Wetland Mitigation Banking: *Approaches to Credit Determination*

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U.S. Environmental Protection Agency

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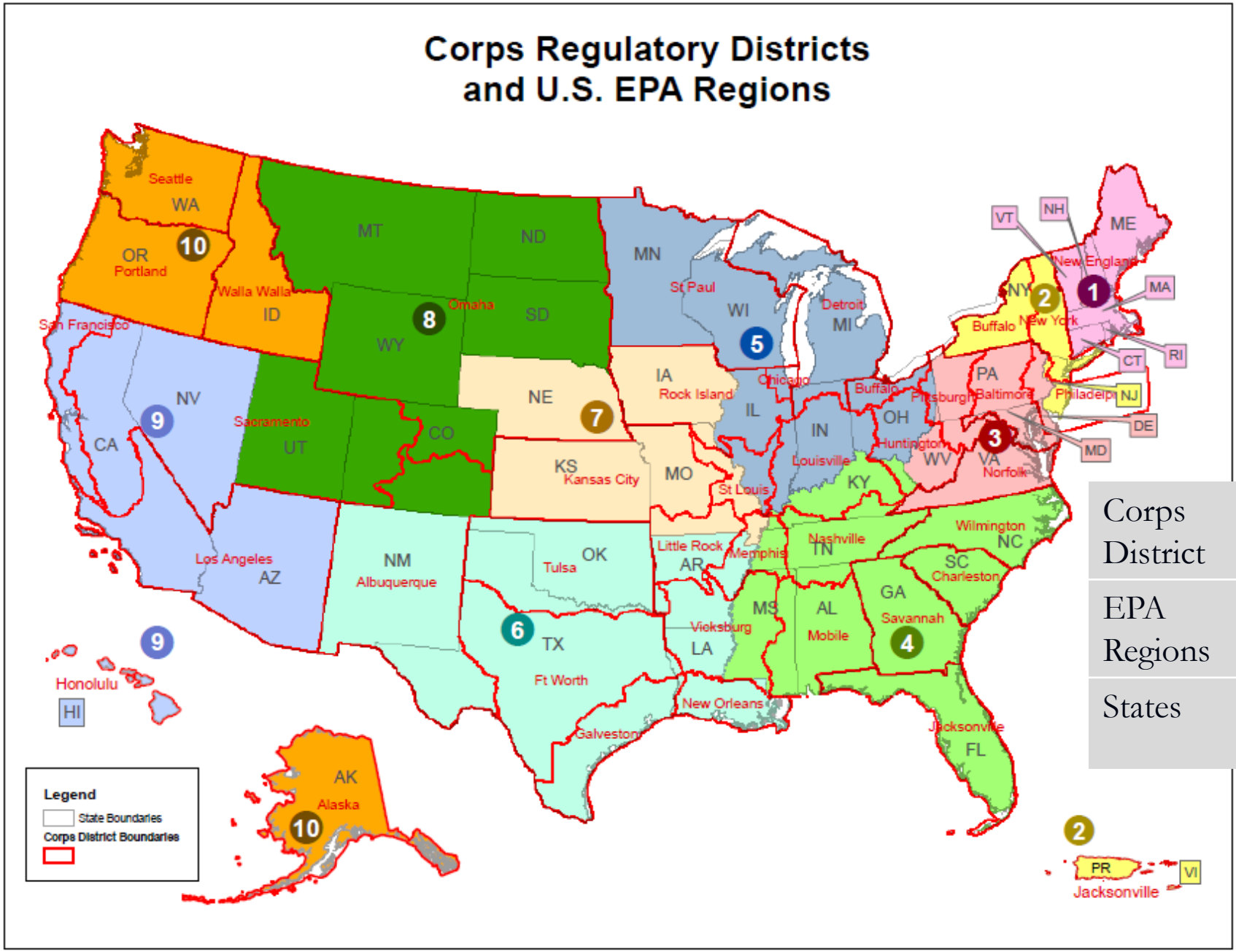
What is Wetland Mitigation Banking?

- Regulatory-driven environmental market
- Permit is required for certain impacts to wetlands and other waters
- To obtain a permit impacts must be:
  - Avoided
  - Minimized
  - Compensated – offset unavoidable wetland losses (debits) by generating credits, helps ensure "no net loss" of wetlands
- Wetland banks generate credits for sale to permit applicants through wetland:
  - Restoration (*preferred*), establishment, enhancement, preservation

