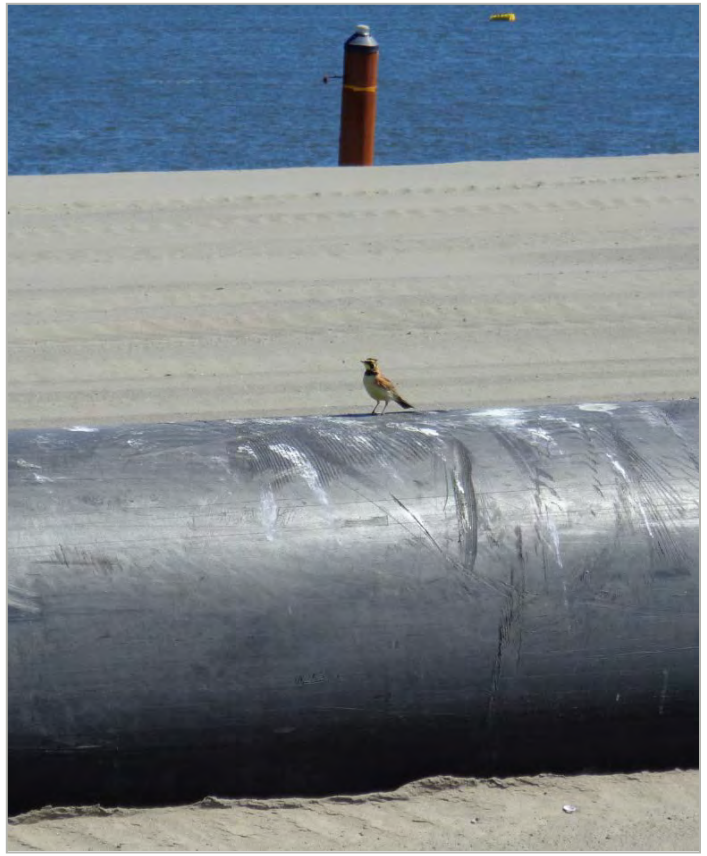

Photo courtesy of Port of Portland

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