Development of Technical Guidance on Wetland Site Names and Stable Unique Identifier Codes for Mapping and Monitoring Wetlands

State/Tribal/Federal Wetland Coordination Meeting

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Types of Existing Wetland Names

- Historic
  - Mapper/Surveyor (e.g., Everglades, Great Dismal Swamp)
  - Associated People and Stories (e.g., Tate's Hell, Purgatory Swamp)
  - Native (e.g., Okefenokee from Okefenoka, meaning "Land of the Trembling Earth", Congaree, Cheyenne Bottoms & Quivira)
  - Landowner Names (e.g., Gowing's Swamp) – they change over time.
- Natural Features
  - Hydrologic Features (e.g., Great Kankakee Swamp for the Kankakee River, Beaver Creek Marsh)
  - Landscape features (e.g., Cheyenne Bottoms, Prairie Potholes)
  - Biologic features (e.g., Cranberry Glades)
- Landmarks
  - Geo-Political (e.g., Boundary Waters Canoe Area, Arcata Marsh for the City Arcata, CA)

Problem to be Addressed

Currently there are no nationally-accepted standards, conventions, protocols, or tools for creating wetland site names and other stable (not likely to change within a defined set) unique identifiers to allow individual wetland sites and corresponding geographic features (e.g., points, polygons) to be effectively tracked, monitored and reported on over time, and to enhance system interoperability between federal agencies, states, tribes, and contracted partners, to facilitate data sharing at a national scale.

Outcomes

- The development of nationally-applicable technical guidance on stable unique identifiers for wetlands may enhance capabilities for associating wetland mapping data with other data sets (such as water quality and monitoring data) expanding the possibilities for analysis.
- Increased availability of such wetland information could better aid in identifying solutions for management, conservation and protection issues for wetlands and other water resources.

Options

Unique (Non-Repeated) Site Names

- Feature Extent? (resolution, lumping vs. splitting)
  - Minimum size ?(Wetland Mapping Standard uses 0.5 acre)
  - Whole or Continuous wetland
  - NWI polygons
  - Monitoring Sites
  - Monitoring Points
  - Other?

- Site Name Type?
  - Common (e.g., Historic, Tract, Owner, Geographic Features)--prevention of redundancy?
  - Scientific/Taxonomic--avoid including information that may change over time like community type? (e.g. “Latin Names”)
  - Systematic

Unique Identifiers

- Identifiers in this sense does NOT refer to the 3 parameters for wetland identification. It means names and codes for use in a database.
- Unique in this sense does NOT refer to “Special” Wetlands. Unique Identifiers means they are names and codes that are Non-Repeated, Not Redundant within the database.

Project Examples

Denise Clearwater

Robb Macleod

Modified NWI Attribute Table

(via Denise Clearwater)

Attributes of wetlands_Mattawoman

FID	Shape *	WMC_ID	CLASS	Shape_Leng	Shape_Area	Org_year	Field_V_1	Field_V_2	UpdateYear	UPD_YR_2
0	Polygon		PFO1A	25526.637346	1394549.77659					
1	Polygon		U	1791.94142	36207.46032					
2	Polygon		U	344.012852	7126.136493					
3	Polygon		PFO1C	3562.494923	186309.230596					
4	Polygon		U	65067.775272	22833698.7734					
5	Polygon		PFO1E	3873.251527	137986.465159					
6	Polygon		U	1408.339495	18096.079931					
7	Polygon		PFO1A	6034.68456	349663.348982					
8	Polygon		PSS/FO1C	276.083001	4441.843063					
9	Polygon		PFO1C	2386.487743	96826.300428					
10	Polygon		PSS/FO1C	180.600691	1865.016883					
11	Polygon		PFO1A	371.288308	5931.812241					
12	Polygon		PFO1A	207.877145	2147.113718					
13	Polygon		U	254.938779	3642.073456					
14	Polygon		PFO1C	366.882669	6452.13346					
15	Polygon		PEM1/SS1Fh	713.591403	26040.855414					
16	Polygon		PSS1A	748.38179	25601.215236					
17	Polygon		PFO1Fh	1249.413661	59999.034321					
18	Polygon		PFO1E	4969.985558	172145.313539					
19	Polygon		PFO1C	8421.152862	311432.582196					
20	Polygon		PFO1Ch	1489.771449	57065.091589					
21	Polygon		U	449.292999	4779.513385					
22	Polygon		PEM1A	1467.317225	30097.517151					
23	Polygon		PFO1/EM1E	373.760832	4868.598643					
24	Polygon		PFO1F	741.427812	14209.663438					