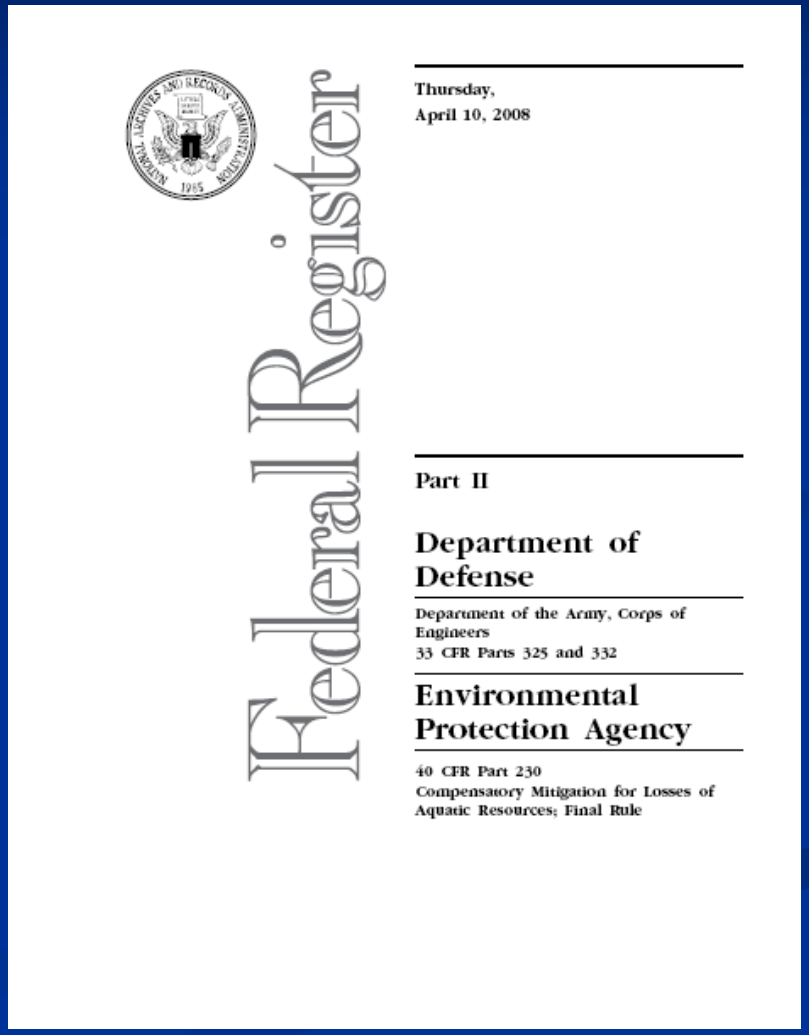
Corps Regulatory Districts and U.S. EPA Regions



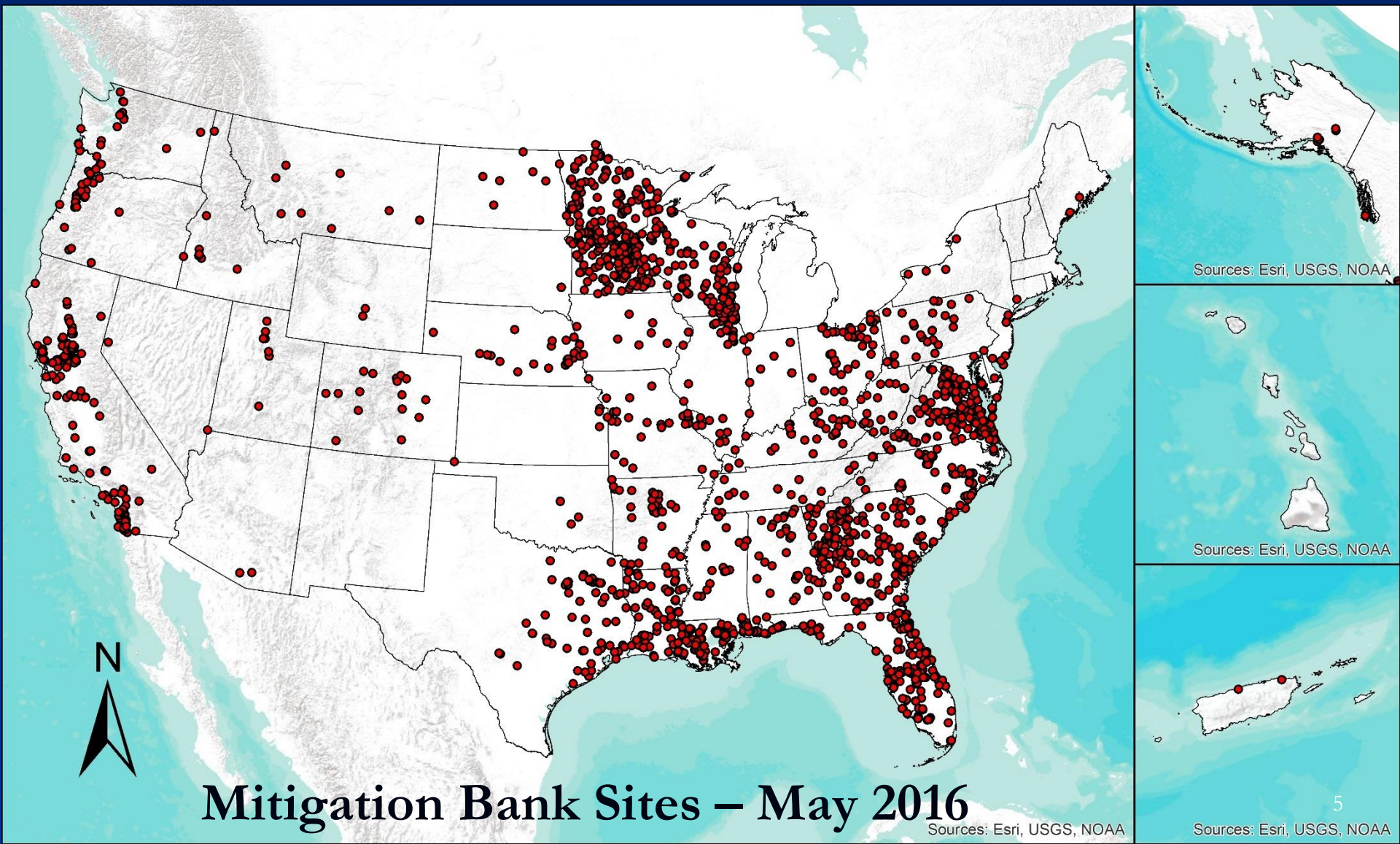
Corps District	38
EPA Regions	10
States	50