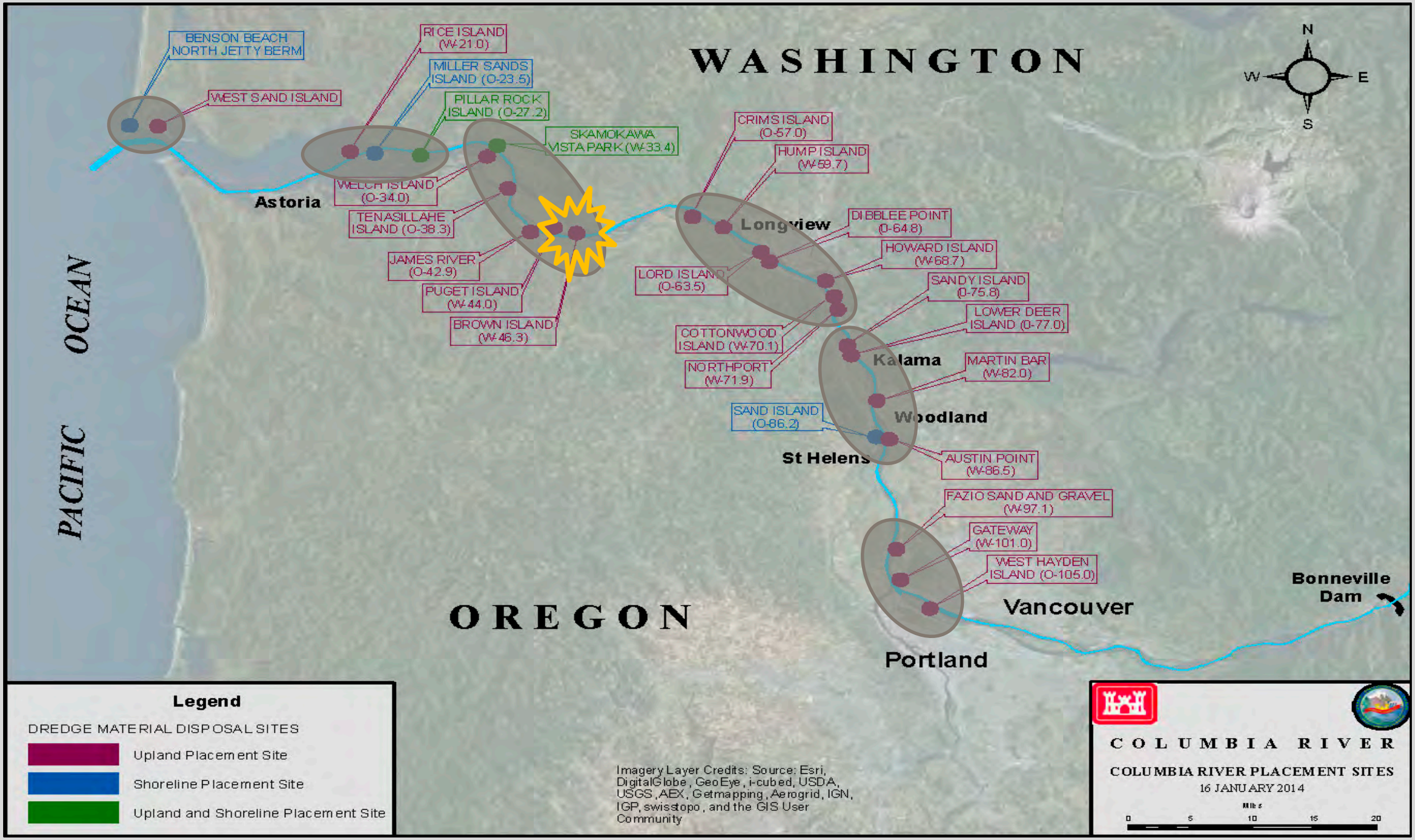
FIVE YEAR DREDGING AND PLACEMENT PLAN