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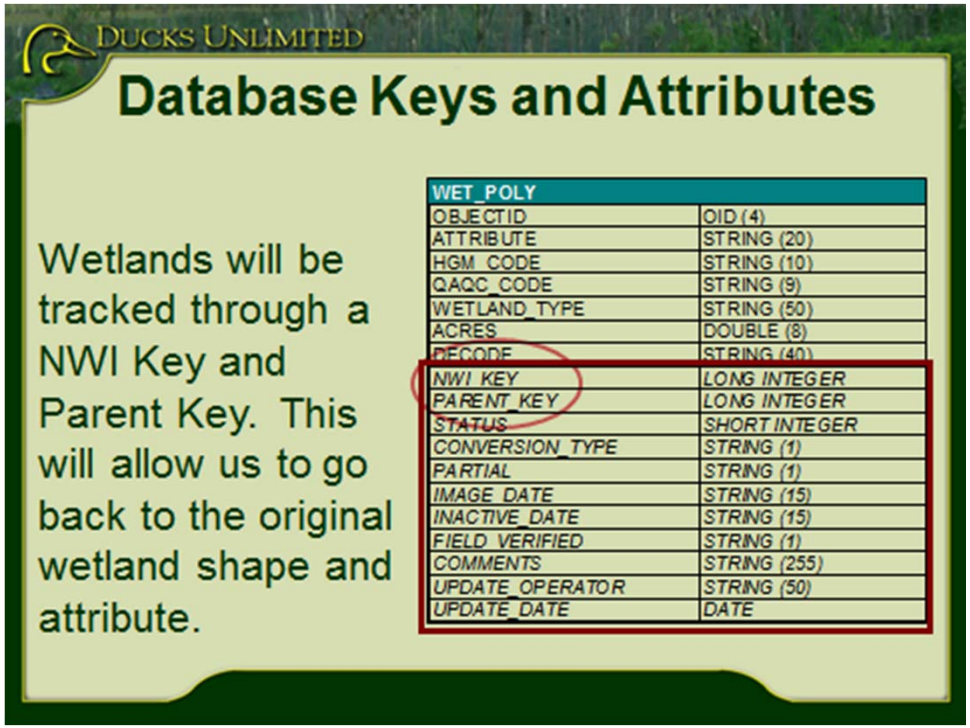
Updating and Tracking Wetlands

Example of Unique Identifier use in a Wetlands Mapping Database

Robb Macleod
Ducks Unlimited

DU added 11 attributes to the official NWI attributes.

- The NWI Key is a unique number for each wetland.
- The Parent Key keeps track of wetlands that changes over time.
- The Status attribute allow us to query active wetlands from inactive (converted) wetlands.
- Conversion type allow us to identify how it was converted (urban, Ag, etc.). Partial identifies wetlands that were only partially converted (part of the wetlands is still active).



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Database Keys and Attributes

Status will allow us to determine if the wetland is “active” (currently exists) or “inactive” (been converted).