Clear and Effective Standards

- Describe requirements for identifying, planning, implementing, monitoring, protecting and managing compensation projects, including determining credits
- Balance need for national consistency with need for regional flexibility



Enabling Banking to Function Across Multiple Regions and States



Mitigation Bank Sites – May 2016

Credit Determination Challenges

- Challenge – developing credit allocation procedures that are:
  - Science-based
  - Principled
  - Consistent
  - Predictable
  - Relatively rapid
- Challenge – developing national regulations that allow adequate level of flexibility to address:
  - The enormous ecological variety of wetlands across the U.S. and
  - Differences among states/districts in the level of investment they have made in development of wetland monitoring and assessment tools
- Challenge – <u>whatever method is used to determine credits at mitigation banks is also used to determine debits at impact sites</u>

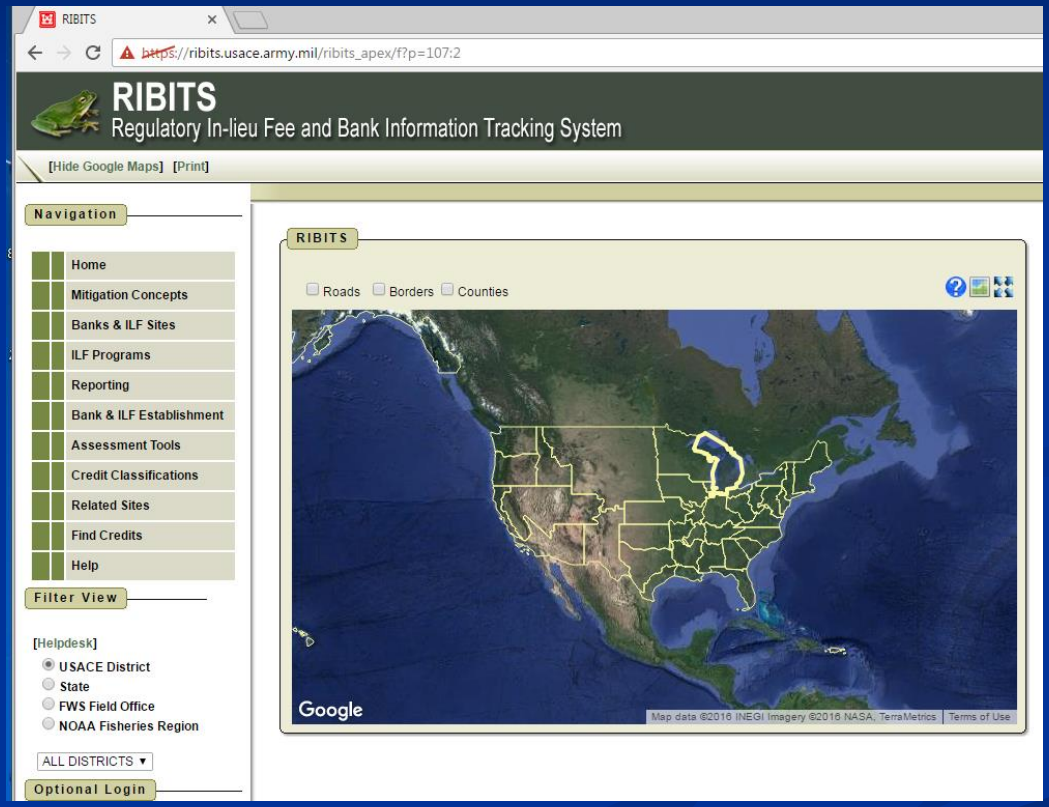
Credit Determination

- Regulations define a credit broadly as:
  - *A unit of measure (e.g. a functional or areal measure or other suitable metric) representing the accrual or attainment of aquatic functions at a compensatory mitigation site. Measure of aquatic functions is based on the resources restored, established, enhanced or preserved.*