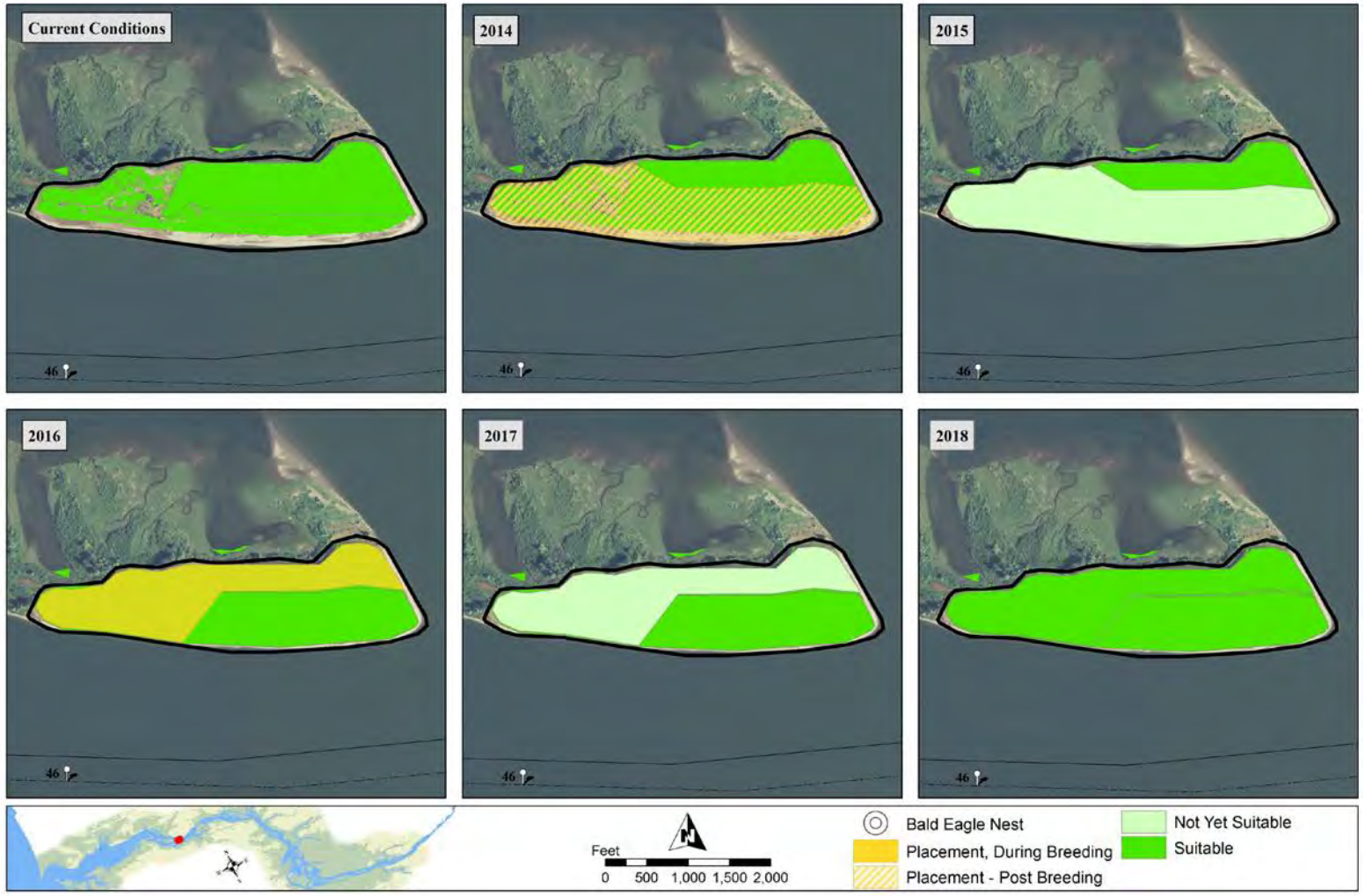
Developed dredging and placement plan for 2014-2018 dredging activities
- facilitate dredging and placement activities needed to maintain navigation on the river
- minimize adverse impacts to larks
- maintain a “shifting mosaic” of suitable habitat

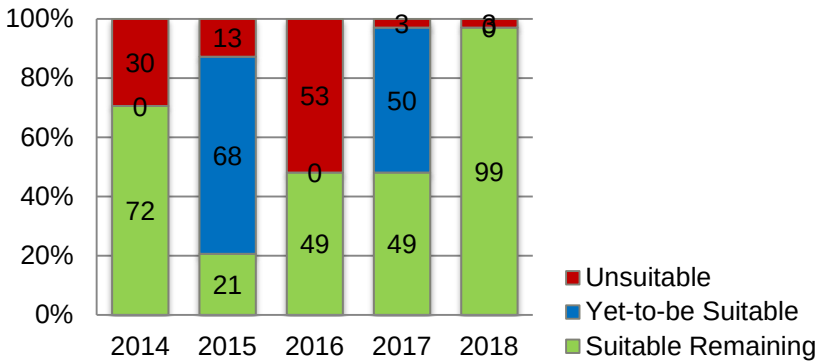
25 upland and shoreline placement sites
- Benson Beach at river mile (RM) -1.5
- West Hayden Island at RM 105

Conducted formal consultation with U.S. Fish and Wildlife Service in 2013
- Five-year term biological opinion
  - Incidental take statement
    - Lose no more than 2 nests per year
    - Lose no more than 3-5 eggs/nestlings per nest, per year
    - Take is exceeded if Columbia River population is less than 52 breeding pairs, 3-year average
- ***Rigorous monitoring of SHLA and habitat***