WET_POLY	
OBJECTID	OID (4)
ATTRIBUTE	STRING (20)
HGM_CODE	STRING (10)
QAQC_CODE	STRING (9)
WETLAND_TYPE	STRING (50)
ACRES	DOUBLE (8)
DECODE	STRING (40)
NWI_KEY	*LONG INTEGER*
PARENT_KEY	*LONG INTEGER*
STATUS	*SHORT INTEGER*
CONVERSION_TYPE	*STRING (1)*
PARTIAL	*STRING (1)*
IMAGE_DATE	*STRING (15)*
INACTIVE_DATE	*STRING (15)*
FIELD_VERIFIED	*STRING (1)*
COMMENTS	*STRING (255)*
UPDATE_OPERATOR	*STRING (50)*
UPDATE_DATE	*DATE*

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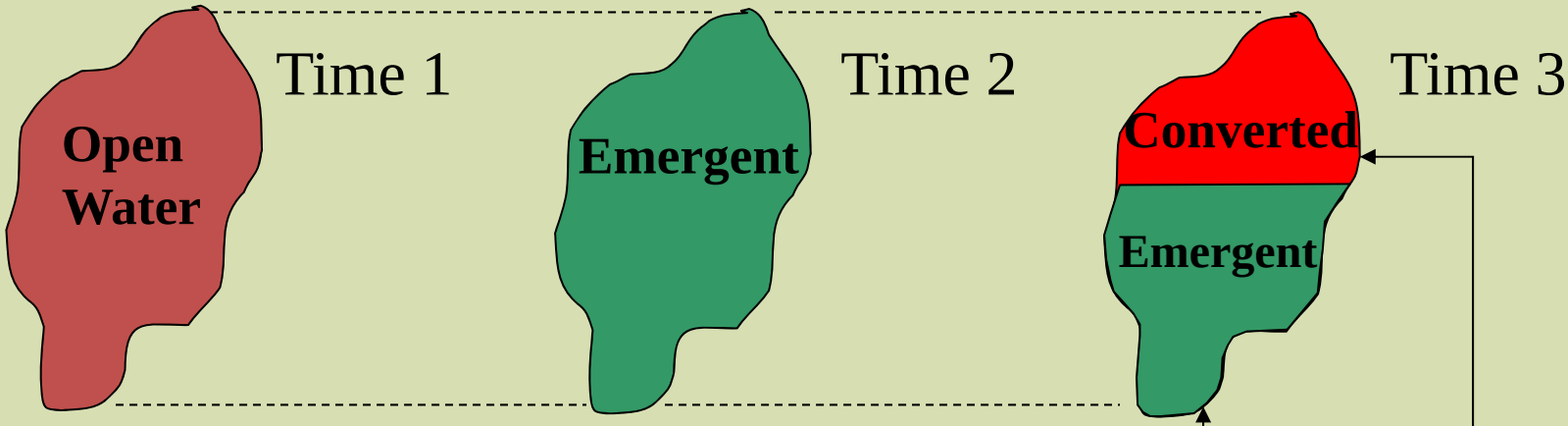
NWI Key/Parent Key Example



WET_POLY	
OBJECTID	
NWI Key = 101	
DRAINAGE_TYPE	
PARTIAL	
IMAGE_DATE	1978
FIELD_VERIFIED	
COMMENTS	
UPDATE_OPERATOR	
UPDATE_DATE	

WET_POLY	
OBJECTID	
NWI Key = 102 Parent Key = 101	
IMAGE_DATE	1998
FIELD_VERIFIED	
COMMENTS	
UPDATE_OPERATOR	RDM
UPDATE_DATE	2005

WET_POLY	
OBJECTID	
NWI Key = 103 Parent Key = 102	
IMAGE_DATE	2005
FIELD_VERIFIED	N
COMMENTS	
UPDATE_OPERATOR	RDM
UPDATE_DATE	2007