- Areal measures (area-based ratios) simple approach, less resource intensive, but more coarse
- Functional measures – more sophisticated approach, more resource intensive, but more precise (*preferred*)

Examples: Credit Determination

- Areal measures (Area-based Ratios)
  - Simple end of spectrum
  - Virginia
  - Blackjack Mitigation Bank
- Functional measures
  - Sophisticated end of spectrum
  - Florida
  - Boarshead Ranch Mitigation Bank



ribits.usace.army.mil

Virginia Example: Areal Measures (Area-based Ratios)

View Bank Information

https://ribits.usace.army.mil/ribits_apex/f?p=107:10:16335115197676::NO::P10_BANK_ID:543

RIBITS
Regulatory In-lieu Fee and Bank Information Tracking System

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Ledger | Bank Contact Sheet | Annual Inspections | Cyber Repository | Photo Gallery

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Virginia

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General Information

Blackjack

Chair(s):	USACE
USACE District:	Norfolk
FWS Field Office:	Virginia
NOAA Fisheries Region:	Northeast
State:	Virginia
Permit No:	NAO-2007-4283
Year Established:	2003
Total Acres:	101.86
Status:	Approved
Approved Date:	01-SEP-03
Type:	Private Commercial
Website:	www.fallingspringsllc.com
Comments:	Wetland mitigation bank that assesses credits using the Mitigation Ratio method

Contact Information

Credit Ledger Summary

Last Transaction: Dec 31, 2015

The credit totals shown on the ledger do NOT reflect any credit reservations or pending transactions. It is the responsibility of potential purchasers to contact the Sponsor and obtain written confirmation of credit availability.

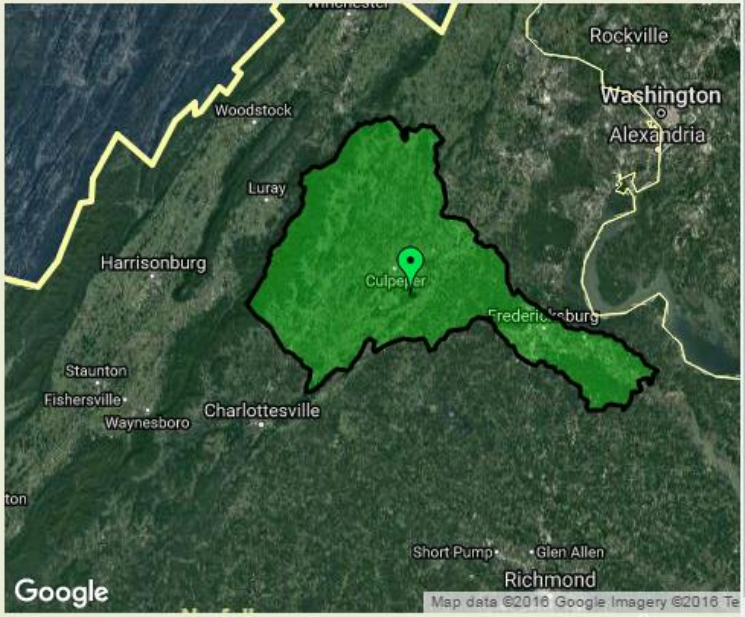
Name	Available Credits	Withdrawn Credits	Released Credits	Potential Credits
Wetland				
Wetlands	1.05	56.63	57.68	58.14

Google Map

Show ☑ Footprint ☑ Service Area

Rank ☑ Primary

☐ Roads ☑ Borders ☐ Counties ☑ USACE Districts ☐ FWS Field Offices ☐ NOA



Virginia: Blackjack Mitigation Bank

Type of Action	Mitigation Credit Assigned
Established (created)/Restored Wetlands	1.00 credit for each acre (1:1)
Preserved Wetlands	0.067 credits for each acre (15:1)
Preserved Upland Forest Buffers	0.067 credits for each acre (15:1)

Type of Action	Acres	Ratio	Credits Produced
Established/Restored Wetlands	55.05	1:1	55.05
Preserved Wetlands	1.42	15:1	0.09
Preserved Upland Forest Buffers	45.00	15:1	3.00
Totals	**101.47**	**-**	**58.14**