WASHINGTON
OREGON
PACIFIC OCEAN
N
W
E
S
BENSON BEACH NORTH JETTY BERM
WEST SAND ISLAND
RICE ISLAND (W-21.0)
MILLER SANDS ISLAND (O-23.5)
PILLAR ROCK ISLAND (O-27.2)
SKAMOKAWA VISTA PARK (W-33.4)
WELCH ISLAND (O-34.0)
TENASILLAHE ISLAND (O-38.3)
JAMES RIVER (O-42.9)
PUGET ISLAND (W-44.0)
BROWN ISLAND (W-46.3)
Astoria
CRIMS ISLAND (O-57.0)
HUMP ISLAND (W-59.7)
Longview
DIBBLEE POINT (O-64.8)
HOWARD ISLAND (W-68.7)
LORD ISLAND (O-63.5)
SANDY ISLAND (O-75.8)
LOWER DEER ISLAND (O-77.0)
COTTONWOOD ISLAND (W-70.1)
NORTHPORT (W-71.9)
Kalama
MARTIN BAR (W-82.0)
SAND ISLAND (O-86.2)
Woodland
St Helens
AUSTIN POINT (W-86.5)
FAZIO SAND AND GRAVEL (W-97.1)
GATEWAY (W-101.0)
WEST HAYDEN ISLAND (O-105.0)
Vancouver
Portland
Bonneville Dam
Legend
DREDGE MATERIAL DISPOSAL SITES
Upland Placement Site
Shoreline Placement Site
Upland and Shoreline Placement Site
Imagery Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
COLUMBIA RIVER
COLUMBIA RIVER PLACEMENT SITES
16 JANUARY 2014
Miles
0
5
10
15
20

FIVE YEAR PLAN: SHLA HABITAT ANALYSIS, BROWN ISLAND





Vegetation succession in river corridor
- Establishes 1-3 years post-placement
- Viable 3-10+ years post-placement

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DREDGING AND HABITAT SUCCESSION: MAXIMIZING SUCCESS

How does SHLA habitat transition from nesting habitat to newly placed dredged material back into suitable nesting habitat.

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CONSERVATION MEASURES – MAXIMIZING SUCCESS

Timing of activities
- Breeding season
- Non-breeding season

Pre-season and pre-placement site preparations
- Dissuasion (trenches)
- Vegetation removal

Deliberate placement plan
- Minimize disturbance within and between years
- Avoid suitable habitat is alternative is available
- Isolate active nests and minimize disturbance

Post-placement modifications
- Mounds or trenches

Hump Island, 2014
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SHLA MONITORING

Annual monitoring of placement sites where suitable habitat exists (2014-2018)
- Occupancy
- Abundance

WA Department of Fish and Wildlife protocol
- Standardized methods
- Three surveys between May and June
- Established line transects
- Audio and visual detections

Territory mapping at select sites
- Estimate average home range size
- Assess accuracy of detectability during surveys
- Identify territory characteristics