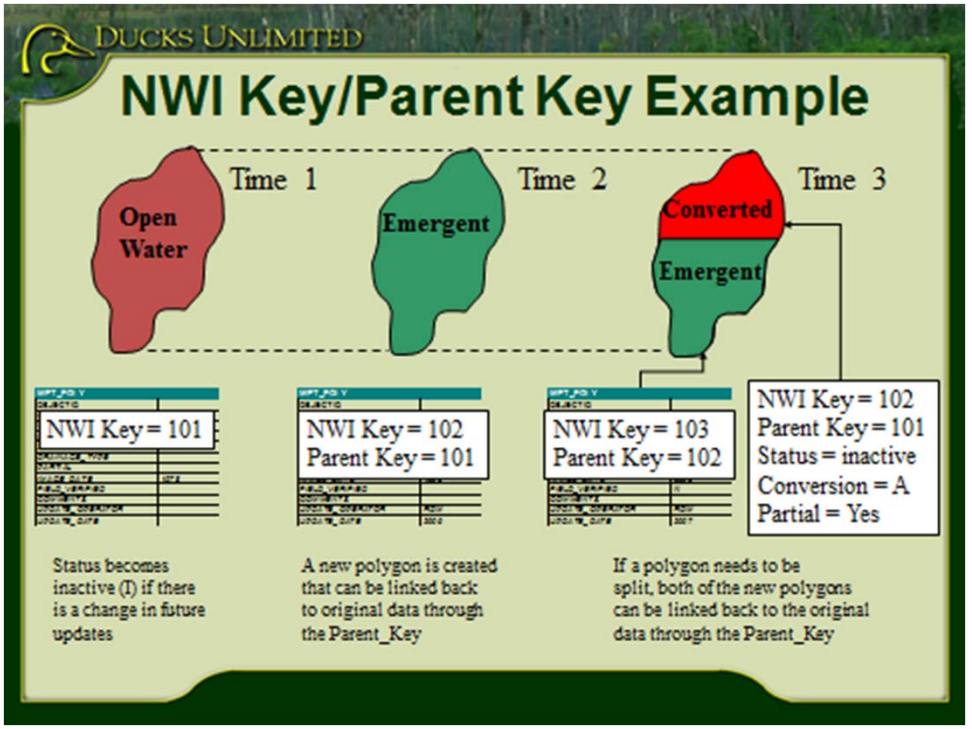
NWI Key = 102
Parent Key = 101
Status = inactive
Conversion = A
Partial = Yes

Status becomes inactive (I) if there is a change in future updates

A new polygon is created that can be linked back to original data through the Parent_Key

If a polygon needs to be split, both of the new polygons can be linked back to the original data through the Parent_Key

Time 1 is the original wetland with a unique ID (NWI Key = 101). In Time 2, the wetland changed from open water to emergent, so the wetland polygon is copied and pasted (now have two overlapping polygons). The original wetland (polygon) is inactivated and the new wetland polygon has a new NWI Key (unique ID) and Parent Key that equals the NWI key of the original. This allows us to summarize the changes in class and links the original with the changed wetland.



In the case where part of the original wetland is converted, the original wetland is copied and pasted, the new polygon is reshaped. The original polygon in inactivated with a conversion type (A – Agriculture) and the partial attribute is Yes. The new polygon has a new NWI Key and Parent Key that equals the NWI Key of the original.

Discussion:
Project Examples?
Case Studies?