1 acre = 0.405 hectares

Areal Measures – Other Examples

Figure 5.3: Example Credit Calculation

Activity	Acres	Crediting	Credit Acres
Restoration of historic wetland area	75	1.0 : 1	75.0
Enhancement of severely degraded areas that still meet wetland definition	17	1.0 : 1	17.0
Enhancement of marginally degraded area that still meets wetland definition	3	0.25 : 1	0.75
Adjacent upland restoration	20	0.25 : 1	5.0
Brush removal and burning in fully functioning wetland	5	0	0
Total	120		97.75

St. Paul District

ble 1 Credit Conversion Rates for Mitigation Banks

Mitigation Activity	Conversion Rate (Area of Activity: Credit)
Wetlands	
Re-establishment	1:1 to 2:1
Creation (Establishment)	1:1 to 2:1
Rehabilitation of altered processes	2:1 to 3:1
Enhancement of wetland structure	3:1 to 5:1
Preservation in combination with re-establishment, creation, rehabilitation, or enhancement of wetlands	5:1 to 10:1
Preservation alone	Case-by-case
Uplands	
Upland enhancement	3:1 to 10:1
Upland preservation	8:1 to 15:1

Source: WAC 173-700-313 and 173-700-318

Washington State

TABLE 1 - RECOMMENDED COMPENSATORY MITIGATION RATIOS FOR DIRECT PERMANENT IMPACTS

Mitigation / Impacts	Restoration[1] (re-establishment)	Creation (establishment)	Enhancement (rehabilitation)	Preservation (protection/ management)
Emergent Wetlands (ac)	2:1	2:1 to 3:1	3:1 to 10:1[2]	15:1
Scrub-shrub Wetlands (ac)	2:1	2:1 to 3:1	3:1 to 10:1[2]	15:1
Forested Wetlands (ac)	2:1 to 3:1	3:1 to 4:1	5:1 to 10:1[2]	15:1
Open Water (ac)	1:1	1:1	project specific[3]	project specific
Submerged Aquatic Vegetation (ac)	5:1	project specific[4]	project specific[5]	N/A
Streams[6] (lf)	2:1[7]	N/A	3:1 to 5:1[8]	10:1 to 15:1[9]
Mudflat (ac)	2:1 to 3:1	2:1 to 3:1	project specific	project specific
Upland[10] (ac)	≥10:1[11]	N/A	project specific	15:1[12]

New England District

Florida Example: Functional Measures

View Bank Information

https://ribits.usace.army.mil/ribits_apex/f?p=107:10:16335115197676::NO::P10_BANK_ID:2594

RIBITS
Regulatory In-lieu Fee and Bank Information Tracking System

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Florida

Optional Login

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General Information

Boarshead Ranch

Chair(s):	USACE
USACE District:	Jacksonville
FWS Field Office:	Jacksonville
NOAA Fisheries Region:	Southeast
State:	Florida
Permit No:	SAJ-2011-01414
Year Established:	2016
Total Acres:	1,547.00
Status:	Approved
Approved Date:	18-MAR-16
Type:	Private Commercial
Website:	
Comments:	Functional assessment used is UMAM.

Contact Information

Credit Ledger Summary

Last Transaction: Jun 15, 2016

The credit totals shown on the ledger do NOT reflect any credit reservations or pending transactions. It is the responsibility of potential purchasers to contact the Sponsor and obtain written confirmation of credit availability.

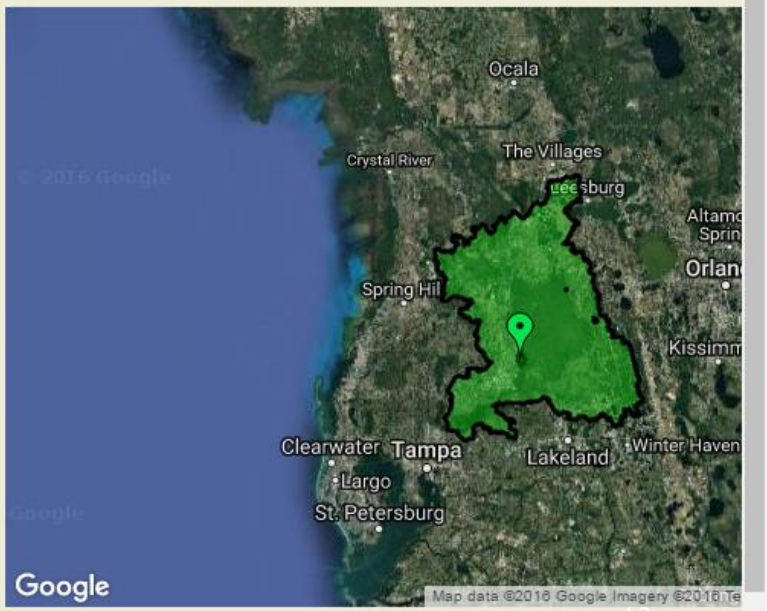
Name	Available Credits	Withdrawn Credits	Released Credits	Potential Credits
Wetland				
Palustrine Forested	9.2	0	9.2	53.07
Palustrine Emergent	.12	.3	.42	118.57