Rice Island, 2017
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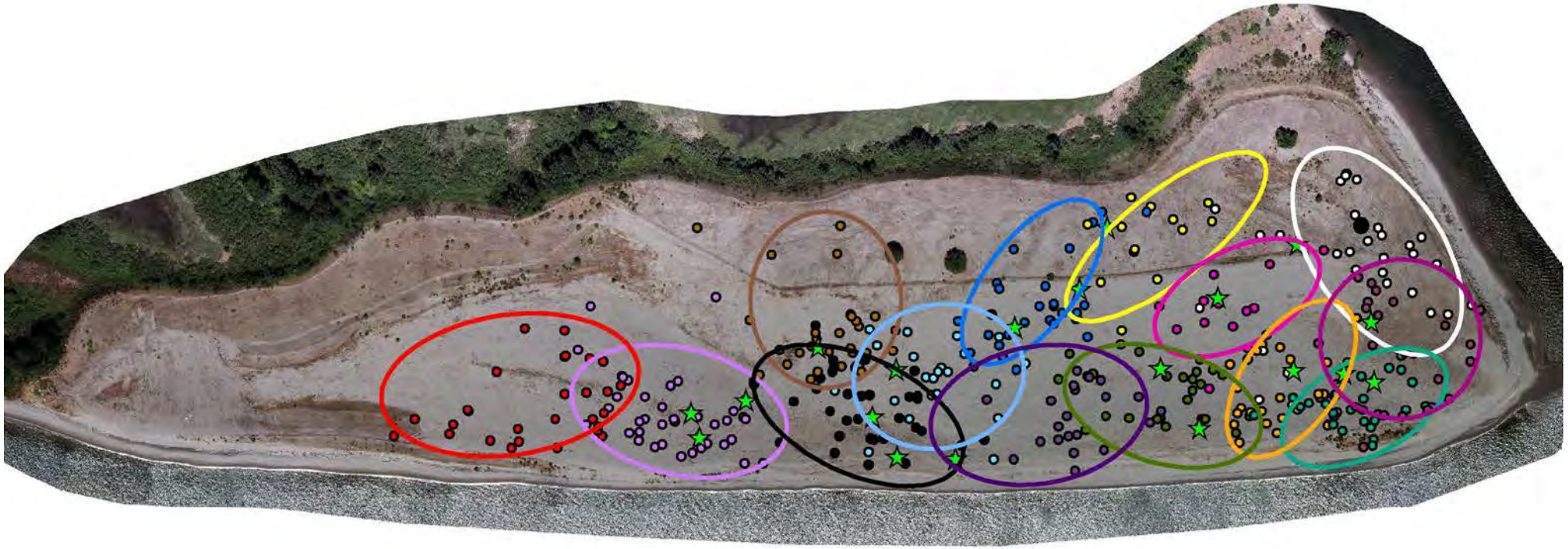
SHLA MONITORING: TERRITORY MAPPING



Brown Island, 2017