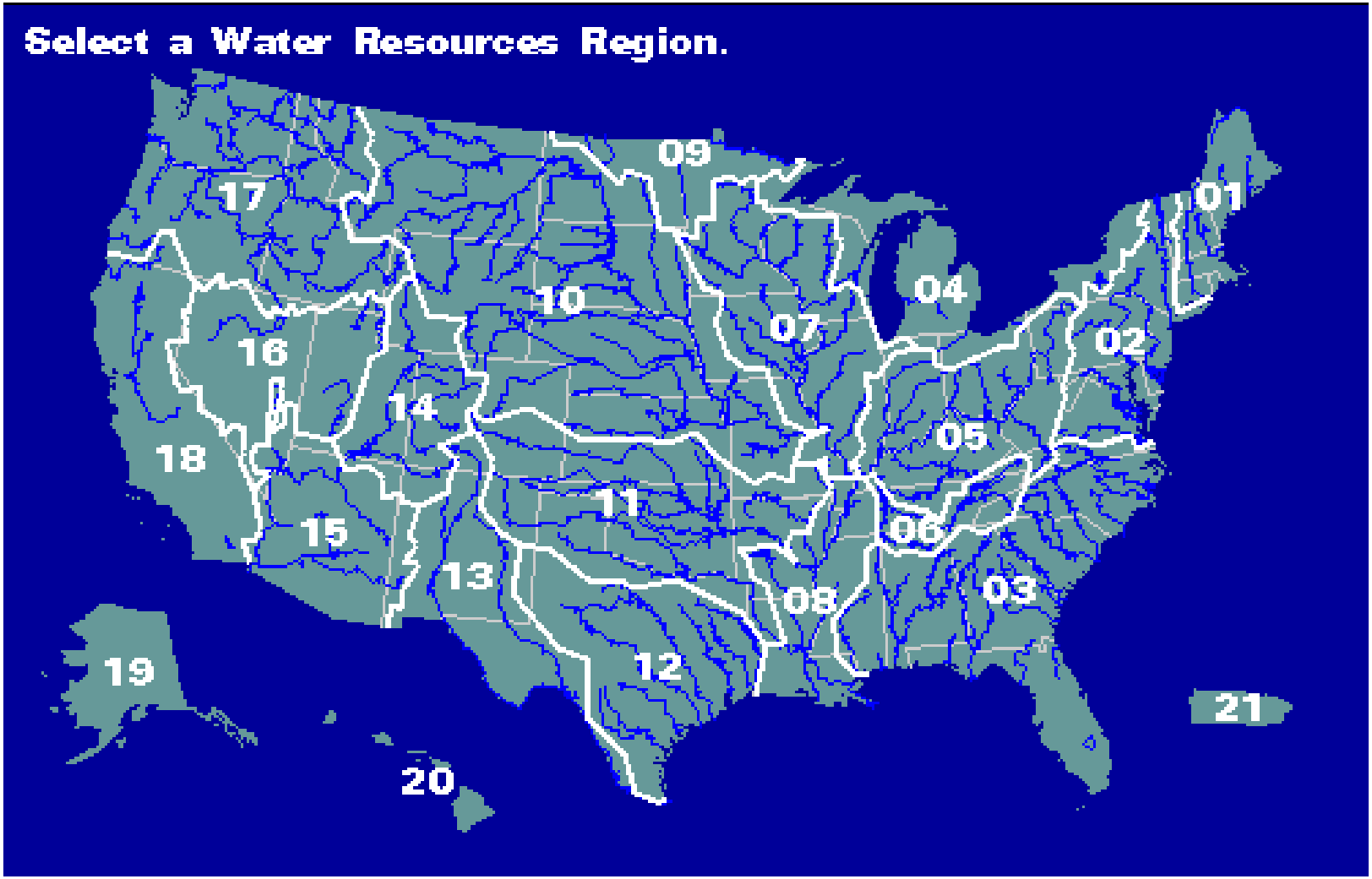
Options - Codes

TYPE?

- **Stable Sequential** [10000001, 10000002…] (currently polygon identifiers are Dynamic —not stable, they are regenerated and change with data versions)
  - Management to prevent duplication?
  - Fixed Length? Or Variable Length as more polygons are added/updated?
- **Hierarchical (Levels? Key to generate code?)**
  - Fixed Length? Or Variable Length to reflect changes over time (parent-child relation of polygons)?
- **Information-rich** Political Boundaries (State, County, Local)
  - Hydrologic Unit Codes (HUC) -length/digits?
  - NHD/Streams
  - Grid
  - Geographic Coordinates (Of what point? Centroid? Consider variation in polygon extent and shape?)
  - Other

Hydrologic Unit Codes (HUC)

8-digit, 10-digit, and 12-digit Codes



Types of Stable Unique Codes

- **Information-based** – watershed/HUC, NHD/streams, geographic coordinates, grid, temporal stamp, etc.)
- **Hierarchical** -- Systematic
- **Assigned** – Sequential, Random, Systematic.
- **Combination – Maintain in separate fields and merge to create the Unique Identifier code at different scales**
  - Area Code (e.g., 11 or 12 digit HUC)
  - Local Code (e.g., NHD/streams, grid, geographic coordinates, etc.)
  - Site Code (assigned sequential or systematic)
  - Time Stamp (e.g., for product versions and updates, parent/child polygon relations and tracking)

Implementation
for Stable Wetland Unique Identifiers

HOW?