Google Map

Show ☑ Footprint ☑ Service Area

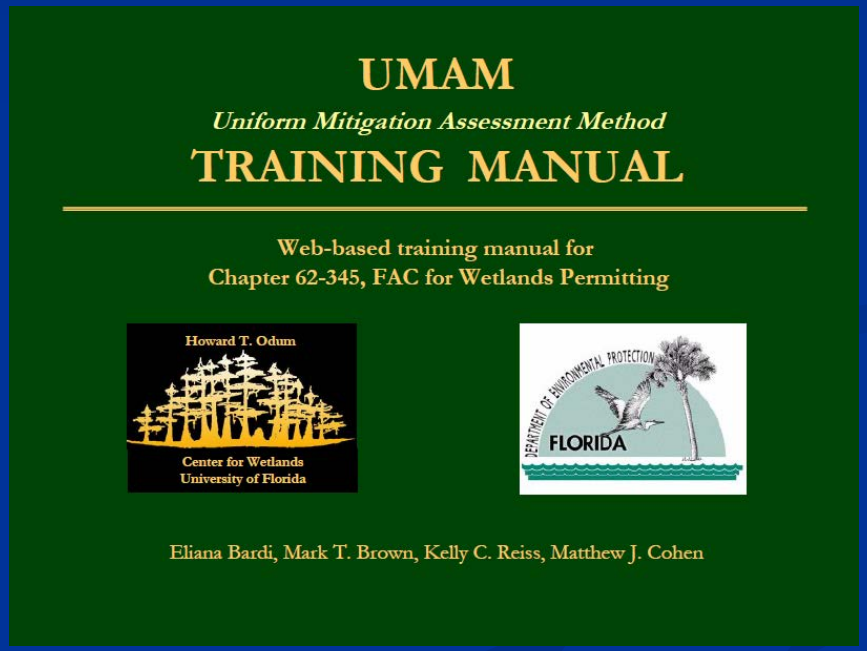
Rank ☑ Primary

☐ Roads ☑ Borders ☐ Counties ☐ USACE Districts ☐ FWS Field Offices ☐ NOA



Florida: Boarshead Ranch Mitigation Bank

- Used Florida Uniform Mitigation Assessment Method (UMAM) to determine credits at bank
  - Designed to assess any type of wetland impact and mitigation
  - Provides standard procedures across State of Florida



UMAM: http://sfrc.ufl.edu/ecohydrology/UMAM_Training_Manual_ppt.pdf

Applying UMAM

- Divide site into Assessment Areas (AA)
- Evaluate each AA based on 3 functional measures from 0 to 10 (10=minimally impacted)
  - Location/landscape support
  - Water environment
  - Community structure
- Evaluate both "current condition" and "with-mitigation"
- Delta = with-mitigation – current condition
- Adjusted Delta = Delta(Time Lag x Risk)
- Credits = Adjusted Delta x Area

AA 2-002
Wetland Restoration

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Boarshead Ranch Mitigation Bank		2-002
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation - Herbaceous Wetland Restoration	Evans, Reilly, Neidner, Hull	8\13\13

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		w/o pres or current	with
.500(6)(a) Location and Landscape Support	See attached narrative for information supporting "current condition" and "with mitigation" scores.	0	9
.500(6)(b)Water Environment (n/a for uplands)	See attached narrative for information supporting "current condition" and "with mitigation" scores.	0	9
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	See attached narrative for information supporting "current condition" and "with mitigation" scores.	0	9

Score = sum of above scores/30 (for uplands, divide by 20)	current or w/o pres	with
	0	0.9