Center for Natural Lands Management

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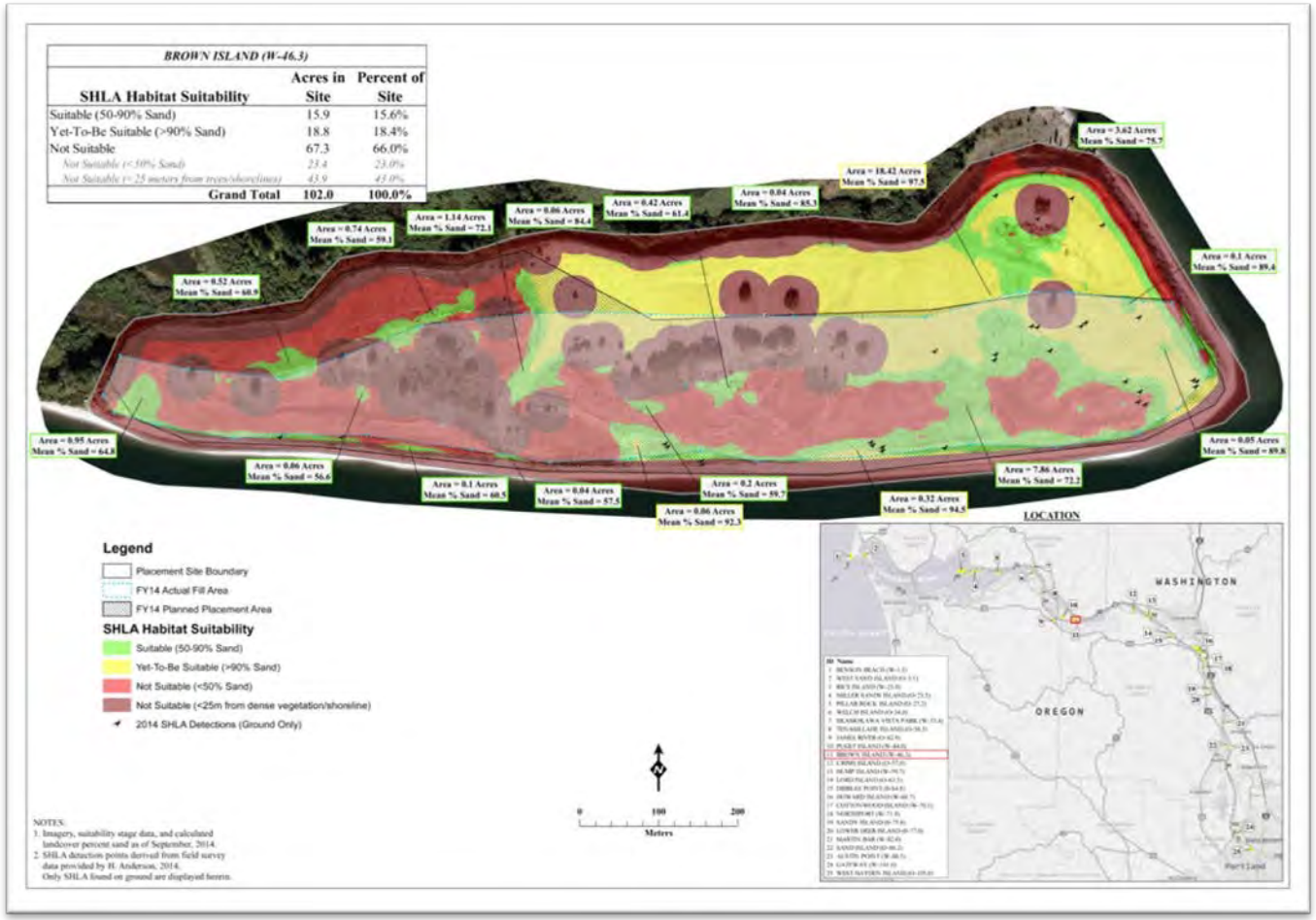
HABITAT MONITORING AND MAPPING, VERSION 1.0