- Database Modification (e.g. add fields, relational tables, etc.)
  - NSDI, State, Project, other?
  - Why not just put it in the existing NWI database? – Too Much Information!

- New Database –who will manage, maintain and update?
  - NSDI, NWI, State, or by Project?

- Generation of code on the fly (by applications or tools)
  - Who will develop, manage and maintain?

- Other?

Key Issues

- Codes need to reflect wetland dynamism: expansion/contraction, disappearance/reappearance, and fragmentation over time.

- Rules must be developed to deal with wetlands which cross HUC boundaries, or cover more than one HUC.

- Codes must function within a relational database context to support robust analysis. The national level is the missing puzzle piece to putting state and regional databases together for analysis.

- Will there be a target minimum or maximum wetland size for coding? The wetland Mapping Standard specifies a target mapping unit of 0.5 acres. Some smaller wetlands have significant biological functions which there may be need to monitor.

- Length of code may become unwieldy.
  - Alpha- numeric code packs more info in field space.
  - Multiple fields may be required to store components of code and to aid in analysis.

Recommendations:

- Use of only these codes and names would not be mandated, states and others would still be free to use their own systems. The intent is to build methods that will solve fundamental problems and be so useful that everybody will want to use it as a complement to their data set.
- The names and codes should remain separate from any wetland/upland determination (even currently drained wetlands or planned/future wetlands could be issued national wetland names and identifier codes.
- Utilize multiple approaches and relational tables for robust usage possibilities. Code(s) should be informationally robust enough to allow for multiple levels of aggregation and splitting.
- Develop a new NSDI standard and National Coverage for Wetland Names and Stable Unique Identifier Codes (work towards grants and funding to develop)
- Stable Unique Identifier Code assignment by online web-based tool and database lookup.
- Develop a regional pilot project.

Next Steps

2012

- Wetland Names Working Group (WNWG) conference calls and document reviews (ongoing)
- National Water Quality Monitoring Council Meeting, April 30 – May 4, Portland, Oregon
- INTECOL/SWS combined Meeting, June 3-8, Orlando, FL
- Draft Review, July 2012
- Technical Report distribution, September 2012

Wetland Names Working Group (WNWG)

- WNWG Conference Calls
  - Alternate weeks (scheduled around WMC webinar)
  - Wednesdays at 3pm Eastern Time

- WMC Scholar Group set-up in progress

Join WNWG

If you are interested in joining the Wetland Names Working Group (WNWG) or being notified of our future activities, please send an email to wetlandmappingconsortium@gmail.com with the subject line "Join WNWG".

If you are not already a member of the Wetland Mapping Consortium (WMC) please register first (for registration information see http://clic.cses.vt.edu/WMC/WMC_Organizers.htm).

NSDI CAP 2011 Project Description

Technical Guidance on Unique Identifiers for Wetland Mapping Standard Implementation, Outreach and Training Materials http://www.fgdc.gov/grants/2011CAP/projects/G11AC20060

Partner Organizations

- FGDC Wetlands Subcommittee including:
  - U.S. Fish and Wildlife Service
  - U.S. Environmental Protection Agency
  - U.S. Army Corps of Engineers
  - U.S. Geological Survey
- National Wetlands Monitoring and Assessment Working Group (NWMAWG)
- Association of State Wetland Managers (ASWM)
- Wetlands Mapping Consortium (WMC)
- Ducks Unlimited (DU)
- Kentucky Division of Water

CMI - **Wetland Site Names and Stable Unique Identifier Codes**

For more information please contact:

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