Delta = [with-current]
0.9

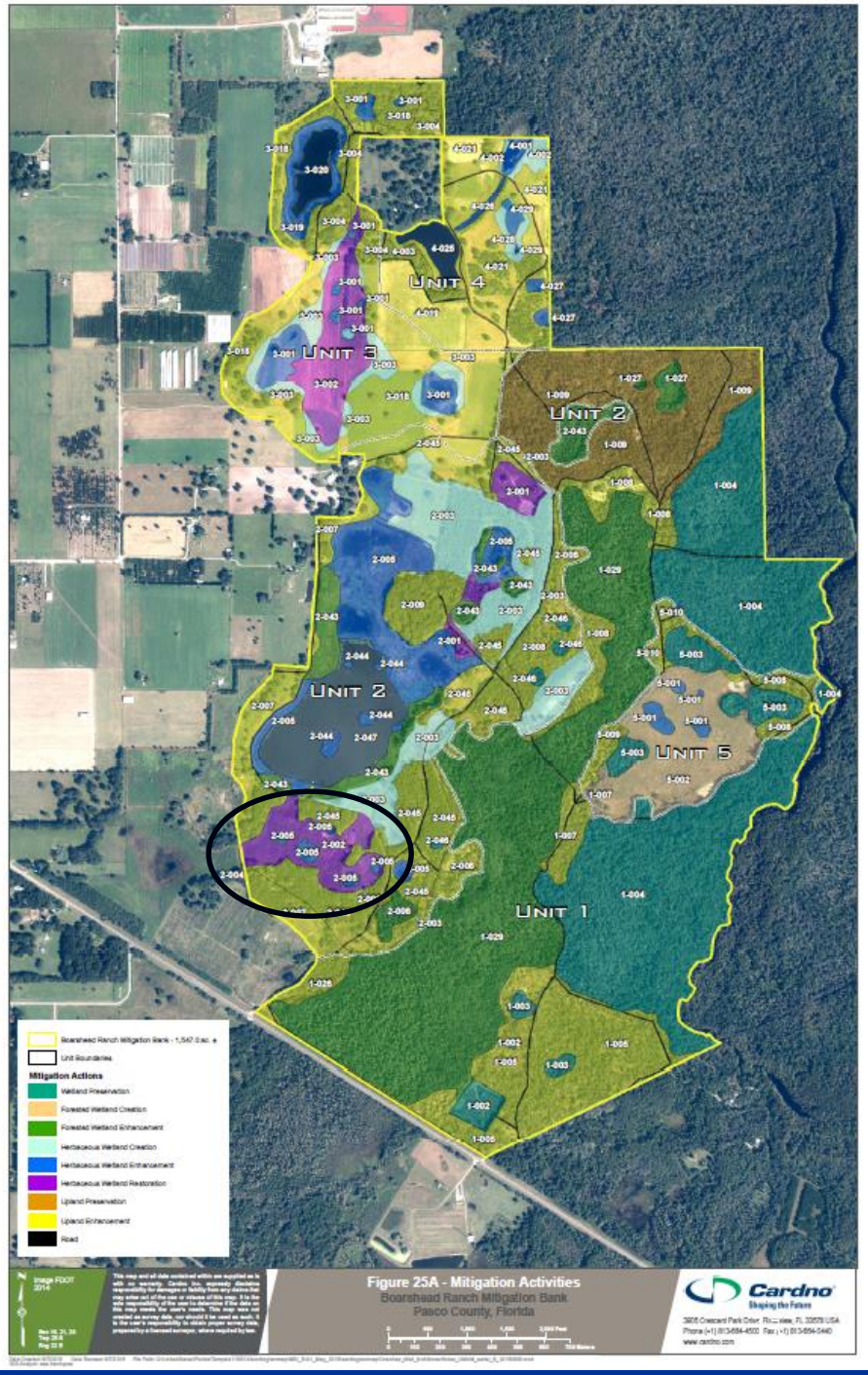
If preservation as mitigation,
Preservation adjustment factor = NA
Adjusted mitigation delta = NA

If mitigation
Time lag (t-factor) = 1.0696
Risk factor = 1.25

For impact assessment areas
FL = delta x acres =

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.673148

Form 62-345.900(2), F.A.C. [effective date 2/2/04]



Florida: Boarshead Ranch Mitigation Bank

UMAM Summary Table (Revised 12/20/15)