High resolution aerial imagery
- 5 cm resolution

Rule based geospatial land classification
- Percent composition of sand
  - 50-90% bare ground = suitable
  - <50% bare ground = unsuitable
  - >90% bare ground = yet-to-be suitable
- 25m buffer from forest edge or shoreline
- Height of vegetation
  - Grass vs. shrub

3 classes of habitat:
- Suitable
- Yet-to-be suitable
- Unsuitable



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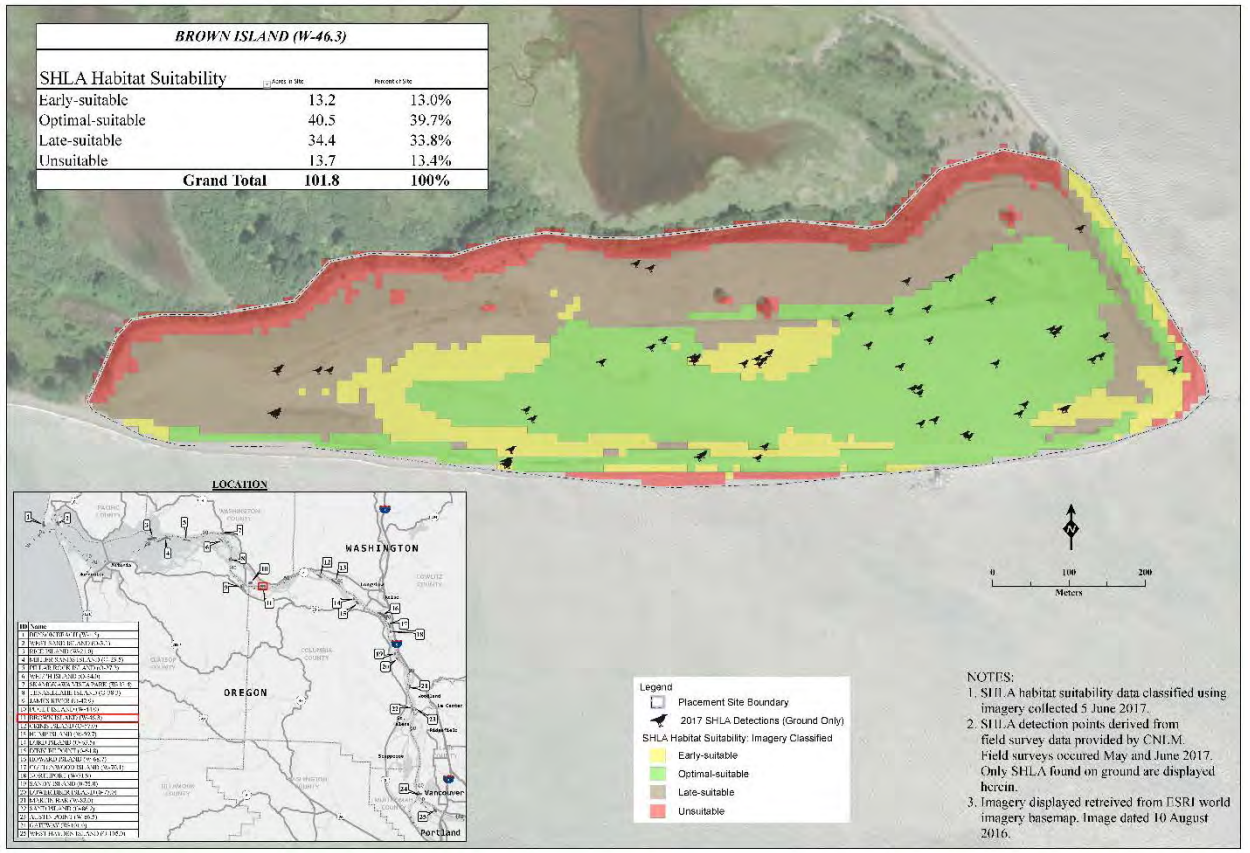
HABITAT MONITORING AND MAPPING, VERSION 2.0

Probability based geospatial model

Google Earth Engine using Sentinel 2 imagery
- 10m resolution
- 8 day repeat frequency

Habitat characteristics
- Normalized Difference Vegetative Index (NDVI)
- Standard deviation of NDVI
- Time since deposition

4 classes of suitability
- Optimal
- Early-suitable
- Late-suitable
- Unsuitable



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MONITORING RESULTS

Number of breeding pairs stable, 59 – 64

Territory sizes
- 2015: 1.4 – 8.5 acres/pair
- 2016: 2.7 – 8.2 acres/pair
- 2017: 2.6 – 7.3 acres/pair
- ***Average: 2.2 – 8.0 acres/pair***

Suitable habitat
- Acres of suitable habitat increasing
- Distribution of suitable habitat equal or increasing

Number of occupied sites has increased
- 8 sites in 2013
- 13 sites in 2017

Streaked horned lark, Tenasillahe Island, 2018
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LEARNING AS WE GO

Five years of new information will help plan and shape future dredging activities in the Columbia River

Opportunity to be on the leading edge of science and contribute to a body of knowledge

- Validate assumptions used in biological assessment for USFWS consultation
  - Site fidelity, movement and dispersal
  - Nesting habitat and home range sizes
  - Habitat characteristics and vegetation succession

Deliberate placement meets the Corps' mission to maintain the federal navigation channel AND meet regulations under the Endangered Species Act

- Coordinated planning
- Strategic thinking
- Long-term management

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THANK YOU

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References:

Anderson, Hannah. 2011. FY2012 Recovery Funding Proposal. Prepared by Hannah Anderson, Center for Natural Lands Management for the U.S. Fish and Wildlife Service. 14 November 2011.

Stinson, Derek W. 2016. Periodic Status Review of Streaked Horned Larks. Washington Department of Fish and Wildlife, Wildlife Program. Olympia, Washington. June 2016.

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