AA ID	Acres	Mitigation Activity	CC loc	With loc	CC water	With water	CC comm	With comm	CC sum	With sum	Time Lag	Risk	Delta	RFG	FG
1-002	6.36	Herbaceous Wetland Preservation	7	9	7	7	7	7	0.70	0.77	1.017	1	0.07	0.065552278	0.42
1-003	3.56	Forested Wetland Preservation	8	9	8	8	8	8	0.80	0.83	1.017	1	0.03	0.032776139	0.12
1-004	223.95	Forested Wetland Preservation	8	9	9	9	9	9	0.87	0.90	1.017	1	0.03	0.032776139	7.34
1-004a	9.26	Forested Wetland Preservation (buffer)	8	8	9	9	9	9	0.87	0.87	0.000	0.00	0.00	0.000000	0.00
1-027	4.97	Forested Wetland Enhancement	8	9	6	6	7	9	0.70	0.80	1.478	1.25	0.10	0.054127199	0.27
1-029	219.3	Forested Wetland Enhancement	8	9	8	9	8	9	0.80	0.90	1.070	1.25	0.10	0.074794316	16.40
1-029a	15.04	Forested Wetland Enhancement (buffer)	8	8	8	9	8	9	0.80	0.87	1.070	1.25	0.07	0.049862877	0.75
2-001	11	Herbaceous Wetland Restoration	0	9	0	9	0	9	0.00	0.90	1.070	1.25	0.90	0.673148841	7.40
2-002	22.4	Herbaceous Wetland Restoration	0	9	0	9	0	9	0.00	0.90	1.070	1.25	0.90	0.673148841	15.08
2-003	72.92	Herbaceous Wetland Creation	0	9	0	9	0	9	0.00	0.90	1.070	1.5	0.90	0.560957367	40.91
2-005	66.81	Herbaceous Wetland Enhancement	6	9	7	9	6	9	0.63	0.90	1.070	1.25	0.27	0.199451508	13.33
2-006	4.11	Forested Wetland Enhancement	8	9	8	9	8	9	0.80	0.90	1.070	1.25	0.10	0.074794316	0.31
2-043	26.68	Forested Wetland Enhancement	6	9	7	9	6	9	0.63	0.90	1.478	1.25	0.27	0.144339197	3.85
2-043a	7.26	Forested Wetland Enhancement (buffer)	6	8	7	9	6	9	0.63	0.87	1.478	1.25	0.23	0.126296797	0.92
2-044	2.25	Herbaceous Wetland Enhancement	6	9	7	8	5	5	0.60	0.73	1.070	1.25	0.13	0.099725754	0.22
2-046	2.64	Forested Wetland Preservation	7	9	7	7	8	8	0.73	0.80	1.017	1	0.07	0.065552278	0.17
2-047	44.85	Open Water (no credit)	0	0	0	0	0	0	0.00	0.00	0.000	0.00	0.00	0.000000	0.00
3-001	15.42	Herbaceous Wetland Enhancement	6	9	7	9	6	9	0.63	0.90	1.070	1.25	0.27	0.199451508	3.08
3-002	31.08	Herbaceous Wetland Restoration	0	9	0	9	0	9	0.00	0.90	1.070	1.25	0.90	0.673148841	20.92
3-003	18.06	Herbaceous Wetland Creation	0	9	0	9	0	9	0.00	0.90	1.070	1.5	0.90	0.560957367	10.13
3-019	9.83	Herbaceous Wetland Enhancement	6	8	9	9	6	8	0.70	0.83	1.070	1.25	0.13	0.099725754	0.98
3-020	9.09	Open Water (no credit)	0	0	0	0	0	0	0.00	0.00	0.000	0.00	0.00	0.000000	0.00
4-001	2.44	Herbaceous Wetland Enhancement	7	9	6	9	3	9	0.53	0.90	1.070	1.25	0.37	0.274245824	0.67
4-002	3.47	Herbaceous Wetland Creation	0	9	0	9	0	9	0.00	0.90	1.070	1.5	0.90	0.560957367	1.95
4-025	7.08	Open Water (no credit)	0	0	0	0	0	0	0.00	0.00	0.000	0.00	0.00	0.000000	0.00
4-026	1.18	Herbaceous Wetland Enhancement	7	9	5	5	6	8	0.60	0.73	1.070	1.25	0.13	0.099725754	0.12
4-027	1.75	Herbaceous Wetland Enhancement	7	9	6	6	6	9	0.63	0.80	1.070	1.25	0.17	0.124657193	0.22
4-028	3.03	Herbaceous Wetland Creation	0	9	0	9	0	9	0.00	0.90	1.070	1.5	0.90	0.560957367	1.70
4-029	1.63	Herbaceous Wetland Enhancement	7	9	3	9	1	9	0.37	0.90	1.070	1.25	0.53	0.398903017	0.65
5-001	4.05	Herbaceous Wetland Enhancement	6	9	8	9	5	9	0.63	0.90	1.070	1.25	0.27	0.199451508	0.81
5-002	55.04	Forested Wetland Creation	0	9	0	9	0	9	0.00	0.90	1.478	1.5	0.90	0.405953992	22.34
5-003	18.29	Forested Wetland Preservation	8	9	9	9	9	9	0.87	0.90	1.017	1	0.03	0.032776139	0.60
	924.8														***171.64***

Conclusions

- Important to have clear and effective national standards for all aspects of mitigation projects, including credit determination
  - Standards must balance need for national consistency with need for regional flexibility
  - Not a single approach to credit determination that will work nationwide
  - Credit determination approaches are not static, regularly updated/revised
- Successful in creating large wetland banking program, most banks sponsored by private sector
  - Over 2,600 credit transactions at mitigation banks in 2015
  - $1.3 – $2.2 billion spent annually by permittees on wetland/stream compensation credits, including bank credits
- Next steps – updating inventory of credit/debit determination methodologies nationwide

For more information about wetlands mitigation in the United States:

https://www.epa.gov/cwa-404/mitigation

ribits.usace.army.mil